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TO THE LATEST EDITION OF THE

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A STANDARD WORK OF REFERENCE IN

ART, LITERATURE, SCIENCE, HISTORY, GEOGRAPHY,
COMMERCE, BIOGRAPHY, DISCOVERY
AND INVENTION

EDITED UNDER THE PERSONAL SUPERVISION OF

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ASSISTED BY A CORPUS OF EXPERIENCED WRITERS

ENRICHED BY MANY HUNDRED SPECIAL ARTICLES CONTRIBUTED BY MEN AND
WOMEN OF INTERNATIONAL REPUTATION

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ILLUSTRATIONS

IN THIS VOLUME.



	PAGE
Band-Cutter and Self-Feeder—Sectional View . . .	280
Battle Monument, Trenton, N. J.	315
Blower Straw-Stacker, Nethery.	281
Capitol Building, Washington, D. C.	493
Distributing-Machine, McMillan	345
Pulaski Monument, Savannah, Ga.	7
Segmentation of the Vertebrate Head and Brain, figures 1-6	47-49
Sense-Organs, figures 1-20	55-61
Smithsonian Institution, Washington, D. C.	110
Sporangium.	142
Sporogonium.	142
Strength of Materials, figures 1-15.	172-184
Suspensor	207
Tammany Hall, New York City.	222
Technical Schools, Illustrated Diagram.	236
Tennyson's Later Home, Aldworth.	252
Tetraspores.	256
Thresher, Sectional View of the Agitator.	280
Threshing-Machine, Modern.	279
Time, Musical, Illustrations of	289
Tone, Musical, Illustrations of.	300
Type-Setting Machine, McMillan.	345
Type-Setting Machine, Thorne.	344
Typewriting-Machine, Caligraph	347
Typewriting-Machine, Hammond.	348
Typewriting-Machine, Oliver.	348
Typewriting-Machine, Remington No. 6.	346
Typewriting-Machine, Remington-Sholes.	347
Typewriting-Machine, Smith Premier.	348
Typewriting-Machine, Thurber.	346
Typewriting-Machine, Yost	347
United States Land Surveys, Diagrams of.	366-7
Voltmeter, Diagrams of, figures 1-4.	459
Weather Signals.	88
Whaleback Steamer (Christopher Columbus).	532
White House, Washington, D. C.	493
Yorktown Monument, Yorktown, Va.	621

STATE AND TERRITORIAL SEALS

South Carolina.	112
South Dakota.	126
Tennessee	248
Texas.	257
Utah	409
Vermont	431
Virginia.	448
Washington.	490
West Virginia.	528
Wisconsin	574
Wyoming	609

STATE CAPITOL BUILDINGS

	PAGE
Charleston, West Virginia.	529
Cheyenne, Wyoming.	610
Columbia, South Carolina.	123
Madison, Wisconsin.	575
Montpelier, Vermont.	432
Nashville, Tennessee.	249
Pierre, South Dakota.	127
Richmond, Virginia	450

COLLEGE AND UNIVERSITY BUILDINGS

Syracuse University, Syracuse, N. Y.	215
Trinity College, Hartford, Conn.	318
Trinity University, Toronto, Can.	318
Tulane University, New Orleans, La.	331
Union Theological Seminary, New York City.	354
University of Chicago, Chicago, Ill.	402
University of Iowa, Iowa City, Ia.	403
University of Vermont, Burlington, Vt.	433
University of Virginia, Charlottesville, Va.	451
University of Washington, Seattle, Wash.	494
University of Wisconsin, Madison, Wis.	576
Vanderbilt University, Nashville, Tenn.	419
Vassar College, Poughkeepsie, N. Y.	423
Washington and Lee University, Lexington, Va.	496
Wellesley College, Wellesley, Mass.	519
Wesleyan University, Middletown, Conn.	522
Williams College, Williamstown, Mass.	558
Yale University, New Haven, Conn.	615

PORTRAITS

Satolli, Francis, Cardinal.	5
Say, Jean Baptiste Léon.	14
Schenck, Robert C.	17
Schley, Admiral Winfield S.	18
Schofield, General John M.	20
Schurz, Carl.	35
Scudder, Horace E.	40
Sedgwick, General John.	44
Seidl, Anton H.	50
Selous, Frederick Courtenay.	52
Semmes, Raphael.	53
Sewall, Arthur	66
Sewall, May Wright.	66
Sewell, William J.	67
Shafter, General William Rufus.	68
Shaw, Henry Wheeler ("Josh Billings").	70
Sheridan, General Philip H.	75

	PAGE		PAGE
Sherman, John.....	76	Thurston, Robert Henry.....	283
Sherman, General William Tecumseh.....	77	Tichborne Claimant, The.....	283
Shiras, George.....	82	Tiffany, Charles L.....	286
Sickles, General Daniel E.....	85	Tolstoy, Count Leo.....	297
Siemens, Ernst Werner, Baron.....	86	Toombs, Robert.....	302
Sigsbee, Charles D.....	89	Tourgee, Albion Winegar.....	305
Simon, Jules.....	95	Tracy, Benjamin Franklin.....	308
Simpson, Matthew.....	95	Trevelyan, Sir George O.....	316
Sims, James Marion.....	96	Trowbridge, John Townsend.....	323
Slidell, John.....	101	Trumbull, Henry Clay.....	326
Sloane, William M.....	101	Trumbull, Lyman.....	326
Smalley, George W.....	103	Tupper, Sir Charles.....	333
Smiles, Samuel.....	104	Turpie, David.....	339
Smith, Charles E.....	105	Tyndall, John.....	342
Smith, F. Hopkinson.....	105	Vassar, Matthew.....	423
Smith, Goldwin.....	106	Vaughan, Herbert, Cardinal.....	424
Smith, Hoke.....	107	Veragua, Duke of.....	429
Smith, Samuel Francis.....	108	Verdi, Giuseppe.....	430
Smith, William Robertson.....	109	Verne, Jules.....	433
Sothorn, Edward Hugh.....	118	Vest, George Graham.....	435
Sousa, John Philip.....	118	Viaud, Louis M. J. ("Pierre Loti").....	437
Speed, James.....	136	Victoria, Alexandrina, Queen.....	442
Spencer, Herbert.....	136	Vilas, William Freeman.....	444
Spinner, Francis E.....	140	Vincent, John Heyl.....	446
Spofford, Ainsworth R.....	141	Voorhees, Daniel Woolsey.....	460
Spurgeon, Charles H.....	145	Walker, Francis A.....	471
Squire, Watson C.....	146	Walker, John Grimes.....	471
Stanford, Leland.....	148	Wallace, Alfred R.....	472
Stanley, Henry M.....	149	Wallace, General Lewis.....	474
Stanton, Elizabeth Cady.....	150	Wallack, John Lester.....	474
Stedman, Edmund Clarence.....	155	Walter, John.....	476
Stephen, Leslie.....	156	Ward, Elizabeth Stuart (Phelps).....	480
Stepniak, Sergius M. D.....	157	Ward, Mrs. Humphry.....	481
Stevenson, Adlai E.....	160	Warner, Charles Dudley.....	484
Stevenson, Robert Louis B.....	161	Washburne, Elihu B.....	489
Stewart, William M.....	162	Watterson, Henry.....	506
Stockton, Francis R.....	164	Watts, George F.....	506
Stoddard, Richard H.....	164	Wells, David A.....	520
Stone, Lucy.....	165	Weyman, Stanley J.....	531
Storrs, Richard Salter.....	167	Wheeler, General Joseph.....	534
Story, William Wetmore.....	168	Whistler, J. A. McNeil.....	539
Stowe, Harriet Beecher.....	169	White, Andrew D.....	539
Strakosch, Clara Louise (Kellogg).....	170	White, Edward Douglas.....	540
Strauss, Johann.....	170	White, Richard Grant.....	540
Stuart, General James Ewell B.....	186	Whitman, Walt.....	544
Sullivan, Sir Arthur.....	191	Whitney, Eli.....	544
Swinburne, Algernon C.....	210	Whitney, William D.....	545
Swing, David.....	211	Whittier, John G.....	545
Symonds, John Addington.....	214	Wilhelmina, Queen of the Netherlands.....	552
Taft, Lorado.....	218	Wilkins, Mary E.....	553
Taney, Roger B.....	223	Willard, Frances E.....	554
Teller, Henry M.....	246	William II, Emperor of Germany.....	555
Temple, Frederick.....	246	Windom, William.....	566
Tennyson, Lord Alfred.....	251	Winsor, Justin.....	570
Tennyson, Lady.....	252	Winter, William.....	570
Terhune, Mary V. ("Marion Harland").....	253	Wolseley, General Garnet Joseph, Lord.....	579
Terry, General Alfred H.....	254	Woolsey, Theodore Dwight.....	591
Terry, Ellen A.....	255	Worcester, Joseph E.....	592
Tesla, Nikola.....	256	Wright, Carroll D.....	605
Thomas, General George Henry.....	270	Yamagata, Marquis.....	616
Thomas, Theodore.....	272	Yates, Richard.....	617
Thompson, Hugh Miller.....	273	York, Duke of.....	621
Thomson, Elihu.....	275	Young, Charles Augustus.....	622
Thurman, Allen G.....	282	Zola, Émile.....	630

CONTRIBUTIONS FROM SPECIAL WRITERS

IN THIS VOLUME.

SAVINGS BANKS IN THE UNITED STATES.

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S

SARONY—SATOLLI

SARONY, NAPOLEON, an American photographer, was born in Quebec, in 1821; removed to New York and made a fortune in lithographing, but lost it while studying abroad. After the Civil War he opened a photographic studio in New York, where he photographed nearly every American celebrity during the next thirty years, as well as many European notables who visited the United States. He died in New York, Nov. 9, 1896.

SARRACENIA. See **INSECTIVOROUS PLANTS**, Vol. XIII, p. 138.

SARFIELD, PATRICK, EARL OF LUCAN, an Irish Jacobite; born in Ireland about 1645; entered the English Life Guards, serving with the Duke of Monmouth on the continent, and against him at Sedgmoor, July 6, 1685; was a member of the Irish Parliament for County Dublin; offering his services to James II, he was created by the King, Earl of Lucan; was present at the battle of the Boyne, July 1, 1690; defended Limerick and forced William III to raise the siege of that place, August, 1690; commanded the Irish reserves at the battle of Aughrim, July 12, 1691; at the second siege of Limerick he surrendered to General Ginckel, Oct. 3, 1691; by the terms of the treaty the Irish army was permitted to enter the military service of France, and the Roman Catholics were guaranteed civil and religious liberty. This treaty being violated by the Protestant party during the reign of William III, Limerick was called "the city of the violated treaty." Lucan retired to France with a corps of Irish volunteers; took part in the battle of Steenkirke, August, 1692, and was killed at the battle of Landen, July 19, 1693.

SARTAIN, JOHN, an Anglo-American engraver; born in London, Eng., Oct. 24, 1808. He learned engraving in the ordinary manner, and came to America in 1830, settling at Philadelphia. There he introduced mezzotint engraving; also practised oil and miniature painting on ivory and vellum; and practised mingled line, mezzotinto, and stippling in his plates. He owned and edited *The Foreign Semi-monthly Magazine*; founded *Sartain's Union Magazine*; and was the designer of the monument to Washington and Lafayette in Monument Cemetery, Washington, D. C. He had charge of the art department at the Philadelphia Exhibition in 1876. Died at his Philadelphia home, Oct. 25, 1897.

SASKATCHEWAN, a large important river of Canada, which draws its waters from the Rocky Mountains, and is formed by two head-waters called the South Branch, or Bow River, and the North Branch. The South Branch issues from a lake about four miles long, fed by a glacier descending from a magnificent *mer de glace*, and by a group of springs in the vicinity. A few yards

north of this group of springs is another group, from which the North Branch takes its rise in lat. 51° 40' N. and long. 117° 30' W. The height above the sea is 6,347 feet. The South Branch flows southeast to its junction with the Belly River in long. 111° 40' W., then northeast to its junction with the North Branch in long. 105° W. Fed mainly from the same glacier that feeds the South Branch, the North Branch flows north past Mount Murchison, 15,789 feet above sea-level, and one of the highest peaks of the Rocky Mountains north through Kutanie Plain, a fine prairie abounding in game, and then flows in a general eastern direction to its confluence with the South Branch. From long. 105° west the river flows east, and falls into Lake Winnipeg. The length of the main river has been estimated at 200 miles, of the South Branch 900, and of the North Branch 500 to 800. For the province, see **NORTHWEST TERRITORY**, Vol. XXI, p. 573; and **NORTHWEST TERRITORIES**, in these Supplements.

SASSAFRAS, a genus of trees or shrubs of the family *Lauraceæ*, having diœcious flowers, a six-parted membranous perianth, nine stamens, a succulent fruit placed on the thick fleshy apex of the fruit-stalk, and surrounded by the unchanged perianth. The sassafras tree (*Sassafras officinalis*) is found from Canada to Florida, has deciduous leaves, yellow flowers which appear before the leaves, and small dark-blue fruit. The wood is soft, light, coarse in the fiber, dirty white and reddish brown, with a strong but agreeable smell resembling that of fennel, and an aromatic, rather pungent and sweetish taste. An oil which is fragrant and essential is extracted from the root.

SASSAFRAS NUTS. See **NUT**, Vol. XVII, p. 664.

SASSANIAN EMPIRE. See **PERSIA**, Vol. XVIII, pp. 607-616.

SATAN. See **DEVIL**, Vol. VII, pp. 136-138.

SATELLITES. See **ASTRONOMY**, Vol. II, pp. 782, 783, and in these Supplements.

SATIN. See **WEAVING**, Vol. XXIV, p. 464.

SATIN SPAR. See **ALABASTER**, Vol. I, p. 439.

SATIRE MÉNIPPÉE. See **France**, Vol. IX, p. 653.

SATOLLI, FRANCIS, a Roman Catholic prelate and diplomat of the Papal See; born in the city of Perugia, Italy, in 1841. He was educated in the diocesan seminary of his native city, over which presided Joachim Pecci, archbishop of Perugia,



CARDINAL SATOLLI.

afterward Pope Leo XIII. He early distinguished himself as an orator and linguist, and on the accession of Leo XIII was chosen his chief assistant in the work of promoting theological studies. He became successively professor in the Propaganda and Roman Seminary, president of the Academy of Noble Ecclesiastics, and archbishop of Lepanto. In 1889 he was deputed by the Pope to represent him at Baltimore, Maryland, on the occasion of the centenary of the Catholic hierarchy, also at the inauguration of the Catholic university in Washington, District of Columbia. On Jan. 24, 1893, he was appointed apostolic delegate to the Roman Catholic Church in the United States, with power to exercise pontifical jurisdiction, subject only to appeal to the Pope. This has given the church in America an autonomy and uniformity which it did not possess before. He was created a cardinal Jan. 5, 1896, and was succeeded in the office of delegate by Sebastian Martinelli in 1896. He has written a *Course of Philosophy* on the *Summa* of St. Thomas, and essays on various philosophical themes.

SATOW, ERNEST MASON, a British diplomat; born in London, 1842. He was sent as student-interpreter to Japan in 1861; was promoted to be second secretary of legation at Tokio in 1881, and in 1883 was given the cross of St. Michael and St. George. He was transferred to Siam as consul-general at Bangkok in 1884; was made minister resident the following year; was successively at Montevideo and Morocco, where he was minister plenipotentiary and envoy extraordinary. While in Japan he became well acquainted with the language and history of the country, and published numerous important papers on Japanese subjects. He edited an Anglo-Japanese dictionary.

SATRAP. See PERSIA, Vol. XVIII, p. 569.

SATSUMA, a province in the south of Kiushiu island. See JAPAN, Vol. XIII, pp. 585, 590; and POTTERY, Vol. XIX, p. 635.

SATURDAY. See MARY, Vol. XV, p. 592.

SATURN, a planet. See ASTRONOMY, Vol. II, pp. 783, 811-12, and in these Supplements. In March, 1899, a new satellite, the ninth, was discovered by W. H. Pickering, at the Harvard Observatory, Arequipa, Peru; it is $3\frac{1}{2}$ times as far from Saturn as Iapetus, the outermost satellite theretofore known; has a period of about 17 months; and when discovered had a magnitude of $15\frac{1}{2}$.

SATURNALIA, a festival. See SATURN, Vol. XXI, p. 321.

SATYR DRAMA. See DRAMA, Vol. VII, 404-06.

SAUGERTIES, a village of Saugerties township, Ulster Co., N. Y., on the west bank of the Hudson river, opposite Tivoli, with which it is connected by ferry, and on the West Shore railroad, 12 miles N. of Kingston. The river furnishes water-power for large paper-mills and factories of iron, brick, and paper goods. Pop. 1900, 3,697. The township is devoted to agriculture, and has important limestone quarries; pop. 1900, 9,754.

SAUGOR. See SAGAR, in these Supplements.

SAUGUS, a township of Essex Co., Mass., on Lynn Harbor, intersected by the Boston and Maine

railroad, 10 miles N.N.E. of Boston; contains the villages of Saugus, East Saugus, Pleasant Hill, and Cliftondale. The first named is the most important, and has factories of boots, shoes, and flannels. Population of the town, 1900, 5,084.

SAUK CENTER, a city of Stearns County, central Minnesota, on the Sauk River, and on the Great Northern and the Northern Pacific railroads, 40 miles W.N.W. of St. Cloud and about 110 miles N.W. of St. Paul. It is the center of an agricultural region, and has flour-mills, elevators and manufactories of binding-twine. Besides a good system of public schools, it has a private academy and training-school. Population 1890, 1,695; 1900, 2,220.

SAUK RAPIDS, a village and the capital of Benton County, south central Minnesota, on the Mississippi River, on the opposite bank and three miles above St. Cloud, on the Northern Pacific railroad, about 65 miles N.W. of St. Paul. It is situated in a region devoted to farming and dairying, and has extensive granite-quarries near at hand. The excellent water-power has encouraged the building of saw, planing, flour and feed mills. Population 1890, 1,185; 1900, 1,391.

SAULCY, LOUIS FÉLICIEN JOSEPH CAIGNART DE, a French numismatist and orientalist; born in Lille, March 19, 1807; studied at the École Polytechnique; entered the artillery service; appointed professor of mechanics at the military school at Metz in 1838; made keeper of the artillery museum at Paris in 1842. He early gained a reputation as an antiquary, and in 1836 gained the numismatic prize awarded by the French Academy. He became a member of the Academy in 1842, and senator in 1859; traveled in Iceland and Greenland, and subsequently in Syria and Palestine. His works include *Essais de Classification des Suites Monétaires Byzantine*, his prize essay (1836); *Voyage Autour de la Mer Morte* (1852-54); *Études sur la Numismatique Judaïque* (1858); *Histoire de l'Art Judaïque* (1858); *Campagnes de Jules César dans les Gaules* (1862); *Voyage en Terre Sainte* (1865); *Derniers Jours de Jérusalem* (1866); *Histoire d'Herode* (1867); *Étude Chronologique des Livres d'Esdras et de Néhémie* (1868); *Sept Siècles de l'Histoire Judaïque* (1874). He died in Paris, Nov. 4, 1880.

SAULT STE. MARIE, a city and the capital of Chippewa County, in the eastern part of the northern peninsula of Michigan, on the St. Marys River and the St. Marys ship-canal, and on the Minneapolis, St. Paul and Sault Ste. Marie and the Duluth, South Shore and Atlantic railroads, opposite a Canadian village of the same name with which it is connected by an international railroad bridge, thus giving direct communication with the Canadian Pacific railroad, and 150 miles E. of Marquette. The surrounding country is rich in timber, and abounds in minerals. The leading interest is in fishing, and a branch of the state fish-hatchery is located here. It has a shipping-trade in fish, lumber and fur, and has also sawmills, cigar factories, brick-yards, machine-shops, ship-yard and marine railway found-

dry, flour, shingle and planing mills. Population 1900, 10,538. For St. Marys Canal, see CANAL, in these Supplements.

SAULT STE. MARIE, a village and port of entry in Algoma district, northwestern Ontario, Canada, on the St. Marys River and the Canadian St. Marys ship-canal, and on the Canadian Pacific railroad, opposite Sault Ste. Marie. It is in an agricultural and mining district; although many of the inhabitants are engaged in the fur-trade and fisheries. The village is a popular summer-resort, and is the seat of the Anglican bishopric of Algoma and the Roman Catholic bishopric of Northern Canada. Population 1891, 2,414. For an account of the ship-canal, see CANAL, in these Supplements.

SAUMAISE. See SALMASIUS, Vol. XXI, pp. 219, 220.

SAUNDERS, FREDERICK, an English author; born in London, Aug. 14, 1807. He removed to New York, and in 1836 entered the publishing business; was an assistant editor of the *Evening Post*; assistant librarian of the Astor Library in 1859; and chief librarian in 1876. He published *Memories of a Great Metropolis* (1852); *Salad for the Social* (1856); *Festival of Song* (1865); *The Story of Some Famous Books* (1887); and *The Story of the Discovery of America by Columbus* (1892).

SAURURÆ. See BIRDS, Vol. III, p. 699.

SAURY, SAURY-PIKE OR SKIPPER, popular names of fishes belonging to the genus *Scomberesox*. They are representatives of the family of flying-fishes. The name *skipper* refers to their habit of swimming near the surface of the water, and, when pursued, of leaping out of the water and gliding for some distance through the air and along the surface. They are small but edible. Species occur both in European and in American waters.

SAUSALITO, a town of Marin County, western California, on San Francisco Bay and at the southern terminus of the Northern Pacific Coast railroad, six miles N. of San Francisco, with which it is connected by ferry. It is the center of a region having agricultural, dairying and grazing interests, and is frequented as a resort for bathing, fishing and yachting. The town is so situated as to command a splendid view of the entrance to San Francisco Bay. Population 1890, 1,334; 1900, 1,628.

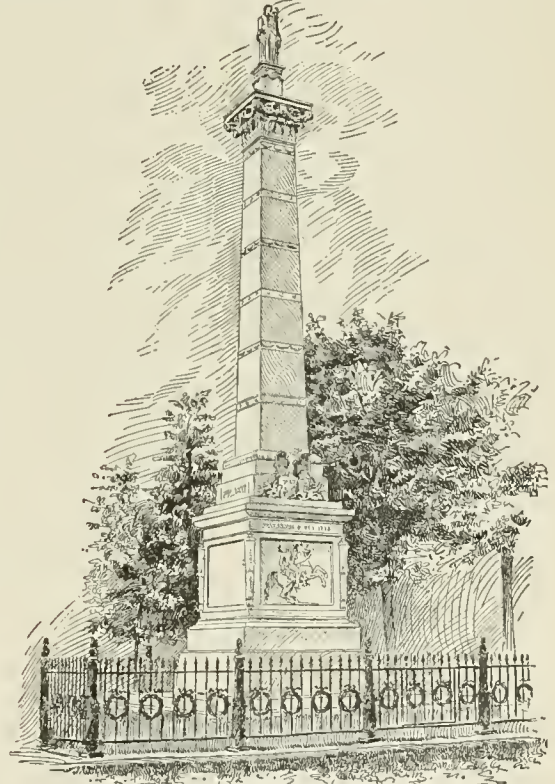
SAVAGE, MINOT JUDSON, a Unitarian clergyman; born in Norridgewock, Maine, June 10, 1841. He was educated at Bowdoin and Andover Theological Seminary; became a Congregational missionary in California; was pastor of churches in Missouri and Chicago, and after 1874 was in charge of one in Boston. In 1896 he removed to a New York church. He wrote *Religion of Evolution* (1876); *Christianity the Science of Manhood* (1873); *Life Questions* (1879); *Beliefs about the Bible* (1883); and *Evolution of Christianity* (1892).

SAVAGE STATION, a battle occurring during McClellan's peninsular campaign, June 29, 1862. Magruder of Lee's army came upon Sumner and Heintzelman retiring toward Savage Sta-

tion, and an engagement immediately took place. Sumner's corps succeeded in barring the road into White Oak swamp until evening, when the Union army retired into the swamp.

SAVANNA, a city of Carroll County, northwestern Illinois, on the Mississippi River, and on the Chicago, Milwaukee and St. Paul and the Chicago, Burlington and Quincy railroads, 11 miles W. of Mount Carroll and about 50 miles N.E. of Rock Island. It is an important shipping-point for flour, lumber and live-stock, and has manufactories of machinery. The surrounding country is rich in agricultural products, and also has a number of lead-mines. Population 1900, 3,325.

SAVANNAH, the capital of Chatham County, Georgia, the northern terminus of the Savannah,



PULASKI MONUMENT, SAVANNAH.

Florida and Western, the southern terminus of the Charleston and Savannah and the eastern terminus of the Georgia Central railroads. In addition to the transportation accommodations thus furnished, the city is in almost daily communication by steamship and sailing-vessels with other cities of the United States and with Europe. Savannah in 1890 was the third largest cotton-shipping port in the United States, and, according to the returns of the year mentioned, had 42 industries in 187 establishments, employing \$2,977,459 in capital and having an annual product of \$4,467,688. The manufactories embrace iron foundries, saw and planing mills, rice and flour mills, cotton-compresses, paper and cotton mills, furniture, ice, sash, door and blind factories. The harbor opposite the city is one of the most acces-

sible and commodious along the Atlantic Coast. The chief articles of export are cotton, rice, naval stores and lumber, their value for 1893-94 being over \$25,000,000. Savannah is the seat of a Roman Catholic bishopric, and has 41 churches for both white and colored of the various denominations; possesses a good public-school system, contains several public libraries, numerous charitable institutions, has three daily and seven weekly newspapers and a monthly periodical. One of the most prominent objects of interest in the city is the classic Pulaski monument, the corner-stone of which was laid by Lafayette in 1824. It was completed in January, 1855. (See PULASKI, CASIMIR, in these Supplements). The city in 1895 had two national banks, with combined capital of \$800,000, six state banks capitalized in the aggregate at \$2,250,000, a private bank, safe and trust company, and several loan associations. It is lighted with gas and electricity, furnished with water from 25 artesian wells, and has a paid police and fire department. The assessed valuation of property in the city in 1890 was \$29,500,000. Population 1890, 43,189; 1900, 54,244. See also SAVANNAH, Vol. XXI, pp. 324, 325.

SAVANNAH, a town and the capital of Andrew County, northwestern Missouri, a short distance west of the One Hundred and Two River, on the Kansas City, St. Joseph and Council Bluffs and the Chicago Great Western railroads, 14 miles N. of St. Joseph. It has interests in flour-milling and dairying. The surrounding country is devoted to stock-raising and fruit-growing. Population 1890, 1,288; 1900, 1,886.

SAVANNAH, a town and the capital of Hardin County, western Tennessee, on the right bank of the Tennessee River, about one hundred miles S.W. of Nashville. It has an important trade with the river towns and is a shipping-point for a district abounding in corn, wheat, cotton, live-stock, stone and iron. Population 1890, 1,087.

SAVANNAH RIVER. See GEORGIA, Vol. X, p. 434.

SAVE, a river of Austria and one of the chief tributaries of the Danube, rising in the Julian Alps, northwestern Carniola; flows southeast through Carniola and Croatia, then east, forming part of the boundary between Bosnia and Servia on the south and Slavonia on the north, and joining the Danube at Belgrade. The principal affluents are the Kulpa, Unna, Verbas, Bosna and Drina. Navigation is obstructed to some extent by sand-bars, but steamers ascend the river as far as the confluence of the Kulpa, a distance of about two hundred miles.

SAVIN. See JUNIPER, Vol. XIII, p. 774.

*SAVINGS BANKS IN THE UNITED STATES. In his annual report for 1895, the United States Comptroller of the Currency states that up to the 2d of December of that year savings banks to the number of 1,017 had submitted reports of their condition. Of this number, 664 are *mutual* institutions, i. e., associations which are conducted solely for the benefit of the deposi-

tors; and 353 are stock savings banks, operated for the benefit of both shareholders and depositors.

The mutual savings banks, with the exception of ten in Ohio, Indiana and Wisconsin, are confined to the Eastern and Middle states, the New England savings banks being nearly all based upon the mutual plan. The loans of the mutual savings banks amounted to \$823,036,954; bonds and stocks, \$801,044,935; deposits, \$1,597,343,160; total resources, \$1,756,740,943.

The total loans of all savings banks were \$1,035,597,142; bonds and stocks, \$841,807,699; deposits subject to check, \$33,760,775; savings deposits, \$1,810,597,023. The aggregate resources were \$2,053,764,328. The resources of the stock savings banks were less than 15 per cent of those of all savings banks.

The report compares these items with those reported in 1894, saying there had been an increase in each, as follows: Loans, \$8,659,334; bonds and stocks, \$63,219,833; deposits, \$66,424,556; total resources, \$73,020,139. The number of depositors had increased 97,832, and the average amount due each depositor was increased from \$365.86 to \$371.36. The interest paid to depositors varied from 3 to 4.5 per cent, the average being apparently a trifle less than 4 per cent.

The steady growth of savings-bank deposits may be seen from a comparison of the present figures with those of preceding years. In 1876 there were 717 savings banks, with total deposits of \$879,600,000.

In 1882 the distribution of banks was as follows: In New England 422, with deposits of \$437,500,000; 179 in the Middle states, with deposits of \$492,500,000; 9 in the Southern states, with deposits of \$3,500,000; 57 in the Western states, with deposits of \$70,000,000; total, 667 (50 less than in 1876), with aggregate deposits of \$1,003,500,000.

In the next seven years the rate of increase was much greater, the 921 savings banks which reported in 1889-90 showing 4,258,893 depositors, with aggregate deposits of \$1,524,844,506.

In 1896-97 the number of depositors had increased to 5,201,132, and the total deposits to \$1,939,376,035, being an average of \$372.88 per head.

In 1895 only about one per cent of the depositors were in the Southern states.

This growth, while it applies, in a measure, to nearly all the states, relates chiefly to the Eastern and Middle states, seven states of the middle West, viz., Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and Minnesota, and in the extreme West, California. This is largely owing to the fact that the Southern states, and many of those of the West, have failed to provide laws which sufficiently protect deposits in savings banks. The states mentioned have adequate protective laws, although the savings-bank business of California corresponds in character to that of building associations in the Eastern states—the deposits being largely invested in real estate.

The growth, as shown, has been almost uni-

form and steady, as whatever fluctuations there have been were practically imperceptible until the period of panic and disquiet, which was consequent upon the agitation of the currency question, and which began in 1892. The withdrawals then became quite large, and in the following spring and summer of 1893 they were greatly increased. This withdrawal, although small as compared to the whole deposit, amounted to millions of dollars; but the feeling of distrust gradually became allayed, and by the end of August of that year (1893) the withdrawals had ceased. In 1896 there was another period of distrust, with large withdrawals of deposits, although the amount did not aggregate as heavily as during 1892-93. These later withdrawals began in July, after the National Democratic Convention at Chicago had declared for a change in the financial system of the government, and continued until the day of election, November 3d. Immediately after the election the change in the conditions was so sudden and sharp that a single bank in Chicago reported that in the first week the increase in deposits was at the rate of fully \$1,000,000 per month, with an apparent assurance that the deficiency would be more than restored by the early part of 1897. No other political issues or convulsions than those mentioned have ever had any visible effect upon savings-bank deposits.

The investment of the deposits of mutual savings banks is largely confined to United States government bonds, and state, municipal and county bonds, with a limited amount of investment, in some states, in real estate and farm mortgages; the spirit and intention, as well as the strict enactment, of the law being, to keep all investments within such lines as will permit of quick realization of money in order to respond to any call for it. The officials of mutual banks exercise no discretion nor methods of their own, as everything is regulated by the state. They, as well as the trustees by whom they are elected, are merely custodians under the law. The joint-stock banks, doing business for their own profit, have, of course, greater latitude; but the general character of their business is largely regulated by the laws of the state within which they are located. Some of them do a general banking business, with loan and discount and foreign exchange departments, and loan money on such securities as grain and provisions, as well as on stocks and bonds. Their intention, also, is to so place their loans as to stand ready at all times to pay deposits on demand. In the cases of such joint-stock banks as carry on a general, in addition to their savings-bank, business, the security afforded to the savings-bank deposits depends largely upon the nature of the state laws which govern such institutions. Experience shows that savings banks do not attain to any considerable proportions in the states that have failed to enact provisions which demand that safety shall be the first consideration. These provisions, while varying in different states, tend, in one form or another, toward a common end in all the states mentioned, through

the requirement of frequent sworn reports, rigid inspection by the state, or the discouraging of heavy loans or investments in real estate or other securities which may not be readily turned.

LAW OF. As many features which are common to the laws of all the states are contained within the present Savings Bank Law of the State of New York (enacted in 1875), we give here the substance of its provisions:

Savings banks are by this law declared to be corporations possessed of the powers and functions of corporations generally. As such they may have perpetual succession, sue and be sued, complain and defend in any court of law or equity, appoint such officers, managers or agents as the business of the corporation requires, provide for the management of its property and the regulation of its affairs, contract and be contracted with, receive money on deposit and invest the same, and exercise any additional powers incidental to the business of a savings bank. Not less than thirteen persons can organize, each of whom is required to make a written declaration that he will accept the responsibilities and faithfully discharge the duties of a trustee of the institution, if the same shall be authorized by the bank superintendent. This officer has discretionary power in regard to the creating of new banks, being required to determine from the best sources of information at his command, whether greater convenience of access to a savings bank will be afforded to any considerable number of depositors by opening a bank at the place designated, and if the density of the population in the neighborhood and in the surrounding country is such as to afford a reasonable promise of adequate support to the enterprise; and also whether the responsibility, character and general fitness for the discharge of the duties appertaining to such trust, of the persons named as trustees, are such as to command the confidence of the community in which the savings bank is proposed to be located. On authority to transact business being granted, the persons designated as trustees have the entire management and control of the affairs of the corporation. Residents of the state alone are eligible as trustees, and whenever a trustee of one bank becomes a trustee, officer, clerk or employee in any other savings bank, or upon borrowing, directly or indirectly, any of the funds of the bank of which he is a trustee, or becoming a surety or guarantor for money borrowed of or a loan made by the bank, or upon failure to attend regular meetings of the board or to perform any duties devolved upon him as a trustee for six successive months, without having previously been excused by the board, his office becomes vacant. But in the discretion of the board such trustees are eligible for re-election. The board of trustees elect from their number a president and two vice-presidents; and from their number or otherwise, elect or appoint such officers and clerks, whose salaries are fixed by the board, as they may see fit. Vacancies in the office of the trustees are filled by the board, which has power from time to

time to make such by-laws, rules and regulations as may be thought proper for the election of officers, for prescribing their respective powers and duties and the manner of discharging the same; for the appointment and duties of committees; and generally, for transacting, managing and directing the affairs of the corporation. Regular meetings of the board of trustees are required to be held as often as once in each month, at which at least seven trustees must be present. Trustees are prohibited by law from having any interest whatever, direct or indirect, in the gains or profits of their banks, or from, directly or indirectly, receiving any pay or emolument for their services, except that trustees acting as officers, whose duties require and receive their regular and faithful attendance at the bank, may receive such compensation as in the opinion of a majority of the board of trustees shall be just and reasonable, such majority to be exclusive of any trustee to whom compensation is voted; but it is not lawful to pay trustees, as such, for attendance at board meetings. No trustee or officer, for himself or as the agent or partner of others, can borrow the funds or deposits of the bank, or in any manner use the same, except to make current and necessary payments authorized by the board of trustees, no can any trustee or officer become an indorser or surety, or in any manner an obligor for moneys loaned by or borrowed of his bank.

Savings banks are authorized by law to receive on deposit such sums of money as may be offered by individuals, corporations or societies, invest the same, and pay interest or dividends thereon. On making first deposit, banks furnish to each depositor a pass-book, in which all deposits and withdrawals are required to be entered. Such pass-book contains the rules and regulations of the bank, and is legal evidence between the corporation and the depositor as to the terms on which the deposit is made. The sums deposited, together with the accumulations, are required to be repaid to depositors or their legal representatives, after demand, in such manner, at such times, after such previous notice, and under such regulations, as the board of trustees may prescribe. The usual provision is for sixty days' notice, which is only demanded in time of panic to allay excitement. While depositors are not restricted as to the number of banks with which they may have accounts, the aggregate amount a single bank can hold to the credit of an individual is limited to three thousand dollars. Such limitation does not apply to deposits made by order of a court of record or a surrogate. Banks may refuse to receive deposits, or at any time return all or any portion thereof. Deposits made by minors or females are held for their exclusive benefit, free from control or lien of all persons whatsoever, except creditors.

It is made the duty of trustees to regulate the rate of interest or dividends on deposits not to exceed five per cent per annum, in such manner that depositors shall receive, as nearly as may be, all profits of the corporation after deducting

necessary expenses and reserving such amount as may be deemed expedient, as a surplus fund for the security of depositors, which, to the amount of 15 per cent of deposits, they are authorized to gradually accumulate and hold, to meet any contingency or loss in business from the depreciation of securities or otherwise. When the surplus exceeds fifteen per cent of deposits, extra dividends may be declared. Savings banks are prohibited from declaring, crediting or paying dividends or interest except on authority of a vote of the board of trustees. When dividends are declared and credited in excess of the earnings of a savings bank, trustees voting therefor are jointly and severally liable to the bank for the excess so declared.

The securities in which investments may lawfully be made are stocks or bonds or interest-bearing notes or obligations of the United States, or those for which its faith is pledged; 3.65 bonds of the District of Columbia; interest-bearing stocks or bonds of the state of New York and those issued by cities, counties, towns or villages thereof, and the stocks or bonds of any state in the Union that has not, within ten years, defaulted in the payment of any part of either principal or interest of any debt authorized by any legislature of such state to be contracted; in bonds and mortgages on unincumbered real estate, situate in the state and worth at least twice the amount loaned thereon. But not more than sixty per cent. of deposits can be so loaned. In case the loan is on unimproved and unproductive real estate, the amount is restricted to forty per cent of actual value. No loan on bond and mortgage can be made except upon the report of a committee charged with the duty of investigating the same, who certify the value of the premises according to their best judgment, which report is filed and preserved among the records of the institution.

Trustees are required to invest the moneys deposited with them, in the securities enumerated, as soon as practicable, except that, for the purpose of meeting current payments and expenses in excess of receipts, there may be kept an available fund of not exceeding ten per cent of the whole amount of deposits, which may be kept on hand or on deposit with banks or trust companies to an amount not exceeding 25 per cent of their paid-up capital and surplus. Or such available fund or any part thereof may be loaned on the pledge of such securities as savings banks are by law authorized to invest in. The real estate that they may hold and convey is such as may be requisite for a banking-house, the cost of which is limited to fifty per cent of the surplus of the bank, and such as may be purchased at sales upon foreclosure of mortgages owned by the bank, or upon judgments or decrees obtained upon debts due to it, or in settlements effected to secure such debts.

Trustees are prohibited from loaning the moneys deposited with them, upon notes, bills of exchange, draft or other personal securities, and it is unlawful for savings banks to deal or

trade in any goods, wares, merchandise or commodities whatever, except as expressly authorized; or in any manner to buy or sell exchange, gold or silver, or to collect or to protest promissory notes, or time-bills of exchange. And no savings bank can lawfully make or issue any certificate of deposit, payable either on demand or at a fixed day, nor pay any interest except regular quarterly or semi-annual dividends upon any deposits or balances, nor pay any interest or deposits, or portion of a deposit, or any check drawn upon itself by a depositor, unless the pass-book of the depositor be produced and the proper entry be made therein at the time of the transaction.

Every savings bank is required to make a full report in writing of its condition at least twice in each year, verified by the oaths of the two principal officers of the bank. The reports made for January and July are based on examinations of assets and liabilities made by a committee of not less than three trustees; the accuracy of the examinations is required to be verified by the oaths of the trustees making the same. An accurate balance of the depositors' ledgers is also required to be taken semi-annually, and if there be discrepancies between them and the general ledger of the bank, the fact must be stated in the semi-annual report.

The bank superintendent makes annual reports to the legislature of the condition of all the savings banks in operation in the state; he also, at least once in two years, either personally or by some competent person, visits and examines each savings bank transacting business in the state. The superintendent may cause special examinations to be made whenever he deems it necessary or expedient. On such examinations, persons whose testimony is required may be compelled to appear and testify. If at any time it appears to the superintendent, from examinations or reports, that any savings bank has committed a violation of its charter or of law, or is conducting business in an unsafe or unauthorized manner, he is required to direct the discontinuance thereof; and whenever such corporation refuses or neglects to comply with his order, or whenever it appears that it is unsafe or inexpedient for any such corporation to continue to transact business, or that any trustee or officer of a savings bank has abused his trust, or been guilty of misconduct or malversation in his official position injurious to the bank, or to its depositors, the superintendent communicates the facts to the attorney-general, who institutes such proceedings as the nature of the case requires. The proceedings instituted by the attorney-general may be for the removal of one or more of the trustees, or for the transfer of the corporate powers to other persons, or to the consolidation and merging of the corporation in any other savings bank that may be willing to accept the trust, or for such other relief or correction as the particular facts communicated to him shall seem to require. In the event of a savings bank being put into liquidation, its

assets are required to be distributed within eighteen months. The advertising as savings banks, by individuals or corporations, without lawful authority, is prohibited under heavy penalties.

JOHN J. MITCHELL.

SAVORY, an herb. See HORTICULTURE, Vol. XII, p. 289.

SAVOY, THE. See LONDON, Vol. XIV, pp. 838, 845.

SAVOY CONFERENCE, a conference between Episcopalians and Presbyterians, held in London soon after the Restoration. The meeting took place in 1661, at the Savoy Palace, between 21 Episcopalian and an equal number of Presbyterian divines, and lasted from April 15th to July 25th, its object being to see what concessions would satisfy the Presbyterians and lead to a "perfect and entire unity and uniformity throughout the nation." The need for such a conference grew out of the fact that under Charles II the attempt was to be made to restore to the Episcopalians the place and power which under the commonwealth had fallen to the Presbyterians. Charles II expressed his intention of doing his best to heal the differences in religion, and therefore issued letters-patent dated March 27th, appointing 12 bishops, with 9 clergymen as assistants, on the side of the Episcopal Church, and an equal number of Presbyterian divines, "to advise upon and review the *Book of Common Prayer*."

The Presbyterians demanded that Archbishop Usher's (see PRESBYTERIANISM, Vol. XIX, p. 689) scheme of a "reduced episcopacy," in which the elements of the Scotch system of presbyteries, synods and general assemblies were combined with distinctions of ecclesiastical ranks, should be made the system to begin with; that responses in the service should be given up; that the prayers in the litany should be combined into one; that no lessons should be assigned from the apocrypha; that the use of the surplice, of the cross in baptism, of godfathers as sponsors, and of holy days, should be abolished. The bishops replied in writing, refusing all concession; whereupon the conference turned its attention to minor points, such as the alterations of the liturgy. Richard Baxter, on the part of the Presbyterians, hastily drew up a *Reformed Liturgy*, which the bishops rejected. An attempt was then made to settle the matter by a formal debate by three persons on each side. The debate turned upon vague abstractions and subtle theological distinctions, varied by outbursts of temper and uncivil personalities. The end of the conference, as might have been expected, was hopeless disagreement between the parties, and the fruitless attempt at union was followed by the famous "Act of Uniformity," in 1662.

SAW-FISH. See RAY, Vol. XX, p. 299.

SAWING-MACHINES. Saws for use in machines are made in three forms—circular, band, and straight. Within a few years there has been developed an improved construction of machines

using circular saws. It consists in using two circular blades instead of one, the advantage being that a thinner kerf is thus obtainable, admitting of faster cutting and a saving of lumber. The second saw is placed above and slightly to the rear of the first saw in the same plane, and is made to rotate in the same direction, though acting oppositely upon the lumber. As the saws used for any one size require to be only one half the diameter with this arrangement, as where one only is used, it follows that they can be made thinner and driven faster. For log-sawing machines the carriage is usually moved by a rack-and-pinion feed, though ropes are also used. A steam-piston device, suitable for rapid work, has been named the "shot-gun" feed.

Re-sawing machines are so named because used by local lumber-dealers to reduce their lumber from certain large standard sizes to smaller dimensions suited to their home trade. They are lighter than the log-saws, and commonly have four upright feed-rolls and one circular saw. In the larger sizes the saws are made sectional, because this plan allows of a thinner blade and consequently thinner kerf. A great variety of sawing-machines are made specially for ripping or cross-cutting, or for a combination of one of these with gaining or grooving. One pattern of saw useful for small cross-cutting is the swing-saw, also called pendulum-saw, which depends from a frame attached to the ceiling, and is swung against the work. The saw-table is a table whose inclination is adjustable by means of screws and weights, and through which a small circular saw protrudes. There are numerous forms, as for making slats, pickets, laths, etc.

Band-saws are increasing in use. They are largely used for resawing. The prevailing type has two large wheels, over which the endless blade runs. Those made by the Egan Company have iron wheels with steel spokes and sometimes rubber tires, the lower wheel being made the heaviest. A six-roll feed is used, also a device of adjustable slides to guide the band. Where band-saws are used in log-mills, a saw-deflector is often used to keep the blade in line.

Two types of machines are built to use straight saws. They are the drag-saw, used for cutting logs in two, and the jig-saw, used for light ornamental work. In the best forms of the latter the strain is balanced by a spring, and in some recent machines the strain is kept constant at all parts of the stroke by counteracting the loosening flexibility of the spring with an eccentric roller that varies the leverage at each point of the stroke.

Metal-working saws are coming into increased use. Circular blades are used. Some are toothed, and some are plain, toothless disks that cut the metal by the friction of rapid rotation. They will sever steel bars four inches square and beams 16 inches deep. One form, designed for trimming armor-plates, has two 36-inch diameter saws, which will trim both sides of a plate at one operation, or which can be used as independent machines. The Newton band-metal saw is used

for cutting centers out of cranks, connecting-rods, pump-levers, etc., and for irregular work that can be guided by hand. The bottom wheel is run in a bath, to lubricate the saw.

Among sawing-machines for special purposes are the marble-saw, which has a toothless blade and is used with abrading sand to cut marble; the barrel-saw, cylindrically shaped, for cutting barrel-staves; the weather-boarding saw, arranged for cutting a log radially from the center, so as to get out weather-boards with the least waste of material; the stockers' saw, especially designed for shaping the stocks of firearms; the comb-saw, having two parallel blades, which cut the spaces between the teeth of combs; and many others.

C. H. COCHRANE.

SAW-MILL. See SAWS, Vol. XXI, pp. 344-346.

SAWS. See TOOL-MAKING, in these Supplements.

SAWYER, PHILETUS, an American public man; born in Whiting, Vermont, Sept. 22, 1816. He had but a few months' schooling, and spent his boyhood aiding as he could his father in the work of the home farm. At 17 he formed a resolution to start out for himself, and accordingly purchased his release from his father, to whom, by law, he was bound for four years longer. For the next eight years he worked in the Adirondack pineries. In 1847 he moved to Fond du Lac, Wisconsin, and two years later to Oshkosh, in the same state; therein became interested in the lumber industries. He was active in taking advantage of the opportunities of the growing state, and accumulated a large fortune. He began his political career in 1856, with his election to the Wisconsin legislature; in 1864 was elected to Congress, and became a United States Senator from Wisconsin in 1881, serving until 1893.

SAWYER, THOMAS JEFFERSON, an American Universalist clergyman; born in Reading, Vermont, Jan. 9, 1804; graduated from Middlebury College in 1829, and became pastor of a Universalist church in New York, holding his position until 1845, when he was appointed principal of the Liberal Institute, at Clinton, New York; was again pastor of a church from 1852 to 1861, when he moved to a farm near Clinton, where he remained, teaching theology at the Liberal Institute until 1869, and was then chosen professor of theology at Tufts College, Medford, Massachusetts, an institution which he had been instrumental in founding. He defended the doctrines of Universalism in public discussions with clergymen of other denominations, and some of these polemics have been published, notably the discussion with Isaac Westcott, entitled *The Doctrine of Eternal Salvation*. He also published *Who is Our God—the Son, or the Father?* (1859), in opposition to the views of Henry Ward Beecher.

SAXE, JOHN GODFREY, an American wit and poet; born in Highgate, Vermont, June 2, 1816. He graduated at Middlebury College in 1839, and studied law at St. Albans, Vermont, where, in 1843, he was admitted to the bar. He practiced

with success in Franklin Co. for several years, and in 1850-51 was state attorney for Chittenden Co. In 1847-48 he was also superintendent of common schools. In 1850-56 he edited the Burlington *Sentinel*. In 1856 he was attorney-general of Vermont. He lived in New York for some years before 1872, when he settled in Albany as editor of the *Evening Journal*. He was much in request as a lecturer, especially at college commencements and anniversaries of literary societies. On such occasions he delivered his longer poems with much *éclat*, while his shorter, humorous poems were published in the *Knickerbocker Magazine* and various journals. In later years he contributed verses to *Harper's Magazine* and the *Atlantic Monthly*. He published *Humorous and Satirical Poems* (1850); *The Money King and Other Poems* (1860); *Clever Stories of Many Nations* (1863); *The Masquerade* (1866); *Fables and Legends of Many Countries* (1872); *The Proud Miss McBride* (1873); *Leisure Day Rhymes* (1875); and numerous other poetical pieces. More than forty editions of his collected poems were issued in the United States and England. In his later years Saxe, who once could evoke mirth from the soberest themes, became a victim of the gravest melancholy. He lived in seclusion at his son's house in Albany, N. Y., and refused to receive any company. Died there March 31, 1887.

SAXE-COBURG AND GOTHA. See Vol. XXI, pp. 347-48. According to recent statistics the area of the duchy is 756 sq. miles, Coburg having 217, and Gotha 539; and the population in 1895 was 216,603,—62,498 in Coburg, and 154,105 in Gotha. In 1899 the common revenue was \$552,250, and the expenditure, \$713,236; and on July 1, 1897, the public debt was, for Coburg, \$711,046, and for Gotha, \$34,811. The capitals, with their populations in 1895, are, Gotha, 31,670, and Coburg, 18,688. In 1895 the duchy had 29,458 farms, which supported a population of 60,633, the chief crops being oats, barley, rye, wheat, potatoes, and hay. There are 173 miles of railroad. On the death of Duke ERNEST II (q. v. *ante*, p. 1214), on Aug. 22, 1893, he was succeeded by his nephew, ALFRED, Duke of Edinburgh, since dead (XXV, 129; XXVI, 488), on the death of whose only son, Prince Alfred (born Oct. 15, 1874), on Feb. 6, 1899, at Meran, in Austria, the DUKE OF CONNAUGHT (q. v. *ante*, p. 895), brother of the reigning duke, became heir presumptive. On June 30, 1899, however, the Duke of Connaught and his son, Prince Arthur, renounced their claims to the succession in favor of Charles Edward, Duke of Albany (born July 19, 1884), son of the late Prince Leopold of England and Princess Helena of Waldeck.

SAXIFRAGACEÆ, a large family of polypetalous plants, closely allied to the rose family, but distinguished from it chiefly by having albuminous seeds, ovaries partly or wholly united, and seldom any stipules. The best-known genera are *Ribes* (currants and gooseberries), *Philadelphus* (syringa), *Doutzia*, *Hydrangea*, and *Saxifraga*.

SAXON LANGUAGE. See GERMANY, Vol. X, pp. 515-16.

SAXONS. See SAXONY, Vol. XXI, pp. 351-52.

SAXONY. See SAXONY, Vol. XXI, pp. 351-59. The area of Saxony is 5,787 square miles; the population in 1890 was 3,500,513. The following table gives the latest figures by chief governmental districts:

DISTRICTS.	AREA, ENGLISH SQ. MILES.	POPULATION DEC. 2, 1895.	DENSITY PER SQ. MILE.
Bautzen	953	385,080	404.1
Dresden	1,674	1,067,757	637.8
Leipsic	1,378	945,179	685.9
Zwickau.....	1,782	1,389,672	779.8
Total.....	5,787	3,787,688	654.5

According to the census of Dec. 2, 1895, there were 12 towns with a population of more than 20,000, namely:

Leipsic.....	399,963	Zittau.....	28,132
Dresden.....	336,440	Glauchau.....	24,914
Chemnitz.....	161,017	Reichenbach.....	24,415
Plauen.....	55,191	Bautzen.....	23,678
Zwickau.....	50,391	Crimmitschau.....	23,553
Freiberg.....	29,287	Meerane.....	23,074

King Albert had in 1898-99 a civil list of \$747,867 per annum, exclusive of the appanages, or dotations, of the princes and princesses, amounting to \$154,709. The former royal domains, consisting chiefly of forests, became in 1830 the property of the state.

CONSTITUTION AND GOVERNMENT. According to the terms of the present constitution, first adopted in 1831, but largely altered since that date, the crown is hereditary in the male line; but at the extinction of the latter, also in the female line. The sovereign comes of age at the completed eighteenth year, and, during his minority, the nearest heir to the throne takes the regency. The legislature is jointly in the King and Parliament, the latter consisting of two chambers. The Upper Chamber comprises the princes of the blood royal who are of age; twelve deputies elected by the owners of nobiliar estates; ten noble proprietors and five other members without restriction, nominated by the King for life; the burgomasters of eight towns; and eleven other representative dignitaries, including a deputy of the University of Leipsic. The Lower Chamber consists of 37 deputies of towns and 45 representatives of rural communes. Both houses may introduce new laws. No taxes can be made, levied, or altered without the sanction of both chambers. The executive is in the King and in the Ministry of State, and in the separate ministries of Justice, of Finance, of the Interior, of War, of Foreign Affairs, and of Education and Ecclesiastical Affairs.

FINANCE. The budget estimate for revenue and expenditure for each of the two years, 1898 and 1899, was \$19,738,519. There was, besides, for the two years 1898-99, an extraordinary revenue and expenditure of \$25,345,837. More than half the total revenue is derived from public domains and railways, the net income from railways alone amounting in 1897 to \$8,934,565. The public debt in 1898 was \$179,086,658, incurred mostly in the purchase and building of railroads.

PRODUCTION AND INDUSTRY. There were in

1895, 193,627 separate farms, supporting a population of 517,642. On May 1, 1897, there were 481,074 factory operatives and 17,354 factories.

INSTRUCTION. Saxony is divided into 28 school-inspection districts. On Dec. 1, 1894, there were 2,213 public Protestant and 41 Roman Catholic common schools, 64 private and chapter schools, and 1,970 advanced common schools (Fortbildungsschulen); total, 4,288 common schools, with a total attendance of 702,665. There were also 1 polytechnic at Dresden (806 students in 1898), 1 mining-school at Freiberg, 1 forestry school at Tharandt, 1 veterinary school at Dresden, 17 gymnasia, 10 realgymnasia, 30 realschulen, 19 seminaries, and 2 girls' high-schools; altogether, 82 educational establishments, with a total attendance of 19,301, exclusive of the university and a large number of industrial, commercial, agricultural, musical, and art institutes. The University of Leipsic, founded in 1409, and attended in 1898 by 3,174 students, is one of the largest in Germany.

RELIGION. The royal family is of the Roman Catholic confession, but the vast majority of the inhabitants are Protestants. In 1895 the distribution of the different sects was as follows: Lutherans, 3,611,670; Roman Catholics, 140,285; Reformists, 10,538; other Christians, 15,059; Jews, 9,902; unclassified, 234. Ecclesiastically, in 1897 the kingdom was divided into 1,005 Lutheran parishes, and 37 Roman Catholic parishes.

COMMUNICATION. At the end of 1897 there were 2,075 miles of railway in Saxony, of which 2,050 miles belonged to the state, and 25 miles belonged to private companies, but were worked by the state.

SAXTON, JOSEPH, an American inventor; born in Huntingdon Co., Pa., March 22, 1799. He showed mechanical ingenuity at an early age, and after serving an apprenticeship at watchmaking, removed to Philadelphia, and there invented a machine for cutting the teeth of watch-wheels, made improvements in the construction of clocks, and constructed the clock for the tower of Independence Hall. While in England, in 1828-37, he constructed a magneto-electric machine, by which the first magnetic spark was obtained; made much of the apparatus used by Wheatstone, and invented a locomotive differential pulley. He was offered the charge of the machinery for printing the Bank of England notes, but returned to the United States to superintend the construction of the machinery and balances for the Philadelphia mint. He invented a deep-sea thermometer, a self-registering tide-gauge, an immersed hydrometer, etc. He was a member of the American Philosophical Society, and one of the incorporators of the American Academy of Sciences. Died in Washington, D. C., Oct. 26, 1873.

SAY, town in central Sudan, on the north bank of the Niger, in 13° 5' N. Lat. Pop. 8,000.

SAY, JEAN BAPTISTE LÉON, a French statesman, born in Paris, June 6, 1826; devoted himself to the study of political economy, and for many years was editor of the *Journal des Débats*. He heartily approved the republic after the fall of Napoleon III, and after the siege of Paris was active, as administrator of the railroads of the north, in provisioning

the city. In Feb., 1871, he was returned to the National Assembly as one of the representatives of the Seine department. In June the same year he became prefect of the department. On Dec. 7, 1872, he was made Minister of Finance by M. Thiers. In Dec., 1874, he was elected "*membre libre*" of the Academy of Moral and Political Sciences, as successor to M. Dubois. He again accepted the portfolio of Finance in M. Buffet's administration, in March, 1875. He



LÉON SAY.

retained his portfolio in the Dufaure cabinet of May 10, 1876, and in the Jules Simon cabinet of Dec. 13 following, but retired with the latter, May 17, 1877. When a new ministry was formed under the presidency of M. Dufaure in Dec., 1877, M. Léon Say again became Minister of Finance, and retained the position in the first cabinet formed by President Grévy. He retired from the administration Dec. 17, 1879, with the head of the cabinet, M. Waddington, and resumed his place among the members of the Left Center. In April, 1880, he was appointed ambassador in London, but returned to Paris in the course of a few weeks, in consequence of having been elected president of the Senate, May 25, 1880. In the previous month the Academy of Moral and Political Sciences had elected him "*membre titulaire*," as successor to M. Michel Chevalier. He was reëlected president of the Senate Jan. 20, 1881, and became Minister of Finance in the Freycinet cabinet, formed Jan. 30, 1882. He wrote *Histoire de la Caisse d'Escompte* (1848); *La Ville de Paris et la Crédit Foncier*, etc.; and published a translation of Goschen's *Theory of Foreign Exchanges*, with an introduction (1866). Died in Paris, April 21, 1896.

SAY, THOMAS, an American zoölogist; born in Philadelphia, July 27, 1787. In 1812 he was one of the incorporators of the Philadelphia Academy of Natural Sciences, as also its curator and a conspicuous contributor to its *Journal*. In 1818, with a number of scientists, he undertook an exploring expedition along the coast of Georgia and Florida, but was prevented by Indian hostilities from pursuing his investigations to a satisfactory result; and in 1819 was the geologist to Major S. W. Long's expedition to the Rocky Mountains. In 1823 he was one of a party seeking the source of the St. Peter river, Minn.; and two years later became associated with Robert Owen in the latter's socialistic scheme at New Harmony, Ind., which resulted in failure. Say wound up the affairs of the society, and died there Oct. 10, 1834. He published a number of works on entomology and conchology.

SAYCE, ARCHIBALD HENRY, an English orientalist; born at Shirehampton, near Bristol, England, Sept. 25, 1846; educated at Grosvenor College, Bath, and Queen's College, Oxford. In 1869 he became a fellow of his college, and in 1870 tutor at Queen's. He took orders in 1870, and in 1876 was appointed

deputy to Max-Müller as Professor of Comparative Philology, a post which he retained till 1890, when he left Oxford to spend the winter in Egypt. Professor Sayce was a member of the Old Testament Revision Committee. Among his published writings the more important are *The Principles of Comparative Philology* (1874); *Introduction to the Science of Language* (2 vols., 1880); *The Ancient Empires of the East* (1884); *Origin and Growth of Religions as illustrated by the Ancient Babylonians* (1887); *The Monuments of the Hittites* (1881); *Fresh Light from the Ancient Monuments* (1884); *Assyria—Its Princes, Priests, and People* (1886); and *Records of the Past* (1890). He also published an *Assyrian Grammar* (1872); a *History of Babylonia* (1877); a monograph on *Sennacherib* (1878); and *The Chaldean Genesis* (1879); together with numerous treatises on ancient Biblical records, on the decipherment of Egyptian inscriptions, and a critical examination of the Chaldean account of the Deluge. In 1893 appeared his edition of Vaux's *Ancient History from the Monuments*, and in 1894 *The Higher Criticism and the Verdict of the Monuments*, defending the authenticity of the Scripture narratives. He also published an annotated edition of books I-III of *Herodotus* (1883) and an *Introduction to Ezra, Nehemiah* (1885). He contributed to this ENCYCLOPÆDIA, chiefly on oriental archæology, as on BABYLONIA, Vol. III, pp. 182-194, or INSCRIPTIONS, cuneiform and Semitic, Vol. XIII, pp. 114-118. See INDEX.

SAYRE, LEWIS ALBERT, an American surgeon; born in Madison, New Jersey, Feb. 29, 1820; graduated at the Transylvania University, and studied medicine in the office of Dr. David Greene in New York, taking his degree in the College of Physicians and Surgeons. In 1859 he was appointed resident physician of Bellevue Hospital, New York, and shortly after was elected professor of orthopædic surgery in Bellevue Hospital Medical College. He is noted for his treatment of diseases of the joints, particularly hip-joint disease, and may be said to be the founder of orthopædic surgery as a specialty.

SCAB, a sheep disease. See VETERINARY SCIENCE, Vol. XXIV, p. 206.

SCAB, in plants, a general name given to those diseases, caused by parasitic fungi, which give rise to roughened surfaces, as apple-scab, pear-scab, grape-scab, potato-scab, etc.

SCABBARD-FISH, a name given to *Lepidopus argenteus*, or to other members of the family. They are long, ribbon-like fishes, with pointed head and long dorsal fin. Sometimes they are found on the European coasts of the Mediterranean. In New Zealand it is considered a fine food-fish. The name was suggested by the general form resembling a sword-scabard.

SCABIES. See PARASITISM, Vol. XVIII, p. 270.

SCAD, the popular name of fishes of the genus *Trachurus*, found in the Mediterranean, in the British seas, and on Atlantic and Pacific shores of America. Large quantities are preserved in salt. The big-eyed scad or goggle of tropical seas belongs to the genus *Trachurops*.

SCAGLIOLA. See BUILDING, Vol. IV, p. 508.

SCALA. See VERONA, Vol. XXIV, p. 173.

SCALDHEAD OR FAVUS. See MEDICINE, Vol. XV, p. 817; and PARASITISM, Vol. XVIII, p. 269.

SCALE. See MUSIC, Vol. XVII, p. 80.

SCALE, in measurement. See SURVEYING, Vol. XXII, pp. 720, 721.

SCALES, of fishes. See ICHTHYOLOGY, Vol. XII, p. 639, 640; of MAMMALS, Vol. XV, p. 348; and of REPTILES, Vol. XX, p. 446.

SCALLOP, the popular name of bivalve mollusks of the family *Pectinidae*. They have more or less rounded shells with straight hinge-line. Numerous green eyes are present on the edges of the mantles. They can swim by rapidly opening and closing the shell by means of the single adduct or muscle. *Pecten irradians* is abundant along the Atlantic Coast south of Cape Cod. Many species of scallops are edible, and highly esteemed, the muscle usually being the only part used as food.

SCAMANDER, a river. See ASIA MINOR, Vol. II, p. 707.

SCANDINAVIAN MYTHOLOGY. See ÆSIR, Vol. I, pp. 209-211; and MYTHOLOGY, Vol. XVII, pp. 155, 156.

SCANDIUM. See *New Elements*, under CHEMISTRY, in these Supplements.

SCANSORES. See ORNITHOLOGY, Vol. XVIII, p. 30.

SCAPHOPODA. See MOLLUSCA, Vol. XVI, pp. 663, 664.

SCAPIOPUS, a genus of toad-like amphibians of the family *Pelobatidæ*. The name of the genus signifies spade-foot, and refers to a spur on the heel of the foot. The animals are subterranean and nocturnal in habits. They occur mostly in the Old World, but some are found in America.

SCAPULA. See ANATOMY, Vol. I, pp. 826, 827.

SCAPULARY. See COSTUME, Vol. VI, p. 463.

SCARABÆUS OR SCARAB. See *Sacred Beetle*, under COLEOPTERA, Vol. VI, p. 131. For the gem, see ETRURIA, Vol. VIII, pp. 640, 641.

SCARFOGLIO, SIGNORA, an Italian novelist, better known as Matilde Serao; born in 1856, in Greece, her father being a political exile, who married Princess Scanyary. Left an orphan at an early age, she was thrown upon her own resources, and obtained employment as a telegraph operator and later as a newspaper correspondent. She then commenced to write fiction, and became known about 1873 as the author of *Apale* and *Piccolo*. She has been a prolific writer of realistic tales, reflecting Neapolitan life and color. In 1891 one of her books appeared in English with the title *Fantasy*, the volume being prefaced with a critical estimate of her work by Edmund Gosse.

SCARLATINA. See SCARLET-FEVER, Vol. XXI, pp. 376, 377.

SCARUS, a genus. See PARROT-FISHES, Vol. XVIII, p. 324.

SCHACK, ADOLF FRIEDRICH (1815-94), a German poet and orientalist. See CALDERON, Vol. IV, pp. 660, 661.

SCHAEFFER FAMILY, a family of American clergymen, the founder of which was FREDERICK DAVID, born in Frankfort-on-the-Main, Germany, Nov. 15, 1760; educated at the gymnasium in Hanau,

and in 1776 emigrated to America. After teaching school for some years he studied theology, and was ordained to the ministry of the Lutheran Church. He held several pastorates, and from 1812 to 1834 was the colleague of Dr. Helmuth in Philadelphia, and in the latter year, owing to old age, he retired from the ministry. He published a number of works on religious questions, and in 1813 received the degree D.D. from the University of Pennsylvania. After his retirement he resided in Frederick, Maryland, where he died Jan. 27, 1836.—His eldest son, DAVID FREDERICK; born in Carlisle, Pennsylvania, July 22, 1787; was graduated at the University of Pennsylvania in 1807; and, after studying theology, was ordained in 1812. He became pastor of the Lutheran congregation at Frederick, Maryland, in 1808, holding this post until within a year or two of his death. From 1826 to 1831 he was editor of the *Lutheran Intelligencer*, the first English periodical that was established in the Lutheran Church in the United States. He took an active part in the establishment of the theological seminary at Gettysburg, Pennsylvania, and in the founding of the General Synod of the Lutheran Church. He died in Frederick, Maryland, May 5, 1837.—Another son, FREDERICK CHRISTIAN, was born in Germantown, Pennsylvania, and educated partly at the academy of his native place, and partly under his father, with whom he studied theology. He was licensed to preach in 1812, and became pastor of the Lutheran Church at Harrisburg, Pennsylvania, where he remained until 1815, when he accepted a call to Christ Church, New York City. In 1823 he organized St. Matthew's English Lutheran Church, but, difficulties having arisen about the church property between the German and English congregations, organized St. James's English Lutheran Church, in which he served until his death. He received the degree of D.D. from Columbia in 1830, and in the same year was elected professor of the German language and literature there. He published *The Blessed Reformation and Parables and Parabolic Sayings* in 1817, and in addition to his work in theology was deeply interested in the study of natural science. He died in New York City, March 26, 1832.—Another son, CHARLES FREDERICK, born in Germantown, Pennsylvania, Sept. 3, 1807; graduated at the University of Pennsylvania, and studied theology privately. He was pastor in succession at Carlisle, Pennsylvania; Hagerstown, Maryland; Lancaster, Ohio; Red Hook, New York; and Easton, Pennsylvania. From 1840 to 1845 he was professor of theology at Columbus, Ohio; from 1857 to 1864 at Gettysburg, Pennsylvania, and at Philadelphia from 1864 to 1879. Among his works are translations of *Lechter on Arts*, Kurtz's *Sacred History*, and Arndt's *True Christianity*. He died in Philadelphia, Nov. 23, 1879.—Frederick David's grandson, CHARLES WILLIAM, a son of Frederick Solomon Schaeffer, was born in Hagerstown, Maryland, May. 5, 1813. After graduating at the University of Pennsylvania and the theological seminary at Gettysburg, Pennsylvania, he became pastor in 1835 at Barren Hill, Pennsylvania, where he remained until 1840, when he went to Harrisburg, Pennsylvania, and from there in 1849 to German-

town, Pennsylvania, where he remained till 1874. In 1864 he was elected professor of ecclesiastical history at the Lutheran Theological Seminary in Philadelphia, and on his resignation of this chair in 1894 was elected professor emeritus. Dr. Schaeffer was for many years president of the General Synod and the General Council of the Lutheran Church, and in 1859 became a trustee of the University of Pennsylvania. He published *Early History of the Lutheran Church in America* (1857); *Family Prayers*; and a translation from the German of the *Halle Reports*. Died in Philadelphia, March 15, 1896.

SCHAFF, PHILIP, a Swiss-American clergyman; born in Coire, the capital town of the Swiss canton of the Grisons, Jan. 1, 1819. He was educated at the universities of Tübingen, Halle, and Berlin, and began to lecture on theology at Berlin in 1842. In 1844 he went to America to fill a professorship of church history and exegesis in the theological seminary at Mercersburg, Pennsylvania. Within a year he was placed on trial for heresy, because of the liberal opinions expressed in his opening address, but was acquitted by the Synod of York, Pennsylvania. He was appointed in 1854 to represent the German Reformed Church of the United States at the ecclesiastical diet in Frankfort, and at the Swiss pastoral conference in Basel. In 1862 he was appointed a lecturer at Andover Seminary, and in 1870 he was made professor of apologetics and symbolics in the Union Theological Seminary, New York. In 1872 he was transferred to the chair of Hebrew, and in 1875 to that of sacred literature, an office which he held actively until the spring of 1893, when he was retired as professor emeritus. In 1871 he was chosen president of the American committee on Bible revision. To the great work of revision he gave himself with unflagging zeal, and when it was actually completed went to England to look after its publication. While on this mission, in 1875, he attended a conference of the Old Catholics, Greeks and Protestants, in Bonn, called with a view to promote Christian unity among these churches. In 1877 he visited Palestine and other Bible lands. Doctor Schaff was the first president of the American Society of Church History, which was organized in New York in 1888. His last public appearance was at the Parliament of Religions in Chicago, in September, 1893, where, though suffering from a paralytic stroke, he was anxious to raise his voice in behalf of religious liberty. Doctor Schaff's works, which are mostly historical and exegetical, include a *History of the Apostolic Church* (1853); *History of the Christian Church* (1867); *Creeds of Christendom* (1876). He also edited a large number of religious works, the most notable being the Anglo-American reproduction and adaptation of Lange's *Critical, Theological and Homiletical Commentary on the Bible*. Several of his writings have been republished in Germany, England and Scotland, and translated into French, Italian, Dutch, Greek, Bulgarian, Arabic, Chinese, Hindustani and Japanese. Died in New York, Oct. 20, 1893.

SCHÄFFLE, ALBERT EBERHARD FRIEDRICH, a German political economist; born in Nürtingen, Württemberg, Feb. 24, 1831; studied theology at

Tübingen, where he became professor of political economy in 1861. From 1862 to 1865 he was a member of the Württemberg Landtag, and for a short time in 1871 held the office of minister of commerce in Austria, but on the downfall of the ministry in the same year went back to Stuttgart, where he devoted himself to study. His writings, which deal with sociological as well as economic subjects, show the influence of Comte and Herbert Spencer. His chief works are *Die Nationalökonomie* (1861); third edition published under the title *Das Gesellschaftliche System der Menschlichen Wirthschaft* (1873); *Kapitalismus und Sozialismus* (1870); *Quintessenz des Sozialismus* (1874); and *Die Aussichtslosigkeit der Sozialdemokratie* (1885).

SCHAGHTICOKE OR HART'S FALLS, a village of Rensselaer County, central eastern New York, on the Hoosac River, five miles above its mouth, and on the Fitchburg railroad. It contains paper and woolen mills, and has manufactories of cassimeres, gunny-cloth, and twine. Pop. 1890, 1,258.

SCHARF, SIR GEORGE, English illustrator; born Dec. 16, 1820, and educated at London University School. Having gained medals at the Society of Arts, he was admitted a student of the Royal Academy in 1838. His first published work was *Scenic Effects*, etchings illustrating the Shakespearian and classical revivals by Macready, at Covent Garden Theater, in 1838-39. He traveled in Italy in 1840, and accompanied Sir C. Fellows in a journey through Lycia and other parts of Asia Minor, whither he proceeded again in 1843, as draftsman to a government expedition. A large collection of his drawings, both of Lycian views and outlines of sculpture, is in the British Museum. He was a director and virtually the creator of the National Portrait Gallery. His time was chiefly devoted to illustrating books, including Fellows's *Lycia*; Murray's *Illustrated Prayer-Book*; Macaulay's *Lays of Ancient Rome* (1847); Milman's *Horace* (1849); Kugler's *Handbook of Italian and German Painting* (1851; 2d ed., 1855); Layard's works on Nineveh; Dr. Smith's *Classical Dictionaries*; Keats's *Poems*; Pollock's *Dante*; and Bray's *Life of Stothard*. Died in London, April 19, 1895.

SCHAUMBURG-LIPPE. See LIPPE, Vol. XIV, pp. 683, 684.

SCHIEFFEL, JOSEPH VICTOR VON, a German poet; born in Karlsruhe, Baden, Feb. 16, 1826. He studied science, philology and literature in Munich, Heidelberg and Berlin. His first successful epic poem was *The Trumpeter of Säckingen* (1853); then followed his historical romance *Ekkehard* (1855). His collection of *Poems*; *Frau Aventure*; *Songs of the Times of Heinrich von Osterdingen*, sounds like an echo of the old German minnesingers; while his *Gaudeamus*; *Songs from Far and Near*, delight by their genial humor, and strike the genuine popular note. Other productions are his *Bergpsalmen*; *Waldeinsamkeit* and *Waltarilied Verdeutsch*. Schieffel was an original poet of sound judgment and genuine fancy. In 1876 he was ennobled by the Grand Duke of Baden. He died in Karlsruhe, April 9, 1886.

SCHENCK, ROBERT CUMMING, an American

soldier; born in Franklin, Ohio, Oct. 4, 1809; graduated at Miami University; studied law and practiced at Dayton, Ohio.

After holding a seat in the state legislature, he served in Congress from 1843 to 1851, and in the latter year was appointed United States minister to Brazil. Afterward he was employed on diplomatic missions to Buenos Ayres, Montevideo and Paraguay. Schenck was appointed brigadier-general of volunteers in May, 1861. He commanded a brigade at the first battle of Bull Run, July 31, 1861; subsequently he served in western and northern Virginia. In April, 1862, he engaged in the battle of Cross Keys, and maintained the ground that he had won until he was ordered to retire. At the second battle of Bull Run he commanded a division, and had his right arm shattered by a rifle-ball. On Sept. 18, 1862, he was promoted major-general, and appointed to the command of Baltimore, which he protected during Lee's invasion. In December, 1863, he resigned from the army and resumed his seat in Congress, to which he had been re-elected, and where he remained until 1869. He was chairman of the committee on military affairs, and in 1868 was at the head of the committee of ways and means. In 1871 Schenck was sent as United States minister to England. He resigned this post in 1876, as the result of a charge that he had promoted in England the sale of mining-stock in which he was interested, and which afterward proved worthless. Returning to the United States, he resumed the practice of law in Washington, District of Columbia, where he died March 23, 1890.

SCHENECTADY, a city of Schenectady County, southeastern New York, 17 miles W. of Albany, on the Delaware and Hudson and the New York Central and Hudson River railways, and on the Erie canal and the Mohawk River. Schenectady is one of the most important manufacturing centers in the state, as it contains the works of the Westinghouse Company, the General Electric Company, the Schenectady Locomotive Works, and miscellaneous manufactures. Pop. 1890, 19,902; 1900, 31,682. See also SCHENECTADY, Vol. XXI, p. 393; and UNION COLLEGE, in these Supplements.

SCHENKEL, DANIEL, a Swiss liberal theologian; born in Dägerlen, canton of Zurich, Dec. 21, 1813. After studying theology at Basel and Göttingen, he began to lecture at Basel in 1837, and was made pastor at Schaffhausen in 1841. In 1851 he was called by the Grand Duke of Baden to be chief university preacher at Heidelberg and church councillor. Schenkel edited the *Allgemeine Kirchenzeitung* (1852-59), and strenuously supported the liberal movement both in theology and in church constitution. He edited the *Bibel-Lexicon*, and was the founder of the German Protestant Union. Among his writings are *Das Wesen des Protestan-*



ROBERT C. SCHENCK.

tismus (1846-51); *Christliche Dogmatik* (1858-59); and *Das Charakterbild Jesu* (1864). He died in Heidelberg, May 31, 1885.

SCHENKENDORF, MAX VON, a German lyric poet; born in Tilsit, Dec. 11, 1783; studied law at Königsberg and practiced his profession until 1813, when, in response to a call to arms, although lame, he entered the Prussian army and fought at the battle of Leipsic. A collection of his songs, mostly patriotic, appeared in 1815 under the title of *Gedichte*. These songs, like the war lyrics of Körner and Arndt, were a powerful help in arousing German patriotism against the tyranny of Napoleon. At the close of the war Schenkendorf became councilor at Coblenz. Died there Dec. 11, 1817.

SCHERER, WILHELM, an Austrian philologist; born in Schönbrunn, April 26, 1841; studied Germanic philology at Vienna under Franz Pfeiffer, and later at Berlin under Jacob Grimm; professor of German language and literature at Vienna in 1868, at Strasburg in 1872, and in 1877 at Berlin, where he remained till his death. His most famous works are *Zur Geschichte der Deutschen Sprache* (1868), in which he used the results of comparative philology far more extensively and successfully than had hitherto been done in this field; and *Geschichte der Deutschen Litteratur* (1883). Died Aug. 6, 1886.

SCHERR, JOHANNES, a German historian, novelist, and writer of verse; born Oct. 3, 1817, in Hohenreichberg, Württemberg, and studied at Zurich and Tübingen. In 1844 he came to be known in act and writing as a strong democrat, and in 1848 was a member of the Württemberg Diet. In 1849 he fled to Switzerland, where in 1860 he became a lecturer in the Zurich Polytechnic. He wrote a universal history of literature, histories of religion, of English literature, of German manners and customs, a series of romances and novels, and various miscellaneous works in prose and verse. He was vehement and one-sided in polemics, and his lively wit and caustic humor, though they give vivacity to a very characteristic and original style, are extravagant and overstrained; yet as a critic he was for a time very influential in German literature. Died Nov. 21, 1886.

SCHIAPARELLI, GIOVANNI VIRGINIO, an Italian astronomer; born in Savigliano, March 4, 1835. He studied mathematics at Turin until 1856, when he went to Berlin and afterward to Pulkowa for observatory work. In 1860 he was employed in the observatory at Milan, and in 1862 was made director there, becoming known by his remarkable discovery of the relation between the orbits of comets and meteors. His observations on the planet Mars are also of much note, as well as his conclusions, not yet fully established, that the planets Venus and Mercury in their rotation around the sun always present the same face to it, as the moon does to the earth. He discovered the asteroid Hesperia (April 29, 1861), and wrote treatises on comets and double stars; *Astronomical Theory of Shooting Stars* (1867); and *The Precursors of Copernicus in Antiquity* (1873).

SCHILLER, HERMANN, a German educator; born in Wertheim, Baden, Nov. 7, 1839; educated at the gymnasium of his native town and at the univer-

sities of Heidelberg and Erlangen. In 1862-68 he was professor in the gymnasium of Wertheim, and at Carlsruhe from 1868 to 1872. In 1872-76 he was director of the gymnasium at Constance; and in 1876 became director of the gymnasium and seminary, and professor in the university, at Giessen. Schiller took high rank among the leaders of the educational movements which mark the history of Germany during the latter half of the nineteenth century. His works include *Geschichte des Römischen Kaiserreichs unter der Regierung des Nero* (1872); *Lehrbuch der Griechischen und Römischen Geschichte* (1891); *Die Lyrischen Versmasse des Horaz* (1892); *Handbuch der Praktischen Pädagogik* (1894).

SCHILLING, JOHANNES, a German sculptor; born in Mittweida, Saxony, June 23, 1828; educated at Dresden and Berlin, and in 1851 exhibited *Amor and Psyche*, his first production to attract attention. The excellence of his work at Berlin secured him a scholarship at Rome for two years. In 1856 he settled at Dresden, and in 1868 became professor in the academy there. Among his great works are the monument of Luther at Worms, the statue of Schiller at Vienna, the War Monument at Hamburg, and the national monument, *Germania*, on the edge of the Niederwald, which was unveiled by Emperor William I in 1883.

SCHISEOPHONE OR SCHISIOPHONE, an instrument for testing metal for flaws. It is a combination of audiometer, telephone, and microphone, and has also a dry-plate battery and a striker. The metal to be tested is carefully rapped all over with the striker, and if the striker comes opposite an internal flaw, an increased sound is heard in the telephone, while at the same time the resistance of the electrical circuit is increased. The combination insures accurate working, and the instrument is pronounced satisfactory for commercial purposes.

SCHIZÆACEÆ. See FERNS, Vol. IX, p. 140.

SCHIZOPODA, an order of small shrimp-like crustaceans, belonging to the subclass characterized by the presence of a carapace (*Thoracotraca*). The name, signifying split-feet, refers to the biramous swimming-feet. They are mostly marine, but some species of the genus *Mysis* occur in fresh water. The difference between the males and females is so great that they were once classed as different genera.

SCHLEY, WINFIELD SCOTT, an American naval officer; born in Frederick County, Maryland, Oct. 9, 1839; graduated from the United States Naval Academy in 1860; entered service and took part in many engagements during the Civil War. From 1866 to 1869 he was instructor at the Naval Academy, and after serving on the Asiatic station returned to the academy. From 1876 to 1879 he was on the Brazil station, and in 1884 was in command of the Greely relief-ships, *Thetis*, *Bear*, and *Alert*, which brought back Greely and six others from Ellesmere Land. He became commander in 1874, chief of the Navy Equipment and Recruiting Bureau



WINFIELD S. SCHLEY.

in 1885, and captain in 1888. With James R. Soley he published *The Rescue of Greely* (1886). Schley attained the rank of commodore May, 1898, and was given command of the Flying Squadron during the war between the United States and Spain. In the destruction of Cervera's fleet, on its escape from Santiago de Cuba, Commodore Schley performed the chief act of his busy life. On the morning of Sunday, July 3, 1898, the Spanish squadron emerged from Santiago harbor, and in the temporary absence of Admiral Sampson, Schley attacked it with the American blockading fleet, and within a brief hour or two destroyed every vessel, most of the Spanish warships having either surrendered or been beached by their commanders so as to save the lives of the crews of the burning and disabled ships. The devastation was complete, and, as was the case at Manila, the casualties on the American side were insignificant. Schley's courage and resourcefulness throughout the fight were most marked. On Aug. 10, 1898, he was appointed rear-admiral; and on Aug. 16, one of the three commissioners to arrange the evacuation of Porto Rico.

SCHLIEMANN, HEINRICH, a German archæologist, was born at Neubuckow, Mecklenburg, Jan. 6, 1822, and died at Naples, Dec. 27, 1890. He was the son of a Lutheran pastor, who, though dying poor, instilled in his son's heart a high admiration of the heroes of ancient Greece. In 1862-66 he was a banker in Sacramento, California, and was there naturalized. In 1869, having amassed a fortune, he began his archæological investigations in Asia Minor, and spent 12 years on the ruined heaps of Hissarlik, on the Trojan plain, the site of ancient Troy. The result of these researches was the work he published in 1874, *Troy and Its Remains*. In 1876, Schliemann obtained permission of the Greek government to excavate similarly the site of Mycenæ, and in the following year his researches were rewarded by the discovery of certain royal tombs, rich in treasures of gold and silver. This interesting and valuable treasure-trove is now deposited in the Polytechnic at Athens, while the account of the discovery, illustrated by elaborate drawings of the relics, was published in 1877 in *Mycenæ: A Narrative of Researches and Discoveries*, with a preface by Mr. Gladstone. Dr. Schliemann's other explorations extended to the island of Ithaca (1869 and 1878), to Orchomenus (1881-82), and to Tiryns (1884-85). Appended to his work *Ilios*, which appeared in an English dress in 1880, is an autobiography of the author, with notes, etc., by Professors Virchow and Max-Müller. See also MYCENÆ, Vol. XVII, p. 115; TIRYNS, Vol. XXIII, p. 408; and TROAD, Vol. XXIII, pp. 581-82.

SCHMALKALD LEAGUE. See LUTHER, Vol. XV, p. 83.

SCHMIDT, HEINRICH JULIAN, a German journalist and author; born in Marienwerder, Prussia, March 17, 1818; studied philology and history in the University of Königsberg, and settled at Leipsic in 1847 as an editor, afterward becoming connected with Gustav Freytag as proprietor of the *Grenzboten*. Removing to Berlin in 1861, he became editor of the *Berliner Allgemeine Zeitung*, holding the position

until 1863. In addition to his journalistic work, he became well known as a writer and much dreaded as a critic. He was the author of *Geschichte der Romantik im Zeitalter der Reformation und Revolution* (1850); *Geschichte der Deutschen Literatur seit Lessings Tod* (1860-64); *Geschichte der Deutschen Literatur von Leibniz bis auf unsere Zeit* (1886). He died in Berlin, March 26, 1886.

SCHMIDT, JOHANNES, a German philologist; born in Prenzlau, Prussia, July 29, 1843; educated at the Gymnasium in Stettin and at the Universities of Bonn and Jena. Among his writings, mostly on philological subjects, are *Zur Geschichte des Indogermanischen Vocalismus* (1871-75); *Die Pluralbildungen der Indogermanischen Neutra* (1889); *Die Urheimath der Indogermanen und das Europäische Zahlssystem* (1890).

SCHMUCKER, SAMUEL SIMON, an American theologian; born in Hagerstown, Maryland, Feb. 28, 1799; graduated at the University of Pennsylvania and Princeton Theological Seminary, and was settled as pastor at Newmarket, Virginia (1820-26). He was one of the founders of the Evangelical Lutheran Theological Seminary at Gettysburg, Pa. In 1846 he took part in the establishment of an ecclesiastical connection between the Lutheran Church in Europe and that in America. His published works are *Elements of Popular Theology* (1834); *Fraternal Appeal to the American Churches on Christian Union* (1838); *Psychology: or, Elements of a New System of Mental Philosophy* (1842); *Lutheran Manual* (1855). He also wrote *The Definite Synodical Platform* (1856), as an American recension of the Augsburg Confession, to be adapted by the synods of the General Synod, in which the Lutheran doctrines of original sin and the sacraments were greatly modified. He died in Gettysburg, July 26, 1873.—His son, BEALE MELANCHTHON, a clergyman; born at Gettysburg, Aug. 26, 1827; educated at Pennsylvania College and Gettysburg Theological Seminary, and in 1849 was ordained to the Lutheran ministry by the synod of Virginia. He held pastorates at Martinsburg, Virginia, and Allentown, Easton, Reading, and Pottstown, Pennsylvania, coming to the last named in 1880 and remaining until his death. As a liturgical writer he was especially distinguished, *The Church Book* and *The Common Service* probably owing more to his indefatigable labors and investigations than to anyone else. He died Oct. 18, 1888.

SCHOFIELD, JOHN MCALLISTER, an American soldier; born in Chautauqua County, New York, Sept. 29, 1831. At an early age he removed with his parents to Illinois, and for a short while taught a school there. He developed a decided taste for mathematics and astronomy. He graduated at the United States Military Academy in 1853, although—a curious circumstance in the life of one afterwards destined to become the general commanding the army—he narrowly escaped dismissal. On graduation he was assigned to service in Florida. Sickness sent him north to recruit his health, and from 1855 to 1860 he was assistant professor of natural philosophy at West Point. In April, 1861, at the opening of the Civil War, he entered the volunteer service as major of the First Missouri Volunteers, and was appointed chief of staff of General Nathaniel Lyon, under whom

he fought the battle of Wilson's Creek. In this battle Lyon was killed. In November, 1861, he was appointed brigadier-general of volunteers, and was afterward in command of the Missouri militia till November, 1862, and of the Army of the Frontier and the district of southwest Missouri from that time till April, 1863. In November, 1862, he was appointed major-general of volunteers. As such he was in command of the Department of the Missouri from May, 1863, till February, 1864, and afterward of the Army of the Ohio. During Sherman's Georgia campaign, Schofield commanded the Twenty-third Army Corps, taking part in most of the fighting, which ended in the capture of Atlanta, Sept. 2, 1864. On Nov. 30, 1864, he defeated Hood's army at Franklin, Tennessee, and soon joined General Thomas at Nashville. He took part in the battle of Nashville and in the subsequent pursuit of Hood's army. In January, 1865, he was sent to North Carolina with his corps. He captured Wilmington, February 22d; was engaged in the battle of Kingston, March 10th; and joined Sherman at Goldsboro, March 22d. He was present at the surrender of Johnston's army and executed the details of the capitulation. In 1866-68 he had command of the military district of Virginia. June 2, 1868, General Schofield succeeded Edwin M. Stanton as Secretary of War. He remained in this office until March 12, 1869, when he was appointed major-general of the United States army, and was ordered to the Department of the Missouri. From 1870 till 1876, and again in 1882 and 1883, he was in command of the Department of the Pacific. From 1876 to 1881 he was superintendent of the Military Academy at West Point. In 1883 he took charge of the division of the Missouri, and in 1886 of the division of the Atlantic. In 1888, as senior major-general, he became general-in-chief of the United States army, with headquarters at Washington. Feb. 6, 1895, he was appointed lieutenant-general by President Cleveland, that grade having been revived by Congress. He was retired Sept. 28, 1895.



GENERAL SCHOFIELD.

SCHOHARIE, a post village N. Y. and capital of Schoharie County, on Schoharie Creek, and on the Schoharie Valley and the Middleburg and Schoharie railroads. It is in an agricultural and manufacturing section, and has an academy, a foundry and carriage-shops. Population 1900, 1,006.

SCHOLTEN, JOHANNES HENDRIK, a Dutch rationalist theologian; born in Leuten, near Utrecht, Aug. 17, 1811. After studying theology and philosophy at the University of Utrecht he was made professor of theology in the University of Leyden in 1843, and soon became the leader of a liberal movement in Dutch theology, which spread all over Protestant Europe. He was rector of the university at various times, and retired in 1881, being regarded as the father of what is known as the Leyden school of theology. He wrote several works; among them,

The Doctrine of the Reformed Church (1848-50), *History of Religion and Philosophy* (1853); *Free Will* (1859); *The Oldest Gospel* (1868). He died in Leyden, April 10, 1885.

SCHOMBURGK, SIR ROBERT HERMANN, a German traveler; born in Freiburg, Prussian Saxony, June 5, 1804. He began at an early age to apply himself to geographical science and natural history. He was charged by the British Royal Geographical Society with the survey of Guiana in 1835. It was during this exploration, and while he was ascending the Berbice River, that he discovered, Jan. 1, 1837, the magnificent aquatic plant denominated the *Victoria regia*. He was the author of *Travels and Researches in British Guiana* (1835-39), a work which has largely contributed to almost every branch of natural science; the *Description of British Guiana*; and a *History of Barbadoes*. In 1857 he was appointed British representative to the Siamese court at Bangkok. He died in Schöneberg, near Berlin, March 11, 1865. His surveys in British Guiana produced the Schomburgk line, claimed by the British government in the dispute with Venezuela on the boundary question.

SCHÖNBRUNN, an imperial palace a few miles from Vienna, built by Maria Theresa in 1744. The palace is generally inhabited by the imperial family during the summer months. It was here that the Peace of Vienna was signed, Oct. 14, 1809. See also CONCORDAT, Vol. VI, p. 241.

SCHOODIC OR GRAND LAKE, an irregular body of water on the boundary between New Brunswick and Aroostook and Washington counties, Maine. Its length is about twenty-five miles and its width averages four. Its general direction is southeast, and from its lower end issues the St. Croix River. It is famous for its trout and land-locked salmon.

SCHOOLMEN. See SCHOLASTICISM, Vol. XXI, pp. 417-431.

SCHOOLS. See INDIAN AFFAIRS, in these Supplements.

*SCHOOLS, PRIVATE, IN THE UNITED STATES. The phrase *private education*, as used in this article, includes education of every kind that is not furnished by the public or the state. It is therefore very comprehensive, but almost exclusive attention will be given to elementary and secondary instruction.

With the exception of the three New England states, Massachusetts, Connecticut and New Hampshire, there were, strictly speaking, no public school systems in the United States previous to the Revolutionary War. In other states the public authority did something for education, but schools of all kinds originated in private initiative and were carried on mainly by private enterprise. Massachusetts, in fact, was the only colony that made its public schools free before the date mentioned. Furthermore, even in the three New England states private schools were a prominent feature of education, and became more prominent than ever, at least in Massachusetts, in the generation following the Revolutionary War. At present every state has a public school

system, more or less efficient; but, with the exceptions named, these systems postdate the Revolution, while the provision of free public instruction in many states, including some of the oldest ones, postdates the Civil War. Accordingly, private schools hold a very important place in the educational history of the country.

The opening of free public schools in the various communities could not help but exercise an important influence on private education. Now public schools waxed, private schools waned. The public schools being free, private schools were wholly unable to compete with them for the children of the masses. In fact, there is no example in the history of the children of the masses generally becoming educated save where the state has made schools and school-attendance compulsory, and tuition practically free. More than this, the larger funds placed at their disposal, together with the legal machinery for examining and certificating teachers, enabled school boards to offer to the public a much better quality of education than a large majority of the private schools were able to supply. Hence, in the United States, as in England, France, and Germany, private schools are obliged to struggle, as a class, with some obvious disadvantages. Still, public schools have nowhere and at no time covered all the ground. In the East, where private schools had, at the beginning of the competition, such a decided advantage, private schools are far more prominent than in the West, where the public school systems grew up with the states. Again, in the cities they are a much greater factor than in the country. The main causes that now operate in favor of private schools in the competition are the following:

1. The demands made in many private and parochial schools being less than in public schools, they often become places of refuge for pupils who are unable to keep up with the classes in the public schools, or who have been unfortunate in their studies;
2. The belief that some private schools offer better instruction than the public schools in some or all the branches taught;
3. The belief that the manners and personal cultivation of the pupil will be better cared for in the one school than in the other;
4. The unwillingness of some parents to subject their children, and particularly their delicate children, to the intellectual and moral ordeal of the public schools; they are apprehensive that their children will suffer in body, mind, or character;
5. Parents who cannot control their children at home, or can control them only with difficulty, frequently send them away to school, either to ease themselves of the labor and care of looking after them, or to promote the interests of their children, or perhaps for both reasons;
6. Fashion, or social influence. One man sends his child to a private school because his neighbor does so. Outside of the church schools, soon to be mentioned, private schools are used principally by rich or well-to-do people. To a degree, the foregoing are valid reasons. There can be

no doubt that private schools perform an important educational office in the country.

However, the greatest reason of all why non-state schools flourish is yet to be mentioned. Outside of the German states, it has not been found practicable to introduce formal or dogmatic religious instruction into the state schools. In Switzerland and France, the state school is purely a civil institution, as much so as the courts of justice; and even in Italy and England theological teaching is not prominent in the state school. No American state goes further to secure religious instruction than Massachusetts, which declares by law that portions of the Bible shall be read in the schools, but without note or comment. Although the Bible is often read, and hymns sung and prayers made, in the schools of the country, there is still a slow process of secularization going on. The tendency is to base moral teaching even on a rational basis rather than on authority. This tendency is very obnoxious to many religious people. Many of the Roman Catholic clergy denounce the public schools as "irreligious," "atheistic," and "godless," and use the authority of their ecclesiastical positions to create and support church schools, and to compel, if necessary, their parishioners to send their children to them. It is not until the Catholic child has been confirmed that the priest is ordinarily willing that the Catholic child shall attend a public school. It is sometimes said: "Twelve million Catholics are against the public school system." In these facts lies the explanation of the extensive system of parochial schools that the Catholic Church has built up in the United States at great cost and sacrifice. A small number of other Christian bodies, as the Episcopalians and Lutherans, sympathize more or less with the Catholics, following them at a considerable distance. Moreover, there are numerous Protestant Christians who think the process of secularization has gone too far. Various attempts to solve the Catholic problem have been made, but so far without success. It has often been demanded that the church should receive a portion of the public school funds, but this has been denied in the most peremptory manner. In a few instances the church authorities have rented their schoolhouses to the school board for a nominal consideration; the board has then employed and paid the Catholic teachers, who are, perhaps, members of teaching orders, and wear in school the garb of their orders, such teachers being permitted to give instruction in the Catholic religion to such pupils as desired it, but not in the time of the regular school sessions. This is sometimes called the "Poughkeepsie plan," because it originated at Poughkeepsie, New York. It has not met with general favor on either side, and so the problem stands unsolved. Some good judges think the best solution is the one that has been reached in France, viz.: A school holiday every week, on which parents who desire to do so may send their children to the ministers of religion to be instructed in the faith. The relation of the Catholic clergy to the public

schools is a question that has sometimes entered very deeply into politics, and not infrequently has decided the results of elections. Still, it is to be said that the Catholic hierarchy is not at one in relation to public schools. For example, Archbishop Ireland of St. Paul, while contending for religious instruction, and demanding a part of the public school funds for the Catholic parochial schools, has asserted that no accusation was ever more unfounded than that Catholics are bent on destroying the state school. On the other hand, he clearly admitted the right of the state school to exist, and declared himself unreservedly in favor of state laws making education compulsory.

The Report of the Commissioner of Education for 1892-93 contained an estimated enrollment of pupils in private and parochial schools, in cities containing more than 8,000 inhabitants, of 775,901. The corresponding numbers in public day schools was 2,876,866. But the ratio of such children to the total number in these cities is very much larger than in the country as a whole. The same year the Commissioner received reports from 1,484 private high schools and academies, employing 6,261 teachers and giving instruction to 96,147 pupils.

A competent Catholic authority gives the statistics of Catholic education in the United States for the year 1895 as follows: Universities, 9; seminaries, 105, with 3,603 students; high schools for boys, 183; high schools for girls, 609; parochial schools, 3,731; children attending parochial schools, 775,070. The Catholic population of the country is given at 9,077,865 persons.

Many of the states have made a certain amount of elementary instruction compulsory, on the ground that the state must see that citizens are qualified for the duties of citizenship. This argument, many contend, involves the right of the state to look after the quality of the instruction given in private and parochial schools, provided the state is going to accept it as fulfilling the conditions of the compulsory law. Acting on this theory, Massachusetts makes two requirements. The first is, that the managers of all such schools shall make an annual report to the State Board of Education, giving the number of students and instructors, courses of study, cost of tuition, and the general condition of the schools under their charge. The second is, that the instruction given in such schools shall be accepted as meeting the requirement of the law only when the teaching in all studies required by law is in the English language, and the school committees are satisfied that the teaching is as good as that furnished in the public schools in the same locality, and that equal progress is made by the pupils therein in the studies required by law with that made during the same term in the public schools. They shall not, however, refuse to approve a school on account of the religious teaching given therein.

The foreign experts who visited us the year of the Columbian Exposition, and who afterward made our schools the subject of comment, of the

two, rather underrated the influence of private schools. A German critic said: "The majority of private schools are select; i.e., for the well-to-do classes, who do not care to send their children to public schools." But this does not apply to the constituency of the church schools. The same writer continues: "In accordance with American principles of government, broad spheres of social life, subordinate to state jurisdiction in European countries, are left altogether open to the disposal of individuals; we cannot but wonder that schools should, to so great an extent, be under state and municipal jurisdiction, and that, proportionally, there are so few private schools; 87.9 per cent of the pupils belong to public schools; only 12.1 per cent to private schools, including parochial schools." A Russian expert made this comment: "Private denominational elementary schools are of little importance. Of the whole number of pupils, only 9 per cent attend them. The remaining 91 per cent attend the public schools."

All those institutions of higher education which do not belong to the state—a list that includes a very large majority of such institutions in the country—would properly fall within the purview of this article. They have, however, received adequate treatment in another place. (See EDUCATION IN THE UNITED STATES, HIGHER, in these Supplements.)

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B. A. HINSDALE.

*SCHOOLS, PUBLIC, IN THE UNITED STATES. The constitution of the United States creates a government of delegated powers, either expressed or implied. Moreover, not only does the Constitution *not* contain the words *education and schools*, but responsible statesmen have never found a school system among its implications. No reference is here made to the territories, or to the District of Columbia. Accordingly, public education is not a national function, but a state function. There are as many systems of public instruction or schools as there are states, and there is no American or United States system, in any legal or practical sense whatever. In this respect the United States are like Germany, and not like France or Italy. Still, it would be a great mistake to suppose that the national government has been indifferent to the subject; on the other hand, it has a distinct status in educational history. The general subject can be treated under two heads: *The Nation*, and *The States*.

A. The Nation. The work done by the nation is merely subordinate and ancillary to that done by the states. It has been limited to contributing to the material resources of education.

1. In all the public-land states (or states formed out of the public domain), Congress has appropriated either one thirty-sixth or one eighteenth part of the public lands for the maintenance of common schools. The year 1850 marks the passage from the first ratio to the second. Reservations of lands for the same purpose have also been made according to the second ratio, in the territories of Oklahoma, New Mexico and Arizona.

2. In the same states, Congress has given lands for the aid and support of state universities. The rule has been two townships of six miles square, or 46,080 acres, each; but a few states have received a larger quantity. In 1862 an act was passed, offering to all the states, on certain terms and conditions, 30,000 acres of public lands, or an equal amount of land scrip, for each of its Senators and Representatives in Congress, on the basis of the census of 1860, for the aid and support of colleges of agriculture and the mechanic arts. Sooner or later all the states in the Union in 1862 accepted this offer, and it has been repeated with the same result to the states entering the Union since that time. In some states new institutions have been founded to meet the conditions, and in others agricultural and mechanical departments have been added to old institutions. In 1887, Congress appropriated \$15,000 a year to the states severally for the establishment and support of agricultural experiment stations in connection with these colleges, and in 1890 it appropriated \$15,000 a year to each of these colleges, said sum to be raised at the rate of \$1,000 a year until a maximum of \$25,000 should be reached, for their more complete endowment and support.

3. Indirectly, Congress has contributed to the support of education in several other ways. It has given the major number of the public-land states large quantities of land without a particular designation of their object, as the salt and swamp lands within their limits, and 500,000 acres under the State Selection Act of 1841. Often these lands have been dedicated, in whole or part, to education. For example, Wisconsin laid the foundation of her normal school system on a moiety of the proceeds of her swamp-lands. In lieu of these grants, North Dakota, South Dakota, and other new states have received specific grants for normal schools, schools of science or schools of mines, and public buildings. In 1836 the national government "deposited" with the states, according to their representation in Congress, the surplus that had accumulated in the national treasury, amounting to nearly thirty million dollars, which has never been recalled. Some of the states, as Connecticut, applied these funds to educational objects. Congress has given nearly all the public-land states 2, 3 or 5 per cent of the proceeds of the public lands sold within their limits, in consideration of the states forbearing

to tax such lands for five years following their sale. And finally, at least one of the states—Massachusetts—has augmented her permanent school fund by adding to it her portion of the direct tax of 1861, which was refunded to the states by the Fifty-first Congress.

The earlier course pursued by Congress was to grant the educational lands without other conditions than a clear designation of the object in view. The title was vested in the legislature. The fact just stated explains, in large part, the wasteful manner in which these lands were often managed. But with lapse of time Congress has become more careful. Previous to 1837 the common-school grants were made to the townships of the state, rather than to the state as a whole, thus making as many school funds as there were Congressional townships. Since that time, and beginning with Michigan, the grants have been to the state, thus creating one consolidated fund. Congress has also learned that it is wise to legislate on the sale of all such lands. Thus in the act providing for the admission of the states of North Dakota, South Dakota, Montana, and Washington, it was provided that "all lands herein granted for educational purposes shall be disposed of only at public sale, and at a price not less than ten dollars an acre, the proceeds to constitute a permanent school fund, the interest of which only shall be expended in the support of said schools."

The following table, compiled from *The Public Domain*, by Thomas Donaldson, printed at the government printing-office, shows the land grants and reservations for educational purposes down to June 30, 1883. As the reservations include all the territories that have since become states, and as later legislation has changed matters very little, this table has a permanent value.

	ACRES.
For public or common schools -----	67,892,919
For agricultural and mechanical colleges -----	9,600,000
For universities -----	1,395,920
Total -----	78,889,839

B. The States. There is, in the United States, no single educational system, but there are, rather, as many systems as there are states. These state systems are wholly of state creation. It is wholly optional with the states to create school systems or not. At the same time, owing to a certain homogeneity of civilization, these systems agree in their larger features. These larger or common features will now be marked out, and accompanied with indications and tracings of the more important divergencies. The discussion will be brought under the three heads,—*Administration, Maintenance, and Instruction.* However, before taking up the first of these heads, some general facts should be stated. As far as possible, the states naturally use the same organs to carry on their educational work that they use to carry on their other work. These more specific observations should be made: 1. Public instruction is rooted and grounded in the state constitutions. 2. The legislatures, subject to the constitutions, enact the state school laws, or organize the state educational systems.

No general line can be drawn between the constitutional and legislative spheres: one state puts into the constitution what another leaves to the law.

3. The constitution and the law together distribute the school administration, partly to general or state organs and partly to special or local organs. This division naturally conforms to the nature of the state institutions. There are, in the country, three systems of local government. The town system, which makes large use of the town and small use of the county, is found in the New England states alone. The county system, which does not recognize the town or township as a political organ, is found in the South, and in some of the Western states. The mixed system, which recognizes both county and township, laying more stress on one and less on the other than New England, originated in the old middle states, and has spread over the larger part of the West. No immediate reference is here made to schools. It is a fact, however, that the New England states make no use whatever of the county in carrying on the work of public education; that the Southern states make small use, or none at all, of the township; while, where the mixed system prevails, both the county organ and the township organ are employed for educational purposes. It may still further be observed that the number of school systems and the decentralization of powers within the state make luminous treatment of the subject peculiarly difficult.

I. ADMINISTRATION. The states all assign some duties, in respect to education, to its non-educational officers, general and local, as assessors, auditors, comptrollers, and treasurers, who have to do with levying and collecting taxes and handling funds, and prosecuting attorneys and attorney-generals, who see to the enforcement of the laws. The distinctly educational organs are the following:

1. *State Superintendence.* The states have all provided a central educational administration, more or less efficient. Sometimes this administration is single, sometimes double.

(1) In every state there will be found an executive officer, sometimes called, as in Massachusetts and Connecticut, secretary of the State Board of Education; sometimes, commissioner of common schools, as in Rhode Island, Ohio, and Georgia; but commonly, superintendent of public schools or public instruction. Sometimes this executive is a constitutional officer, and sometimes his status is to be sought in the school law. In some states, as in Massachusetts and Connecticut, he is appointed by the state board; in some, as in Maine, Tennessee and Minnesota, he is appointed by the governor; in Vermont, New York, and Virginia he is elected by the legislature; generally, however, he is chosen by the people at the popular election. The term of office ranges from a single year to good behavior, as judged by the state board. These single executives differ considerably in the range of powers and duties assigned to them. In some states, as New York and Pennsylvania, they exert a decided official

influence on public education; in other states, as Ohio and Michigan, they are little more than clerks charged with the preparation and distribution of blanks, and the collection and publication of statistics and other facts, accompanied by appropriate discussions.

(2) When double, the state executive consists of the secretary, commissioner, or superintendent, as before, and the State Board of Education. These boards are constituted and appointed in different ways, and perform quite different duties. The Massachusetts board consists of the governor and lieutenant-governor, *ex officio*, and eight other persons appointed by the governor and council for a term of eight years, one retiring each year. The Michigan board consists of the state superintendent, *ex officio*, and three members elected by the people for the term of six years, one member retiring every two years. The Indiana board consists of the superintendent, who is *ex officio* a member and president of the board, his coadjutors being the governor of the state, the presidents of the State University, of Purdue University, and of the State Normal School, together with the superintendents of the three largest cities of the state, as determined by the enumeration of children for school purposes. The duties of these boards are supervisory in their nature. The Massachusetts board is authorized to receive and hold, in trust, for the state, all donations or bequests made to it for an educational purpose. It prescribes the forms of registers to be kept in the schools, and the forms of blanks to be used by school committees in making their returns, and submits to the legislature an annual report containing an abstract of such returns and a history of its own doings, together with such observations upon the condition and efficiency of the system of popular education, and such suggestions in regard to the most practicable means of improving and obtaining it as the experience and reflection of the board may dictate. The general management of the state normal schools is also vested in the board. The secretary of the board is its executive arm. He collects information respecting the state of the schools, and is required to diffuse as widely as possible, throughout the commonwealth, information concerning the best system of studies and the best method of instruction for the young, in order that the best education which public schools can be made to impart may be secured to all children who depend upon them for instruction. He is required to attend teachers' meetings or institutes, and to advise school committees as to the performance of their duties. To assist the secretary, the board appoints one or more agents, whose business it is to visit the cities and towns, inquiring into the state of the schools, etc. The Michigan board conducts the examinations for state certificates, prepares the questions for the county examinations of teachers, and has exclusive management and control of the state normal school. Sometimes state boards have important duties to perform relative to school books. In some states,

where a board is associated with the superintendent, he is still independent of the board in all matters concerning only his own office.

2. *County Superintendence.* A large majority of the states have provided county superintendence, or its equivalent, for their schools. No such organ, however, is found in New England or in Ohio. Sometimes the county superintendent is appointed by a county board, as in Pennsylvania and Indiana, but he is commonly chosen by the people at the popular election. These county boards are composed of the school directors of the county, or other representatives of local bodies. Sometimes they have performed their sole duty when they have elected the superintendent and fixed his salary. Within his jurisdiction, the county superintendent's duties are similar to the duties of the state superintendent. He is a channel of communication between the state department and the schools and school-officers. The Pennsylvania law makes it his duty to visit, as often as practicable, the several schools of his county, to note the course and method of instruction, to give such direction in the art of teaching in such schools as seem to him necessary, so that each school shall be equal to the grade for which it was established, and that there may be, as far as practicable, uniformity in the course of studies in the schools of the several grades respectively.

3. *The Town or District.* There are, in the United States, two modes of local school organization and administration—the township-unit system and the district system. Under the first system, the town or township is a body corporate and politic for school purposes, and the management of the schools is put into the hands of some town authority provided for that purpose. In Massachusetts this authority is a school committee consisting of three members, or of some multiple of three, chosen at the town meeting. In Ohio it is the township board, composed of members elected in the subdistricts into which the township is divided, one from each district. In Indiana it is the township trustee, who is intrusted with much other important township business. Under the second system, which is much more prevalent, the town or township is divided into school districts, each one of which is a body corporate and politic for school purposes, and so a school unit. This unit manages its own school or schools, through a board of directors or trustees chosen by the legal electors. In Michigan this board consists of an assessor, a director, and a moderator, who are singly charged with the performance of some distinct duties, and together carry on the function of public education. Whether under the township-unit system or the district system, these boards, subject to the law, and sometimes subject to popular instruction at the town or district meeting, levy taxes, buy lots, build schoolhouses, employ teachers, fixing their salaries, provide supplies, and, in general, supervise the schools. Under the township-unit system, also, the town or township is commonly

divided into districts, but only for attendance purposes. Formerly, the whole supervision of the town or district schools was exercised by the school committee or board, assisted, perhaps, by the resident ministers and committees of citizens. At present, board supervision, assisted more or less in the ways indicated, is the only form of supervision that a great majority of these schools still receive, save in those states where county superintendence prevails. The Massachusetts law provides that the town committee shall have general charge of all the public schools in the town, and other states have equivalent legislation. But as such supervision as this is apt to be inefficient, a considerable demand for professional supervision has sprung up, and many states have provided for it. Thus the Massachusetts law says a town, by vote, may require the school committee to appoint annually a superintendent, who, under the direction of the committee, shall have the care and the supervision of the public schools; and still further, that two or more towns may, by vote, form a district for the purpose of employing a superintendent of all the public schools in such district. At the present time, town or township supervision is rapidly growing in public favor.

4. *The City and the Borough.* Almost all cities, and often incorporated villages or boroughs, constitute distinct school districts. This end is reached either by incorporating into the state school law special provisions applying to such cases in general, or by enacting special laws or charters. Many of the city school systems of Michigan are carried on under such charters granted by the legislature. In all these cases the schools are managed by school boards, which are constituted and elected in a variety of ways. In New York City the members of the board are appointed by the mayor; in Philadelphia, by the judges of the courts; in Chicago, by the mayor, subject to the confirmation of the general council; but generally they are elected by the people, either on city tickets or on ward or district tickets. Some boards, subject to the law, levy the school taxes as well as expend them; but others are dependent upon the common taxing authority of the city for revenues. In general, it may be said that each board buys lots, builds schoolhouses, purchases supplies, prescribes the course of study and text-books, elects teachers and superintendents, and exercises a general supervisory oversight of the schools. In Virginia, however, county and city superintendents of schools are appointed and removed by the State Board of Education, consisting of the governor, the superintendent of public instruction, and the attorney-general, subject to confirmation by the senate. Sometimes these city districts have their own boards of examiners to examine teachers, but others use the common examining authority. In special cases city school administration is extremely complex and difficult to describe. It is not deemed important here to deal with these anomalous cases.

II. SCHOOL MAINTENANCE. This branch of the

subject may be treated under the two divisions,—*Revenues* and *Expenditures*.

1. **REVENUES.** The subject of sources of school revenues is an extensive one in itself. Only an outline is here attempted.

(1) *Income from Permanent School Funds or Endowments.* A large majority of the states have such funds or endowments for the maintenance of the common schools. In the public-land states these funds grew originally out of the land grants made by Congress for common-school purposes, only the interest of which was made available. Not infrequently, states have increased these original funds by adding to them state funds. Then most, if not all, of the non-public-land states have created school funds out of their own resources. For example, Connecticut, in 1796, dedicated the proceeds of the lands that she owned in northern Ohio, known as the Western Reserve, to the perpetual support of her schools, and at present this fund amounts to something more than \$2,000,000. Before public schools had taken the strong hold on the public mind that they now have, it was thought wise to create permanent school funds, sometimes even at the expense of state taxation. It was thought that they would serve as bulwarks to public education.

(2) *State School Taxes.* These are levied in various ways. Connecticut levies a tax on the property, amounting, in the aggregate, to \$1.50 for every person between the ages of 5 and 16 years, and New Jersey one of \$4 for every person between the ages of 4 and 18 years. Rhode Island levies a lump sum of \$120,000 for the year, and Pennsylvania a sum of \$5,500,000.

Ohio and Wisconsin levy a tax of one mill and Nebraska one of one and one half mills on a dollar on the tax duplicate of the state. Indiana votes 11 cents, and Kentucky 22 cents, on every \$100 of taxable property in the state. The purpose of these state taxes is to make the wealthy districts, as the cities, assist the poor ones in the important matter of education.

(3) *Local Taxes.* Generally speaking, the great resource for school support is taxes imposed by the local authorities, such as county, town or township, district and city taxes. In some states there is a growing tendency to depend less than formerly upon local taxes and more upon general taxes.

(4) *Miscellaneous Sources.* Of these there is a considerable variety. Fines, license taxes, penalties, taxes on banks, taxes on dogs, etc., are utilized in different states for school support. Some states, most of them found in the South, levy poll taxes of small amount for the same object.

The report of the Commissioner of Education for 1893-94 shows, state for state, the sources from which the school moneys received for the year were derived. As would naturally be expected, considerable differences appear in the ratios of items when state is compared with state. It is impossible to give the table in full. The totals are as follows:

Income from permanent funds and rent of school lands	\$ 8,486,052
Income from the state taxes	33,074,152
Income from local taxes	111,245,253
Total income raised by taxation	144,329,410
Income from all other sources	14,235,930
Total receipts, excluding sales of bonds and balance on hand	167,051,392

2. **EXPENDITURES.** Under this head only the most general facts relating to the distribution and application of school moneys need be stated.

(1) The Congressional township funds of the public-land states, or those of them admitted to the Union between 1803 and 1837, are applied directly to their object by the local authorities.

(2) The income of the permanent funds arising from Congressional school lands in the other public-land states is distributed by the state authorities to the counties, and by the counties to the towns or districts, according to their respective number of persons, on an annual enumeration, between certain ages, as 6 and 21, or 5 and 20 years.

(3) The income arising from permanent funds in the non-public-land states is sometimes given to those towns or districts that, by reason of their poverty, especially need assistance, and it is sometimes distributed according to population between certain prescribed ages. Massachusetts is an example of the first method, Connecticut of the second.

(4) The proceeds of state taxation are sometimes distributed according to one of the foregoing rules, and sometimes according to the other. In Ohio the distribution to the counties, etc., is according to their respective population between the ages of 6 and 21 years.

(5) Local taxes are applied to local purposes, county, town or township, city, or district, as the case may be.

(6) It is not uncommon to devote the proceeds of fines, licenses, etc., to the support of schools within the civil division that collects or imposes the tax. For example, the constitution of Nebraska provides that all fines, penalties and license moneys arising under the general laws of the state shall belong and be paid over to the counties, respectively, where the same may be levied or imposed, and all fines, penalties and license moneys arising under the rules, by-laws, or ordinances of cities, villages, towns, precincts, or other municipal subdivisions less than the county, shall belong and be paid over to the same, respectively. All such fines, penalties, and license moneys shall be appropriated exclusively to the use and support of common schools in the respective subdivisions where the same may accrue. The constitution of California contains the somewhat singular provision that the public school system shall include primary and grammar schools, and such high schools, evening schools, normal schools, and technical schools as may be established by the legislature, or by municipal or district authority, but the entire revenue derived from the state school fund and the state school tax shall be applied exclusively to the support of

primary and common schools. High schools must, therefore, be created and supported at local cost, which has had much to do with retarding high-school education within the state.

The report of the Commissioner for 1893-94 shows the school expenditures for that year. Only the totals are given.

Sites, buildings, furniture, libraries and apparatus-----	\$29,237,231
Salaries of teachers and superintendents----	108,520,730
Other expenses-----	32,626,212
Total expenditures, excluding payment of bonded debt-----	\$170,384,173

The American ideal is free instruction in the public elementary schools. In this respect a great change has taken place in a generation, tuition fees and rate-bills having disappeared altogether. The principle has been universally adopted that the property of the state shall educate the children of the state. But in the public high schools fees are frequently charged, particularly in those states where public instruction is not well developed. Sometimes these charges are limited to special branches of study, as the classical and modern languages. The report of the Commissioner of Education for 1892-93 shows that the total income of public high schools for that year was \$8,374,000, of which \$616,350 was derived from tuition. This item is, however, misleading, because it is common to charge all pupils fees who attend school out of their own town or district. In the state universities and colleges, fees are universal. It may be observed that a free school in the United States is something quite different from a free school in France or Italy. There, it is a school that is not maintained by the state, and so is, in a measure, free from its control, as a private or church school. Here, its freedom consists in the absence of money charges, making a school that all persons who are properly prepared are free to attend. When school bills were generally passing away some years ago, the word *free*, in connection with schools, had great vogue, but is now much less often met with. A free school was a public school, and in some states the legal title of the state superintendent is still "superintendent of free schools." So strongly has the belief that education should be free taken hold of the public mind that considerable progress has been made in making the use of text-books free to the pupils, as well as buildings, furniture, and apparatus. For years indigent pupils have been so provided, and now, in many towns and cities, including all those of Massachusetts, all children are so furnished who attend the public schools.

III. INSTRUCTION. The states of the Union all provide public instruction of the elementary and secondary grades, and a majority of them provide higher instruction as well. In other words, every state has a system of public instruction, more or less perfect. We are now to pass in review the several kinds of education that are provided.

1. *The Common School.* This school is for the

instruction of the youth of the country in the common branches of education. It is the equivalent of the elementary school of England, the primary school of France, the people's school (or *Volks-schule*) of Germany. In the cities, where the pupils are closely graded, it is common to speak of "the grades." Furthermore, the grades are commonly divided into primary and grammar, but sometimes into primary, intermediate, and grammar. The state law makes it obligatory upon the local school authorities, or rather upon the people themselves, to establish and maintain such schools. The Massachusetts law, which, everything considered, is the most perfect of its kind, provides: "In every town there shall be kept, for at least six months in each year, at the expense of said town, by a teacher or teachers of competent ability and good morals, a sufficient number of schools for the instruction of all the children who may legally attend public school therein, in orthography, reading, writing, English grammar, geography, arithmetic, drawing, the history of the United States, and good behavior. Algebra, vocal music, agriculture, sewing, physiology and hygiene shall be taught, by lectures or otherwise, in all the public schools in which the school committee deem it expedient." It is further provided that the several towns shall raise such sums of money for the support of schools as they judge necessary; that if any town refuse or neglect to comply with this requirement, it shall forfeit a sum equal to twice the highest sum ever voted for the support of schools therein; and that the towns shall elect a school committee which shall have general charge and superintendence of the school or schools thus provided for.

A list of studies will be found in the several state school laws, but not always as long a list as the one given above, and not always given in the same way. Sometimes the studies are put in a list in which teachers must be examined. The studies included are called the legal branches. Often the law specifies that the instruction in physiology shall embrace the effect of alcoholic drinks, stimulants, and narcotics on the human system. Civil government, also, which is not embraced in the above list, has been made a legal branch in a large number of states. The six months' limit is only a minimum; any town may exceed it, and many towns do exceed it. At this point there is considerable difference in the different states. In Ohio the public schools must continue in session not less than 24 weeks in the year, nor more than 44 weeks. In Michigan the minimum is 5 months. In Connecticut it is graded according to the number of persons in a district between the ages of 4 and 16 years, the limits being 24 and 36 weeks. In the Southern states, where the school systems have been created since the Civil War, the schools are in session for a shorter time each year than at the North. In 1892-93 the schools of the country were kept on an average 136.7 days. The five great divisions of states recognized by the Census Office presented the following averages:

	DAYS.
North Atlantic states-----	169.7
South Atlantic states-----	105.7
North central states-----	146.4
South central states-----	93.1
Western states-----	141.1

The rules regulating the time that the schools must be taught each year are enforced by denying to the town or district sometimes neglecting to observe the rules all share in the state school fund, whether derived from endowments or state taxes. The making of reports, and other compliances with legal requirements, are also enforced in the same manner. Again, there are variations relating to the ages of persons to whom school privileges are accorded. The constitution of Nebraska makes it the duty of the legislature to provide for the free instruction, in the common schools of the state, of all persons between the ages of 5 and 21 years. In Massachusetts the limits are fixed by the town committee. In Ohio the limits are 6 and 21 years. In Connecticut and Michigan, the lower limits are 4 years and 6 years respectively, and no higher limits are assigned. As a rule, instruction in the several branches is given in the English language. This rule, however, does not prevent the teaching of other languages, as such. Many states have made instruction in German, under certain conditions, permissible, or even compulsory. Thus in Ohio, boards of education are required to provide instruction in the German language for the school or schools under their charge during any school year, when a demand therefor is made by 75 freeholders, residents of the district, representing 40 or more pupils who desire, in good faith, to study the German and English languages together.

The old slave states not only provide separate schools for the two races, white and black, but they also make it illegal for children of the different races to attend the same school. The Alabama law declares: "In no case shall it be lawful to unite in one school children of the white and colored races." This relates to public schools; but Florida went so far as to enact a similar prohibition in relation to non-public schools, since declared unconstitutional.

2. *The High School.* Here, again, we may begin with Massachusetts. The law provides: "Every town may, and every town containing five hundred families or householders according to the latest public census taken by the authority either of the commonwealth or of the United States shall, besides the schools prescribed in the preceding section [i.e., elementary schools], maintain a high school to be kept by a master of competent ability and good morals, who, in addition to the branches of learning before mentioned, shall give instruction in general history, book-keeping, surveying, geometry, natural philosophy, chemistry, botany, the civil polity of this commonwealth and of the United States, and the Latin language. Such high school shall be kept for the benefit of all the inhabitants of the town ten months at least, exclusive of vacations, in each year, and at such convenient place, or

alternately at such places, in the town as the legal voters at their annual meeting determine. And in every town containing four thousand inhabitants the teacher or teachers of the schools required by this section shall, in addition to branches of instruction before required, be competent to give instruction in the Greek and French languages, astronomy, geology, rhetoric, logic, intellectual and moral science, and political economy." The law also requires any town that is exempt from the legal duty of maintaining a high school, owing to the smallness of its population, to pay the tuition of any child who, with its parents or guardian, resides in the town, and who attends the high school of another town or city, having first obtained permission of the authorities of such school. Many Massachusetts towns, falling below the population limit given in the law, avail themselves of the option accorded to support high schools. Still more, two adjacent towns, having each less than five hundred families may form one district for the establishment of a high school, where the majority of legal voters of each town shall in a legal manner so determine. Massachusetts is the only state that makes the maintenance of high schools compulsory. The other states content themselves with giving the local authorities power to maintain them if they and their constituents so desire. In such cases the studies to be taught are selected and grouped by the school board, subject to the law. In the larger high schools of the country two or more courses of study will be found, as the classical, scientific, English, German, Latin and scientific, commercial, and still others. Indeed, more than one course is generally to be found in the small schools. It is also common to connect manual training departments with high schools. The full high school course is four years, but schools can be found in cities of good educational repute that require but three years.

The public high schools may be viewed under two aspects. Primarily, they are designed to give pupils who have completed the work of the elementary schools an opportunity to carry the studies that they have been pursuing still further, and to take up new studies. Students who complete the courses graduate and receive diplomas, but not degrees. Accordingly, these schools are sometimes called "people's colleges." But, to a great extent, the studies of the high school, considered as the people's colleges, are also necessary to fit young men and women for the college and university, and so they become fitting or preparatory schools. In fact, public high schools, to a great degree, have taken the place of academies and so-called preparatory departments. Particularly is this true in the Western states, where a state university is found at the head of the state educational system. In such cases the university is apt to facilitate the student's passage from the high school to its halls by accepting his diploma, or it may be a special certificate, as entrance credentials, in lieu of an entrance examination. Nor is this affiliation confined to the state high

schools; often, if not always, it embraces non-state schools, and also extends beyond state limits. The university satisfies itself as to a school's fitness to sustain such a relation by examining, perhaps by a committee especially sent for that purpose, the school's course or courses of study, equipment, discipline, and instruction. This system originated at the University of Michigan in 1871. The calendar of that university for 1896-97 carried on its "diploma" list 152 schools.

It has been the opinion of some judges that no division of education, taking the country together, is in such an unsatisfactory condition as secondary education. This is particularly true of the public high schools, considered as schools fitting for college. Much attention has recently been devoted to this subject. A committee of leading educators, commonly called the "Committee of Ten," has recently investigated it thoroughly, and submitted a report, with typical courses of study, which has already led to much discussion, and will no doubt lead to valuable reforms.

3. *State Universities and Colleges.* Every state now carries on some higher educational work, general, special, or both. Reference to state universities and colleges of agriculture and the mechanic arts has been made already. The subject will also receive fuller treatment in another article. (See EDUCATION IN THE UNITED STATES, HIGHER, in these Supplements.)

4. *Normal Schools, etc.* When the agitation for better education had fairly set in (in the decade 1835-45), it was clearly seen that the provision of better teachers was necessary to the accomplishment of the end. About the same time, the attention of American educators was first drawn to the school systems of the German states, in which the teacher's seminary—or the normal school, as we have chosen to call it, borrowing the name from the French—is such an important feature. In these facts originated the movement to give elementary teachers professional training as well as academical training. The first American normal school was founded in 1839, and the number of such schools has continued to increase until the present day. But the effort to provide professional training for teachers has not been confined to normal schools. Training-classes are found in high schools, while pedagogical departments and chairs, which look rather to the preparation of teachers for the secondary schools, have been established in many colleges and universities. A small number of teachers' colleges have also been established. Public normal schools are divisible into two classes,—schools supported by the states, and schools supported by localities or cities. Many cities have adopted the policy of providing, in whole or part, teachers for their own schools. Of state schools, Indiana has 1; Michigan, 2; Pennsylvania, 13; New York, 11; Connecticut, 1; Rhode Island, 1; Illinois, 2, with two others in prospect. In 1892-93 there were reported to the Bureau of Education 52,008 so-called "normal" students, of whom 27,926 were in public normal schools, 7,286 in private normal

schools, while the remainder were scattered among high schools, public and private, and colleges and universities. There were 5,043 normal graduates that year. The same year the total number of teachers employed in the public schools was 383,010. It is also safe to say that ten per cent of these teachers were new teachers. It is therefore clear that a large majority of the total number of teachers in the public schools receive no professional training before entering upon their work. Some years ago the commissioner reported that in 28 states less than ten per cent of the public school teachers had received such training. To a Prussian or a Saxon, accustomed to seeing all teachers professionally trained, this would seem an anomalous state of affairs.

5. *Teachers' Institutes.* A teachers' institute may be defined as a normal school that is held for a short term with a short course of study, and conducted according to methods peculiar to itself. It is known only in the United States, save as it may have been introduced into Canada. In 1839, Dr. Henry Barnard, then secretary of the Connecticut Board of Education, "in order to show the practicability of making some provision for the better qualification of common-school teachers, by giving them an opportunity to review and extend their knowledge of the studies usually pursued in district schools, and of the best methods of school arrangements, instruction, and government, under the recitations and lectures of experienced and well-known teachers and educators," called together, at Hartford, for a month's session, such teachers of Hartford County as were disposed to attend, organized them into a school, and, with several instructors whom he had called to his assistance, proceeded to instruct them along the lines proposed. This was the first institute of which we have any knowledge; the name, however, was given at a later day. The next year, Dr. Barnard held a second one, for ladies. Other educators were quick to imitate his example, and soon the institute spread over the states that were participating in the forward educational movement then in progress. The originator of the institute, looking only to immediate results, had no idea at the time that he was creating a new instrument of great power. At present over two thousand institutes are held in the country every year, with an aggregate attendance, it is probable, of something like two hundred thousand persons. In the main, Dr. Barnard's ideas have been adhered to,—reviews of academical studies and professional instruction. The generation of higher ideals of life and teaching, and the stimulation of educational enthusiasm, are also to be mentioned among the prominent objects that are held in view.

6. *Evening Schools.* In the older and more densely populated states, evening schools are an important feature of public education. Generally, these schools nearly parallel the instruction given in certain branches by the day schools, but sometimes they more nearly correspond to the

continuation schools of Germany. In general, it is the object of these schools to enable persons whose elementary education has been neglected, or who cannot attend the day schools, to make good, in part, their deficiencies, and particularly boys and young men. The Massachusetts law makes it the compulsory duty of towns and cities having ten thousand or more inhabitants to establish and maintain evening schools for the instruction of persons over 12 years of age in orthography, reading, writing, geography, arithmetic, drawing, history of the United States, and good behavior. The school committee may add still other branches, if it deems it expedient to do so. It is also made the duty of every city of fifty thousand or more inhabitants to establish and maintain an evening high school, in which shall be taught such branches of learning as the school committee may deem expedient, whenever 50 or more residents, 14 years of age or over, competent to pursue high school studies, shall, in writing, petition it to do so, and shall certify a desire to attend. In 1893-94, 55 Massachusetts towns supported 285 evening schools, with an average attendance of 17,420. The average in attendance had about doubled since 1885. But here, as in some other respects, Massachusetts is in advance of the other states.

7. *The Defective, Dependent, and Criminal Classes.* Great progress has been made in the United States in the education of the so-called defective classes, not only the blind and deaf and dumb, but also the feeble-minded. Private enterprise, sometimes prompted by philanthropy and sometimes by commercial considerations, has taken hold of this problem; nevertheless, government is the all-powerful agent. The new states are following closely in the wake of the old ones in providing asylums or schools for the blind, deaf and dumb, and feeble-minded. A competent observer said of the work done by these classes that was exhibited at Chicago: "The feeble-minded are the least susceptible to education; and yet the drawings, compositions, maps, needlework and carvings show great possibilities for even the imbecile classes." Among the dependent classes, the Indians hold an important place. The work done in the Indian schools maintained by the general government deserves special mention, for no more interesting educational experiment is now in progress than the attempt to make civilized men and women out of the children of the plain, forest, and mountain. Fifty-two of the government Indian schools contributed to the grand educational exhibit made at the Columbian Exposition. In respect to the criminal classes, it must suffice to remark that the conviction is constantly gaining ground that education must be depended upon to prevent vice and crime, far more than institutions of repression and punishment. Particularly is this the case with the young of vicious and criminal tendencies.

Two agencies have greatly stimulated interest in the subject, and have done much to guide the public thought. The first are variously called educational associations, teachers' associations, and the like, and have sprung into existence in the

last fifty or sixty years. It would be difficult to exaggerate the united influence of these associations. Much the most imposing one is the National Educational Association, organized in Philadelphia in 1857. This association, which counts its members by thousands, holds an annual meeting in July and issues an annual volume of proceedings. The other agency referred to is the Bureau of Education, in the Department of the Interior at Washington, created in 1867. The Revised Statutes declare it to be the purpose and duty of the bureau to collect statistics and facts showing the condition and progress of education in the several states and territories, and to diffuse such information respecting the organization and management of schools and school systems and methods of teaching as shall aid the people of the United States in the establishment and maintenance of efficient school systems and otherwise promote the cause of education throughout the country. The head of the bureau is styled Commissioner of Education, whose reports are extensive and valuable magazines of educational information.

MISCELLANEOUS TOPICS. Several miscellaneous topics, necessary to round out the view, still remain to be mentioned.

1. *Foreign Influence.* In colonial days, American education and educational institutions conformed, in general, to English ideas and models. There was, indeed, a far greater development of public elementary education in the principal New England colonies than could be found in the mother country. Save that of the Dutch in New York and the Germans in Pennsylvania, it is not easy to discover an appreciable foreign influence, and such influence as existed became less and less as time wore on. The Revolutionary War brought the states into contact with the mind of France, and for a time that country exercised a distinct influence on our education, confined, however, mainly or wholly, to colleges and superior schools. About 1815 American students began to resort to the German universities, and in less than twenty years the result began to be seen on this side of the ocean. The effect was not measured by what the returned students said, wrote and did; translations of Madame de Stael's *Germany* and M. Victor Cousin's *Report on the State of Public Instruction in Prussia* were considerably read; American educators, as Profs. A. D. Bache and Calvin E. Stowe, visited the European countries to investigate the state of education, and on their return published the results of their studies. Progressively, American education has been strongly influenced from top to bottom by the German learning, science, schools, methods and spirit. Especially was it the impetus from this source that first led to the establishment of normal schools in the United States.

2. *Religion in the Public Schools.* This has been, and still is, a burning question. As in many European countries, so in the United States, steady progress has been made in the direction of making the public school a distinctly civil school, to

the exclusion of ecclesiastical and formal religious elements. This movement has been strenuously resisted, mainly on the ground that formal religious teaching is essential to good morals. As a rule, the school authorities either require or permit the reading of the Bible in the schools, and the singing of religious hymns, but no formal didactic instruction. The Massachusetts law declares that some portion of the Bible shall be read daily in the schools, but without note or comment. The supreme court of Ohio has decided that the whole subject is committed to boards of education, and the supreme court of Wisconsin, that to read the Bible in the state schools is contrary to the state constitution. Generally speaking, the mind of the teacher is an important factor in the practical question. Some bodies of Christians object very strongly to the settlement that has been reached, so far as that language is applicable to the facts. The Roman Catholic Church, in particular, takes this ground. Formal dogmatic instruction in religion the clergy insist upon, and as the state refuses to furnish or permit it, they build up and support, whenever it is consistent, parochial schools for the elementary education of the children of the church. To an extent, other churches, as the Lutheran, pursue the same policy. Much care is taken in the matter to guard the rights of conscience in respect to education. For example, the constitution of the new state of Montana provides: "No religious or partisan test or qualification shall ever be required from any person as a condition of admission into any public educational institution of the state, either as teacher or student; nor shall attendance be required at any religious service whatever, nor shall any sectarian tenets be taught in any public educational institution of the state; nor shall any person be debarred admission to any of the collegiate departments of the university on account of sex." A cognate point is this: The states guard the public school funds against the danger of diversion to private or sectarian purposes. The revised constitution of New York, 1894, declares: "Neither the state nor any subdivision thereof shall use its property, or credit, or any public money, or authorize or permit either to be used, directly or indirectly, in aid or maintenance, other than for examination or inspection, of any school or institution of learning wholly or in part under the control or direction of any religious denomination, or in which any religious tenet or denomination is taught."

3. *Manual Training.* One of the salient features of recent American educational history is the marked stress laid upon manual training. This movement originated in the conviction that more should be done than was being done to fit youth for the practical duties of life. This first ideal was not unlike that of the trades schools of Europe. Soon, however, the center of interest shifted, and now the main argument that is urged is the direct pedagogical value of such training, irrespective of the future employments of children. Still, manual training has not wholly freed

itself from its earlier tendency. A German critic of American education says two currents are noticeable in American manual training. "The first follows the principle that manual training should be a part of every division of education, beginning with the kindergarten." The second is "to make manual training an essential part of secondary education." Thus far such training has become more prominent in the secondary sphere than in the elementary sphere. Besides the manual training-school proper, manual training departments, in which instruction in wood-work, metal-work, etc., is given, are often found connected with high schools. A competent authority, who studied the whole subject at Chicago in 1893, said: "Manual training for boys and girls is gaining in favor, and only the great expense of equipment prevents it from being introduced very generally. The work of adapting it to every school grade, from the kindergarten to the institute of technology, is being carried rapidly forward, and the time will soon come when progressive school boards everywhere will make it a part of the prescribed course of study." In particular has the conviction taken strong hold of men's minds, that manual and industrial training, and that of a very practical kind, must form a very important part of the education of the colored race in the South, if that race is ever to reach the level of a worthy citizenship.

4. *Teachers' Tenures and Salaries.* A German critic, comparing the salaries paid to teachers in the United States with those paid in Germany, remarks: "It must be remembered that the advantage of permanency connected with positions in Germany does not exist in America," and "there are no pensions and stipends after death," etc. In no particulars does the status of the American teacher differ more widely from that of the German teacher than those here mentioned. Permanency of tenure has been the theme of no little discussion, but mainly without practical results, save as public opinion has been enlightened and boards of education have been educated. The rule is for boards to select teachers for a year only at a time, but public opinion, to a great extent, enforces, particularly in cities and towns, the re-election of teachers of approved ability from year to year. Public opinion, however, is not equally effective in the case of the superintendent, who stands in an exposed condition. It may be mentioned that Cincinnati alone of American cities has taken an advanced step in respect to tenure. The teacher is first elected for one year, then, if re-elected, for two years, then for four, and then for good behavior.

Much less attention has been paid to retiring-pensions for teachers, but, so far as law is concerned, more progress has already been made. Within two or three years, several large cities, as Brooklyn, Cincinnati, Detroit and Chicago, have established pension systems for teachers. The principal funds provided for the purpose are mainly contributed by the teachers themselves, so that the scheme is little more than a system of mutual

insurance. In Detroit, besides gifts and legacies made by individuals, and such moneys as the public authorities may appropriate, the teachers' retiring fund consist of such parts of teachers' salaries as may be withheld by the board for absences from duty, and such percentages of their salaries as the board may see fit to levy for the purpose. No teacher can become a beneficiary of the fund who has not served in the public schools 25 years, nor can he then receive an annuity of more than \$400.

On the whole, teachers are better paid in the United States than in foreign countries. In 1892-93, of the total expenditure for school purposes, 64 per cent was for teachers' wages. Still, the average pay per month of male teachers in 42 states was only \$46.39; of female teachers, \$38.46. The highest male average was in Massachusetts, \$140.73; the lowest, in North Carolina, \$25.34. These last figures, however, mean less than might appear. In the one state, only a few positions, and those highly paid ones, are held by men, while in the other state a majority are held by men. The relative number of female teachers tends slowly to increase, while the aggregate is already more than double the number of men. The respective numbers in 1892-93 were: Females, 260,914; males, 122,056; total, 382,970.

Massachusetts had the smallest per cent of males, 8.8; Arkansas the largest, 70.2. The wages of women are slowly approaching, although still much below, the wages of men. In California the law decrees that no discrimination shall be made between the sexes, other things being equal; but school boards often, if not generally, discover means to evade the law, thus illustrating the futility of legislating against the law of supply and demand.

5. *The Rural Schools.* Much attention has of late been given to this subject. The education furnished in rural schools, measured by a scholastic standard, is inferior to that given in city schools, and there is reason to think that, other things being equal, illiteracy is greater in the country than in the cities. The relative sparseness of population, the insufficiency of funds, the small size of the schools, and the larger employment of children in regular industries are factors to be considered. In the South, the presence of two races is a much more serious fact, educationally considered, in the country districts than in the cities. Attempts have been made, with considerable success, to introduce into the rural schools regular grading, classification, examinations and more systematic work. In some states it is attempted to overcome the difficulties incident to rural schools by consolidating the schools at central points, as the centers of towns or townships, and carrying the children to and from the school, as far as necessary, at the public cost. Massachusetts has already gone some distance in this direction, and Ohio is just starting. In this way it is believed schools can be improved, and their cost be reduced at the same time. At the present time a committee created and appointed

by the National Council of Education in 1895 is engaged in investigating the whole subject, with instructions to report in 1897.

6. *City School Organization.* Once city schools, as a class, were as unrelated and ill organized as country schools still are. The city was divided into districts, each with its own committee or board, its own school or schools, its own funds, and its own corps of teachers. Experience proved this to be a very unsatisfactory state of things. Accordingly, when the new-born interest in public schools and popular education declared itself about the year 1835, the cities and boroughs began rapidly to organize themselves into single school districts, with unitary boards controlling all the public schools of the city. This may be called the "union" school movement. This has now been the form or type of city school organization for 50 years. Still, this model is not always followed. Sometimes two or more complete systems of schools will be found in the same city, as in Saginaw, Michigan, and in Denver, Colorado. Occasionally, the high school or schools are placed under one or more special boards, as in Cincinnati. Now and then the existing system is a curious compound of the old district plan and the modern unitary plan, as in Pittsburg. In Hartford, Connecticut, no unification of the districts has been effected, save that there is a single high school for the whole city; the common school districts are still wholly separate and distinct. The same description would have applied to Philadelphia previous to 1883. The causes of these anomalous situations are always historical; the greater perfection of the unitary plan is seldom or never disputed.

At the same time, practically, that the union school movement declared itself, the city school superintendent appeared on the scene. Superintendence could not possibly have preceded a system to be supervised. From that day to this, unification and city superintendence have advanced with equal step. A fully developed city system of instruction, on the pedagogical side, is a highly organized body. At the top stands the superintendent of instruction, who is the executive officer of the board. He is supported by a staff of assistant superintendents, or supervisors, and special teachers. Theoretically, and generally practically, he is also the pedagogical leader of the teachers. Next below him we find the high school principal or principals, with a staff of assistants. Below this grade we meet the principals of the ward or district schools, leading the teachers who are devoted to primary and grammar school instruction. Perhaps a city training-school supported especially to prepare teachers for the city schools completes the circuit of the system.

7. *Examining and Certifying Teachers.* A school teacher holds a peculiar position among public teachers. He is an employee, in some countries an officer of the state, and receives a compensation from the public treasury, in some countries also a pension on retirement. Again, the state provides public instruction for its youth, and

often makes attendance on this instruction compulsory. How shall the state satisfy itself that the teacher is competent to do the work and deserving of the salary? The only practical answer to this question is, the state must examine all candidates and certificate such as it finds worthy of certification. Hence the examination systems that have sprung up in the various states, of which there is considerable variety. The traditional New England plan is for the town school committee to examine candidates, either directly or indirectly. Cities that are independent districts frequently have independent boards of examiners appointed by the board of education. In those states that make large use of the county as a political organ, the local examining authority is connected with the county. Sometimes this authority is lodged in a board of examiners, sometimes in the county superintendent. The certificates given by these authorities are recognized, as a rule, only within the jurisdictions that grant them. Moreover, they are given for limited periods of time,—1, 2, 3, or 5 years. But many states have provided for state examinations and certificates, good either for long periods, or for life. Sometimes this work is done by state boards of education, sometimes by special boards of state examiners. Normal schools are often empowered to grant certificates to their graduates. The same may be said of some state universities, as of Michigan and California, provided these graduates have done a prescribed amount of pedagogical study. The laws provide that the authorities that grant certificates may, for sufficient reasons, revoke them. Little progress has been made in the direction of interstate recognition of certificates.

8. *Compulsory Education.* To compel the towns and districts to support schools is not to compel citizens to use these schools. Formerly, there was complete freedom on the part of parents at this point; but in later days, owing to fuller appreciation of the value of education to the individual, and to the state or social whole, measures of compulsion have become common, but not universal. Compulsory education laws, more or less stringent, have been enacted in many states, the most stringent being found in the older states, where large wealth is available for school support, and where a dense population and a complex social organization render public education more important. The Massachusetts law, which is one of the most effective, provides that every person having under his control a child between the ages of 8 and 14 shall cause such child to attend some public school in the city or town where he resides, at least 30 weeks every year, if the schools are kept open that length of time, with an allowance of two weeks for absences not excused by the superintendent; and for every neglect of such duty the offending person shall forfeit to the use of the public schools of the city or town a sum not exceeding twenty dollars. But if a child has attended for the same period a private day school approved by the school committee in the city or

town, or if he has been otherwise instructed for the period in the branches required by law to be taught in the public schools, or has already acquired these branches, or if his physical and mental condition is such as to render his attendance inexpedient or impracticable, then the compulsory rule shall not take effect. Ordinarily, compulsory education laws are much less stringent than this; the penalty for disobedience or neglect is slight, or perhaps none at all, and the exemptions from school-attendance are more numerous. Often, truant-officers are appointed, however, whose business it is to see that the attendance laws are enforced. In the cities and towns of Massachusetts where gratuitous instruction in the use of tools or in manufacturing is given, compulsory attendance also includes the fifteenth year. On the whole, the compulsory education laws are neither satisfactory in themselves, nor are they efficiently enforced. It is common to fix, by law, an age below which children shall not be employed in mercantile, mechanical, and manufacturing establishments. In Connecticut this age is 13 years.

9. *The New Education.* For some years past this topic has been more discussed in educational circles than almost any other that could be named. To define the "new education" is quite as difficult as it is to define the "new theology." Either one is rather a spirit, a habit of thought, or a stream of tendency, than a formal creed or statement of doctrine. It may be said, in general, that the new education, so called, has absorbed into itself the main ideas of the sense-realistic school from Comenius down; that it is sympathetic to new movements, as manual training, nature-study, the kindergarten, and child-study; that it lays the primary stress on the child, the secondary stress on studies; and that, although many of its principles are applicable to the higher stages of education, it finds its great sphere of activity in elementary schools. It may be added that the new education has contributed more to educational spirit or enthusiasm than to educational thought.

10. *History.* It may be impossible to fix the absolute beginning of teaching and education in the United States, but the beginning of practical school legislation was no doubt the statute enacted by the general court of Massachusetts in 1647. This statute ordered that every town in the jurisdiction having fifty householders should employ a teacher who should teach all such children as resorted to him to write and read; also, that every town with 100 householders should set up a grammar school, the master of which should be able to instruct youth so that they would be fitted for the university (i. e., Harvard College). The cost of maintaining these schools was to be paid by the parents of the children so educated, or by the inhabitants in general, by way of supply, as the major part of those that ordered the "prudentials" of the town might direct. A penalty was imposed upon the towns that should neglect to perform their duty.

Beginning with this statute, Massachusetts led the other colonies in school legislation, Connecticut closely following. Systems of public schools can therefore be traced back to the beginnings of those states. John Adams, writing to the Abbé de Mably in 1782, found the key to the history of New England in four institutions: the towns, the churches, the schools, and the militia companies. The Dutch of New York and the Quakers of Pennsylvania also gave much attention to education. In most of the colonies, however, the subject was left to private enterprise, and with few exceptions it cannot be claimed that what we know as public instruction existed in the colonies down to the Revolution. Nor does the Revolution appear to have given state education any new momentum. On the contrary, the public schools of Massachusetts declined after that period. In many states it came to be understood that public schools were for the poor, and they were sometimes called "pauper schools." When the Connecticut school fund became available early in this century, that state took a leading position, which it continued to hold until the beginning of the educational renaissance. The movement that is sometimes designated by this name, which was due to a variety of causes, began in the decade 1835-45. State superintendence, local superintendence of a professional character, normal schools, teachers' institutes, public school libraries, and school unification are now first heard of in our history. Great progress was made throughout the Northern states, but at the South, slavery barred the way. The Civil War gave popular education a great impulse, which it has never lost. There are now as many public school systems as there are states, all of which there is reason to think are gaining in efficiency. Astonishing progress has been made in the material equipment of schools—in sites and buildings, libraries, books, furniture, and illustrative material. Methods of teaching and discipline have improved. Great pains have been bestowed upon elaborating courses of study. Associations and societies with an educational aim are all the time increasing in number and influence. Educational literature—text-books, journals, and pedagogical works—constantly multiply and improve in character. The present annual expenditure for public schools is not less than \$175,000,000,—much the largest sum that any country now expends, or has ever expended, for such a purpose. In 1892-93 there were 13,510,719 pupils, or 69 per cent of the youth between the ages of 5 and 18 in the country, enrolled in common schools alone, with an average daily attendance of 8,857,717 pupils. The total value of public school property was \$398,435,039. The sum of \$9.21 per taxpayer and \$8.45 per capita of the youth of school age was raised for school purposes. The warfare upon ignorance is progressing favorably. In the 20 years from 1870 to 1890, the reduction of illiteracy was from 20 per cent to 13.3 per cent of the total population 10 years of age and over. Still, the present statis-

tics of illiteracy are alarming, or at least would be if they were not relatively so much less than formerly. In 1890 as many as 6,324,102 persons 16 years of age or over were illiterate. By far the larger number of these, however, were emigrants from foreign countries and the colored people of the South. There is much reason to believe that the next census will show a further gratifying reduction of the per cent of illiteracy, particularly in the Southern states.

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B. A. HINSDALE.

SCHOULER, JAMES, an American lawyer and historian; born in West Cambridge (now Arlington), Massachusetts, March 20, 1839; graduated from Harvard in 1859; studied law and began to practice in Boston; entered the Union army in 1862 and served for a year in the signal corps, after which he returned to the practice of law. Among his legal writings are *Domestic Relations*; *Personal Property*; *Bailments*; *Wills, Executors and Administrators*. He is best known, however, as the author of a *History of the United States under the Constitution* (1880-91).

SCHOUTEN, WILLEM CORNELIS. See HOORN, Vol. XII, p. 156.

SCHRADER, JULIUS FRIEDRICH, a German painter; born in Berlin, June 16, 1815; studied painting under his father, at the academy of his native city, at Düsseldorf from 1837 to 1845, and having gained the grand prize at Berlin in 1844, he went from Düsseldorf to Rome, where he remained three years. He there painted the *Capitulation of Calais*, which gained his election to the Berlin Academy. Among his best known works, in addition to a number of portraits, are *The Death of Leonardo da Vinci* (1851); *Esther before Ahasuerus* (1856),

Cromwell at the Deathbed of His Daughter (1864); and the great fresco in the New Museum of Berlin.

SCHREINER, OLIVE. See CRONWRIGHT-SCHREINER, OLIVE, in these Supplements.

SCHREYER, ADOLF, a German painter; born in Frankfort-on-the-Main, July 9, 1828; studied at the Städcl Institute in Frankfort, and in Munich; followed the Austrian army along the Danube in 1854, and then traveled in Turkey, southern Russia, Algeria, and the East. He then took up his residence in Paris, remaining there until 1870, when he removed to Kronenberg. In 1862 he was made court painter to the Grand Duke of Mecklenburg-Schwerin, and in 1864 received the cross of the Order of Leopold. His paintings, most of them large, show a beautiful coloring of landscape, and are widely celebrated for their portraits of animals, especially horses. Among his works, many of which are in the United States, are the *Battle of Waghäusel* (1858); *Cossack Horses* (1864); *Charge of Artillery* (1865); *Horses Frightened by Wolves*; *Arabs Retreating*; and *Arabs on the March*. Died Feb. 14, 1895.

SCHRÖDER, FRIEDRICH LUDWIG. See DRAMA, Vol. VII, pp. 442-43.

SCHUCKBURG, DR., a young British surgeon on the staff of Gen. James Abercrombie during the war against the French and Indians, the reputed author of the words of *Yankee Doodle*, which he is said to have written in 1758, sitting on the edge of a well (still in existence) at Fort Crailo, in ridicule of the raw American recruits who came in clad in all kinds of motley garb, the name of the song being *The Yankee's Return from Camp*. The author's name is also given as SCHUCKBERG, SHACKBERG, and STACKPOLE.

SCHULTE, JOHANN FRIEDRICH. See OLD CATHOLICS, Vol. XVII, p. 755.

SCHULTZ, SIR JOHN CHRISTIAN, a Canadian legislator; born at Amherstburg, Ontario, Jan. 1, 1840; studied at Oberlin College, Ohio, in medicine at Queen's University, Kingston, and Victoria University, Cobourg. After taking his medical degree, in 1860, he practiced in Winnipeg. He also engaged in the fur trade, wrote for the *Nor'wester*, and made a study of the fauna, flora, soil, and climate of the country. In 1867-68 he agitated in favor of the union of the provinces; and after the Northwest was purchased by Canada, in 1869, was captured by the insurgents under Louis Riel and sentenced to death, but escaped. In 1871-82 he was M. P. for Lisgar in the Dominion Parliament, but was defeated in 1882, and appointed to the Senate. In 1888-95 he was lieutenant-governor of Manitoba. Died in Winnipeg, April 13, 1896.

SCHULTZE POWDER. See SHOOTING, Vol. XXI, p. 835.

SCHUMANN, CLARA JOSEPHINE, a German pianist, daughter of Freidrich Wieck; born in Leipsic, Sept. 13, 1819; made her *début* as a pianist at ten years of age; married Robert Schumann, the composer, September, 1840; a fine renderer of Chopin's music; visited England in 1856, in 1865, and then frequently; in 1878 became principal teacher of the piano at the Conservatoire, Frankfort; composed a number of pianoforte pieces. Died May 20,

1896, in Frankfort-on-the-Main. See SCHUMANN, ROBERT, Vol. XXI, p. 459.

SCHREINER, HON. W. P., Q. C., C. M. G., Prime Minister of Cape Colony, was born in Cape Colony in 1857, and is brother to Olive Schreiner, the author of *The Story of an African Farm*. He was educated at Cape Town and at London University and admitted to the English Bar in 1882. He settled at Cape Town and entered the Legislature of the Colony, becoming attorney-general in Mr. Cecil Rhodes' cabinet. He later on became Premier, and is in political affiliation with the Afrikaner Bond, though understood to be neutral in his attitude towards the war in the Transvaal.

SCHURMAN, JACOB GOULD, a Canadian educator; born in Freetown, Prince Edward Island, May 22, 1854; educated in Canada, England, Scotland, France, and Germany, having won the Gilchrist scholarship for Canada in 1875, and the Hibbert traveling scholarship for Great Britain in 1878. He was professor of philosophy and English literature in Acadia College, Nova Scotia, 1880-82; in Dalhousie College, Halifax, 1882-86; and in 1884 was elected honorary life-governor of University College, London. In 1886 he became professor of Philosophy at, and in 1892 president of, Cornell University. In 1892 he became editor of *The Philosophical Review*, and in 1893 of *The School Review*. In 1898 he was made president of the Philippine Islands commission. Among his writings are *Kantian Ethics and the Ethics of Evolution* (1881); *The Ethical Import of Darwinism* (1888); and *Belief in God* (1890).

SCHURZ, CARL, a German-American statesman and journalist; born in Liblar, near Cologne, Prussia, March 2, 1829. From 1846 to 1848 he studied at the University of Bonn. In the spring of 1849 he was engaged in an unsuccessful attempt to excite an insurrection at Bonn, and took part in the defense of Rastadt, a fortified town of Baden, then occupied by the Revolutionary party. On the surrender of that fortress he escaped to Switzerland. In 1852 he removed to the United States, resided for three



CARL SCHURZ.

years at Philadelphia, and then settled in Watertown, Wisconsin. In 1859 he removed to Milwaukee, where he practiced law. He became a leader of the German element of the newly founded Republican party, and was a prominent speaker for Lincoln during the Presidential campaign in 1860; was appointed United States minister to Spain, March, 1861, but resigned that post in December of the same year to enter the army. In April, 1862, he was appointed brigadier-general of volunteers; and in May, 1863, he became major-general. Schurz commanded a division in the second battle of Bull Run, and also in the battle of Chancellorsville. At Gettysburg he was in temporary com-

mand of the Eleventh army corps, and took part in the battle of Chattanooga. After the war he settled at St. Louis, and in 1869 he was chosen United States Senator from Missouri. He was a supporter of Horace Greeley in 1872. In 1875 he removed to New York. In the campaign of 1876 he supported Rutherford B. Hayes for the Presidency, and after the election of the latter was, in 1877, appointed Secretary of the Interior. In 1881-83 he edited the New York *Evening Post*. In the fall of 1884 he was conspicuous for his opposition to Mr. Blaine, and was a leader of the "Mugwumps," thus assisting in the election of President Cleveland. Schurz wrote one of the best biographies of Henry Clay (1887). His forcible speeches in favor of sound money were of value and importance in the Presidential campaign of 1896.

SCHUSTER, ARTHUR, a German scientist; born in Frankfort-on-the-Main, Sept. 12, 1851; educated at the gymnasium of his native city, at the Geneva Academy, and after the removal of his parents to Manchester, England, at Owens College, but completed his studies at the University of Heidelberg. In 1873-74 he was honorary demonstrator in the physical laboratory at Owens College, and in 1875 was appointed chief of the eclipse expedition to Siam. Became professor of applied mathematics at Owens College in 1881, holding the position till 1888, when he succeeded to the chair of physics. Besides the eclipse expedition already mentioned, he took part in three others: to Colorado in 1878; to Egypt in 1882, in which he photographed for the first time, on plates prepared by Captain Abnéy, the spectrum of the solar corona. In 1879 he was elected a fellow of the Royal Society. He wrote several papers *On the Present State of Spectrum Analysis*, and made valuable investigations concerning the discharge of electricity through gases, and on terrestrial magnetism.

SCHUYLER, a city and the capital of Colfax County, eastern Nebraska; about 60 miles W.N.W. of Omaha, on the north bank of the Platte River, near its junction with Shell Creek, and on the Union Pacific and the Burlington and Missouri River railroads. It is the trade-center of a rich agricultural district, and has large flour-mills, sugar and syrup works, hay-presses, etc., and a large United States sugar-beet experiment station. Population 1900, 2,157.

SCHUYLER, EUGENE, an American author and diplomatist, a descendant of Peter Schuyler, first mayor of Albany; born in Ithaca, New York, Feb. 26, 1840; graduated at Yale in 1859 and at Columbia Law School in 1863. He was consul at Moscow from 1867 to 1869, at Reval from 1869 to 1870, secretary of legation at St. Petersburg from 1870 to 1876; traveled extensively in Russian Turkestan, Khokan and Bokhara; became secretary of legation and consul-general at Constantinople in 1876; consul at Birmingham in 1878; chargé d'affaires at Bucharest in 1880; concluded a treaty with Roumania and Servia in 1881; was minister to Greece, Servia and Roumania from 1882 to 1884, and consul-general at Cairo from 1889 till his death. He lectured in the United States in 1885, and wrote

many books of travel and works on history, diplomacy and commerce, including *Turkestan* (1876); *Peter the Great* (1884); and *American Diplomacy* (1886). He died in Cairo, Egypt, July 18, 1890.

SCHUYLER, PHILIP, an American general; born in Albany, New York, Nov. 20, 1733. He inherited large estates from his father, and increased his wealth by marriage. In 1755 and 1758 he served in the British army against the French, and rose to the rank of major. In 1775 he was a delegate to the Continental Congress that convened in Philadelphia, and in June of the same year he was made major-general of the Revolutionary army. In August he went to Ticonderoga, having for his object the placing of that fort and Crown Point in a state of defense. Poor health compelled him to return to Albany, where he fulfilled the duties of quartermaster-general and commissary-general. In 1777 he was again chosen to represent New York in Congress, and was appointed chief of the military in the State of Pennsylvania. Soon after, he was directed to proceed to the Northern department and take command there. But General Gates, who had been appointed to co-operate with Schuyler, undermined him in every possible way, so that Congress, yielding to the pressure from New England, sent Gates to supersede Schuyler. The latter gave his successful rival the full benefit of his services and superior knowledge of the country and its inhabitants. He was present at Burgoyne's surrender, which his own wise arrangements had greatly helped to bring about. In April, 1779, after he had been re-elected to Congress, he resigned from the army. He aided the public treasury by liberal advances from his private resources. In 1789 and again in 1797 the New York legislature elected him United States Senator. In the New York legislature he contributed largely to the code of laws adopted by the state, and was an active promoter of the canal system. He died in Albany, New York, Nov. 18, 1804.

SCHUYLKILL HAVEN, a borough of Schuylkill County, eastern central Pennsylvania, on the Schuylkill River and Canal, four miles S. of Pottsville, and on the Pennsylvania and the Philadelphia and Reading railroads. It is engaged in mining and shipping coal, having large wharves and canal-boat docks, and contains shoe and soap factories, hosiery-works, railway car-shops and rolling-mills. Population 1890, 3,088; 1900, 3,654.

SCHUYLKILL RIVER, the largest affluent of the Delaware River; rises in Schuylkill County, a few miles northeast of Pottsville, and runs southeasterly to Port Clinton, where it passes through Kittatinny, after which it flows in a southerly direction through Berks County and forms a part of the boundary between the counties of Chester and Montgomery. It flows through Philadelphia, cutting the city almost in two; is one of the most beautiful features of Fairmount Park, and is the chief source of the water-supply for the city. After a course of about 130 miles it enters the Delaware at a point near League Island. By means of dams and locks, canal-boats ascend the Schuylkill as far as the coal regions of Schuylkill County. Some of the other towns of importance upon the river besides Phila-

delphia, are Pottsville, Reading, Phoenixville and Norristown.

SCHWAB, GUSTAV, a German author; born in Stuttgart, June 19, 1792; studied theology and philosophy at Tübingen. After holding the professorship of ancient literature at the Stuttgart gymnasium, he was in 1837 appointed pastor at Gomaringen, and in 1840 of St. Leonhard Church in Stuttgart, where he remained until his death. He was one of the best known of the Swabian poets, and considered the most elegant of the school of writers founded by Uhland. His *Gedichte* appeared in 1828-29. Among his prose writings are *Schillers Leben* (1840); *Sagen des Klassischen Alterthumes* (1838-40); *Deutsche Volksbücher* (1843). He died Nov. 4, 1850.

SCHWATKA, FREDERICK, an American Arctic explorer; born in Galena, Illinois, Sept. 29, 1849; graduated at West Point in 1871, and served as a lieutenant of cavalry on the frontier till 1877, meanwhile being also admitted to the Nebraska bar and taking a medical degree in New York. In 1878-80 he commanded an expedition to King William's Land which discovered and buried the skeletons of several of Sir John Franklin's party, and gathered information which filled up all gaps in the narratives of Rae and McClintock, besides performing a notable sledge-journey of 3,251 miles. (See POLAR REGIONS, Vol. XIX, pp. 325, 326.) After exploring the course of the Yukon in Alaska, in 1884, he resigned his commission. In 1886 he commanded the New York *Times* Alaskan expedition, and ascended Mount St. Elias to a height of 7,200 feet. He conducted an expedition to northern Mexico in 1889 to study the remains of Aztec civilization and those of the cliff and cave dwellers, and in 1891 led another party to Alaska, which opened up some seven hundred miles of new country in the same quarter. In recognition of his services, he received the Roquette Arctic medal from the Geographical Society of Paris, and a medal from the Imperial Geographical Society of Russia. Among his writings are *Along Alaska's Great River* (1885); *Nimrod of the North* (1885); and *The Children of the Cold* (1886). He ended his life by suicide in Portland, Oregon, Nov. 2, 1892.

SCHWEINFURTH, GEORG AUGUST, a German explorer and naturalist; born in Riga, Russia, Dec. 29, 1836. After being educated at Riga and Heidelberg, he devoted himself to the study of botany, and made scientific excursions in Russia, France and Italy. In 1864, 1865-66 and 1868-71 he made three journeys in the valley of the Nile to investigate the flora and fauna of the Nile regions. In 1873-74 he explored the great oasis in the Libyan desert, and was appointed by the Khedive director of the Museum of Natural History at Cairo. In 1876-78 he explored the country between the Nile and the Red Sea, and in 1881 took part in an exploration of the Island of Scotia, after which he engaged in promoting German colonization in equatorial Africa. Among Dr. Schweinfurth's writings are *Plantae Quædam Niloticæ* (1862); *Beitrag zur Flora Ethiopiens* (1867); *Reliquia Kotschyaræ* (1868); and *Im Herzen von Afrika* (2 vols., 1874); translated

into English under the title *The Heart of Africa* (1874). He also sent rich collections of natural history to Germany.

SCHWEINITZ, LEWIS DAVID DE, an American botanist; born in Bethlehem, Pennsylvania, Feb. 13, 1780; educated in Germany, where he resided from 1798 to 1812. In the latter year he became Moravian pastor at Salem, South Carolina, where he remained until 1821. By his indefatigable researches he discovered over 1,400 new species of American plants, 1,200 of which being fungi. He published *Catalogues of the Fungi of North Carolina* (1818), and afterwards of *North America* (1832). He died in Bethlehem, Feb. 8, 1834.—His son, EDMUND ALEXANDER DE SCHWEINITZ was born in Bethlehem, Pa., Mar. 20, 1825. On Aug. 28, 1870, he was consecrated bishop, and became president of the Northern Conference of the Moravian Church in America. He published *The Moravian Manual* (1859); *The Moravian Episcopate* (1865), etc. He died Dec. 18, 1887.—His son, GEORGE EDMUND DE, an ophthalmologist; born in Philadelphia, Pennsylvania, Oct. 26, 1858. After completing his education he became prosector of anatomy at the University of Pennsylvania in 1883, and lecturer on medical ophthalmology in 1891. In the same year he became professor of ophthalmology at the Philadelphia Polyclinic, and a year later at Jefferson Medical College. From 1888 to 1891 he was connected with *The University Medical Magazine*, and in 1892 was appointed ophthalmic editor of *The Therapeutic Gazette*. He has published numerous surgical and medical works.

SCIDMORE, MRS. ELIZA RUHAMAH, author of a notable work on *China: the Long-Lived Empire*, was born at Madison, Wis., Oct. 14, 1856, and educated at boarding schools. She has acted as corresponding secretary of the National Geographic Society, and of late has resided in Washington. Her chief books are *Alaska, the Southern Coast and the Sitkan Archipelago*; *Jinkrissha Days in Japan*; *Westward to the Far East*; *From East to West: Guide to Alaska and the Northwest Coast*; *Java, the Garden of the East*; and *China: the Long-Lived Empire*. The latter work was brought out for the authoress by The Century Company, N. Y., and in London by Messrs. Macmillan & Co., and attests the writer's ability, her intimate acquaintance with the Far East, and her artist eye for picturesque effects in nature and in human life.

SCIATICA. See NEURALGIA, Vol. XVII, p. 364.

SCIENCES, THE NATIONAL ACADEMY OF. See ACADEMIES OF SCIENCE, in these Supplements.

SCILLA. See HORTICULTURE, Vol. XII, p. 252.

SCINCIDÆ, a family. See LIZARD, Vol. XIV, p. 733.

SCIO, a post village of Harrison County, eastern Ohio, 110 miles E.N.E. of Columbus, on the Pittsburg, Cincinnati, Chicago and St. Louis and the Wheeling and Lake Erie railroads, in a region devoted to agriculture, poultry, and stock-raising; numerous oil-wells have recently been sunk; is the seat of Scio College, a Methodist co-educational institution, sometimes known as "One-Study University," established in 1866. In 1898 it had 16

instructors, 410 students, and a library of 2,500 volumes. Population 1890, 616; 1900, 1,214.

SCIOTO RIVER, a northern affluent of the Ohio, noted for its natural beauty, rising in Anglaize County, western Ohio. It flows east through Anglaize, Hardin and Marion Counties; then south, intersecting Delaware, Franklin, Pickaway, Ross, Pike and Scioto, and enters the Ohio River at Portsmouth. Other important towns on the river are Chillicothe, Circleville and Columbus. The Scioto flows through a fertile valley, and has a course of about two hundred miles, navigable at high water for a distance of 130 miles from the mouth.

SCISSORS-BILL. See SKIMMER, Vol. XXII, p. 120.

SCISSORTAIL (*Milvulus*), a bird belonging to the tyrant-birds (*Tyrannidae*), found in Mexico, Central America and some Southwestern states. It is a very beautiful and graceful bird, and is specially active during twilight. The name refers to the long, forked tail which is opened and closed in a scissors-like fashion. Two birds of the genus *Milvulus* bear the name. The swallow-tail fly-catcher (*M. forficatus*) is the most common, while the fork-tailed fly-catcher (*M. tyrannus*) is also sometimes called scissortail.

SCITUATE, a township of Plymouth County, eastern Massachusetts, containing the villages of Scituate, North Scituate, Scituate Center and Greenbush, on the Atlantic Ocean, and on the New York, New Haven and Hartford railroad, 27 miles S.E. of Boston. The manufacture of boots and shoes is the leading industry. The township is popular as a summer-resort. Population 1900, 2,470.

SCITUATE, a township of Providence County, north central Rhode Island, between the townships of Gloucester, Johnston, Cranston, Coventry and Foster, about seven miles W. of Providence. It contains Moswauicut Pond, and is intersected by the Pawtucket River. The villages in the township are Kentville, Chapmist, North and South Scituate. Population 1895, 3,529.

SCIURIDÆ. See MAMMALIA, Vol. XV, p. 418.

SCLATER, PHILIP LUTLEY, an English ornithologist; born in Hoddington House, Hants, Nov. 4, 1829; educated at Oxford, and later became a fellow there; in 1855 was called to the bar at Lincoln's Inn, and in 1859 became secretary of the Zoölogical Society at London. From 1875 to 1877 he was private secretary of his brother, George Sclater-Booth, who was then president of the local government board. Afterward he was general secretary of the British Association for the Advancement of Science until 1882, when he was made vice-president. Among his publications are *Zoölogical Sketches; Catalogue of American Birds; Guide to the Gardens of the Zoölogical Society of London*, and several hundred papers on ornithological subjects and kindred sciences. He edited the *Ibis* after 1860.

SCLATER-BOOTH, GEORGE, an English statesman; born in London, July 25, 1826. From Winchester School he proceeded to Balliol College, Oxford. He was called to the bar of the Inner Temple in 1851. In 1857 he was elected member of Parliament for North Hampshire, which constitu-

ency he continued to represent in the Conservative interest until 1887. As secretary of the poor-law board in 1867, he represented that department in the lower house. On the resignation of Lord Derby in February, 1868, Mr. Sclater-Booth was appointed to the secretaryship of the treasury in place of Mr. Hunt, who became chancellor of the exchequer. During Mr. Gladstone's administration he served as chairman of the committee on public account. On the formation of Mr. Disraeli's government, in 1874, he was sworn in as a privy councillor, and appointed to the office of president of the local government board, which he held till the Conservatives resigned in April, 1880. During the period of Mr. Gladstone's administration (1880-85), Mr. Sclater-Booth acted as chairman in conducting the new experiment of grand committees. In 1887 he was created a peer, with the title of Baron Basing. He died in 1894.

SCLERENCHYMA. See HISTOLOGY, Vol. XII, p. 15.

SCLERODERMA. See TRUFFLE, Vol. XXIII, pp. 591, 592.

SCLEROTIC COAT. See ANATOMY, Vol. I, p. 886.

SCLOPIS, FEDERIGO PAOLO, an Italian public man and legal writer; born in Turin, Italy, Jan. 10, 1798. He graduated at Turin, and in 1827 began lecturing before the Turin Academy. He was elected correspondent member in 1845, and in 1869 foreign member of the Institute of France; was chosen Minister of Justice in Piedmont (1848); Italian Senator in 1849, being president of the Senate from 1861 to 1864; and was president of the Geneva congress for the Alabama arbitration. He was president of the Turin Academy of Sciences, and in 1868 Victor Emmanuel presented him with the order of the Annunziata. He published *La Storia della Legislazione Italiana* (1840-64); and *Ricerche Storiche sopra le Relazioni Politiche tra la Dinastia di Savoia ed il Governo Britannico* (1853). He died March 8, 1878.

SCOLOPACIDÆ, a family of wading birds, including the snipe, curlew, woodcock, sandpiper and others. Most species are more or less aquatic, but some, as the woodcock, frequent dry woodlands. The family is widely distributed over the world.

SCOMBERESOCIDÆ. See ICHTHYOLOGY, Vol. XII, p. 693.

SCOMBRIDÆ. See ICHTHYOLOGY, Vol. XII, p. 690.

SCOPAS. See ARCHÆOLOGY, Vol. II, p. 360.

SCOPELIDÆ. See ICHTHYOLOGY, Vol. XII, p. 692.

SCORPENIDÆ. See ICHTHYOLOGY, Vol. XII, p. 689.

SCORPIO. See ZODIAC, Vol. XXIV, p. 791, et seq.

SCORPION-FLY. See INSECTS, Vol. XIII, p. 151.

SCORPIONS. See ARACHNIDA, Vol. II, pp. 283-286.

SCORZONERA. See HORTICULTURE, Vol. XII, p. 287.

SCOTCH CONFSSION OF FAITH. See PRESBYTERIANISM, Vol. XIX, p. 679.

SCOTISTS. See SCHOLASTICISM, Vol. XXI, pp. 29-30.

SCOTLAND. See GREAT BRITAIN, *ante*, 1449-56.

SCOTLAND, CHURCH OF. See PRESBYTERIANISM, Vol. XIX, pp. 679-85.

SCOTLAND, FREE CHURCH OF. See FREE CHURCH OF SCOTLAND, Vol. IX, pp. 742-46.

SCOTT, DRED. See UNITED STATES, Vol. XXIII, p. 772.

SCOTT, HUGH SETON, an English novelist; better known as Henry Seton Merriman. His works include *The Phantom Future* (1889); *From One Generation to Another* (1892); *The Slave of the Lamp* (1892); *From Wisdom Court* (with Stephen G. Tallentyre, 1893); *With Edged Tools* (1894); *The Grey Lady* (1895); *The Sowers* (1896); *Flotsam* (1896); *The Money Spinner* (1896); *In Kedar's Tents* (1897); *Roden's Corner* (1898).

SCOTT, RICHARD WILLIAM, a Canadian public man; born in Prescott, Ontario, Feb. 24, 1825. He was admitted to the bar; was at different times mayor of Ottawa; a member of the Canadian Assembly; of the Ontario Assembly, of which he was president from 1871 to 1873; member of the Queen's Privy Council; Secretary of State from 1874 to 1878; and temporary Minister of Justice and Minister of Internal Revenue at Ottawa. It was due to his influence that the liquor law known as the *Scott Law* was passed. He became a member of the Dominion Senate, March 13, 1874, and was always a leader of the Liberals.

SCOTT, THOMAS ALEXANDER, an American railroad manager; born in London, Franklin County, Pennsylvania, Dec. 28, 1824. In 1841 he entered the office of collector of tolls at Columbia, Pennsylvania; in 1847 became chief clerk to the collector of tolls at Philadelphia; the next year became connected with the uncompleted Pennsylvania railroad; rose rapidly to be general superintendent, and in 1859, vice-president. During the Civil War he held various commissions under the government, at one time being assistant Secretary of War, having charge of questions regarding transportation, and was commissioned a colonel for his services. By securing control of Western lines he was able to make the Pennsylvania line what it is to-day. He became president of the Union Pacific, and finally succeeded to the presidency of the Pennsylvania railroad. He resigned in 1880, and died in Darby, Pennsylvania, May 21, 1881.

SCOTTDALE, a borough of Westmoreland County, southwestern Pennsylvania; 17 miles S. of Greensburg and about 35 miles S.E. of Pittsburg, on the Pennsylvania and the Baltimore and Ohio railroads. It is surrounded by a country having large deposits of bituminous coal, most of which is converted into coke. It has also a rolling-mill, iron-foundries, gas and water-pipe works, and is a shipping-center for coal, coke and iron. Population 1890, 2,693; 1900, 4,261.

SCOTTISH LITERATURE. See SCOTLAND, Vol. XXI, pp. 540-543.

SCOTTSBORO, a post village and the capital of Jackson County, northeastern Alabama, 41 miles E. of Huntsville and 5 miles W. of the Tennessee River, on the Memphis and Charleston railroad. It is in a

region which produces cotton and grain; has mines of coal and iron, and quarries of granite and marble. The village has a tannery and saw-mill, and is the seat of a co-educational institute. Population 1890, 959; 1900, 1,014.

SCOTT WEB PERFECTING PRESS. See PRINTING-PRESSES, in these Supplements.

SCOTUS, DUNS. See DUNS SCOTUS, Vol. VII, pp. 545, 546.

SCOTUS, JOHANNES E. See ERIGENA, Vol. VIII, pp. 522-524.

SCOURING-RUSH. See RUSH, Vol. XXI, p. 62; and HORSETAIL, Vol. XII, p. 208.

SCOUTS. See NAVY, in these Supplements.

SCRANTON, a town and the capital of Jackson County, southeastern Mississippi, 40 miles S.W. of Mobile, Alabama, on the Pascagoula River, about half a mile from the Gulf of Mexico, on the Louisville and Nashville and the Moss Point and Pascagoula railroads. It has grist and saw mills, is an important shipping-point for lumber, and has an extensive oyster industry. Population 1900, 2,025.

SCRANTON, a city and the capital of Lackawanna County, Pennsylvania. It was in 1890 the fourth city in size in the state, having connection by rail with other points by the Central of New Jersey, the Delaware and Hudson, the Delaware, Lackawanna and Western, the Erie and Wyoming Valley, and the New York, Ontario and Western railroads; and the returns of the same year showed 41 industries in 138 establishments, having an invested capital of \$25,144,936, an annual product of \$22,801,028, and paid to 8,498 persons \$3,921,831. Besides the coal-mining industry, in which the people of the region about Scranton are almost exclusively engaged, the annual shipments of anthracite coal reaching about 9,000,000 long tons, taken from 46 mines, the manufacture of iron and steel is the most important, followed by the manufacture of malt liquors, silk goods, planed lumber, flour and feed, brass goods, carriages, leather, stoves, woolen goods, glass, buttons and cigars. The city has gas and electric lights, electric street-railways, 140 miles of streets paved with brick and asphalt; a good water-supply, drawn from mountain-brooks; 70 churches of various denominations; excellent system of public schools, with property valued at \$900,000; several notable buildings, among them the United States government building, municipal building, courthouse, county jail, state armory, Albright Memorial Library, Moses Taylor Hospital and St. Patrick's Cathedral; in 1895, three national and four state banks, with combined capital of \$1,150,000; a safety-deposit company, several building and loan associations, 4 daily and 20 weekly newspapers, 1 monthly and 1 quarterly periodical. The assessed valuation of property in the city in 1890 was \$22,000,000, and the tax-rate \$3.20 on \$100. Population 1880, 45,850; 1890, 75,215; 1900, 102,026. See also SCRANTON, Vol. XXI, pp. 551, 552.

SCREW-PINES, the common name of the small monocotyledonous family *Pandanaceæ*, but holding no relation to true pines. They are nearly related to the arums and palms. The branching, woody stem is supported by a large number of aerial roots;

the long, linear and often thorny leaves are closely crowded together, and the flowers are borne in ample clusters from a more or less sheathing spathe. The family contains about eighty species, natives of the islands of the Indian Ocean.

SCRIBES. See ISRAEL, Vol. XIII, p. 419.

SCRIBNER, CHARLES, an American publisher; born in New York City, Feb. 21, 1821; graduated at Princeton in 1840, and in 1846 joined in founding the publishing firm of Baker and Scribner. His partner died soon after, and the firm became Charles Scribner and Company. *Hours at Home*, first issued in 1865, in 1870 was merged in *Scribner's Magazine*, which was sold by the firm in 1881 and re-christened the *Century Magazine*. Charles Scribner died in Lucerne, Switzerland, Aug. 26, 1871, and the firm in 1879 became Charles Scribner's Sons, and they in 1887 began a new *Scribner's Magazine*.

SCRIVENER, FREDERICK HENRY AMBROSE, an English Biblical scholar; born in London, Sept. 29, 1813. He graduated at Cambridge; spent a number of years as master of classical schools; was rector of St. Gerrans in 1861; vicar of Hendon and prebendary of Exeter in 1876, and died at Hendon, Oct. 26, 1891. He was an authority on philological criticism of the New Testament, and has published valuable works, including *Cambridge Paragraph Bible, with the Text Revised and a Critical Introduction Prefixed* (1873); and *Plain Introduction to the Criticism of the New Testament* (1861).

SCRIVENERS' CRAMP. See CRAMP, Vol. VI, p. 543.

SCROPHULARIACEÆ. See PARASITISM, Vol. XVIII, p. 265.

SCUDDER, HORACE ELISHA, an American author; born at Boston, Massachusetts, Oct. 16, 1838.



H. E. SCUDDER.

After graduating at Williams College in 1858 he went to New York City, where he taught school for three years. His stories for children, *Seven Little People and their Friends* (1862), proved highly successful, and decided him to follow literature as a profession. His next work was *Dream Children* (1863). He edited *The Riverside Magazine for Young People* from 1867 till 1870, and published in its third volume *Stories from My Attic* (1869). In 1890 he succeeded T. B. Aldrich as editor of the *Atlantic Monthly*, and became a resident of Cambridge, Massachusetts. Among his most successful books for children are the *Bodley Books* (8 vols., 1875-87); *Dwellers in Five Sisters Court*; *Children's Book* (1881); and a *History of the United States* (1884). In 1882 he published a monograph on *Noah Webster*, a historical biography of *Washington* in 1886, and a collection of essays in characterization and criticism entitled *Men and Letters* (1888). He was also the editor of the *American Commonwealths* series; of a collection of *American Poems and Prose*; and jointly with Mrs.

Taylor, of the *Life and Letters of Bayard Taylor* (1884).—His brother, SAMUEL HUBBARD SCUDDER, an American naturalist; born in Boston, Massachusetts, in 1837. After studying at the Lawrence Scientific School of Harvard College he became assistant to Professor Louis Agassiz in the Museum of Comparative Zoology, and in 1864 was made custodian of the Boston Society of Natural History, of which he was president in 1880-87. In 1886 he became palæontologist of the United States Geological Surveys, which post he occupied as late as July, 1889. Mr. Scudder devoted himself chiefly to entomology; was a member of the National Academy; officially connected with the American Association for the Advancement of Science, and the Academy of Arts and Sciences. He wrote a large number of entomological works, and many contributions to Smithsonian and learned society publications, besides an account of travel, entitled *Winnipeg Country, or Roughing it with an Eclipse Party* (1886).

SCUDDER, JOHN, an American missionary; born in Freehold, New Jersey, Sept. 3, 1793; graduated at Princeton (1811); studied medicine in New York; missionary to India (1819); ordained the next year to the ministry of the Dutch Reformed Church; settled in Ceylon, where he established hospitals as well as schools and churches, and labored for 19 years. He died at the Cape of Good Hope, Jan. 13, 1855, on his way home. He was the author of several books pertaining to his work.—His son, HENRY MARTYN, was born in Panditeripo, Ceylon, Feb. 5, 1822; educated in New York, at the university of that city (1840), and the Union Theological Seminary (1843); returned to the Madura mission of the Dutch Reformed Church; became a medical missionary in Arcot City; returned home in broken health (1864); pastor of Presbyterian congregation in San Francisco (1865); of Congregational churches, first in Brooklyn, New York (1872), and then in Chicago, Illinois (1882); missionary to Japan (1887-89); settled in Winchester, Mass. (1891). He published several books of a devotional character in Tamil, one of them being a rendering of the *Liturgy of the Reformed Protestant Dutch Church*. He had two brothers associated with him in the Arcot mission. Died in Winchester, Mass., June 4, 1895.

SCULPIN, a popular name of very indefinite application given to various fishes. It is especially applied to fishes of the family *Cottidae*. Three species of *Cottus* on the Atlantic coast of America bear the name. The deep-water sculpin or sea-raven is *Hemitripterus acadianus*. Several other genera are locally called sculpins. Some are common on the Pacific coast. These fishes are rarely eaten.

SCUP OR SCUPPAUG (*Stenotomus chrysops*), a fish of the family *Sparidae*, common on the Atlantic coast of the United States. In some places it is called *porgy* (q.v., in these Supplements). Scuppaug was the name given by the Indians, while scup is evidently an abbreviation. Vast numbers of scup appear on the coast south of Cape Cod early in summer, and large quantities are taken in the fish-pounds.

SCURVY-GRASS, a name given to *Cochlearia officinalis*, a seashore plant of the family *Crucifera* or mustards, but not found in the United States, where *Barbarca præcox*, a member of the same family, is often cultivated as a salad-plant under the same name, though more commonly known as winter-cress.

SCYLLIDÆ. See SHARK, Vol. XXI, p. 778.

SCYPHOMEDUSÆ. See HYDROZOA, Vol. XII, pp. 555-559.

SCYPHOZOA, a class of *Calenterates* composed of the *Scyphomedusa* or *Acraspeda* (the jelly-fishes) and the *Anthozoa* or *Actinozoa* (the corals). The *Hydrozoa* (the hydroids), the *Scyphozoa* and the *Ctenophora* (the comb-bearers) compose the sub-kingdom *Calenterata*.

SCYTHOPOLIS. See DECAPOLIS, Vol. VII, p. 18.

SEA ANEMONE. See *Corallegine*, under ACTINOZOA, Vol. I, pp. 129-131.

SEA-BASS, a large fish common along the Atlantic coast of the United States. On the northern coast the sea-bass is *Centro pristis furvus*, while south it is *C. atrarius*. The color is black, with lighter spots in longitudinal rows. It is often called black-fish. During the winter it retires to deep waters, and approaches the shores at the beginning of warm weather.

SEA-BEAR OR SEA-LION. See MAMMALIA, Vol. XV, p. 443.

SEABURY, SAMUEL, an American Episcopal bishop; born in Groton, Connecticut, Nov. 30, 1729. He graduated at Yale, and studied theology under his father, who was an Episcopalian clergyman; studied medicine at the University of Edinburgh, 1752; took orders the next year; was engaged in missionary work and preaching, and in 1767 became rector in Westchester, New York. In 1775 he came under the suspicion of the Whigs and was imprisoned for several weeks, and on his release retired to New York, where he was appointed chaplain of the Royal American Regiment in 1778. After the close of the war, the Connecticut churches sent Seabury to England to seek an American episcopate. This he was unable to secure in England, on account of the complicated relationship of the church to the government, but turned to Scotland, and after some difficulty was duly consecrated bishop Nov. 14, 1784. Finally, Parliament in 1786 authorized the English bishops to consecrate American clergymen without demanding an oath of allegiance to the crown. Two having been consecrated, Bishop Seabury's diocese was received at the general convention at Philadelphia in 1789. Before the war he had several controversies with Hamilton, and wrote several papers on the situation. These are found in *Free Thoughts on the Proceedings of the Continental Congress* (1774); *Congress Canvassed* (1774); and *A View of the Controversies Between Great Britain and Her Colonies* (1774). Two or three volumes of his sermons have also been published. He died in New London, Feb. 25, 1796.—His grandson, SAMUEL SEABURY, clergyman; born in New London, June 9, 1801. He was educated in private and at Columbia College; took orders in the Protestant

Episcopal Church in 1828. After preaching for a number of years he became editor of the *Churchman* in New York, 1834; in 1849 rector of the Church of the Annunciation, in New York, where he remained until 1868; and in 1863 became professor in the General Theological Seminary, where he taught until his death, Oct. 10, 1872.—He wrote *Discourses on the Supremacy and Obligation of Conscience* (1860); *American Slavery Justified* (1861); and other works.—His son, WILLIAM JONES SEABURY, clergyman; born in New York, Jan. 25, 1837; was a graduate of Columbia; had studied law and practiced from 1858 to 1866, when he took up the study for the ministry in the General Theological Seminary. He succeeded his father as rector of the Annunciation in 1868, and as professor of ecclesiastical polity in the General Theological Seminary, 1873. He wrote *An Introduction to the Study of Ecclesiastical Polity* (1894).

SEA COW OR MANATEE. See MANATEE, Vol. XV, pp. 456, 457.

SEA CUCUMBER. See ECHINODERMATA, Vol. VII, p. 639.

SEA DEVIL. See DEVIL FISH, Vol. VII, p. 138.

SEA DOVE OR DOVEKIE. See GUILLEMOT, Vol. XI, p. 263.

SEA ELEPHANT. See MAMMALIA, Vol. XV, p. 444; and ELEPHANT-SEAL, in these Supplements.

SEAFORD, a town of Sussex County, southwestern Delaware, on the Nanticoke River, at the head of navigation for small vessels, and on the Philadelphia, Wilmington and Baltimore railroad, 84 miles S. of Wilmington. The surrounding region has interests in agricultural pursuits and in the oyster industry. Population 1890, 1,462; 1900, 1,724.

SEAFORTH, a town of Huron County, western Ontario, about 25 miles S.E. of Goderich, on the Grand Trunk railroad. It is an important shipping-center for lumber and agricultural products, the annual shipments of grain reaching one million bushels. There are here extensive deposits of rock-salt, a stratum one hundred feet in thickness underlying the town at a depth of about one thousand feet, and producing large quantities of salt. The town has foundries, saw, planing, flax and woolen mills. Population 1891, 2,641.

SEA ISLANDS. See GEORGIA, Vol. X, p. 434.

SEA KALE. See HORTICULTURE, Vol. XII, p. 287.

SEAL FISHERIES. See SEAL, Vol. XXI, pp. 581-583; and, BERING SEA QUESTION, in these Supplements.

SEALKOTE. See SEALKOT, Vol. XXI, p. 850.

SEALSFIELD. See POSTEL, KARL, in these Supplements.

SEAMING-MACHINE. This name is given to machines for making joint-seams in tinware and in cotton cloth. The tinners' machine has usually two disks rotating at right angles, and so formed and adjusted that a tin article, as a pan, may be run between them and have its seams pressed tight. The disks are adjustable and interchangeable for various forms of work. The cotton-cloth machine is a form of sewing-machine adapted to joining the margins

of cloth so that the seams made will not interfere with the operations of printing, trimming, etc.

SEAMOUSE, a popular name of a marine worm belonging to the genus *Aphrodite* in the group of polychætatus annelids. The name mouse refers to the thick covering of beautifully colored hairs on the back. They are among the most highly organized worms. Species are found on the west coast of Europe.

SEA OTTER. See OTTER, Vol. XVIII, p. 70.

SEA PIE. See OVSTER-CATCHER, Vol. XVIII, p. 111.

SEARCH AND SEIZURE. See NAVY, Vol. XVII, p. 290; and SEARCH, RIGHT OF, Vol. XXI, p. 608.

SEARCH-LIGHT. This device, which, by means of an electric light fixed in front of a powerful reflector and properly obscured at the sides, throws a beam of direct light to a very considerable distance, illuminating all objects in its direct path, has been especially adapted to naval and military purposes, and at the present time constitutes an invariable adjunct to the equipment of every armored vessel as well as to that of many Transatlantic steamers. One such light shown at the Columbian Exposition in Chicago was a specimen of the possibilities in this direction. This lamp stood eight and one half feet above the platform, and the diameter of the projector was five feet. The silvered glass mirror had a clear working diameter of five feet, with a thickness of seven eighths of an inch. It was carefully ground and polished on both sides, the work requiring more than five months. The training of the projector is effected either by hand or by means of an electric motor placed under its base. Where the electric motor is employed, it can be operated from any distance. It is said that the light from this instrument is visible at a distance of 85 miles, and that a person standing eight miles away in the track of its light can see to read a newspaper. An observer posted by the side of such a projector could, with the aid of a field-glass, distinguish a vessel 20 miles away. The peculiarity of this projector, aside from the fact of its having a parabolic mirror, consists in the use of an arc light having the carbons parallel with the axis of the projector, the positive carbon lying outermost. The lamp used in this projector requires a current of 200 amperes at 50 volts, and consumes about ten electrical horse-power. The surface intensity of the light in the mirror is 194,000,000 candle-power. The average intensity of the rays received by the mirror is 45,600 candle-power. Projectors of such power will of course be used only on land and for purposes of coast defense.

Results obtained from projectors of smaller power used at sea have not, however, been uniformly successful. A test of the value of the device for naval purposes was ordered by the United States government at the naval station in Newport, Rhode Island, May 15, 1894. It was arranged that during the evening of the 15th instant the torpedo-boats *Cushing* and *Stiletto* should endeavor to enter the harbor unobserved while search-lights were employed to detect them if possible. Both boats were painted a

dark color. The test took place at half-past nine in the evening. The boats entered the range of the search-lights, and for ten minutes were in the open channel, but though the search-lights were assiduously trained upon the spot where it was expected to catch sight of them, they both succeeded in passing unobserved to their anchorage. In general, however, the search-light may be depended upon to show the presence of objects of any size at a considerable distance.

C. H. COCHRANE.

SEARCH-WARRANT. See *Stolen Goods*, under THEFT, Vol. XXIII, p. 233; and WARRANT, Vol. XXIV, p. 371. As to the right to search vessels at sea, see SEARCH, RIGHT OF, Vol. XXI, p. 608.

SEARCY, a town and the capital of White County, northeastern central Arkansas, about 50 miles N.E. of Little Rock; on the Searcy and West Point railroad, four miles W. of its junction with the St. Louis, Iron Mountain and Southern railroad. It is the trade-center and shipping-point for a region producing cotton and fruit, and has grist and planing mills, machine-shop and cotton-gin. Owing to the existence of mineral springs in the vicinity, the town is popular as a health-resort. It is the seat of Searcy College (Methodist Episcopal South), an institution for the education of men; of Searcy Female Institute and Galloway Female College. Population 1890, 1,203; 1900, 1,995.

SEARLE, ARTHUR, an American astronomer; born in London, England, Oct. 21, 1837; removed to the United States at an early age, and in 1856 was graduated at Harvard University. He made a specialty of astronomical studies, and, after serving for 16 years as assistant professor of that science, was in 1887 called to the chair of astronomy at Harvard. He was a member of the American Academy of Sciences, and furnished the results of his investigations to periodicals and magazines published in the United States and Europe.—His brother, GEORGE MARY SEARLE, an American Roman Catholic priest; born in England, June 27, 1839, and became a graduate of Harvard in the class of 1857. From that year until 1866 he was engaged at the Dudley Observatory, Harvard University, and in the employ of the United States government as professor of astronomy. During the latter year he studied theology, and in 1871 was ordained a priest of the Roman Catholic Church, after which he was connected with the Paulist Seminary, New York, as science-teacher. He contributed to journals of the church and to the *Astronomical Review*. He also published an *Elementary Geometry*.

SEA ROBIN, same as GURNARD, Vol. XI, p. 332.

SEARS, BARNAS, an American educator; born in Massachusetts, Nov. 19, 1802. He was a graduate of Brown University and Newton Theological Seminary, a professor at what is now Colgate University, and in 1833 went to Germany, where he studied at Halle, Leipsic and Berlin. While in Germany he formed a Baptist church by secretly and at night baptizing several persons at Hamburg. This church has since grown in spite of oppression till it has over twenty-five thousand members. He became a teacher at Newton Seminary on

his return; from 1839 to 1848, was president; secretary of the Massachusetts Board of Education (1848-55); and president of Brown University (1855-67); after 1867 he was general agent of the Peabody Educational Fund. He was for several years editor of the *Christian Review*, and later the *Bibliotheca Sacra*; and besides collaborating on *Classical Studies* (1843), wrote *Ciceronian* (1844), and *Life of Luther* (1851). He died in Saratoga Springs, New York, July 6, 1880.

SEARSPORT, a town of Waldo County, southern Maine, six miles N.E. of Belfast and about 25 miles S. of Bangor, at the head of Penobscot Bay. It has an extensive shipping-trade in lumber, hay and ice; is engaged in ship-building; has saw, grist and spool mills, and large poultry-farms. Population 1890, 1,693; 1900, 1,349.

SEASHORE RIGHTS. See RIPARIAN LAWS, Vol. XX, pp. 565, 566.

SEA-SIDE GRAPE. See KINO, Vol. XIV, p. 91.

SEA-SQUIRT, any ascidian. See TUNICATA, Vol. XXIII, pp. 616-618.

SEATTLE, the most populous city of the state of Washington and the capital of King County, is located on Seattle harbor, or Elliott Bay, Puget Sound, and on the Columbia and Puget Sound, the Seattle, Lake Shore and Eastern, the Northern Pacific and the Great Northern railroads, and has regular steamship communication with the Orient, San Francisco and Alaska. The city was founded in 1852 by New Yorkers, and was named in honor of Seattle, the most powerful Indian chief of that region. Since 1880, the almost phenomenal growth of Seattle has furnished additional evidence of the enterprise indigenous to Western civilization, and the almost unlimited extent of Western resources. In addition to the mediums of external communication, the city in 1890 was provided with fully 25 miles of electric and cable roads, and as many more miles were under construction, all radiating from the center of the city and reaching to the farthest outlying districts. In the matter of churches each denomination is represented by one or more organizations, and there are many costly and elegant church buildings. Its educational system is of the highest standard. The city is the location of the Washington State University (q. v., in these Supplements), also of Seattle Female College, College of the Immaculate Conception, and Academy of Holy Names, while the public schools afford the fullest complement of advantages for securing an education. Among the prominent public buildings are the courthouse, the county almshouse and public library. The city in 1894 had 7 national, 3 savings and 5 private banks, and up to that time had not had a bank failure. The publications include 3 daily and 13 weekly newspapers, and 7 monthly periodicals. The assessed property valuation for the same year was \$32,752,153, and the tax-rate 125 mills. The manufactories in 1890 numbered 331, with an invested capital of \$4,758,283 and an annual product of \$10,203,007. The various industries include saw-mills, iron-works, sash and door works, carriage works, brickyards, machine-shops, tanneries, brew-

eries, ice-factories, printing and publishing establishments.

The shipments from the city consist of coal, lumber, shingles, hops, grain, hay, hides, wool, furs, fruit, game and fish.

On June 6, 1889, a disastrous fire occurred, in which 65 acres of improvements, the business center of the city, were burned over, entailing losses aggregating \$15,000,000, only one brick building being left in the business district. Another extensive conflagration visited the city in May, 1890; but in spite of these repeated calamities, the city's growth and development were not checked, and not a single business failure occurred in consequence. The city is the center of a rich agricultural, lumber and mining region, there being within a radius of 36 miles coal-fields covering 60,000 acres, and mountains of hematite iron-ore. Since 1890 many plans for further improvement have been set on foot, one being a scheme for the utilization of Snoqualmie Falls by the transmission of electrical power, and another being the construction of a canal, for which an appropriation has been made by the United States government. It is to run from Puget Sound through Lake Union to Lake Washington, a body of fresh water which does not freeze in winter and in which vessels may scour their bottoms, thus avoiding the expense of docking. The population of Seattle, which in 1880 was but 3,533, has since been steadily increasing, being in 1890, 42,837; in 1892 (state census), 58,893; U. S. census 1900, 80,671. See also SEATTLE, Vol. XXI, p. 610.

SEA UNICORN. Same as NARWHAL, Vol. XVII, p. 235.

SEA URCHIN. See ECHINODERMATA, Vol. VII, pp. 629, 630.

SEA-WEED. See ALGÆ, Vol. I, pp. 507-509.

SEAWELL, MOLLY ELLIOT, an American authoress; born in Gloucester County, Virginia, 1859. She passed the early part of her life there, but lived for some time in Washington, District of Columbia. Among her publications are *L. Abnormale* by "Vera Sapoukhyn," which was for some time believed to have come from a Russian hand; an essay on *The Absence of the Creative Faculty in Women* (1892), that gave rise to a wide and warm discussion; *Throckmorton* (1890), a Virginia story; *Maid Marion* (1891); *Midshipman Paulding* (1891); *Children of Destiny* (1893); *Paul Jones* (1893); *Through Thick and Thin* (1894); and *A Strange, Sad Comedy and The Sprightly Romance of Marsac* (1896).

SEBACEOUS GLANDS. See NUTRITION, Vol. XVII, p. 685.

SEBACIC ACID, C¹⁸H³⁶(COOH)², a dibasic acid formed by distilling oleic acid or by heating castor-oil with a concentrated solution of potassic or sodic hydrate. Thin plates or feathery bunches little soluble in water, very soluble in alcohol or ether. Melts at 127°.

SEBASTIAN, KING. See PORTUGAL, Vol. XIX, p. 546.

SECESSION. See UNITED STATES, Vol. XXIII, pp. 773, 774.

SECESSION CHURCH. See UNITED PRESBYTERIAN CHURCH, Vol. XXIII, pp. 727, 728.

SECOND ADVENT. See MILLENNIUM, Vol. XVI, pp. 314-318.

SECONDARY CELLS OR ACCUMULATORS. See ELECTRICITY, § 109, in these Supplements.

SECRETION. See NUTRITION, Vol. XVII, pp. 671-674.

SECRET SOCIETIES. *Collegiate*. See COLLEGE FRATERNITIES, in these Supplements. *Beneficial*. See BENEFIT SOCIETIES, in these Supplements.

SEDALIA, a city of Missouri. Population 1900, 15,231. See SEDALIA, Vol. XXI, p. 619.

SEDAN, a post village and the capital of Chautauqua County, southeastern Kansas, 30 miles W.S.W. of Independence and about 60 miles S.W. of Humboldt, on the Missouri Pacific railroad. It is the center of a region producing corn, wheat, oats, tobacco, cotton, wool, sorghum and live-stock. Coal is also found in the vicinity. Population 1890, 970; 1900, 1,067.

SEDGE FAMILY, the common name of the great monocotyledonous family *Cyperaceæ*, containing rush-like or grass-like plants, with flowers in spikes or heads, one in the axil of each scale-like bract (glume), and no evidence of calyx or corolla except occasional rudiments. The family is of no economic value, containing the bulrushes and the sedges proper, which latter are species of the huge genus *Carex*. A species of *Cyperus* (*C. papyrus*) was used by the ancient Egyptians for making papyrus paper.

SEDGEMOOR. See SOMERSET, Vol. XXII, p. 257.

SEDGWICK, a distinguished New England family, whose first representative in America was ROBERT SEDGWICK, a colonist; born in London, in 1590. He was engaged in mercantile pursuits until 1635, when he removed to Massachusetts; was always prominent in affairs of the colony, being a representative of Charlestown in the general court, a commander of the colonial forces under Cromwell, and a member of a commission to govern Jamaica, where he died, May 24, 1656. Among other things, he established the first iron-furnace in America, in 1643, and was one of the founders of the Ancient and Honorable Artillery Company, in 1638.—A descendant of his, THEODORE SEDGWICK, statesman and jurist, was born in Hartford, Connecticut, May, 1746. He was a graduate of Yale College; studied for the ministry, but turned to law; engaged in the Arnold expedition against Quebec in 1776, and was a member of the Continental Congress from 1785 to 1786. After the war he held several state offices; was a member of Congress for seven years, and in the Senate three; in 1802 was appointed judge of the Massachusetts supreme court. He died in Boston, Jan. 24, 1813. Shortly after the adoption of the state constitution he secured, while defending a runaway slave, a decision which practically abolished slavery in the state.—His eldest son, THEODORE SEDGWICK, a lawyer, was born in Sheffield, Massachusetts, Dec. 31, 1780. He practiced law in Albany, New York, for twenty years, and returned to Stockbridge, Massachusetts, on account of failing health. In that state he took an active interest in politics, and secured the passage of a bill through

the legislature sanctioning the building of a railroad from Boston to Albany. He published *Public and Private Economy*. He died in Pittsfield, Nov. 7, 1839.—His wife, SUSAN RIDGLY SEDGWICK, a writer, was born in New Jersey, in 1789. She wrote a number of books, mostly for young people, including *Morals of Pleasure* (1829); *Allin Prescott* (1835); *Louisa and Her Cousins* (1859); and *Walter Thornley* (1859). She died in Stockbridge, Massachusetts, in 1867.—Her sister, CATHERINE MARIA SEDGWICK, also an author; born in Stockbridge, Massachusetts, in 1789. Her first work, *A New England Tale*, was written in 1822. She had been well educated, and in 1813 started a private school for young women, which she continued for nearly fifty years. Among her works are *Redwood* (1824), translated into several European languages and by one translator ascribed to J. Fenimore Cooper; *Hope Leslie* (1827); *Clarence* (1830); *Linwood* (1835); *Letters from Abroad to Kindred at Home* (1841); *Historical Sketches of Old Painters* (1841); *Morals of Manners* (1846); and *Letters to My Pupils* (1862). She died in Roxbury, Massachusetts, July 31, 1867.—A son of Theodore and Susan, THEODORE SEDGWICK, a jurist, was born in Albany, Jan. 27, 1811. He graduated at Columbia, and began practicing law in 1833; in 1834 went to Paris as an attaché of the United States legation; on his return practiced law in New York. He wrote *What is Monopoly?* (1838); *Thoughts on the Annexation of Texas* (1844); *Treatise on the Measure of Damages* (1847); and *Treatise on the Interpretation of Statutory and Constitutional Law* (1857). He died in Stockbridge, Massachusetts, Dec. 8, 1859.

SEDGWICK, JOHN, an American soldier; born in Cornwall, Connecticut, in 1313. He was educated at West Point, and took part in the Mexican War, fighting at Cerro Gordo, Churubusco, Molino del Rey, Chapultepec, and at the capture of the City of Mexico. In August, 1861, he was commissioned brigadier-general of volunteers and assigned for service in the Army of the Potomac. He distinguished himself at the battle of Fair Oaks, arriving, after a toilsome march, just in time to decide the day. At Antietam he bore a conspicuous part, leading a division and exposing himself fearlessly. In December, 1862, he was promoted major-general of volunteers. He fought bravely at Fredericksburg, Chancellorsville, Gettysburg, Rappahannock Station and in the Wilderness campaign. At Spottsylvania Courthouse, May 9, 1864, while placing some cannon in the intrenchments, he was struck in the head by a bullet fired by a Confederate sharpshooter and instantly killed. A monument was erected to his memory at the Military Academy at West Point in 1868.



GENERAL SEDGWICK.

SEDIMENTARY ROCKS. See *Stratification*, under GEOLOGY, Vol. II, pp. 292-296.

SEED FARMS IN THE UNITED STATES.

Seeds of all staple garden and farm grains, fruits and vegetables have been in steady demand since the first settlement of the country. In early times families preserved seed supplies from their own productions from year to year, in most cases from whatever might be left on the farm, while in other cases a careful selection was made and purer and better seeds obtained, which not only furnished the home supply, but were eagerly sought by friends and neighbors.

The first regular seed farm of those now in the country, as far as we have any record, was established by David Landreth in connection with the nursery business in Philadelphia in 1784.

The general growth of the country, the great increase of population in cities and villages and consequent establishment of market-gardens, the demand for choice seeds and often the inability to procure them, induced market-gardeners to grow and save seeds, at first for their own uses only, later to supply an ever-increasing demand, until some finally drifted into seed-production as a regular business.

This branch of horticulture has never (before 1890) been made the subject of census-inquiry. Therefore, with no recorded data to guide in the work, it has been somewhat difficult to procure even the few facts and figures herewith submitted.

After careful inquiry by circular letter (often many times repeated) to each and every seed-dealer in the United States, a record was made showing a total of 596 farms in the United States devoted exclusively to seed-production. These farms occupy 169,851 acres of land, of which 96,567 $\frac{1}{4}$ acres were reported as devoted to seed-production during the census year, and there was capital invested to the amount of \$18,325,935.86.

Aside from these special seed farms which have been under investigation, there are a number of extensive dealers in seeds having test gardens and farms, where side by side all new and old varieties are grown for the purpose of comparison. On these farms are also tested all seeds handled by these dealers, whose custom it is to secure their supplies by importation and by contracting with farmers in various favored sections of this country to grow any particular variety of seed best adapted to that farmer's land or locality. It has been impossible to reach these. Therefore, while this report shows the extent and production of the seed farms proper, the total garden-seeds produced in the United States is considerably in excess of the amount here given. One dealer reports supplying farmers annually one thousand bushels of peas and two thousand bushels of beans for planting, and then buying back all the seeds that can be grown from this stock, which amounts to about ten thousand bushels each of peas and beans; and as many other dealers have contracts in like proportion on various other seeds, it will be seen that the garden-seed business alone is assuming great importance in the agriculture of the country.

Again, while the greater amount of seed grains, cotton, tobacco, etc., used upon farms is of home and neighborhood production and is freely exchanged for labor or for other products, there are in nearly every county one or more successful farm-

ers who, by a careful selection of seed-stock and by better methods secure greater returns than their neighbors and are able to dispose of part of their productions for seed purposes at advanced rates. These men cannot be classed as seed-farmers, and would hardly be able to estimate what proportion of their crops was sold for seed purposes annually; but it is safe to assume that such farmers produce one third of all the small grains, corn, potatoes, tobacco and cotton-seed planted. In addition to these, there are annually sold for seed purposes upward of one million bushels of selected grains, both of the standard and newer varieties, very little of which is produced upon regular seed farms. The same is true of grass-seeds, which are produced in enormous quantities in New York, Pennsylvania, Ohio, Indiana, Kentucky, Michigan, Minnesota, Missouri, Kansas and Nebraska, largely supplying the demands of the country as well as furnishing a considerable surplus for export.

Of the 596 seed farms in the United States, 258, or nearly one half, are in the North Atlantic division, the original center of seed production. These farms have an acreage of 47,813, or an average of 185 acres per farm; while in the North Central division there are 157 farms, with an acreage of 87,096, or an average of 555 acres per farm. The seed farms of Massachusetts and Connecticut average 142 acres per farm, while those of Iowa and Nebraska are 695 acres in extent, and are producing seeds on a scale of equal magnitude to the other products of that section of the country. Several of these seed-producing farms embrace nearly three thousand acres each.

The leading states in seed cultivation are New Jersey, New York, Ohio and California, in the order named. So far as reported, there were but two seed farms in the country previous to 1800 (the one previously mentioned and the other at Enfield, New Hampshire, in 1795), only 3 in 1820, 6 in 1830, 19 in 1840, 34 in 1850, 53 in 1860, 100 in 1870, 207 in 1880, and 200 more were established between 1880 and 1890, leaving 189 unaccounted for as to date of establishment. But as the proprietors of the older seed farms take great pride in this matter, it is safe to assume that 90 per cent of the unreported farms have come into existence within the past twenty years.

SEEDS. See BOTANY, Vol. IV, pp. 153-157; AGRICULTURE, Vol. I, pp. 383, 384; and HORTICULTURE, Vol. XII, pp. 215-217.

SEE-LAND, an island. Same as ZEALAND. See Vol. XXIV, p. 771.

SEELEY, HARRY GOVIER, an English geologist; born in London, Feb. 18, 1839. He was educated at the Royal School of Mines and afterward at the Sidney Sussex College; from 1859 to 1871 was busy arranging the specimens and teaching in the Woodwardian Museum; in 1876 was appointed professor of geography and lecturer on geology in King's and Queen's colleges, London, becoming dean of Queen's College in 1881, and was elected a fellow of the Royal Society in 1879. He studied fossils, especially reptilia fossils, in all parts of the world, and published the results of his works mostly in the *Geological Magazine* and *Annals of Natural History*.

He also published *Ornithosauria* (1870); *Physical Geology and Palæontology* (1885); *Fresh-water Fishes of Europe* (1886); *Factors of Life* (1887); and *Handbook of the London Geological Field Class* (1894).

SEELEY, SIR JOHN ROBERT, English historian; was born in London in 1834. He was educated at the City of London School and at Christ's College, Cambridge, and subsequently became a fellow of his college. He was appointed professor of Latin in University College, London, in 1863, and professor of modern history at Cambridge in 1869. In 1865 he published anonymously *Ecce Homo*, a remarkable survey of the life and work of Jesus Christ, which produced a profound sensation in theological circles. While not professedly unorthodox, the work invited the reader to dismiss from his mind theological traditions and schemes of dogma, and even the associations of divinity, and to contemplate the purely human aspect of Christ's career. The "enthusiasm of humanity" was the key he offered to unlock the character of Jesus. This work was followed, in 1882, by *Natural Religion*, in which its author's characteristic of Christianity, as a union of politics and morals, is promulgated. In 1879, he passed from religion to history, and published the *Life and Times of Stein*, which, though somewhat lacking in unity, is an elaborate study of the source of the recent greatness of the German Empire. This was followed by *The Expansion of England* (1883), a graphic representation, in a series of scientifically treated historical lectures, of the growth of the British Empire. The work has since become a mine of historical doctrine, and its narrative an example of lucid force and restrained eloquence. In 1886 he published his severe arraignment of Bonaparte, entitled a *Short History of Napoleon I*, an expansion of the article on NAPOLEON in this ENCYCLOPÆDIA. (See Vol. XVII, pp. 192-226.) In *The Growth of British Policy* (1896), a complementary work to *The Expansion of England*, the author presents in bold detail the cardinal lessons of history drawn from the story of British territorial acquisition and government. Professor Seeley was for many years a constant contributor on historical and political topics to the English and American reviews and magazines. His other writings embrace *Roman Imperialism* (1869); *Lectures and Essays* (1870); an edition of *Livy*, annotated for schools; and in collaboration with Rev. E. A. Abbott, a valuable text-book, *English Lessons for English Readers*. In 1893 appeared *Goethe Reviewed After Sixty Years*. In the following year Professor Seeley was knighted, and in 1895 he died, January 13, in Cambridge.

SEELYE, JULIUS HAWLEY, an American educator; born in Bethel, Connecticut, Sept. 14, 1824. After studying theology at Auburn, New York, and Halle, Germany, he was ordained pastor of the first Reformed Church at Schenectady, New York, where he remained until 1858. In that year he was elected professor of mental and moral philosophy at Amherst College. In 1874 he was chosen to Congress, and served till 1877. Although usually voting with the Republicans, he opposed the Hayes Electoral Commission. Then he was installed as

president of Amherst College, which office he held for twelve years. He was one of three visiting overseers for Andover Theological Seminary; a trustee of Smith College for women, Clark Institute for Deaf Mutes, and Mt. Holyoke Seminary. His earnest Christian character served to raise the standard of education, of public opinion, and political action. He published *The Way, The Truth, and the Life* (1874); *Christian Missions* (1875); and *Lectures to Educated Hindus* (1873). He died in Amherst, May 12, 1895.—His brother, LAURENS CLARK SEELYE, an educator; born in Bethel, Connecticut, Sept. 20, 1837; studied theology at Andover, Massachusetts, and at Berlin and Heidelberg, Germany. In 1863 he was ordained pastor of a Congregational church at Springfield, Massachusetts. From 1865 till 1873 he was professor of English literature and oratory at Amherst College, and in 1874 he became president of Smith College for young women at Northampton, Massachusetts. He published numerous articles on education and on the Celtic situation.

SEEMAN, BERTHOLD, a German explorer; a native of Hanover; born Feb. 28, 1825. In 1846 he entered the service of the English government as the naturalist to accompany the *Herald* on a voyage around the world. He afterward made a tour through Central America. He published accounts of his voyages to the East, to the Arctic regions and to other parts of the world; was the editor of *Bonplandia* (1853-62) and *Journal of Botany* (1863-71), and made frequent contributions to London periodicals of a scientific character. Among his works are *A Narrative of the Voyage of the Herald* (1853); *Popular History of Palms* (1855); *Flora Vitensis* (1865), and other scientific works. He died in Nicaragua, Oct. 10, 1871.

SEEPAGE. See IRRIGATION, in these Supplements.

SEGMENTAL ORGANS. See EMBRYOLOGY, in these Supplements.

SEGMENTATION OF OVUM. See EMBRYOLOGY, in these Supplements.

*SEGMENTATION OF THE VERTEBRATE HEAD AND BRAIN. The head is the most interesting of all animal structures, because it contains the brain and the highest developed sense-organs. The earlier comparative anatomists, noting its extremely complex structure and the presence in it of organs that do not occur elsewhere, were inclined to interpret it as entirely different in plan of construction from the trunk, and thus the head came to be looked on as a structure *sui generis*. On this account it was customary, until recently, in philosophical zoölogy, to separate the head region from the trunk region; but advances in knowledge regarding the head have brought about a fundamental change of view. The head is now recognized as merely the most extremely modified part of the animal, formed by differentiation and specialization from structural elements like those that follow in the trunk. According to this conception, the distinction between head region and trunk region is one of degree of differentiation, and not one of kind. This gives an interesting basis for considering the brain.

It has long been recognized that the trunk of vertebrated animals exhibits a segmental arrangement of parts especially well seen in the embryos of all, and also shown in some of the adult structures. For instance, in the lower vertebrates the muscles of the trunk show a jointed arrangement, and in all representatives of the group the nerve-trunks leave the spinal cord in pairs, thus dividing that axial structure into nodes and internodes. The nerves of the head are the equivalents of those of the trunk, and the question was forced upon anatomists, Is the head similarly segmented? The brain of the adult does not show divisions into segments; but did it primitively?

It is the object of the present article to bring forward, in a summary way, the recent evidence bearing on this question. While the brain is the particular structure toward which the thought is to be directed, it should be borne in mind that the brain is merely a part of the head, and generalizations regarding its plan of construction involve also the broader question of the plan of the head, of which it is a part. Moreover, the head segmentation is only an expression of the general segmentation of the embryo; and this brings us to a statement of the probable origin of segmental structures based on hypothetical derivation of the vertebrates.

There are, of course, rival theories as to the line of descent of the vertebrates. The one which the evidence so far accumulated seems to favor is, that they are descended from segmented ancestral forms not unlike arthropods and articulated worms of to-day. The jointed arrangement of parts in the ancestors has left its trace in the descendants, and it is thus we would account for the presence of segments in the very young embryos of all vertebrates. The embryos are the least modified, and therefore closest to the ancestral forms, but in the course of historical evolution the segments have become modified, and in most structures of the adult the original segmentation has disappeared.

If vertebrates are derived from segmented ancestors, it is probable that the nervous system of annelids and arthropods presents us with a prototype of the vertebrate nervous system. It will be helpful to have in mind its plan of construction as we proceed. Fig. 1 shows a diagram of the nervous system of one of the arthropods. In front there is a collection of nervous matter, on the dorsal surface, called the brain, and connected with this are the nerves from the eyes, antennæ and other parts of the head. Behind this, on the ventral surface, lies a nerve-cord which runs the whole length of the body, and is segmentally divided by enlargements, one of which occurs in each segment of the animal. These enlargements are called ganglia, and are the points from which nerves pass to the organs and tissues. They are in reality double, and the brain consists of an aggregation of ganglia. The connectives are in the nature of nerve fibers, while the ganglia are centers of nervous activity. It is clear from the diagram that the nervous system of these animals is distinctly segmented. It will be shown, presently, that the nervous system



FIG. 1.

Diagram of the nervous system of an insect, to show its segmental character.

of the vertebrates passes through a similar stage in very young embryonic periods.

As regards the segmentation of the vertebrate

brain, there are three chief questions: (1) Is there sufficient evidence to show that the brain was originally a segmented structure? (2) If so, how far forward does the segmentation extend? and (3) How many segments have entered into the composition of the head? These questions will be taken up serially. The first question will be introduced by a brief historical review.

The conception that the head is segmented took rise at the beginning of this century. In 1806 Oken, the German naturalist, while walking in the Harz forest picked up the blanché skull of a sheep, and immediately said, "It is a vertebral column." From this as a starting-point, he studied the construction of the skull, separated it into parts, and came to the conclusion that it contains three modified vertebrae, one for each the eye, jaw and ear. The same view was advocated later by Goethe, and was much elaborated, in the middle of the century, by the distinguished anatomist, Sir Richard Owen. The theory thus inaugurated became famous under the title of the "Vertebral theory of the skull." Although it has been shown that the skull is in no wise composed of modified vertebrae, and therefore that the vertebral theory is entirely fanciful, it contained, nevertheless, a grain of truth, viz., the head is a segmented structure, and it served to introduce into morphological philosophy the real question of head segmentation.

To Huxley belongs the credit of having overthrown the vertebral theory of the skull. In 1859, in the Croonian Lectures, he showed that the divisions of the bones of the cranium have nothing to do with the primitive segmentation of the head. In some of the lower fishes, where, if the theory were true, we should expect the parts of the skull to be but slightly modified and to approach more nearly to vertebrae than in the higher forms, the cranium is solid, exhibiting no trace of segmentation. In the course of development, also, the bones of the cranium are preceded by a cartilaginous case—the so-called primordial cranium—that is not segmented; the bones of the cranium arise later, mainly in the skin as dermal structures. Therefore, the divisions of the skull by sutures is secondary, and has no deep-seated significance. Huxley directed attention to the cranial nerves that are arranged in serial order, and to branchial clefts of fishes and embryos of higher vertebrates, as bearing evidence of the original segmentation. The question was thus shifted on to a new and rational basis.

Gegenbaur, in 1871, treated the question in a very thorough way from the same general standpoint, and reached the conclusion that there are nine segments represented in the head.

Balfour (1874) and his pupil Marshall (1878) soon brought a new factor into the problem. The divisions of the middle germ-layer, which are so evident in the trunk of all vertebrate embryos, were shown to extend into the head and were designated head-cavities; assuming that each pair of these structures in the head represent an original segment, as they do in the body. Balfour and Marshall identified eight or nine pairs of them, and concluded that there

cannot be less than that number of segments in the head. Balfour expressed the conviction that there were, primitively, a larger number of segments, but owing to extreme modification of the head region they are no longer evident.

Van Wijhe, a Dutch anatomist, made a very careful study of the head-cavities, and in 1882 published his conclusions that there are nine segments in the head. His researches have ever since their publication been the standard for reference.

In 1890 Dohrn and in 1891 Killian showed the presence of a larger number of head-cavities in very young embryos; they accounted for 18 or 19 pairs, but further pointed out that they are transitory.

Recently, another set of segmental structures has come into prominence in discussions of the segmentation of the head, viz., segmental divisions of the neural tube. It has been shown that the entire neural tube (primitive spinal cord and brain) is divided by constrictions into similar segments, and these segments are now brought forward as embodying the original segmentation. These segments were first shown by Béranek, in 1884, to be definitely related to the cranial nerves, and therefore of segmental value. Additions to our knowledge regarding these segments were made by Orr in 1887, McClure in 1889 and Waters in 1892. They confirm the observations that the cranial nerves sustain definite relations to the neural segments. They showed further, that they extend from the front part of the head backward to the posterior part of the body, and that there are at least two in the fore-brain, three in the mid-brain and six in the hind-brain of fishes, reptiles and birds.

The writer, in 1894, made known the early history of these segments, and showed that they antedate in the time of their appearance the other segmental structures of the head.

It thus becomes clear that the problem of head-segmentation is a very complex one, and if it is to be solved, all segmental structures of the head must be taken into consideration. All recent efforts to solve the problem have been based on observations of segmentation exhibited in (1) cranial nerves and branchial clefts, (2) mesoblastic head-cavities, and (3) segments of the neural tube.

The first-mentioned basis may be passed for the present, as involving too much conjecture. The nerves of the head have undergone extreme modification, and with our present knowledge it is impossible to tell their primitive arrangement. There are several features about them that must necessarily cause confusion. Certain branches, and probably entire nerves, have disappeared through degeneration, and some of them (like the sixth nerve) are also subject to vagrant changes of position, arising at one point and shifting so as to occupy an entirely new position in the adult stages.

The second and third points mentioned are just now more important clues to the segmentation of the head. The former, or head-cavities, are the segments that give rise to muscles, and the latter are segments of the nervous system. The muscle-segments or head-cavities have received by far the most attention, as they are more conspicuous; but it is an open question which form of segmentation affords the most reliable evidence as to the primitive number of brain-segments. I am inclined to think that the neural segments are more favorable for this purpose. Comparative study shows that the neural segments are the first to appear, and are less subject to changes than the head-cavities. The large number of the latter discovered by Dohrn and Killian in the head of shark embryos are very transitory; they exist only for a

brief embryonic period, and soon become reduced to the conventional nine segments of Van Wijhe. The neural segments, on the other hand, begin very early, and preserve their original number and characteristics through several embryonic periods.

The general question, as far as head-cavities are concerned, has been well reviewed by Rabl. (See *Verhandlungen der Anatomischen Gesellschaft*, June, 1892; also abstract in English, in *The Journal of Comparative Neurology* December, 1892.)

The facts regarding the neural segments (based on the observations of the writer) will be briefly brought out here. The actual anatomical conditions to be seen in very young embryos are shown in the following figures:

Fig. 2 represents a very young shark embryo, in which the axial embryo is fairly established. The specimen

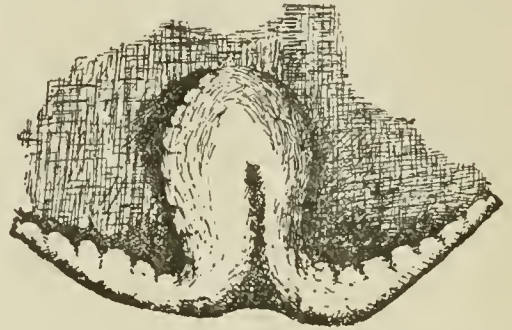


FIG. 2.

Very young shark embryo, showing primitive segments; \times about twenty diameters.

from which the sketch was made had attained a length of one and one tenth millimeters. The embryo was removed from the yolk of the egg, and the embryonic rim, which is seen extending laterally right and left, was cut some distance from the axial embryo. The segmental folds, best seen on the left of the figure, extend from the anterior end through the length of the embryo and outward into the embryonic rim. These structures, once established, may be traced onward in unbroken continuity till anatomical landmarks had made their appearance about the head and it becomes possible to determine their relation to other cephalic structures.

The examination of an older embryo (Fig. 3) shows a similar segmented condition. In this embryo the trunk-region is slender and the head-region has become broadly expanded. The optic vesicles (*op*) have made their appearance on the head-plate. The segments are more clearly marked than in the earlier stage. There are 11 pairs of them in the broadly expanded head-plate, and, as in the former case, they extend through the trunk-region and outward into the embryonic rim. It should be noted also that the segments of the head-region are similar to those of the trunk-region.

We have here a remarkable picture. It is obvious that this young animal that is to be hatched from the egg as a vertebrate is now in an invertebrate condition. It exhibits a jointed structure similar to that of the articulated group. The inference to be drawn is not difficult. As Dr. Whitman has said in another connection: "This is a stage through which every vertebrate

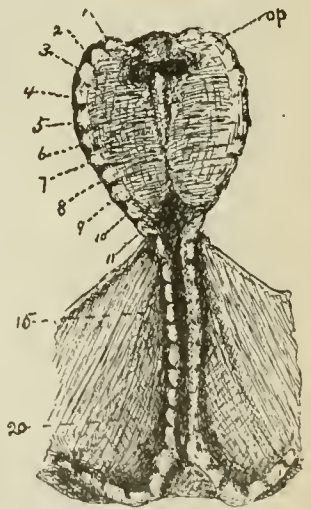


FIG. 3.

Shark embryo, showing the similarity of the segments in the head and trunk; \times about twenty diameters.

passes on its way from the egg to the adult, a stage in which the fish, the amphibian, the reptile, the bird, the beast and man find a common level, and in which every title to superior rank lies in unexpressed potentialities. But more than this; for it is here that the vertebrate is an invertebrate and stands beside its prototype, the segmented worm. On the same metropolitan plane the lobster, the crab, the insect, in short all the members of the great arthropod group, meet and acknowledge their community of descent."

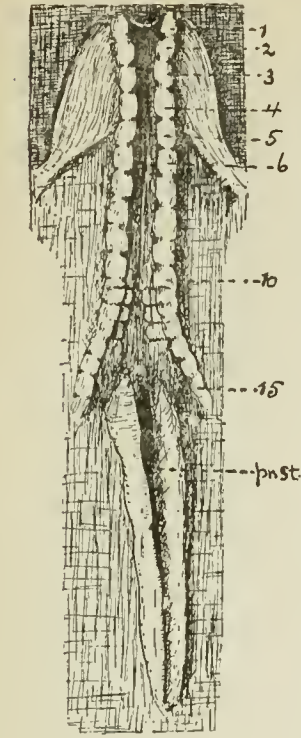


FIG. 4.

Young embryo of chicken, showing the early formed segments.

tion of the ear capsule. In order to understand this figure when compared with the earlier ones, it must be remembered that the right and left margins of Fig. 3 are des-

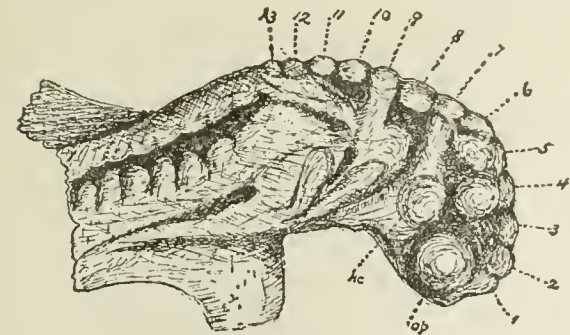


FIG. 5.

Head of shark embryo after closure of the neural groove, showing segments of the fore, mid and hind-brain; X about twenty diameters.

igned to grow upward and approach one another, thus forming an open neural groove, and that ultimately they are to meet in the middle plane, and thus convert the neural groove into a closed neural tube. The closure of the neural groove is accompanied by a forward bending of the head, and thus we get the appearance presented by Fig. 5 when the embryo is viewed from the side. The neural segments are indicated by the figures 1 to 13, and it will be observed that number 1 is near the anterior limit of the head. The first five segments are embraced within the region of the fore and mid brain, and the succeeding ones belong to the hind-brain. Owing to the rapid modifications in the forepart of the brain, the first five segments become very soon indistinguishable, but those of the hind-brain remain clearly defined for a considerable period.

Fig. 6 represents a shark embryo after the formation (and partial closure) of the ear capsule (*au*). The seg-

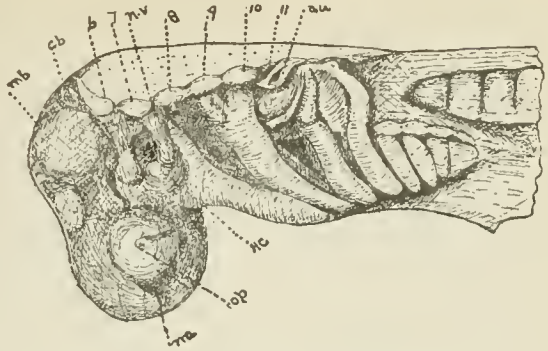


FIG. 6.

Head of shark embryo, showing segments of the hind-brain (6-11); those of the fore and mid brain have disappeared; X about twenty diameters.

ments of the hind-brain, numbered 7 to 11, are easily seen, while those originally lying farther forward have become obliterated.

Neural segments of a similar character have been identified in very early stages of bony fishes, several amphibia, and birds. In all these animals they have been observed in living stages, and therefore are actual structures and not artificially produced by reagents used in preparing the tissues for examination.

The evidence shows us, therefore, that the head is originally a segmented structure, and that the segments of the head do not, at first, differ from those of the trunk. The general proposition laid down at the outset, viz., that the head is formed by differentiation and specialization from structural elements like those that follow in the trunk, is sustained.

We may now turn to the second question—how far forward does the original segmentation extend? Until recently, it has been assumed that the fore-brain is not included in the segmented region, but this has been based more on inference than on actual observation. The two anterior pairs of nerves—olfactory and optic—coming from that region have been placed by common consent in a different category from the other cranial nerves. These two nerves have been regarded as outgrowths from the brain and not at all as true nerves. Moreover, the head has been considered by some of the most careful students of our time, to be derived from an unsegmented ancestral rudiment found in an enigmatical larval form (*Trochophore*) of the annelids. This larval form is unsegmented, it possesses a nervous system, and the segmented part of the animal is derived from it by budding. All this gave rise to the conviction that the brain of both annelids and vertebrates must contain an unsegmented anterior part.

But here, as elsewhere, the mist of speculation is being dispelled by the sun of investigation. Already the olfactory nerves have been shown to have a similar history to the other cranial nerves, and to all appearances the optic nerves are soon to be included with the others. Dr. Whitman has also shown (1892) by a masterly analysis of the brain of the leech, that the nervous system of the annelids is segmented throughout. The collection of cerebral ganglia or brain of these animals is segmented to its extreme anterior end, and consequently there is

no non-segmented part of the central nervous system in these animals, as has been so long assumed. While this is the state of the case in annelids, in vertebrates likewise, the existence of segment in the fore-brain has been shown by Waters, Zimmerman and others. The figures in this article bear evidence to the complete segmentation of the nervous system, and, in view of the facts, we are justified in concluding that the vertebrate brain still bears in early stages the marks of primitive segmentation.

The hind-brain is not so extensively modified as the more anterior parts, and the segments remain clearly defined there after they have disappeared forward. The brain of vertebrates has been gradually formed, and it may be assumed that, as the needs of the animal for a larger amount of brain-matter grew and increased, it gradually encroached on the region of the spinal cord, and that some of the segments originally belonging to the spinal cord, have been pressed into the service of the brain.

Having determined that segments exist in the brain, we should again observe that the segmentation belongs to the whole head region; the brain as the principal part of the head partakes of the general segmentation; it is not therefore a definite segmentation of the nervous system with which we have been dealing, but that of the head region as a whole.

There is still another fundamental question: How many segments have entered into the composition of the head? The results of different observers vary, and the number depends, of course, somewhat on the limits assigned to the head. Van Wijhe counts nine segments, based on a study of the head-cavities, Dohrn and Killian 18 or 19. Orr and McClure identified 11 head-segments from observations on the neural segments. The writer finds in shark embryos, 11 segments in front of the vagus nerve and 14 in the entire brain region. There may be more, but probably not less.

The question of head segmentation is a fundamental one, affecting the whole subject of the metameric (or segmental) structure of vertebrates. The head has sustained the greatest structural changes; it has undergone a longer train of modifications than any other animal structure. If we could know in all their detail the entire changes through which that structure has passed, from the egg to the adult, even in one animal, we should have a key to the chief questions of vertebrate descent.

Taking into account the results of recent studies, we may look upon the human brain, not as a homogenous mass of tissue, but as a *complex*, composed of an aggregation of simpler brains of the annelid type all united into a working whole. We are to understand that its complexity has been brought about through ages of responses to external and internal influences, and its perfection of physiological action has been gradually attained. It is the highest product of evolution, the goal toward which, in the morphological world, nature has been working for countless æons of time.

WILLIAM A. LOCY.

SEGOVIA, a river of Nicaragua. See Coco, in these Supplements.

SEGUIN, a town and the capital of Guadalupe County, Texas, 35 miles E. of San Antonio, on the north bank of the Guadalupe River, and on the Southern Pacific railroad. It is situated in a district producing cotton, corn, sweet potatoes, lumber and live-stock, and has flour-mills and cotton-gins. Population 1890, 1,716; 1900, 2,421.

SEGUIN, ÉDOUARD, a French physician; born in Clamecy, Jan. 20, 1812. In studying medicine he devoted himself chiefly to the training of idiots, and thoroughly investigated the cause and philosophy of idiocy, and the best means of dealing with it. In 1839 he opened the first school for young idiots in the Faubourg St. Martin, Paris. He was soon able to obtain remarkable results by his system of training. In 1844 a commission from the French Academy of Science examined his plan of training idiotic children, and reported that Dr. Seguin had solved this problem. He then published his *Traitément Moral, Hygiène et Éducation des Idiots* (1846), which is accepted as the standard authority. After the revolution of 1848 Dr. Seguin emigrated to America. Here he visited the schools for idiotic children in South Boston and Barre, Massachusetts, and Albany, New York. After re-visiting France twice he settled in New York City in 1863, where he later on established the Seguin Physiological School for feeble-minded children, which still exists. He also enjoyed a high repute as a specialist in nervous diseases. The United States Bureau of Education sent him as commissioner to the Vienna Exposition in 1873. Among his publications in English were *Idiocy and Its Treatment by the Physiological Method* (1866); *Medical Thermometry* (1871); and *Report as Commissioner to the Vienna Exposition to the Secretary of State* (1876). He died in New York, Oct. 28, 1880.

SEIDL, ANTON H., an Austrian musical conductor; born in Budapesth, Hungary, May 7, 1850. He was educated at Leipsic and studied also at Bayreuth under Richter and Wagner. He was employed by Wagner in making the first copy of the score of the Nibelungen tetralogy; in 1879-81 was conductor at the Leipsic Opera House; in 1882 made a European tour as conductor of Neumann's Nibelungen opera troupe; married Fräulein Krauss, soprano singer, in 1885; in



ANTON H. SEIDL.

the same year became conductor at the New York Metropolitan Opera House, and in 1891 succeeded Theodore Thomas as conductor of the Philharmonic Society. Died in New York, March 28, 1898.

SEIDLITZ POWDERS. See AERATED WATERS, Vol. 1, p. 184.

SEIGNIORAGE, the toll charged by the mints for coining gold and silver. The value of the metal put into the coin is enough less than the face value of the coin to pay for minting. In gold it is so small that one could melt a gold coin and get as much for it as its face showed value. All American

gold shipped abroad is taken by weight, and no allowance made for the cost of coining it. The value of silver in a silver dollar in 1896 was, at most, half the face value of the coin. Its purchasing power was upheld, as the same in paper money was, by the pledge of the government to redeem it. The government made a large profit by putting less than a gold dollar's worth of silver in a silver dollar. This profit is called "seigniorage." See also MONEY, Vol. XVI, pp. 725, 726.

SEINES. See FISHERIES, Vol. IX, pp. 255, 256.

SEISMOLOGY. See EARTHQUAKE, Vol. VII, pp. 608-612.

SEISTON. See SISTAN, Vol. XXII, p. 100.

SEIZURE. See NAVY, Vol. XVII, p. 290; and SEARCH, RIGHT OF, Vol. XXI, p. 608.

SELACHOIDEI. See ICHTHYOLOGY, Vol. XII, pp. 685, 686.

SELACHOSTOMI, SAME AS POLYODONTIDÆ. See ICHTHYOLOGY, Vol. XII, p. 687.

SELAGINELLEÆ. See FERNS, Vol. IX, p. 107.

SELANGOR. See STRAITS SETTLEMENTS, Vol. XXII, p. 587.

SELBORNE, ROUNDELL PALMER, EARL OF, an English lawyer; born in Mixbury, Oxfordshire, Nov. 27, 1812; called to the bar at Lincoln's Inn in 1837, and in 1849 made queen's counsel. In 1861 he became solicitor-general in Lord Palmerston's administration, and again in 1863 under Lord John Russell. In 1871 he was counsel for Great Britain before the Geneva arbitration tribunal. In Oct., 1872, he was made Lord Chancellor of England, with the title of Baron Selborne, of Selborne. He retired with Gladstone in Feb., 1874, and returned to his former office when the Liberals were again victorious in 1880. In Dec., 1882, he was created Earl of Selborne, and Viscount Wolmer of Blackmoor. He retired again with Gladstone in 1885. He was noted not only for his legal labors, but also for his literary attainments, and wrote *The Book of Praise* (1862); *Ancient Facts and Fictions Concerning Churches and Tithes* (1888); *Hymns, their History and Development* (1892); *Letters to His Son on Religion* (1898); and the article on HYMNS in this ENCYCLOPÆDIA. In 1877 he was elected Lord Rector of St. Andrews. Died in Petersfield, Hampshire, May 4, 1895.

SELECTION, GERMINAL. See HEREDITY, in these Supplements.

SELENIC ACID. See CHEMISTRY, Vol. V, p. 506.

SELENIOS ACID. See CHEMISTRY, Vol. V, p. 503.

SELENITE. See *Gypsum*, under MINERALOGY, Vol. XVI, p. 401.

SELEUCID DYNASTY AND SELEUCUS, the names of four monarchs. See PERSIA, Vol. XVIII, pp. 585, 586, 588, 589.

SELF-BINDING HARVESTER. See HARVESTING-MACHINERY, in these Supplements.

SELF-CONSCIOUSNESS. See PSYCHOLOGY, Vol. XX, pp. 81-85.

SELF-INDUCTION. See ELECTRICITY, § 72, in these Supplements.

SELFRIDGE, THOMAS OLIVER, an American naval officer; born in Boston, Massachusetts, April 24, 1804. In 1818 he entered the navy as a mid-

shipman, and in 1844 had risen to the post of commander of the flagship of the East India squadron and later of the Pacific squadron; was transferred to the *Dale* in 1847, and wounded during the capture of Mazatlan and Guaymas. After that time he was engaged on shore duty, except for a few months during the Civil War. From 1848 to 1861 he was at the Boston navy-yard, and from 1862 to 1865 at Mare Island, California. He was successively president of the examining board, lighthouse inspector at Boston, and again on the examining board until 1871, when he was retired on waiting-orders. In 1855 he became captain, in 1862 commodore and in 1866 rear-admiral, being now the senior navy officer on the retired list.—His son, THOMAS OLIVER, likewise a rear-admiral, was born in Charlestown, Massachusetts, Feb. 6, 1837. He graduated from the United States Naval Academy (1854); was promoted lieutenant (1857); and lieutenant-commander (1862). During the Civil War he was in most of the important operations of the war, among them the capture of Vicksburg, the Red River expedition and the engagement between the *Cumberland* and *Virginia*. In 1869 he was promoted commander, and had control of the surveys for an interoceanic canal across the Isthmus of Darien in 1870; besides other missions, including surveys on the Arato River in 1871-73. He was a commissioner at the International Congress on Canals, at Paris in 1876; surveyed the Amazon River (1877-80); was appointed captain (1887), and placed in charge of the Newport torpedo station. In 1885 he was placed in command of the *Omaha* in the Asiatic squadron, and while here was tried for carelessness in target-practice, but was acquitted by court-martial. In 1894 he was made commodore, and in 1896 rear-admiral. He was presented with the decoration of the Legion of Honor in recognition of his services on the Isthmus of Darien, and was made an honorary member of the Belgian Geographical Society.

SELIGMAN, EDWIN ROBERT ANDERSON, an American economist; born in New York, April 25, 1861. He graduated at Columbia in 1879, and afterward studied at Heidelberg, Berlin, Geneva and Paris. On his return he studied at the Columbia Law School and School of Political Sciences. He then began lecturing at Columbia on political economy, and in 1890 became professor of political economy and finance. He was also treasurer of the American Economic Association between 1885 and 1890, and editor of *Political Science Quarterly* after its establishment in 1886. Among his works are *Railway Tariffs and the Interstate Commerce Law* (1887); *Two Chapters on the Mediæval Guilds of England* (1887); *Finance Statistics of the American Commonwealths* (1889); *Taxation of Corporations* (1890); and *On the Shifting and Incidence of Taxation* (1892).

SELIM, three sultans. See TURKEY, Vol. XXIII, pp. 643, 644, 648.

SELINGROVE, a borough of Snyder County, eastern central Pennsylvania, 50 miles N. of Harrisburg, on the Susquehanna River and on the Pennsylvania railroad. It is the center of an agricultural region, for whose produce it is the principal outlet,

and has good water-power utilized in saw and planing mills, sash-and-door factories. Located here is the Missionary Institute of the Evangelical Lutheran Church. Population 1900, 1,326.

SELKIRK, THOMAS D., EARL OF. See RED RIVER, Vol. XX, p. 315.

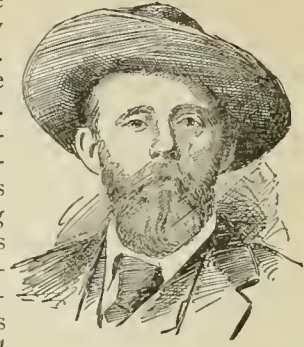
SELKIRK MOUNTAINS, a range about one hundred and seventy-five miles long and eighty miles broad, lying to the west of the Rocky Mountains, and extending through southeastern British Columbia. In elevation it varies from 6,500 to 9,000 feet, the highest known mountain in the range, Mount Macdonald, being 9,940 feet high. The range is densely wooded, the timber-line rising to six thousand feet, while the perpetual snow-line is at an elevation of about seven thousand feet. The abundant rain and snowfall causes a large development of glaciers; and that these great ice-fields were formerly more extensive than now, is shown by numerous moraines and other traces of ice-action. Attention was first called to these mountains through the difficulties experienced by engineers of the Canadian Pacific railroad in finding a route across the range.

SELLAR, WILLIAM YOUNG, a British author; born in Mowich, Sutherlandshire, Scotland, in 1825, and educated at the Edinburgh Academy, Glasgow University and Balliol College, Oxford. In 1851 he acted as assistant to the professor of humanity in Glasgow, and in 1855 went to St. Andrews to act in a similar capacity to the professor of Greek, to whose chair he succeeded six years later. In 1863 he was transferred to the chair of humanity in the University of Edinburgh. He wrote *Roman Poets of the Augustan Age*; *Roman Poets of the Republic*; and prepared for this ENCYCLOPEDIA the articles on a great many Latin writers, including CATULLUS, HORACE, OVID, and VIRGIL.

SELMA, a city and the capital of Dallas County, southwestern central Alabama; occupies a prominent bluff on the Alabama River, nearly 165 miles north of Mobile, with which city it has communication by both rail and water. The city is handsomely laid out, well built, and a prominent shipping-point for the rich cotton-growing and lumber, iron-ore and coal producing district of the surrounding country. It is also an important railroad center, being located on the Birmingham, Selma and New Orleans, the Louisville and Nashville, the Mobile and Birmingham, and the Southern and Western of Alabama railroads. It contains a courthouse, city hall, national bank, with capital of \$400,000, two state banks, two daily, a semiweekly and two weekly papers, two academies and numerous churches. The list of manufactures includes cotton-seed oil, cotton batting and goods, ice, hollow-ware, car-wheels, sash, doors and blinds, etc. Population 1890, 7,622; 1900, 8,713. See also SELMA, Vol. XXI, p. 639.

SELOUS, FREDERICK COURTENAV, an English explorer and naturalist; born in London, Dec. 24, 1852. He was educated at Rugby, and afterward traveled in Switzerland and Germany. In 1871 he went to South Africa, where he spent his time traveling and making investigations, the results of which were sent to the Royal Geographical Society.

From this body he several times received honorable mention, and in 1883 won its highest honor, the founders' gold medal. He was also elected a fellow of the Zoölogical Society. His many adventures are said to have moved H. Rider Haggard, the novelist, (q.v. in these Supplements) to depict Selous as Allan Quatermain. During the Matabele campaigns he rendered valuable services as a scout to the colonists. His experiences are chronicled in his *A Hunter's Wanderings in Africa* (1881); and *Travel and Adventure in South-east Africa* (1893).



F. C. SELOUS.

SELWYN, EDWARD CARUS, an English educator; born in Lee, Kent, Nov. 25, 1853. While receiving his education at Eton and Cambridge was always one of the distinguished students. He became a fellow at King's College, Cambridge, and later assistant classical lecturer; in 1880 became divinity lecturer at Emanuel's College and King's College, and dean of the latter; in 1882 was chosen principal of Liverpool College, where he remained till 1887, when he accepted the position of head-master of Uppingham School.

SEMAPHORE, a signaling apparatus, commonly a post, with cross-arms, which may be set at different angles. For railway signaling in the United States, the semaphore post is about 25 feet high, and is made with two forms of arms, one square-ended, the other notched. The square-ended are used for home-signaling, and are painted red on the side toward the trains which they govern, and white on the other side. The notched arms for distance-signaling are painted green on the side toward the trains which they govern, and white on the other side. When the semaphore arm is set at a right angle in the daytime, or bears a red light at night, it signifies to the engineer that there is danger, and he must stop or run very slowly. If the semaphore arm is set at an angle in the daytime, or bears a white light at night, it means that the track is clear, and that the train may go ahead in safety. A dwarf semaphore about two feet higher than the rail, and bearing an arm about a foot long, is also in use, for sending trains from the side to the main track, and *vice versa*, and for running trains in the reverse direction on a double track.

SEMBRICH, MARZELLA, an Austrian operatic singer; born in Lemberg, Feb. 15, 1858. At first she studied for the piano and violin, under Herr Stengel, whom she afterward married. While working under Liszt at Vienna it was discovered that she had a splendid voice. She studied at Milan under Lamperti, Jr.; made her *début* in Athens in *I Puritani*, on June 3, 1877; but returned to Vienna for further study. In 1878-80 she sang at Dresden; in 1880 she appeared in London, and later sang successfully in the principal cities of Europe. In 1883-84 she made a sensation in

New York. Her chief parts were *Zertina*, *Susanna*, *Martha*, *Lucia*, *Amina*, *Rosina*, and *Constance*. In 1898–99 she repeated her triumphs in the United States.

SEMELE, a myth. See DIONYSIUS, Vol. VII, 248.

SEMINOLE INDIANS. For history, see FLORIDA, Vol. IX, p. 341. A tribe of the Muskogee Indians, who removed from Florida to the Indian Territory in 1842. They have taken to agriculture, have become thoroughly civilized, and support schools. At present they number about 2,500.

SEMI-PELAGIANISM. See PELAGIUS, Vol. XVIII, pp. 472, 473.

SEMMES, RAPHAEL, an American naval officer, born in Charles County, Maryland, Sept. 27, 1809. He

was secretary of the Light-house Board in 1859–61, but resigned at the beginning of the Civil War, and joined the Confederate navy. He obtained great notoriety by his exploits as commander of the side-wheel steamer *Sumter*, with which he captured eighteen merchantmen. In August, 1863, he took command of the fast steamer *Alabama*, at the Azores Islands, put to sea, and captured sixty-two



RAPHAEL SEMMES.

American merchantmen, most of which he burned at sea. In 1863 the *Alabama* was sunk in the English Channel by the United States vessel *Kearsarge*. He was appointed rear-admiral in 1864, and ordered to the James River squadron, with which he guarded the water-approaches to Richmond until the city was evacuated. At Greensboro, North Carolina, on May 1, 1865, he participated in the capitulation of General Johnston's army. He returned to Mobile, and opened a law office. There, on Dec. 15, 1865, he was arrested by order of Secretary Welles and imprisoned for some months, but subsequently released without trial. Semmes was afterward an editor of a daily paper at Mobile, but soon became a professor in the Louisiana Military Institute at New Orleans. Later, he returned to the practice of law at Mobile. His adventures are recorded in *Memoir of Service Afloat During the War Between the States* (1869); he also wrote *Campaign of General Scott in the Valley of Mexico* (1852); and other similar works. His career of destruction gave occasion to the "Alabama Claims." He died in Point Clear, Aug. 30, 1877. See also KEARSARGE, in these Supplements.

SEMOLINA. See MACARONI, Vol. XV, p. 125.

SEMPACH. See SWITZERLAND, Vol. XXII, p. 784.

SEMPER, KARL, a German naturalist; born in Altona, Germany, July 6, 1832. He was educated at the naval school in Kiel; at the Hanover Polytechnic School; and Würzburg University. He traveled in the Indies, China, Japan, and a number of the larger groups of islands in the East; was on his return in 1866 appointed professor of zoölogy at Würzburg, which position he retained until his

death. In 1877 he delivered a series of lectures before the Lowell Institute in Boston, which have been published as *Animal Life as Affected by the Natural Conditions of Existence* (1881). He also published *Reisen im Archipel der Philippinen* (1867–72); *Die Palau Inseln im Stillen Ocean* (1873); and *Die Natürlichen Existenzbedingungen der Thiere* (1880), above noted. He died May 29, 1893.

SENATOBIA, a town and the capital of Tate County, northwestern Mississippi, on Hicaholahala creek, 35 miles S. of Memphis, Tenn., on the Illinois Central R.R. It is situated in a region producing cotton, corn and live-stock, and is an important shipping-point. Population 1900, 1,156.

SENECA, a city and the capital of Nemaha County, northeastern Kansas, founded in 1860, on a branch of the Nemaha river, and on the Kansas City North-Western and the St. Joseph and Grand Island railroads, about 65 miles W. of St. Joseph, Missouri, and 70 miles N.N.W. of Topeka. It is in a farming, fruit-raising and stock-raising district; has a large trade in butter, and contains flour and grist mills, a foundry and a shoe factory. Population 1890, 2,032; 1900, 1,846.

SENECA, a town of Newton County, southwestern Missouri, near the boundary-line between Missouri and the Indian Territory, 16 miles W.S.W. of Neosho and about 325 S.W. of St. Louis, on the St. Louis and San Francisco railroad. It is in a region producing agricultural products, live-stock, zinc and lead; had in 1890 the only tripoli mines in the United States, and contains flour-mills and other industries. Population 1890, 1,101; 1900, 1,043.

SENECA FALLS, a village of Seneca County, southwestern central New York, on the Seneca River, and on the New York Central and Hudson River and the Seneca Falls and Cayuga Lake railroads, 10 miles N.E. of Geneva, about 16 miles from Auburn and about three miles W. of Cayuga Lake. It is situated in a picturesque lake region, producing agricultural products, gypsum and building-stone. The Seneca River at the village has a fall of fifty feet, furnishing excellent water-power for manufactories of knit goods, pumps, machinery, sash and blinds, and flour. The village has an academy and electric-railway communication with the neighboring villages of Waterloo, Genesee and Cayuga Lake Park. Population 1900, 6,519.

SENECA LAKE, an elongated body of water in southwestern central New York, surrounded by the counties of Yates, Schuyler, Ontario and Seneca, having a north-and-south length of about 35 miles and a width of from 1 to 4 miles, and has an elevation of 447 feet. The shores of the lake are bold and picturesque; its greatest depth is 630 feet, and navigation is carried on the year round by steam-boats. Seneca River issues from the north end of the lake and flows eastward into Cayuga Lake. At the south end is Watkins Glen, one of the points of interest on the lake.

SENECAS, a subtribe of the Iroquois Indians. See IROQUOIS INDIANS, in these Supplements.

SENEFELDER. See LITHOGRAPHY, Vol. XIV, pp. 697, 698.

SENEGA, the name of a drug obtained from the

root of *Polygala senega*, sometimes called Seneca snakeroot, a plant comparatively common throughout the eastern United States. It is a low herb, with leafy, tufted stems, and a terminal spike of small, white, irregular flowers.

SENEGAL AND RIVIÈRES DU SUD. (For general description and early history, see **SENEGAL**, Vol. XXI, pp. 660-61.) In 1895 the French laid claim to all of West Africa from Cape Blanco to Togo Land, and inland to the Upper and Middle Niger and considerable territory to the east of the Upper Niger. Of this territory, Senegal and Rivières du Sud embrace countries occupied, countries annexed, and countries protected, extending along the Senegal as far as Matram, and along the coast from north of Cape Verde to Gambia, having an area of 14,700 square miles, and a population of 174,000, of whom 135,000 were in Senegal proper. Adding the various protected states gives a total area of 115,800 square miles, and a population of about 2,000,000. The government of the colony is vested in a governor-general and colonial council in Senegal, and one deputy is sent to France. The defensive armament consists of 2,508 men (including natives), and 66 officers. In 1898 there were 246 miles of railway and 574 miles of telegraph lines. The imports for 1897, consisting of foods, drinks, and textiles, amounted to about 25,000,000 francs; the exports, chiefly ground-nuts, oils, gums, India-rubber, woods, and skins, aggregated 12,000,000 francs. The local budget for 1898 was 3,929,367 francs; the colonial debt, 517,657 francs; and the cost to France of maintaining the colony, according to the budget for 1899, was 6,106,942 francs. The principal river of the colony, the Senegal, is navigable at high water for small vessels; and the largest towns are St. Louis, with a population of 20,000, and Dakar, with 2,000.

SENIGALLIA. See **SINIGAGLIA**, Vol. XXII, p. 94.

SENLAC OR HASTINGS, BATTLE OF. See **ENGLAND**, Vol. VIII, p. 291.

SENNACHERIB. See **BABYLONIA**, Vol. III, pp. 187, 188.

SENSATION. See **PSYCHOLOGY**, Vol. XX, pp. 40-51.

***SENSE-ORGANS.** The sense-organs of animals embrace all those structures endowed with especial sensibility. They are on the surface, and therefore are properly designated end-organs. They serve to bring the organism into relation with the external world, and have played an important part in the evolution of animal life; they are the doorways through which the knowledge of external events and the recognition of surrounding conditions have crept in to modify the development of animals.

These end-organs exhibit great variation in different animals, from the lowest to the highest, yet they differ from one another mainly in degree of development and specialization. The simpler ones consist of single cells or clusters of cells, in which the protoplasm is a little more sensitive to external impressions than in the surrounding cells, but at this stage they are not specialized along any particular line, they possess merely height-

ened sensibility. The higher ones embrace such complex developments as the vertebrate eye and ear. So many gradations in structure exist, leading from one to another, that we may say the sense-organs form a series, at the lower end of which are the simplest sensory papillæ and at the upper end the highest developed sense-organs.

The question of the origin and relationship of sense-organs is full of interest. From the combined results of investigation on both invertebrates and vertebrates, it seems altogether probable that the higher sense-organs have been derived from those of a lower order, and, indeed, that they have all been differentiated from a common sensory basis, and therefore are related in a direct way. This view has been gaining ground for upward of ten years, and has a firm foothold in philosophical discussions; and although the evidence favoring such an interpretation is still incomplete, the hypothesis was never so well supported as at present.

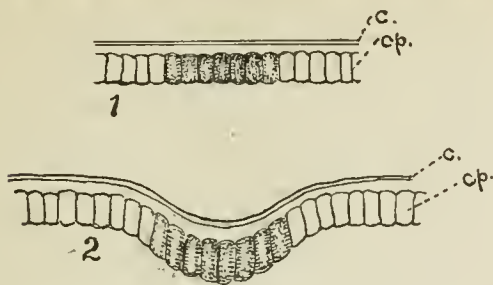
It is important to note that the sense-organs of animals have been gradually perfected. They did not spring fully differentiated into existence in the higher animals, but were gradually developed, and a very long time was required after their appearance for their perfection. For instance, the eye of vertebrates did not make its appearance suddenly in that group of animals. It is connected with simpler structures of the same kind by slight gradations. The comparative anatomy of the eye shows gradations from a simple pigment-spot, to localize the light or heat rays, to the fully formed complex eye.

It may be well, before going farther, to form some conception of the possible modes in which an organ of sense may have originated. What, for instance, were the initial steps in the development of a visual or an auditory organ? It may be safely assumed that changes in the protoplasm, looking toward increased sensibility, would begin in the surface cells, because, from their position, they are subject to extrinsic influence and are the ones in which the protoplasm would be first acted upon in such a way as to bring about modifications in the degree of its irritability.

In the simpler forms, the surface cells are substantially alike, and the whole surface is more or less sensitive. "Suppose, however, some solid and opaque particles of pigment deposited in certain cells of the skin (Fig. 1). Their opacity would arrest and absorb the light, thus increasing its effect, while their solidity would enhance the effect of the external stimulus. A further step might be a depression in the skin at this point (Fig. 2), which would serve somewhat to protect these differentiated and more sensitive cells, while the deeper this depression the greater would be the protection.

"The epithelial cells frequently secrete more or less matter, which may form a more or less solid ball. This might be set in vibration by the sound-waves, and would thus increase the effect on the underlying more sensitive cells. Such a body is an incipient ear, and is known as an otolith. On

the other hand, it might serve as a lens, and, by condensing the light, would act like a burning-glass and increase its effect on the cells below.



FIGS. 1 AND 2.

Fig. 1. Diagram of the skin, with seven cells containing granules.
Fig. 2. Diagram of skin in process of infolding (after Lubbock). *c.*, cuticle; *cp.*, cells of the skin.

A further stage would be that the immediately subjacent cells, acted on by the increased stimulus, might (Fig. 3) develop into special nerve-tissue.

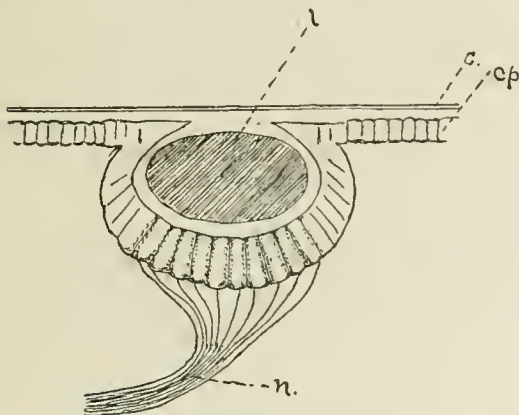
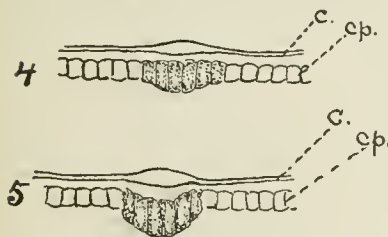


FIG. 3.

Diagram of later stage in the origin of a sense-organ (after Lubbock).

“Nor is this a merely imaginary case. Each of the above stages may be found in actual existence—that, for instance, indicated in Fig. 2 in the limpet; Fig. 3, and also higher developed stages in other mollusks. But more than this, if the development of the eye of an individual snail be watched in the egg, it will be found to pass successively through stages resembling the figures. In other cases, however, the organs of sense have a different origin and history. Suppose, for instance, that the hypodermic layer were at any spot somewhat more strongly developed (Fig. 4) than elsewhere; in that case the cuticle secreted by the hypodermic cells would tend to be rather thicker than usual. This would again constitute a lens and serve to condense the light, and the development would



FIGS. 4 AND 5.

Fig. 4. Diagram of the beginning of a sense-organ.
Fig. 5. Diagram of further stage in formation of sense-organ.

pass into the condition represented in Fig. 5, and then into later conditions. Nor, as we shall presently see, do these two types of development by any means exhaust the ways in which eyes may originate. In the two cases given, the eyes originate from the skin, but in others—for instance, in ourselves—the percipient elements are formed from the central nervous system.” [Lubbock.]

In order to be functional, the end-organ must be connected with the central nervous system by transmitting strands or nerves. The stimulus is received at the surface and transmitted by nerve-fibers to the sensorium, and there must be unbroken continuity between these three essential parts. There are, of course, simpler conditions in the unicellular animals, and in animals before the differentiation of a nervous system, but, above the very lowest animals, sense-organs, nerves and sensorium exist; they must be intact and in direct continuity, to permit of functional activity.

There is such a wide range of sensibility exhibited in the different sense-organs, that it is at once a point of great difficulty to conceive how the same substance can exhibit such variations in its activities. A mere suggestion can be thrown out along this line. It is to be observed that protoplasm is the physical basis of sensibility; without it there would be no sensation; and this leads to the view that sensation depends upon the properties of protoplasm. The more highly perfected qualities exhibited by protoplasm are dependent on a long train of experiences, through which the living matter has passed, the results of which are impressed upon it. The protoplasm cannot escape wholly from its past history, nor can it, at a single bound, reach a high plane of differentiation, although the capabilities for such attainments are inherent in it. The different experiences of protoplasm, operating through long time, may account for the wide range of difference exhibited in its actions.

The most complex sense-organs still retain traces of their earlier and simpler condition, especially in the embryo. Each time an animal is developed the sense-organs are formed anew, from the beginning. The cells, which are to become sensory, are at first indifferent, like the rest of the cells of the embryo, except in their potentialities; by gradual differentiation and specialization they become different, and at each step the sense-organs, in process of formation, reveal in some measure their ancestral conditions. These facts are significant, and it is very helpful in understanding sense-organs that they may be thus followed step by step in the embryo. Comparative study is another aid to this end. The ear and nose of vertebrates begin as modified patches of surface cells that gradually sink below the surface. The eyes of invertebrates begin on the surface in a similar manner, and are carried inward by an infolding. The eyes of vertebrates begin in cells of the central nervous system, and are apparently out-growths from an inclosed tube; it is to be remembered, however, that the inner surface of this tube

pass into the condition represented in Fig. 5, and then into later conditions. Nor, as we shall presently see, do these two types of development by any means exhaust the ways in which eyes may originate. In the two cases given, the eyes originate from the skin, but in others—for instance, in ourselves—the percipient elements are formed from the central nervous system.” [Lubbock.]

was originally on the outside, and, as we shall see later, it is not impossible to interpret the vertebrate eye as a surface organ.

Laying hypotheses aside, we are not without facts that show, in some cases, the derivation of the more complex sense-organs from simpler ones. For instance, upward of ten years ago Dr. Whitman showed a genetic relation between eyes and tactile papillæ in the leech. This animal, as is well known, has a body composed of a series of rings or segments that follow one another in linear order. There are sensory papillæ located on the upper surface of each body-ring, and certain of them are in direct rows with the eyes. In the hinder-part of the body the papillæ are purely tactile, but, passing headward, they become gradually modified, and are at first mixed tactile and visual and finally the anterior five pairs are purely visual. So gradually do they pass into one another by structural gradations that the serial homology of the hinder papillæ with the eyes is demonstrated. We have here a well-authenticated case of sense-organs of a high order being connected, by insensible gradations, with those of a lower type. Whitman says: "Although the evidence appears to me conclusive that the eyes and the segmental papillæ were, originally, morphological as well as physiological equivalents, it does not, of course, follow, necessarily, that both organs now have the same functional significance. The original papillæ may have represented sense-organs of a more or less indifferent order, among which, in the course of the historical development of the leech, a division of labor was introduced, a few at the anterior end becoming specialized as light-perceiving organs, the rest either remaining in their early indifferent condition or becoming specialized in some other direction."

Following the work of Whitman, the existence of a series of rudimentary sense-organs in vertebrates was brought to light in 1885 by Foriep and Beard. While it is by no means clear that these are the homologues of the sensory papillæ of leeches, there are, nevertheless, many things that weigh on that side. The series has become rudimentary or lost in the adult forms of higher existing vertebrates, but they are present in the embryos. Closely related to these are similar organs presently to be described as lateral-line organs. It is now generally believed that the sense-organs of the lateral line constitute the basis from which the higher sense-organs of vertebrates are derived.

In looking over memoirs dealing with the structure of sense-organs, one cannot fail to be struck by the remarkable similarity of the sense-cells in the different kinds of sense-organs. They are easily reducible to one type, and this, of course, favors the view that they have been derived from a common form.

The present article undertakes to deal, in a general way, with the sense-organs of vertebrates only, supplementing what has gone before by the introduction of new facts and a

new point of view from which to consider these organs.

It is convenient to recognize two main groups of sense-organs, simple generalized ones, the ganglionic series, and more specialized ones belonging to the higher senses. Those by means of which the lowest sensory impressions are appreciated, and also touch and temperature, have a diffused and wide distribution over the body, and always remain near the surface-cells, from which they originate. Those connected with sight, hearing and smelling are more highly differentiated, and their sense-cells form aggregations, which disappear from the surface and become inclosed in cavities of the head called sense-capsules. As has already been indicated, sight, hearing and smell are regarded as secondary differentiations of a diffused sense.

SENSE-ORGANS OF THE LATERAL LINE. The most generalized sense-organs of vertebrates, from which it seems probable most of the others have been derived, are those of the lateral-line system. This system of sense-organs is found in adult and embryonic fishes, and in the larval stages of amphibia. Vestiges of the organs appear in embryos of birds, but in this class they are transitory and do not develop. If any traces of this system make their appearance in mammals, they are extremely transitory and have escaped notice.

The lateral-line organs occur in both the trunk-region and the head-region. In the trunk-region of fishes they are arranged in linear order along the sides, forming, usually, a single lateral line, which is visible to the naked eye (Fig. 6, *ll*).

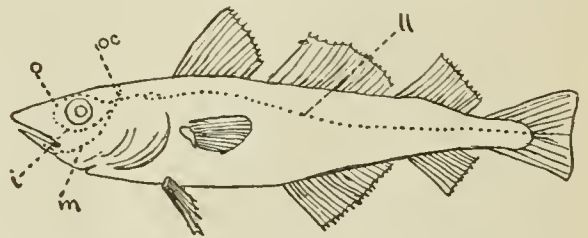


FIG. 6.

Diagram to show the position of the lateral line and its chief branches in a fish. *ll*, lateral line; *o*, supra-orbital; *i*, infra-orbital; *m*, mandibular; *oc*, occipital.

Along the line, pores open to the outside and lead inward to a longitudinal canal. In scaly fishes the scales in the path of the line are perforated. These openings were originally regarded as mucous pores for the escape of mucus, which was supposed to be secreted by gland-cells underneath; but they are now known to contain sense-organs, which were originally formed on the surface in the shape of little nerve-hillocks, and, in process of development, sank below the surface and became inclosed in canals. In the head-region the canal system is much branched and sense-organs abundant. There is always, externally, a line running above the eye (supra-orbital, Fig. 6, *o*), one underneath the eye (infra-orbital, *i*), one leading out on the lower jaw (mandibular, *m*), and one over the back of the head (occipital, *oc*). Inter-

nally, the canals are very much branched, and some of them lie imbedded in the bones of the head.

Fig. 7 shows the typical distribution of the main trunks of the lateral-line system in amphibia.

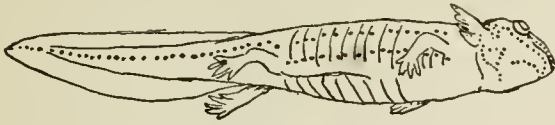


FIG. 7.

Diagram to show the distribution of the lateral-line organs in amphibia.

In this class of animals the sense-organs remain at the surface and do not become inclosed in canals. The surface sense-organs are in the hinder-part of the body, arranged in two or three lines. When amphibia change their aquatic habits and become terrestrial, the lateral-line organs are lost at the time of metamorphosis.

One point of great interest is that these sense-organs are connected with the central nervous system entirely through branches of the cranial nerves. Those in the body-region do not send nerves directly into the spinal cord, at various planes along which they are situated, but, on the contrary, a long lateral nerve, made up of fibers coming from the various sense-organs, passes along the body and connects with the vagus nerve in the head. Other organs, lying in the various planes of these sense-organs, are connected directly with the spinal cord by means of nerve-fibers. While the lateral-line organs in the back part of the body connect through the tenth nerve with the brain, those in the head-region unite with branches of the fifth and seventh cranial nerves.

In these sense-organs, as in others, the cells are of two kinds—sensory cells and supporting cells. The nerves are connected with the former, which are usually central in position.

Recent investigations (Wilson, Mitrophanow) show that the lateral-line system starts from a thickening of surface cells on each side of the head, in the region at which the ear later appears, and out of a common thickening, which splits into three parts, the lateral line, the ear and branchial sense-organs arise. This strengthens the view that all these organs belong in one series. The lateral-line organs show also an interesting connection with the nose, as well as the ear. Allis, in his well-known memoir on the lateral line of *Amia*, gives a figure that shows a connection between the epithelium of the nasal pit and that of the lateral line (Fig. 8, *ll* and *na*). In subsequent growth the nasal pit follows the same course as the surface organs of the lateral line; it sinks below the surface and becomes inclosed, as do the former structures when they are converted into canal organs. The ear, in the process of development, begins on the surface, passes inward, retaining a tubular connection with the outside, and develops along the same general direction as the lateral-line organs. The latest view regarding the ear is, that it is a greatly modified canal organ. While it is held by modern morphologists that nose and ear probably belong to

the lateral-line series, the genetic relationship of the eyes is more problematical. It must be said, also, that the organs of taste and touch have not as yet been shown to have any genetic connection with the ganglionic sense-organs.

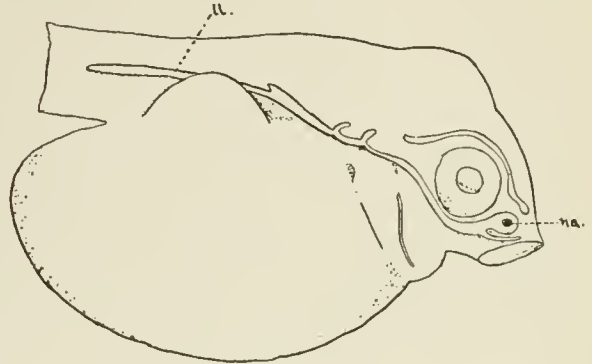


FIG. 8.

Young fish embryo (*Amia*) on the yolk, showing a connection between the nasal epithelium (*na*) and the lateral line (*ll*). (After Allis.)

Nothing is definitely settled regarding the physiology of the lateral-line sense-organs. They are evidently a kind of organ adapted to aquatic life, and are, doubtless, concerned with the perception of mechanical disturbances in the surrounding water. They are of further interest on account of their segmental character, and afford a possible connection between the segmental sense-organs in invertebrates and the higher ones of vertebrates.

Besides the organs of the lateral line, there are in vertebrates other simple sense-organs, found on the surface, in which there is no marked distinction between the supporting cells and the sensory cells. They are called end-bulbs, and nerve-fibers pass from these bulbs into the central nervous system. In fishes, these end-bulbs are widely distributed among the organs of touch. They are especially abundant on the head. They are clearly related to touch-corpuscles, but still are different from the n. In the amphibia they pass into the mouth and function as taste-buds. In all other vertebrates these organs have a limited distribution in the mouth-parts and tongue constituting the organs of taste. But little is known regarding the development of these organs.

Still other surface organs are the touch-corpuscles. They are treated of under the heading *Physiology*.

The organs by means of which temperature is appreciated do not correspond with those of touch. It has been shown by Goldschneider and others that the hot and cold spots and touch-spots in the skin do not coincide. If, for instance, a map of the sensitive spots in any given area of the skin be made, those spots sensitive to heat, to cold and to touch, although intermingled, will be found to occupy independent territories.

The nose, as already indicated, begins as two superficial thickenings of cells—the olfactory plates—which very soon sink below the surface, forming nasal pits. The cells therein become differentiated into the sense-cells of the nose. It

has recently been shown that the fibers of the olfactory nerve begin in the surface sense-cells and grow inward. This is now believed to be the direction of growth of nerve-fibers in all organs of sense. Instead of starting in the brain, as was formerly believed, and growing outward, the nerve-fibers start in peripheral cells and grow inward. Nerve-fibers develop in the chick as early as the third day of development. The olfactory ganglion develops also from the plate of epithelium cells and not from the brain. The beginning of the nose is shown in Fig. 8, *na*, and again in Fig. 9, *na*. In the former, its connection with the front part of the lateral line is exhibited, and in the latter its position in front of the eye in the shark.

The ears of vertebrates begin as circular, cup-like depressions on each side of the head, called

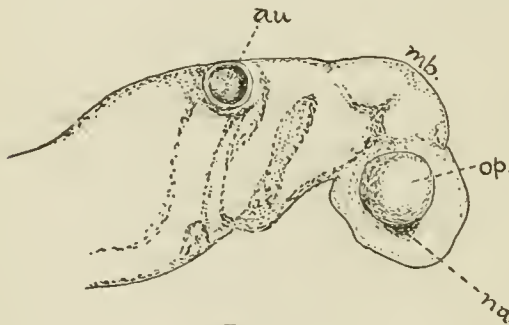


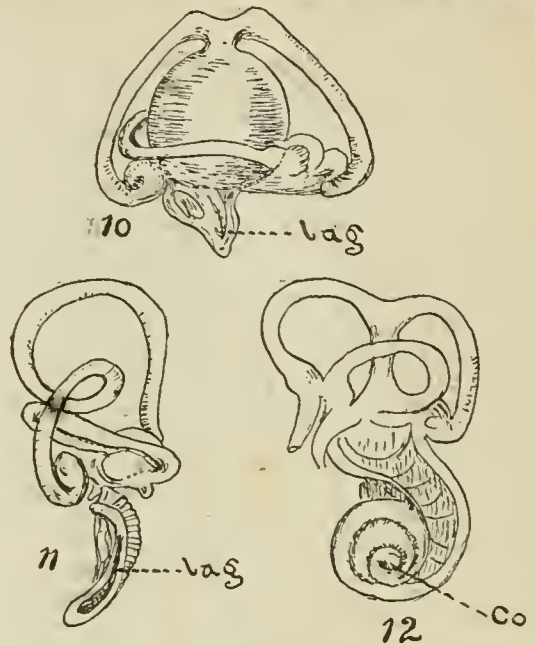
FIG. 9.

Head-end of shark embryo, showing the beginning of the ear (*au*) and the nose (*na*). *mb*, mid-brain; *op*, eye.

the auditory saucers (Fig. 9, *au*). This signifies that the auditory organ, like those of smell and taste, have been derived primitively from a modified integumentary organ. The latest view, derived from tracing its development, is, that it represents a modified canal organ. The shallow depressions at the surface very soon sink below the integument and become converted into closed capsules, which, however, retain their connection with the outside by means of tubes and two surface pores. These exist in the lowest fishes, and do not correspond to the external passages of the mammalian ear. The developing ear-capsules undergo great and complex modifications. They take the same general line of development as the canal organs of the lateral line, but are much more complex. Sensory patches are developed along the course of the tubes, and probably correspond to the canal sense-organs of the lateral line.

In the anatomy of the ear, the essential parts are those in which the auditory nerve ends—or, according to later views, begins. In all ears of vertebrates there is a complicated sac-like structure—the membranous labyrinth—from which the three semi-circular canals arise. In the lower forms, a cochlea is slightly developed from the inferior part of the membranous labyrinth. In the mammalian ear the cochlea becomes the important part. It is coiled like a snail shell, and contains the so-called organs of Cort and the chief endings of the auditory nerve. Figs. 10, 11 and 12 will give some idea of the development of the cochlea. In animals of the grade of the lizard

(Fig. 10, *lag*), the beginning of the cochlea (now called lagena) is seen as a small process from the lower part of the membranous labyrinth. In birds (Fig. 11, *lag*) it is larger, and in mammals



FIGS. 10, 11, 12.

Fig. 10. Membranous labyrinth of a lizard.

Fig. 11. Membranous labyrinth of a pigeon.

Fig. 12. Membranous labyrinth of an ox. (Nos. 10, 11 and 12 after Hasse.) *lag*, lagena; *co*, cochlea.

(Fig. 12, *co*) it is much developed and coiled upon itself.

The anatomy of the mammalian ear is discussed under the heading, ANATOMY, Vol. I, pp. 891-895, Figs. 80-84.

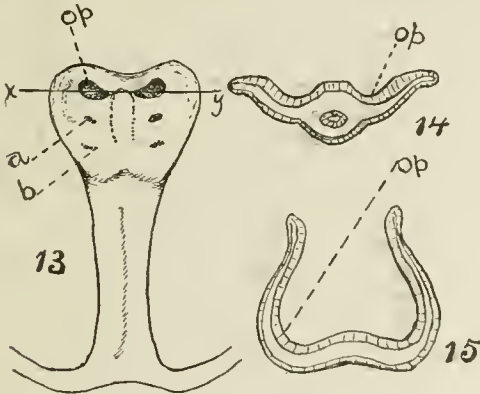
Recent researches have made some fundamental changes regarding the minute histology of the cochlea, which are regarded as too technical to include in a general article of this kind. See Ayers's *The Vertebrate Ear*, etc., *Journal of Morphology* (1892).

THE VERTEBRATE EYE. Within the past five or six years much light has been thrown on the development of the vertebrate eye. The eyes of invertebrates and vertebrates have been regarded as very different. The invertebrate eye starts by a thickening of surface cells, followed by an infolding, but the vertebrate eye arises as an outgrowth from the brain-walls, and until recently the accepted view was, that the optic vesicles arise as diverticula from the foremost vesicle of the brain after the closure of the neural groove. It is designated a brain-eye, to distinguish it from the hypodermal eye of invertebrates. It had, indeed, been pointed out by Kölliker, His, Van Beneden and others, that the rudiments of the eyes appear very early in certain mammals; but this was regarded as exceptional, and a case of precocious development occurring only in animals of that group. These observers had simply noted the presence of circular depressions, or pits, occurring in the area subsequently occupied by the eyes; they did not show that the

cells in these pits are different from those in the rest of the neural plate. It is manifestly important, before these circular depressions can be accepted as truly rudiments of eyes, to show that differentiation has taken place in some of their cells.

Whitman, in 1889, observed the very early appearance of the rudiment of the eye in one of the amphibia (necturus), "its basis being discernible as a circular area long before closure of the neural folds of the brain." Since that time, the very early existence of the eye has been observed in other groups of vertebrates, sharks, amphibia and birds. In 1893 Eycleshymer found that the early-formed paired depressions in amphibia contain differentiated cells and pigment. A remarkably early appearance of the eye in elasmobranch fishes was recorded by the writer, also in 1893. It is now well established that the vertebrate eye begins very early, before the formation of brain vesicles.

Fig. 13 represents a very young dog-fish embryo. The head-end is expanded into a broad cephalic



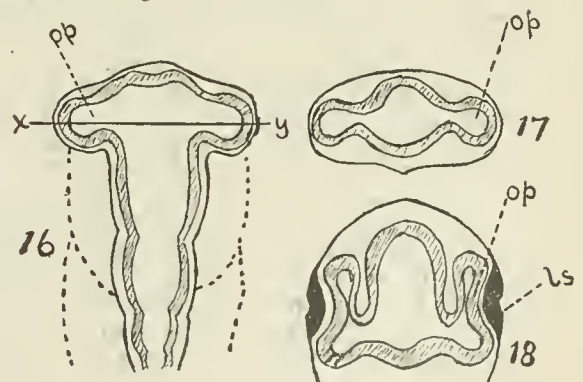
FIGS. 13, 14, 15.

Fig. 13. Outline of a very young embryo of the dog-fish (*Acanthias*), showing the beginnings of the eyes, *op*, and also "accessory eyes," *a* and *b*.
Fig. 14. Section of the above through the line *x y*.
Fig. 15. Section through the same region of an older embryo.

plate, and the trunk-region is more slender. The cephalic plate is merely the anterior end of the neural plate, out of which the central nervous system is formed; in the process of formation of the brain and spinal cord, this neural plate becomes rolled up so as to be converted into a tube. The right and left margins of Fig. 13, for instance, are destined to grow upward, arch over toward the median plane and come into contact, thus converting the neural tube, first, into a groove, and then into a tube, which is enlarged into a vesicle at the head-end. This union takes place early in the formation of the embryo, nevertheless; the rudiments of the eyes arise on the cephalic plate while it is broadly expanded, and therefore in a very early embryonic stage. They make their first appearance as circular depressions slightly concave upward (Fig. 13, *op*). If a section be made across the cephalic plate in the line *x y*, it would appear as in Fig. 14, in which *op* indicates one of the optic vesicles. They are seen to be rounded depressions with a concave surface exposed freely to the light. Within the optic pits

the cells have already begun to grow different from the surrounding ones, and therefore they represent the incipient eyes. Fig. 15 is a cross-section of a later stage after the walls have grown upward and form a neural groove. The eye vesicle of the left side is indicated by *op*. This figure shows that the original circular depressions have become involved in the process of infolding, and, when the neural groove closes above, the eye vesicles are shut up in a closed tube.

We may now ask what light this throws upon the early development of the eye of primitive vertebrates. The very early appearance of these cup-like depressions, and the differentiation of cells within their limits, are not without significance. It is believed that the rolling up of the nervous material so as to form a neural tube is a relatively late feature of development, acquired within the vertebrate series. If this be true, it may be assumed that the ancestors of vertebrates possessed eyes that were formed at the surface in some such way as shown in Fig. 13, and were exposed to the light in the position in which they were originally formed. When, in the course of evolution, the infolding of the nervous system began, the optic pit would become implicated and would ultimately be carried inside, away from the light, and necessitate further steps in order to form an efficient eye. What the further steps were, can still be traced, in a general way, by observing what actually occurs during the subsequent stages in the development of the eye, as shown in Figs. 16, 17 and 18.



FIGS. 16, 17, 18.

Fig. 16. Diagram of the embryo in which the optic vesicles (*op*) are budding off from the brain.
Fig. 17. Section of the above through the line *x y*.
Fig. 18. Section through the head of an older embryo in the region of the eyes, showing the secondary optic cup (*op*) and the lens (*ls*) being set free from the outer layer of cells.

Fig. 16 represents a view from above upon an embryo, just as the eye vesicles are budding out from the vesicle of the fore-brain. Fig. 17 shows a cross-section through the line *x y*. This is, of course, after the complete closure of the neural groove. The pouch marked *op* in this figure is the same as that in Figs. 14 and 15, indicated by the same letters. In the two former figures the inside of the circular depressions is exposed to the light; the same surface is now inside closed vesicles, and the light will more readily reach it through the outer skin, which is transparent or

translucent. Soon after this stage is reached the cells of the outer skin become aggregated just in front of the optic vesicles and give rise to a lenticular mass (Fig. 18, *ls*), which pushes its way into the original vesicle, causing it to become cup-shaped toward the outside and thus producing a secondary optic vesicle or eye-cup. The lenticular thickening becomes set free from the epidermis and constitutes the lens of the eye. The new eye-cup undergoes modifications and becomes the eyeball. This mode of eye-formation is secondary, while the condition shown in Fig. 13 probably represents the original or primary mode of formation of vertebrate eyes. The continued appearance of circular depressions upon the cephalic plate is to be regarded as a survival of an early condition, an actual stage in ancestral history.

The structure and physiology of the human eye is treated under the headings, ANATOMY, Vol. I, pp. 885-891; and EYE, Vol. VIII, pp. 816-828. One of the recent developments regarding the formation of the retina and optic nerve may be pointed out. The fibers of the optic nerve are formed in the retina and grow inward toward the brain, not from the brain outward to the eye, as was formerly believed. This is significant in the light of recent studies, which have shown that the nerve-fibers of sense-organs grow from peripheral cells. The direction of growth of the fibers from the retina is such that they are obliged to arch over and penetrate that structure in order to reach the brain. This indicates that in all probability the retina was originally on the surface, and, like the nose and ear, started as a peripheral patch of epithelial cells.

The eyes are the highest developed of the sense-organs, and in that particular stand at the head of the series. There has been much controversy, however, as to whether they belong to the same series with the other sense-organs, or whether they occupy a position by themselves. It has been pointed out, as an argument for separating them from the other sense-organs, that they develop from the brain-walls, and therefore have a different origin. But it should be borne in mind that the brain-walls were originally on the surface as a part of the cephalic plate. The cephalic plate is a structure that has had a very long ancestral history, and it is probable that the eyes originally lay outside its limits, but in the process of growth it became so much expanded as to include these sensory areas. Being thus brought into close relation with the cephalic plate, the eye-pits became involved in its infolding, and although originally on the outside they became shut up in the closed neural tube. This would account for the present mode of development of the eyes.

ACCESSORY SENSE-ORGANS ON THE CEPHALIC PLATE. In Fig. 13 are shown accessory organs (*a* and *b*), lying behind the eyes on the cephalic plate. These organs resemble the optic cups in mode of origin and structure, and it is possible that they represent accessory eyes. They were

discovered by the writer in 1893, in embryos of sharks and birds. Seven or eight pairs can be made out in sections of these animals; the two anterior pairs are the most conspicuous, and are the only ones shown in Fig. 13. If they represent formerly functional eyes, the ancestors of vertebrates were multiple-eyed; but whether they represent eyes or not, is entirely hypothetical. At all events they are present, and probably represent some kind of serial sense-organ. They are extremely transitory, and exist in the embryos merely as survivals of ancestral structures.

THE PINEAL SENSE-ORGANS. One of the most interesting sense-organs of vertebrates is that which of late years has come to be regarded as a third unpaired eye. There are, in reality, several structures to represent the organ in some animals, but, treating the matter historically, we shall speak of it as if there were only one.

In the brains of all vertebrates there is an outgrowth from the roof of the primary fore-brain (thalamencephalon), that is designated pineal gland, epiphysis, etc. Its condition and prominence vary in different animals. In the human brain it is a conical eminence, and is covered over by the cerebral lobes, but in some of the lower vertebrates it is above the brain, in contact with the walls of the skull. In some living lizards, in which group of animals it is highest developed, there is an eye-like capsule imbedded in a connective tissue-sheath in the skull, and connected with the roof of the brain by a strand which probably represents a nerve. Its structure also differs, as well as its relation and position. In most adult vertebrates it is degenerate, in a few it is highly differentiated. Over ten years ago its eye-like structure was demonstrated by De Graaf (1886) and Spencer (1886). Since that time it has attracted much attention, and knowledge regarding its relationship has been much advanced, especially within a few years.

Before taking up the more recent work, it will be well to describe its condition in some living forms. Spencer described it in 28 different species of lizards.

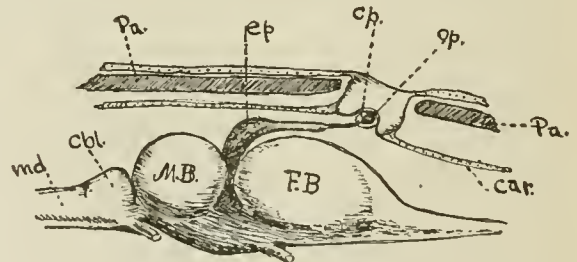


FIG. 19.

Diagram of the brain of *Hatteria punctata*, showing the relation of the pineal eye (*ep*) to the brain and the cranium. (After Spencer.) *FB*, fore-brain; *MB*, mid-brain; *cbl*, cerebellum; *md*, medulla oblongata; *ep*, epiphysis; *Pa*, pineal eye; *Pa*, bony part of the cranium; *car*, cartilage.

Fig. 19 is a sketch of the brain of *Hatteria punctata*, one of the simplest forms of living lizards. The fore-brain is indicated at *F.B.*, the mid-brain at *M.B.* and the hind-brain at *cbl*. Rising from the roof of the 'tween-brain, just be-

tween fore and mid brain, is a conical eminence, the epiphysis (*ep*). A strand connects this with the eye-cup (*op*), which is imbedded in a capsule (*cp*) of connective tissue. The bony wall of the skull (*Pa*) is interrupted here, so this structure lies in a sort of foramen filled with a plug of cartilage. The skin just above the eye-cup lacks pigment, which makes the roof of the cranium translucent to light at this point.

The minute structure of the eye-cup is very interesting. Fig. 20 shows an enlarged view of that structure, in which it is seen that it contains a lens-like structure (*ls*) lying in front of a cavity corresponding to the cavity of the eyeball in the

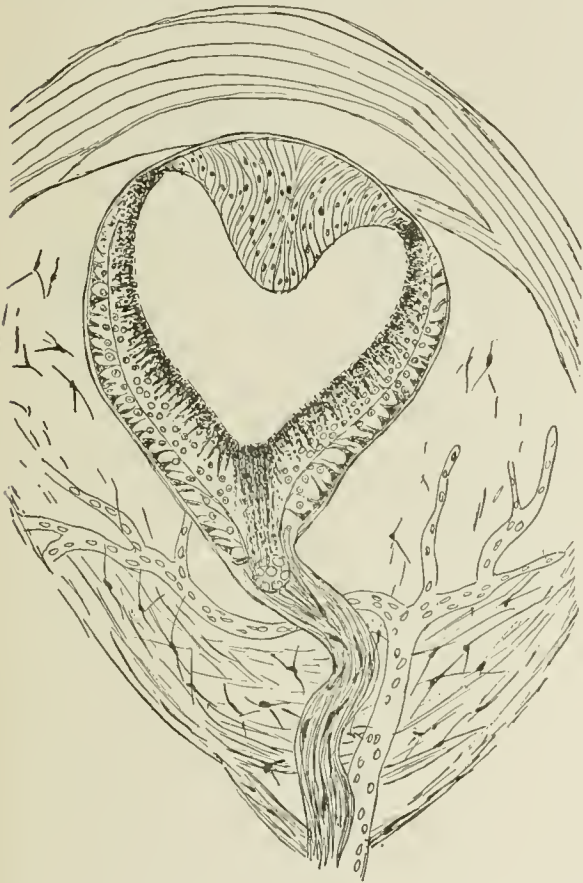


FIG. 20.

Somewhat enlarged section through the pineal eye of the above, showing the lens, retina and nerve.

paired eyes. The most interesting part of all is the membrane which lines this cavity, and which is so placed as to receive the rays of light which might be focused on it by the lens. This membrane is very complex, resembling, in many points, the structure of the retina. There is, as shown in Fig. 21, a very high differentiation of its cells.

This figure is a very highly magnified view of a small part of the retina, showing that its cellular elements have undergone great modification, and are arranged in six layers, as follows: 1. On the outside, nearest the light, is a layer of rod-like bodies enveloped in deep pigment; 2. A double row of spherical nucleated elements; 3. A thin layer of finely punctated material; 4. A layer of

nucleated spherical nucleated elements, lying close to the layer just mentioned; 5. A layer of cone-shaped bodies without nuclei; 6. Between the bases of the above, a series of spindle-shaped elements with nuclei. This membrane obviously

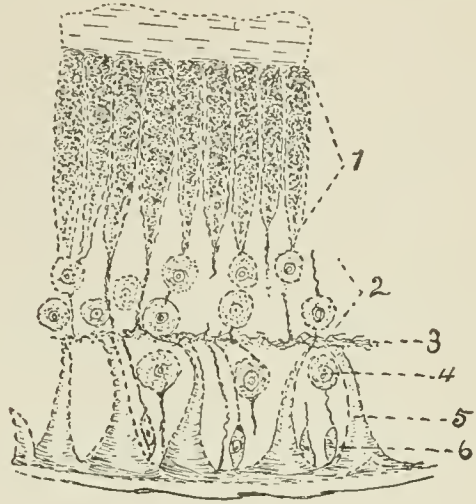


FIG. 21.

Highly magnified portion of the retina of the preceding figure, showing the six layers into which its cellular elements are divisible.

corresponds to the retina of the paired eyes. It is connected with the epiphysis and brain by a fibrous strand, which represents the optic nerve.

Notwithstanding the complexity of this organ, it represents, probably, a degenerated condition, but a condition that actually exists in living forms. There is reason to believe that formerly, in geological times, this organ was more highly developed; that it has now ceased to be functional, and therefore is on the wane.

The evidence pointing in this direction is the discovery, within a few years, of fossil skulls of animals from which the living forms of lizards and reptiles have descended, in which there is a large median foramen or orbit. These skulls show three orbits—two for the paired eyes, and a third, located in the middle plane, which, it is assumed, was for the pineal eye during the time that the latter organ was functional and of use to the animal. The median orbits are in many cases provided with roughened places in such positions as to indicate that they were originally for the attachment of muscles. The latter were probably concerned with the movements of this eye. The fossil remains referred to belong to the Permian epoch. This kind of evidence, combined with the present structure of the organ, indicates that we have in the pineal eye a sense-organ that was functional in the Permian period, and that it is preserved in living animals as a survival which may be still highly differentiated, as in living lacertilia, or present in a very degenerate condition. It may further be conjectured that it did not cease to be functional in some forms till quite recently. It has, indeed, been suggested that it may still be light-perceiving in some living forms.

The history of the growth of our knowledge of this remarkable sense-organ may now be briefly

summarized. First, in 1886, came the demonstration of its eye-like structure in amphibia by De Graaf, and in lacertilia by Spencer. Both authors investigated the structure in adult forms. Spencer studied its condition in 28 different species, demonstrating clearly that even in the adult forms of these animals this organ has an eye-like structure with a lens, a pigmented retinal layer, and a nerve.

Following the study of the adult structure came investigations of its embryonic conditions by Béranek, Francotte, Leydig and others. By these investigators many points of minute structure were worked out, and it was shown that the organ is higher developed in the embryonic periods than in the adult.

The next step was the discovery (Selenka, Hill, Eycleshymer, 1890-92) that there is more than one outgrowth from the roof of the brain in the position of the pineal eye. Two distinct outgrowths were noted by the authors named above—the epiphysis, and a newly discovered one.

Still, the discoveries in this region of the brain-roof were not exhausted. It was soon observed that there are sometimes two accessory pineal structures, both of which may resemble the originally discovered one in structure. These accessory structures are rudimentary, and very inconstant in their occurrence. In most individuals they are lacking, but in others of the same age are present and well developed. These discoveries are well substantiated by a number of observers, whose results were published from 1889 to 1894, and as the case now stands there is more than one pineal sense-organ to be taken into account.

The most recent advances consist in carrying the history of these organs backward into very early embryonic stages, and showing (Locy, 1893) them to be connected with patches of sensory epithelium that arise on the cephalic plate; and the discovery (De Klinckowström, 1894), in iguana, of three distinct nerves connected with the pineal outgrowths. The most important outcome of the recent work is to strengthen the view that the pineal eye is double in origin, thus throwing it into line with the other paired organs. After the discovery that it is a sense-organ, at first, it stood by itself as a single, azygous organ, and it was difficult to homologize it with the other sense-organs, all of which are paired in origin.

A bird's-eye view of the vertebrate sense-organs bears out the conception that they are all fundamentally related, and have probably been derived from a common sensory basis. WM. A. LOCY.

SENSITIVE PLANT. See MIMOSA, Vol. XVI, p. 345.

SENSITOMETER. An instrument for testing the sensitiveness of the film on photographic plates. In the form devised by L. Warnerke, there are 25 squares printed in gelatine color, of varying transparency. These are numbered from 1 to 25, in a fatty, non-transparent ink. This is exposed before a dry plate in a light ob-

tained by burning one inch of magnesium wire. The development of the plate, as compared with others exposed under like conditions, exhibits its sensitiveness. Another photographic sensitometer (Spurge's) has a pendulum which beats seconds, giving a horizontal to-and-fro motion to a pencil, which draws a sinuous line on a moving drum. This form serves to illustrate certain technical phenomena in photography.

SENSORY CENTERS. See PHYSIOLOGY, Vol. XIX, pp. 41, 42.

SENSORY NERVES, PHYSIOLOGY OF. See EMBRYOLOGY, in these Supplements.

SEOUL, the name meaning literally "capital," or officially, HAN-YANG, "the fortress on the Han," a city and the capital of Korea, on the right bank of the river Han, 26 miles by road and 55 miles by river from the port of Chemulpo, on the Yellow Sea. As described by Henry Norman, Seoul was, in 1894, "a city of about two hundred and fifty thousand people, surrounded by a more or less dilapidated wall, pierced by several imposing gateways, all of which are closed at sunset at the sound of a great bell. . . . On one side of the city a second wall incloses the palace and the royal domains. . . . The city is surrounded by mountains, and lies like the palm of one's hand when the fingers are turned upward. . . . It has two wide streets—and two only. For a quarter of a mile in front of the palace and then at a right angle for a mile or so there is a fine, well-kept road, fifty yards wide, while everywhere else in the city the average width is about twelve feet. Almost all are traversed by an unsavory gutter, sometimes down the middle, sometimes at the sides, while every now and then you cross a kind of canal-sewer, a lingering, shallow stream of water, refuse and filth. . . . The houses are built of wood and paper, and all thatched, for it is forbidden for anybody except an official to cover himself with a tiled roof."

Accounts of the city give the date of its founding in 1397. In the latter part of the sixteenth century it became a royal city, and in the following century was sacked by the Manchus. Until recently the city was closed to foreigners, and since their admission there have been several uprisings against them, the most serious occurring in 1888 and 1894.

Seoul played an important part in the late war between China and Japan, being occupied in 1894 by the Japanese troops.

The inhabitants of Seoul, like those of the rest of Korea, show very little commercial enterprise. Attempts to develop the mineral resources of the surrounding country, to establish a mint, a post-office, a match factory, or to introduce silk-culture, have all failed.

SEPARATE BAPTISTS. See BAPTISTS IN THE UNITED STATES, in these Supplements.

SEPHARDIM. See JUDAISM AND THE JEWS, in these Supplements.

SEPTIMANIA. See LANGUEDOC, Vol. XIV, p. 287.

SEPTUAGESIMA. The third Sunday before

Lent, and supposed to be so named because it is about seventy days before Easter; but probably the term was adopted without any intention of expressing definite numbers, and simply on a false analogy with Quadragesima, the Latin name of Lent.

SEQUARD, BROWN. See BROWN-SEQUARD, in these Supplements.

SEQUENCES. See HYMNS, Vol. XII, p. 583.

SEQUIN. See NUMISMATICS, Vol. XVII, p. 657.

SERAO, MATILDE. See SCARFOGLIO, SIGNORA, in these Supplements.

SERAPEUM. See ARCHITECTURE, Vol. II, p. 387; and SERAPIS, Vol. XXI, p. 674.

SERES. Same as CHINESE. See CHINA, Vol. V, p. 627.

SERF. See SLAVERY, Vol. XXII, pp. 134-137.

SERGEANT, a non-commissioned officer in the American army and marines, ranking higher than a corporal. The first sergeant of a company is the highest and best paid of that rank. Each battalion has a sergeant-major, who is the highest non-commissioned officer. The sergeant's duties are to teach the men tactics and to drill them. He also has a certain amount of police power.

SERICULTURE. See SILK, Vol. XXII, p. 58.

SERIMETER, an instrument for testing the tensile strength of silk threads. It is important for manufacturers to know the elastic stretch of various grades of silk thread, and also its breaking-strain. For this purpose a thread to be tested is strained in a long narrow box, having at the top a pointer moving on a graduated quadrant. The upper end of the thread is tied to a bell-crank that operates the pointer. Two clips are attached to the thread, and a clock-work mechanism is started to draw the thread against the strain of a spring connected with the pointer. One of the clips records, on a flat scale on the lower end of the box, the amount of stretch before breaking, and the pointer on the quadrant indicates the breaking-strain.

SEROUS-MEMBRANE. See ANATOMY, Vol. I, p. 848.

SERPA PINTO, ALEXANDRE ALBERTO DE ROCHA, a Portuguese explorer of Africa; born at the Tendaes, in Douro, Portugal, April 30, 1846. He entered the Portuguese infantry in 1863, and served as lieutenant in the Zambesi war in 1869. For distinguished service he was made major in 1877, and then crossed Africa from Benguela to Durban (in Natal). In 1884 he undertook, with Cardoso, an expedition through the country between Mozambique and Lake Nyassa. Their journey was rich in geographical discoveries, and extended the Portuguese protectorate over many tribes of the interior of Africa. In 1887 Serpa-Pinto was dispatched on diplomatic missions to East Africa. His chief work dealt with his crossing Africa from the Atlantic to the Indian Ocean.

SERPENT, a musical instrument. See OPHICLEIDE, Vol. XVII, p. 778.

SERPENTS. See SNAKES, Vol. XXII, p. 189.

SERPENT STAR, a star-fish. See *Ophiuridea*, under ECHINODERMATA, Vol. VII, pp. 634, 635.

SERPENT-WORSHIPERS OR OPHITES. See Gnosticism, Vol. X, p. 703.

SERPULA, a genus of marine worms of the annelid group. The worm has on the anterior end two lateral clusters of beautifully colored arborescent gills. The larvæ are free-swimming. The adults are sedentary, and secrete a long, coiled calcareous tube into which the worm retreats when disturbed. *Serpula dianthus* is found on the coasts of the United States. Its tubes are found on the under-side of stones near low-tide mark.

SERRA, JUNIPERO, a Franciscan missionary; born in the Island of Majorca, Nov. 24, 1713. He entered the Franciscan Order in 1731; went to Mexico in 1749, where he labored among the Indians until 1767, when he was sent to California. The Jesuits had been expelled, and their missions were placed in charge of the Franciscans. Father Serra was made president of these, and the development of the California mission is due very largely to him. San Diego was the first mission founded by him. This was in 1769, and many others followed. He died at the San Carlos mission, Aug. 28, 1784.

SERRA DO MAR MOUNTAINS. See BRAZIL, Vol. IV, p. 223.

SERRANIDÆ, a large family of fishes containing over three hundred species. They are all carnivorous fishes, and many well-known and valuable food-fishes belong to the family. Some examples are the jew-fishes, groupers and sea-bass (q.v., in these Supplements).

SERRANO, Y DOMINGUEZ, FRANCISCO, DUKE DE LA TORRE, a Spanish soldier; born at San Fernando, near Cadiz, Spain, Sept. 18, 1810. He entered on a military career at an early age. Having joined the party of Queen Maria Christina, he was by her influence made general of division before he was thirty years old. In 1845 he became lieutenant-general and senator. After the marriage of Queen Isabella, in 1846, Serrano obtained such influence over the young Queen that trouble arose in the royal household and much scandal among the Queen's subjects. In 1847 he was made governor-general of Granada. This withdrew him from the court. In 1854 he was implicated in an insurrection at Saragossa, and was banished. When the revolution of September, 1868, drove Isabella from the country, Serrano hastened to Cadiz, and with General Prim seized the direction of the government. He became president of the Council of Ministers and commander-in-chief of the army. On June 16, 1869, the Cortes declared Serrano Regent of Spain. He quelled promptly the republican insurrections that arose in various places, and arranged with Prince Amadeus, son of the King of Italy, to become King of Spain. But Amadeus abdicated the royal power very soon, and the republic was proclaimed on Feb. 11, 1873. In February, 1874, Serrano was appointed President of the Executive Department. He took the field against the Carlists

several times, and with varying success. In January, 1875, he made arrangements for proclaiming Alfonso, son of ex-Queen Isabella, King of Spain. In November, 1883, he was appointed Spanish ambassador to France. He died in Paris, France, Nov. 26, 1885.

SERUM, a watery portion of the blood. When blood is drawn from the body and set aside for a few hours, it separates into two parts—the coagulum or clot, and a straw-colored liquid called serum. About seven per cent of serum is albumen and ten per cent certain salts of sodium, potassium, calcium and magnesium, with chlorides of sodium and potassium—all in solution in water. Serum as a constituent of the blood may be graphically shown as follows:

BLOOD	{	corpuscles - -	}	coagulum.
		fibrin		
		plasma	{	serum.
albumen				
salts - - -				
		water - -		

Serum is employed in the refining of sugar, the albumen in coagulation taking out the impurities. Serum also plays an important part in serum therapeutics.

SERUM THERAPEUTICS. See ISOPATHY, in these Supplements.

SERVAL. See MAMMALIA, Vol. XV, p. 435.

SERVANT. See MASTER AND SERVANT, Vol. XV, pp. 620, 621.

SERVIA. For general article, see SERVICIA, Vol. XXI, pp. 686-692. The present ruler is King Alexander I, born Aug. 14, 1876, the son of King Milan I, who abdicated March 6, 1889. The son was proclaimed King, but as he had not reached his majority, a regency was appointed to govern the country in the interval. On April 13, 1893, Alexander took control of the government; and in May, 1894, abrogated the constitution of 1888 and proclaimed the old constitution of 1869 to be in force until a new mode of carrying on the government should be devised. This instrument gave the King greater power, especially in allowing him to appoint one-third of the delegates to the National Assembly, the constitution of 1888 providing for their election by the people. The electors of the country as a whole supported the King in this *coup d'état*. The area of the kingdom is 19,050 square miles; the population on Jan. 1, 1898, was 2,384,205. The principal towns are Belgrade, the capital, 59,494 inhabitants; Nisch, 21,524; Kragouyévatz, 13,870; Leskovatz, 13,165; Pozarévatz, 11,699; Shabat, 11,689; Vranja, 11,553; and Piro, 9,920. The state religion is Greek orthodox, and is controlled by the Minister of Education and Public Worship. Elementary education is compulsory, and all education, including university education, is free. There were 77,175 pupils in attendance in the common schools; 7,099 in the middle schools, *i. e.*, technical, normal, and high schools; and 478 students at the university. According to the budget estimates for 1898 the total revenue of Servia amounted to \$13,764,900; the expenditure to \$13,964,514; the national debt to \$81,907,500. The total strength of the

regular army is 160,751 men, every male over twenty years of age being obliged to serve actively for two years, and thereafter for short periods each year in the reserve. The value of the imports in 1897 was \$9,062,765; of the exports \$11,187,996. Servia has at present one railroad, the Belgrade-Nisch-Vranja line, which with its branches has 354 miles of track. The roads are in a bad condition. Navigation on the Danube and other rivers is mostly carried on by foreign steamboat companies. In 1898 there were 2,522 miles of telegraph lines and 134 stations.

SERVIAN LANGUAGE. See SLAVS, Vol. XXII, p. 150.

SERVIAN LITERATURE. See SERVICIA, Vol. XXI, p. 689.

SERVICE-BERRY, a local name for *Amelanchier Canadensis*, a plant of the rose family, closely related to haws and apples. It flowers in early spring, and produces a berry-like, purplish, edible fruit. It is also called June-berry and shad-bush.

SERVICE GUNS OF THE UNITED STATES. See GUN-MAKING, in these Supplements.

SERVICE-TREE. See HORTICULTURE, Vol. XII, p. 276.

SESAME, the common name of the genus *Sesamum*, a plant of the family *Bignoniaceae*. *S. Indicum* is an herb from India and Egypt, with oblong or lanceolate, often three-lobed leaves, rose-colored or white flowers, and sweet, oily seeds, which are used in the Orient for food, oil, etc. Sesame-grass is *Tripsacum dactyloides*, or gama-grass, a common species of the United States.

SESTERTIUS. See NUMISMATICS, Vol. XVII, p. 652.

SESTRI PONENTE. See GENOA, Vol. X, p. 157.

SETEE OR SETHOS, kings. See EGYPT, Vol. VII, pp. 738, 739.

SETH, ANDREW, a Scotch educator and philosopher; born in Edinburgh, Dec. 20, 1856. He was educated at the University of Edinburgh and abroad; became instructor in logic in Edinburgh in 1880; held a professorship in University College, Cardiff, in 1883; lectured at Edinburgh in the same year; professor at St. Andrews (1887-91); became professor of logic and metaphysics in Edinburgh University in 1891. Among his works are *The Development from Kant to Hegel* (1882); *Essays in Philosophical Criticism* (1883); *Scottish Philosophy*, with W. R. Haldane (1885), and *Hegelianism and Personality* (1887). He contributed articles on philosophical subjects to this ENCYCLOPEDIA, including MYSTICISM, PHILOSOPHY and SCHOLASTICISM.

SETH OR SET, a god. See EGYPT, Vol. VII, pp. 715-717.

SET-OFF. Set-off is a counterclaim or demand made against the plaintiff by the defendant, and in the same suit, whereby he offers to set off the plaintiff's claim against the demand made by himself. Set-off is a statutory remedy, enacted to prevent a multiplicity of actions, and is in very general use throughout the United States. As a

rule, only demands for the payment of money in a definite, liquidated sum may be set off, and unliquidated claims, such as those growing out of trespass, replevin and other actions arising *ex delicto*, cannot be set off. As a general rule, a set-off cannot be claimed by a defendant in a suit by the government. For the right to recoup against the plaintiff's claim and for the difference between set-off and recoupment, see **RECOUPMENT**, in these Supplements.

SETON, ELIZABETH ANN, an American nun, founder of the first community of Sisters of Charity in the United States; born in New York City, Aug. 28, 1774. In 1794 she married William Seton, of New York, and after his death joined the Roman Catholic Church (March 14, 1805). She opened a school in New York in 1805, but, not meeting with success, gave it up in 1808. In the following year she with her sisters-in-law, Harriet and Cecilia Seton, took the veil, and with \$8,000 given by a recent convert to Catholicism, bought a farm in Emmetsburg, Maryland, and there founded the first community of the order of Sisters of Charity in the United States, together with a school for girls under its supervision, Mrs. Seton becoming the Mother Superior. In 1811 the rules and constitution of St. Vincent de Paul were adopted and the community became a regular Roman Catholic order. In 1814 a colony of sisters was sent to Philadelphia to take charge of the orphan asylum, and in 1817 of that in New York. Mother Seton wrote her *Memoirs* in 1817. She died in Emmetsburg, Maryland, Jan. 4, 1821.

SETTER DOG. See **DOG**, Vol. VII, p. 328.

SEVEN PINES, BATTLE OF. See **FAIR OAKS**, in these Supplements.

SEVENTEEN-YEAR LOCUST. See **CICADA**, in these Supplements.

SEVENTH-DAY ADVENTISTS. See **ADVENTISTS**, in these Supplements.

SEVENTH-DAY BAPTISTS. See **BAPTISTS IN THE UNITED STATES**, in these Supplements.

SEVEN-UP, also called **OLD SLEDGE**, **HIGH**, **LOW**, **JACK** and **ALL FOURS**, a game of cards for two or four players, which had its origin among the Dutch, who introduced it into America when they made their early settlements in New York. The terms used in the game are: *High*, the highest trump out; *Low*, the lowest trump out; *Jack*, the knave of trumps; *Game*, the greatest number of points that either player or side can show in the tricks won, each ace being valued at four points, each king at three, each queen at two, each knave at one each, ten at ten points. For taking the tricks the cards count as in whist, the deuce being lowest and the ace highest. In beginning the game the dealer gives each player six cards, dealing them in threes, and turns the card left on the top of the deck for a trump. If the player at the left of the dealer, after looking at his hand, does not wish that suit for trump, he *begs*, and if the dealer desires to retain it he must give him one point. Otherwise he places the card turned up under the deck and deals three cards more to-

gether to each player and turns another trump. If it be of the same suit he places that under the deck and deals three more around, continuing this operation until a new suit has been made trump. If he turns a knave it becomes his. The player at the left of the dealer leads, and other players are obliged to follow suit if able, or trump. Unlike whist and other games, one may play a trump at any time. The object of the game is to secure as many as possible of four points. The first point is given to the player originally holding the *High*, the second to the one originally holding the *Low*, the third to the one winning the *Jack*, the fourth to the one obtaining *Game*. The game is won when an agreed number of points, usually seven, nine or eleven, have been obtained by one player or side. If at the end of a hand each player has enough points to complete this number, the points obtained in the last hand are added to the previous score of each player to whom they belong, one by one and in the order named above, the player winning whose score in this way first reaches the required number irrespective of the total number of points obtained by each. The game of pedro, California Jack, cinch and many others are derived from this game.

SEVEN WISE MEN, the collective designation of a number of Greek sages, who lived about 620-548 B. C., and devoted themselves to the cultivation of practical wisdom. Their moral and social experience was embodied in brief aphorisms, sometimes expressed in verse, sometimes in prose. The names of the Seven, as usually given, are Solon, Thales, Pittacus, Bias, Chilon, Cleobulus and Periander of Corinth; but there is not absolute unanimity among the ancients either as regards the names, the number, the history, or the sayings of these famous sages. The fragments of wisdom attributed to them which have come down to us are to be found in Orelli's *Opuscula Græcorum Veterum, Sententiosa et Moralia*, and have been translated into German by Dilthey in his *Fragmente der Sieben Weisen*.

SEVEN WONDERS OF THE WORLD. The name given by the ancients to seven monuments of antiquity, viz.: (1) The Egyptian pyramids; (2) the mausoleum at Halicarnassus; (3) the temple of Artemis (Diana) at Ephesus; (4) the Colossus of Rhodes; (5) the hanging gardens of Babylon; (6) the Pharos of Alexandria; (7) Phidias' statue of Zeus Olympus at Athens.

SEVEN YEARS' WAR. See **FRANCE**, Vol. IX, pp. 588-591.

SEVERALTY, ALLOTMENTS IN. See **INDIAN AFFAIRS**, in these Supplements.

SEVERUS, WALL OF. See **HADRIAN**, Vol. XI, p. 366.

SEVIER, JOHN, an American pioneer and soldier; born in Rockingham County, Virginia, Sept. 23, 1745. He married at the age of 17, founded the village of Newmarket in the Shenandoah valley, and became noted as a leader in border Indian fights, gaining the rank of captain in the Virginia militia. In 1772 he moved to Wa-

tauga, on the western slope of the Alleghanies, in a district which is now a part of Tennessee. When the Revolution broke out, this section of the country, known as the Washington district, was annexed to North Carolina, and Sevier became its representative in the North Carolina Assembly, besides holding the principal military and civil offices of the district. During the Revolution he carried on continual and successful warfare against the British and the hostile Indian tribes, his most notable success being that of King's Mountain, Oct. 7, 1780, which turned the tide of British success in the South. At the close of the war the North Carolina legislature ceded the Washington district to the general government and the residents of it organized a state government and applied for admission to the Confederation under the name of the State of Franklin, Sevier being chosen first governor. North Carolina, however, opposed this action, and as the cession was not yet formally completed, suppressed the new government and imprisoned Sevier. The territory was now ceded to the general government. Sevier took the oath of allegiance to the United States, was created brigadier-general of the district, and in 1790 became its first representative to Congress. In 1796 the territory was admitted to the Union as the State of Tennessee, and Sevier was chosen governor, and re-elected to the office five times thereafter. In 1811 he was chosen to Congress, and held his seat until his death. In 1815 President Monroe appointed him special commissioner to settle a boundary dispute between the State of Georgia and the Creek Indians, and he died in his tent while performing this duty. For fifty years Sevier had held undisputed sway over the new country west of the Alleghanies, and was the prime mover and controller of all the important movements, both civil and military, that had taken place there. James R. Gilmore has written his *Life* (1887). He died Sept. 24, 1815.

SEVIER LAKE, an elongated body of salt water, in Millard County, western Utah, to the westward of the Beaver Creek Range, at an altitude of 4,500 feet. The lake has no outlet and but one tributary, the Sevier River, upon which it is dependent for a water-supply; but inasmuch as the water of the river is also most entirely used for irrigation, the lake, which in 1872 was 27 miles long, 10 miles wide and 15 feet deep, is now much reduced in size, generally becoming dry in summer and having but a few inches of water in the winter. The precipitated salt has formed upon the bottom of the lake a crust estimated to contain 1,500,000,000 tons, mostly sodium chloride, the remainder being sodium phosphate and magnesium phosphate. The only forms of animal life which can exist in this lake are a species of brine-shrimps and the larvæ of certain insects. From old water-lines upon the sides of the valley, Sevier Lake is shown to have once been of great extent, and probably with Great Salt Lake and others formed a vast inland sea.

SEWALL, ARTHUR, an American ship-builder and public man; born in Bath, Maine, Nov. 25, 1835.

After a public-school education he entered his father's ship-yard in Bath, and at 19 formed a partnership with his elder brother for the construction of wooden vessels. The firm was dissolved by the death of the senior partner in 1879, and the business carried on by Mr. Arthur Sewall and his sons. In their yard



ARTHUR SEWALL.

was built the largest wooden ship constructed in the United States, the *Roanoke*, 3,400 tons. A plant for the construction of steel vessels was added to the Bath equipment, and the *Dirigo*, the first steel ship built in America, launched from there. Mr. Sewall became interested in the Bath Iron Works, was chosen president of the Bath National Bank, a director of the Maine Central railroad, and in 1893-94 its president. He was an influential man in the Democratic councils of the State of Maine, and in 1888 was made member of the Democratic National Committee. In 1895 he announced himself a believer in the free coinage of silver at the ratio of 16 to 1, and in the Democratic National Convention which met in Chicago in 1896 was nominated Vice-President. His nomination was opposed by the Western and more radical element of the party, and the Populist Convention soon after refused to indorse his nomination, while accepting William J. Bryan, his associate on the Chicago ticket. In the November elections following, this ticket was defeated.

SEWALL, MAY WRIGHT, an American educator; born in Milwaukee, Wisconsin; educated at Northwestern University; was made principal of the Plainwell, Michigan, high-school; later of the Franklin, Indiana, high-school; subsequently taught in the Indianapolis high-school; in 1880 married T. L. Sewall, of Indianapolis, and in 1882, opened with him a girls' preparatory school in that city. She was a delegate to the International Council of Women which



MAY WRIGHT SEWALL.

met in Washington in 1888, and was one of the founders of the permanent National and International councils, and served as president of the former and vice-president of the latter. She was appointed member at large of the board of managers of the World's Columbian Exposition of 1893, and was chosen chairman of the committee which had charge of the World's Congress of

Representative Women; and she edited *Résumé of the World's Congress of Representative Women*. In Indianapolis she was one of the founders of the Woman's Club, and the Equal Suffrage Society. In 1899 she was elected president of the International Council of Women, at its meeting in London.

SEWALL, SAMUEL, an American jurist; born in Bishopstoke, England, March 28, 1652. He moved with his parents to Newbury, Massachusetts, and in 1667 entered Harvard, graduating in 1671. He studied theology and entered the ministry, but after his marriage with Hannah Hull, the richly dowered child of the master of the Boston mint, he gave his attention entirely to public affairs. He was assistant governor from 1684 to 1686 and in 1689; visited Europe in 1688; in 1692 became member of the council and judge of the probate court. He took a prominent part in judging witches at the time of the Salem witchcraft, but in after years repented so thoroughly of his action that, in 1697, he made public confession of his error before the congregation of the Old South Church in Boston. In 1718 he was appointed chief justice of Massachusetts, and held the office until 1728. Justice Sewall was noted for his benevolence and piety, and was the author of perhaps the first tract against negro slavery, which he published in 1700, under the title of *The Selling of Joseph*. The Massachusetts Historical Society has published his diary and letter-book. He died in Boston, Massachusetts, Jan. 1, 1730.

SEWANEE, a village of Franklin County, Middle Tennessee, about 90 miles S.S.E. of Nashville, on the Nashville, Chattanooga and St. Louis railroad. It is situated on a plateau two thousand feet above sea-level, in a mountainous region. It is a popular pleasure-resort and is the seat of the University of the South (q. v., in these Supplements).

SEWARD, a city and the capital of Seward County, southeastern Nebraska, 25 miles W.N.W. of Lincoln, on the Big Blue River, at the mouth of Lincoln Creek, and on the Burlington and Missouri River in Nebraska and the Fremont, Elkhorn and Missouri Valley railroads. It is the center of a region raising and shipping grain and live-stock extensively, and contains elevators, foundry and machine-shops and flour-mills. Population 1890, 2,108; 1900, 1,970.

SEWELEL (*Haplodon rufus*), the Indian name for a small rodent which inhabits limited areas in Washington and Oregon. With the exception of the tail, which is represented by a bunch of hairs, the sewelel resembles a muskrat. It is allied with the beaver, and is often known as the "mountain beaver" or "boomer." It is gregarious, lives in burrows, and is vegetarian. See MAMMALIA, Vol. XV, p. 418.

SEWELL, WILLIAM J., an American public man; born in Ireland, in 1835; moved to the United States and engaged in mercantile pursuits in New Jersey; at the outbreak of the Civil War became captain of a company of New Jersey volunteers and served throughout the war, gain-

ing the brevets of brigadier and major-general; was wounded at Chancellorsville and Gettysburg; after the war became connected with the Pennsylvania railroad; was elected state senator in 1872, 1875 and 1878; chosen to succeed J. H. Randolph in 1881 in the United States Senate, and served until 1887; was re-elected in 1895. Senator Sewell was chairman of the New Jersey delegations to the National Republican conventions of 1876 to 1892 inclusive.



W. J. SEWELL.

SEXTUS EMPIRICUS. See SCEPTICISM, Vol. XXI, p. 380.

SEYFFARTH, GUSTAVUS, a German archæologist and Egyptologist; born in Uebigau, Saxony, July 13, 1796. He was educated at Leipsic, in the Gymnasium and University, and afterward studied in Paris under Champollion, the French Egyptologist. From 1825 to 1855 he was professor of Oriental archæology in the University of Leipsic; in 1855 came to America and became professor of archæology and exegesis in Concordia Lutheran Seminary in St. Louis; retired in 1871, and lived thereafter until his death in New York City. He claimed to have been the first to decipher the Egyptian hieroglyphics on the Rosetta stone, and was a strong opponent of Champollion in the conclusion which the latter reached that the hieroglyphic characters represented sounds, not ideas. His theories have been sustained by Heinrich Karl Brugsch and others. Seyffarth published many works on Egyptology, and also on theology and history. Among the most important are *Chronologia Sacra* (1846); *Die Grundsätze der Mythologie* (1843); *Chiliasm Critically Examined* (1861); *Rudimenta Hieroglyphices* (1826); *Brevis Defensio Hieroglyphices Inventæ*; and *The Literary Life of Gustavus Seyffarth* (1886). He died in New York, Nov. 17, 1885.

SEYMOUR, a township of New Haven County, southwestern Connecticut, 11 miles N.W. of New Haven, near the junction of the Naugatuck, Bladen and Little rivers, and on the New York, New Haven and Hartford railroad. The village of Seymour is one of the oldest places for the manufacture of wool in America, the woolen cloth industry being started here in 1803 by General David Humphreys, who imported the first merino sheep into the United States. The town has churches, schools, and manufactures of brass and copper goods, mechanics' tools, horseshoe-nails, paper, cables, woolen and rubber goods. Population 1890, 3,300; 1900, 3,541.

SEYMOUR, a city of Jackson County, southern Indiana, 60 miles S. of Indianapolis, 50 miles N. of Louisville and 87 miles W. of Cincinnati, on the Baltimore and Ohio Southwestern, Evansville and Terre Haute, and Pittsburg, Cincinnati, Chicago and St. Louis railroads. The

city is prominent as a shipping and distributing point. It is the site of the machine-shops of the Ohio and Mississippi division of the Baltimore and Ohio Southwestern railroad. Population (1890), 5,337; 1900, 6,445.

SEYMOUR, VICE-ADMIRAL SIR EDWARD H., K. C. B., in command of the British fleet on the China station, was born in 1840, and entered the Royal Navy in 1852. Commander 1866, Captain 1873, Rear-Adm. 1889, Vice-Adm. 1895. Served in the Black Sea during the Crimean war, in the China war (1857-60), and in the Egyptian war (1882). Was in command of the first attempt to relieve the Legationers in Peking during the uprising of the Boxers in June, 1900. The attempt failed, being frustrated by the coöperation of the Chinese imperial troops with the Boxer rioters.

SEYMOUR, GEORGE FRANKLIN, American P. E. bishop; born in New York, Jan. 5, 1829; ordained priest in 1855; conducted a mission at Dobbs Ferry, N. Y.; in 1860 became president of St. Stephen's College, at Annandale, N. Y.; held rectorships at Manhattanville, Hudson, and Brooklyn, N. Y.; professor in the General Theological Seminary in 1865; in 1878 was elected bishop of Springfield, Illinois.

SEYMOUR, HORATIO, an American statesman; born at Pompey Hill, N. Y., May 31, 1810; educated at Geneva Academy (now Hobart College) and Part-ridge's Military School, Middletown, Conn.; studied law and was admitted to the bar in 1832, but did not practice; in 1841 was elected to the state legislature as a Democrat, and in the following year mayor of Utica; in 1843 and 1844 was re-elected to the assembly; in 1852 was elected governor, but was defeated in 1854. When the Civil War broke out, Seymour remained loyal, and aided in recruiting troops, but protested that the war might have been avoided. In 1862 he was again elected governor, and although he strongly opposed many of the measures of Lincoln and the administration, notably the emancipation of the slaves, he made a very efficient war governor, and was specially active in suppressing the draft riots of July, 1863, in New York. He refused the Democratic nomination for the Presidency in 1864, but was nominated in 1868 against his will, and received only 80 electoral votes against 214 for Grant. After his defeat he retired from public life. He died Feb. 12, 1886.

SEYMOUR, JANE. See ENGLAND, Vol. VIII, 336.

SEYMOUR, THOMAS DAY, an American classical scholar; born in Hudson, Ohio, April 1, 1848; graduated at Western Reserve College in 1870, and afterward studied in Germany; was professor of Greek in Western Reserve College 1872-80; and at Yale in 1880; in 1887 became chairman of the managing committee of the American Classical School in Athens, Greece. He wrote *Homeric Language and Verse* (1885), and edited *Selected Odes of Pindar* (1882); six books of *Homer's Iliad* (1887 and 1891); and a *School Iliad* (1889).

SFORZA. See ITALY, Vol. XIII, pp. 477, 479.

SHABAK. See EGYPT, Vol. VII, p. 742.

SHAD. See Vol. XXI, pp. 726-27; MENHADEN, Vol. XVI, pp. 10-11; PISCICULTURE, Vol. XIX, p. 128.

SHADOW-BIRD (*Scopus umbretta*), a name given

to the African umbretta, or umber-bird, because of its somber-colored plumage. It is allied to the herons and storks. The color is dark brown and bronzed, and there is a crest on the back of the head. A single pair build a large oven-like nest, five or six feet high, which is entered at the side. The bird is sacred to the natives. It stands alone in the family *Scopida*.

SHAD-BUSH. See JUNE-BERRY and SERVICE-BERRY, in these Supplements.

SHAFTER, WILLIAM RUFUS, American army officer; born in Galesburg, Mich., Oct. 16, 1835, and worked on his father's farm until he was 21, after which he received some education at the Prairie Seminary, when he returned to farming. On the breaking out of the Civil War he became first lieutenant of the 7th Michigan Infantry, and took part in the battle of Ball's Bluff and in McClellan's peninsula campaign. On Aug. 22,



GENERAL SHAFTER.

1862, he was honorably mustered out, but on Sept. 5, 1862, he became major of the 19th Michigan Infantry, and served in Kentucky and Tennessee. In February, 1863, he was taken prisoner, but was exchanged in May following. On June 5, 1863, he was made lieutenant-colonel of his regiment; on April 19, 1864, colonel of the 17th U. S. Infantry; in March, 1865, brevet brigadier-general of volunteers; on July 28, 1866, lieutenant-colonel of the 41st U. S. Infantry; and on March 4, 1879, colonel of the 1st U. S. Infantry. On May 3, 1897, he was made brigadier-general, and assigned to the department of the Columbia, but was later transferred to that of California. After the war with Spain broke out, he was, on May 4, 1898, made major-general of volunteers, and put in command of the army sent, on June 14, to Santiago de Cuba; and he conducted the campaign against that city until, on July 17, 1898, it was surrendered, together with the eastern portion of Santiago de Cuba province. In October, 1898, he was made commander of the department of the East, with headquarters on Governor's Island, New York; and early in 1899 he was again put in command of the department of California.

SHAGREEN. See LEATHER, Vol. XIV, p. 390; SHARK, Vol. XXI, p. 779.

SHANAMA. See PERSIA, Vol. XVIII, p. 656.

SHAKOPEE, a city, the capital of Scott Co., Minn., on the south bank of the Minnesota river, 28 miles W. of St. Paul; is the center of an agricultural region; contains railway repair-shops, steam flour-mill, wagon-shop, factories of brick and lime; and is the seat of an orphan asylum. Pop. 1890, 1,757; 1900, 2,047.

SHALER, NATHANIEL SOUTHGATE, geologist; born in Newport, Ky., Feb. 22, 1841; graduated at the Lawrence Scientific School at Harvard in 1862; and served for two years as an artillery officer in the Kentucky Federal Volunteers. In 1864 he became assistant in palæontology in the Museum of Comparative Zoölogy at Harvard; in 1865 instructor in zoölogy and geology in the Lawrence School; in 1868 professor of palæontology at Harvard; in 1887 professor of geology

in the same institution. Dr. Shaler was put in charge of a geological survey of Kentucky in 1873, and carried on the work, at intervals, through seven years, publishing reports of it in six volumes (1876-82). In 1884 he was appointed on the Atlantic division of the United States Geological Survey; was chosen president of the Geological Society of America in 1895. Among his works are *On the Nature of Intellectual Property* (1878); *A First Book in Geology* (1884); *Kentucky*, in the American Commonwealths Series (1885); *Aspects of the Earth* (1889); *Nature and Man in North America* (1892); *Sea and Land* (1894); and *American Highways* (1896).

SHALLOT. See HORTICULTURE, Vol. XII, p. 288.

SHAMO DESERT. See GOBI DESERT, Vol. X, pp. 712-714.

SHAMOKIN, a borough of Northumberland County, eastern central Pennsylvania, 19 miles S.E. of Sunbury and 14 miles S.S.E. of Danbury, on the Northern Central and Philadelphia and Reading railroads. It is the shipping and receiving point for the anthracite coal regions in that portion of the state. It contains numerous churches, grammar and high schools, public library, water-works, two banks, three daily and four weekly papers, several hotels, machine-shops, foundries and powder-mill. Population 1890, 14,403; 1900, 18,202.

SHAMROCK, the leaf of the small white clover (*Trifolium repens*), the national emblem of Ireland. According to the tradition, St. Patrick used a trefoil to illustrate the mystical doctrine of the Trinity, and thereafter it was worn as a badge upon the annual celebration of St. Patrick's day, and finally was adopted by the Irish as their national emblem. The hop-clover (*Trifolium minus*), the wood-sorrel (*Oxalis acetosella*), and the nonesuch (*Medicago lupulina*) have been also considered to be the original shamrock.

SHANNON, a river. See IRELAND, Vol. XIII, p. 216.

SHANNY-FISH, a fish of the genus *Pholis* (*Blenius*), occurring on the coasts of France and England, and rarely on the Atlantic coast of North America. Peculiar modifications of its pectoral fins enable it to crawl on land above the tide-mark. It is of no economic importance.

SHAN SE, a province. See CHINA, Vol. V, p. 634.

SHAN STATES. See SHANS, Vol. XXI, pp. 773, 774.

SHANTUNG, a province. See CHINA, Vol. V, pp. 633, 634.

SHARON, a borough of Mercer County, western Pennsylvania, on the Shenango River, 75 miles N.N.W. of Pittsburg and 14 miles W. of Mercer, and on the Erie and Pittsburg, Lake Shore and Michigan Southern and New York, Lake Erie and Western railroads. It is extensively engaged in iron-manufacturing and coal-mining, there being ten mines in operation, and contains three banks, one daily and four weekly papers, a high school and graded schools, several churches, rolling-mills, foundries, boiler-shops, nail-works, horse-collar factory, saw, planing and flour mills. Population 1890, 7,459; 1900, 8,916.

SHARP, GRANVILLE. See SLAVERY, Vol. XXII, p. 139.

SHARPE, RICHARD BOWDLER, an English ornithologist; born in London, Nov. 22, 1847; was educated at the Petersborough and Loughborough schools, and at 18 was appointed first librarian of the London Zoölogical Society; in 1872 senior assistant in the zoölogical department of the British Museum, with charge of the collections of birds. He was made a fellow of the London Zoölogical Society and honorary member of scientific societies of Lisbon, Amsterdam, Moscow and elsewhere. Among his works are *A Monograph of the Family of Kingfishers*; *A Monograph of the Family of Swallows*; and 11 volumes of the *Catalogue of Birds* in the British Museum. He also finished John Gould's *Birds of Asia and Birds of New Guinea*.

SHARPSBURG (MARYLAND), BATTLE OF. See ANTIETAM, BATTLE OF, in these Supplements.

SHARPSBURG, a borough of Allegheny County west-southwestern Pennsylvania, on the north bank of the Allegheny, and on the Pennsylvania and Gettysburg and Western railroads, five miles N.E. of Pittsburg. As a suburb of Pittsburg, it has street-railway connection with the latter city, and many common industrial interests. There are oil and iron fields in the surrounding region, and the borough itself has blast-furnaces, rolling-mills, machine-shops, paper-mills, oil-can works and manufactures of lubricating-oil, glass, and varnish. Population 1890, 4,898; 1900, 6,842.

SHARPSVILLE, a borough of Mercer County, western Pennsylvania, three miles N.E. of Sharon, on the Shenango River, and on the Erie and Pittsburg, New York, Lake Erie and Western and Sharpsville railroads. It is in a region rich in coal, and is extensively devoted to the manufacture of pig-iron, there being ten blast-furnaces in operation. Population 1890, 2,330; 1900, 2,970.

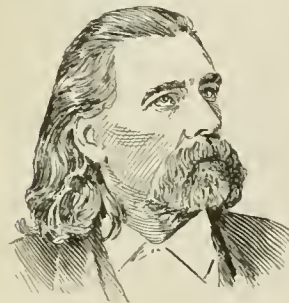
SHARSWOOD, GEORGE, an American jurist; born in Philadelphia, July 7, 1810. He was educated at the University of Pennsylvania, studied law, and was admitted to the bar in 1831. In 1837-38 and in 1842-43 served in the state legislature; in 1845 was commissioned judge of the district court of Pennsylvania; in 1848 became its president; in 1850 professor of law in the University of Pennsylvania, the department, founded in 1790, having been revived in the former year; was elected to the supreme bench of Pennsylvania in 1867; chief justice in 1878. He retired in 1882. He made numerous contributions to law literature, among which are *Professional Ethics* (1854); *Popular Lectures on Common Law* (1856); *Law Lectures* (1869); and edited *Blackstone's Commentaries* (1859). He died in Philadelphia, May 28, 1883.

SHASTA, MOUNT, a peak of the Sierra Nevada system in Siskiyou County, northern California, in latitude 41° 35' N., at the point where the Sierra Nevada range terminates topographically. It is situated in a rich gold-mining region, and according to the United States Geological Survey has an altitude of 14,350 feet.

SHAW, ALBERT, an American journalist; born in New London, Ohio, July 23, 1857. He was

educated at Iowa College, Grinnell, Iowa, and at Johns Hopkins. In 1884 he became an editorial writer on the staff of the *Minneapolis Tribune*, which position he retained until 1891 with the exception of a portion of the years 1888-89, which he spent in Europe. In 1891, he became the editor of the American edition of *The Review of Reviews*. Among his works are *Local Government in Illinois* (1883); *Icaria: A Chapter in the History of Communism* (1884); *Co-operation in a Western City* (1886); *The National Revenue* (1888); *Municipal Government in Great Britain* (1895).

SHAW, HENRY WHEELER, an American humorist, better known by his *nom-de-plume*, "Josh Billings";



H. W. SHAW.

born in Lanesboro, Massachusetts, April 21, 1818. He was the son of Henry Shaw, member of Congress from 1818 to 1821; received a common-school education and entered Hamilton College in 1832, but soon left there to go West; became a deck-hand on Ohio River steamboats, a farmer and afterward auctioneer. In 1858 he settled in Poughkeepsie, New York, and in 1859 wrote his *Essay on the Mule*, which attracted no particular attention. A year later he rewrote his *Essay* using the peculiar phonetic orthography afterward characteristic of his work, and sent the article to a New York paper, over the pen-name "Josh Billings." It made a hit and was reprinted by several other journals. In 1870 he published a travesty of Thomas's *Old Farmers' Almanac*, entitled *Josh Billings's Farmers' Almanax*, of which 90,000 were sold in three months. In 1863 he began to lecture and became quite as successful on the platform as in literature. His lectures consisted of a series of disconnected observations, delivered in an affectedly awkward manner, and in the backwoods dialect which he utilized in writing. Among his other books are *Josh Billings, His Sayings* (1866); *Josh Billings On Ice* (1875); *Josh Billings's Complete Work*, one volume (1877); and *Josh Billings's Spice Box* (1881). Francis S. Smith wrote his *Life*, (1883). He died in Monterey, California, Oct. 4, 1885.

SHAW, LEMUEL, an American jurist; born at Barnstable, Massachusetts, Jan. 9, 1781. He graduated at Harvard, studied law, and was admitted to the bar at Boston in 1804. In 1820 he was a member of the convention for revising the constitution of Massachusetts; drafted the charter of the city of Boston in 1822; state senator in 1821-22, and again from 1828 to 1830. In 1830, on the death of Chief Justice Isaac Parker, Shaw was appointed his successor, though he had never held any judicial office before. He held this post from 1830 till 1860. He soon gained a high reputation for judicial ability, and is regarded as one of the foremost jurists New England has produced. Among other noted cases, he presided over the trial of Professor Webster for the murder of Dr. George Parkman. He was an overseer of Harvard

College for 22 years, and received the honorary degree of LL.D. from it in 1831, and from Brown University in 1850. He died in Boston, March 30, 1861.

SHAW, WILLIAM NAPIER, an English physicist; born in Birmingham, March 4, 1854. He was educated at Emmanuel College, Cambridge, graduating in 1876, and later studied in Berlin; was chosen fellow of Emmanuel in 1877; in 1879 lecturer on natural science; was demonstrator in experimental physics at the Cavendish Laboratory (1880-87); lecturer in physics at Cambridge University (1887-90); in 1890 was appointed senior tutor in Emmanuel College. In the following year he was chosen fellow of the Royal Society. Among his works are *Text-Book of Practical Physics*, with R. T. Glazebrook; *The Present State of our Knowledge in Electrolysis and Electro-Chemistry* (1890); and the articles on ELECTROLYSIS and PYROMETER in this ENCYCLOPÆDIA.

SHAWANO, a city and the capital of Shawano County, eastern central Wisconsin, on Wolf River, at the head of navigation, near Shawano Lake, and on the Chicago and North-Western railroad, 152 miles N.N.W. of Milwaukee, and about 35 miles W.N.W. of Green Bay. It is in an agricultural and lumbering region; is an important shipping-point for lumber, and has saw, planing and feed mills. Population, 1890, 1,505; 1900, 1,862.

SHAW-LEFEVRE, GEORGE JOHN, an English publicist, was born near Nottingham in 1832; educated at Eton and Trinity College, Cambridge; called to the bar in 1856; member of Parliament for Reading (1863-85); served twice on the Admiralty Board; secretary to the Board of Trade (1868-71); First Commissioner of Public Works in 1880, and again in 1892, in which office he made marked improvements in the London streets; Postmaster-General in 1884, and established the sixpence telegram rates; sat in Parliament for Bradford (1886-97); published authoritative works on land tenures in the United Kingdom, of which *Agrarian Tenures* appeared in 1893. In politics, he is a Liberal.

SHAWNEE, a village of Perry County, southeastern central Ohio, 43 miles S.E. of Newark and about 28 miles S. of Zanesville, on the Baltimore and Ohio and the Columbus, Sandusky and Hocking railroads. It is in an agricultural and coal-mining region, and has foundries and saw and planing mills. Population 1890, 3,266; 1900, 2,966.

SHAWNEE INDIANS. See INDIANS, Vol. XII, p. 831.

SHAWNEETOWN, a city and the capital of Gallatin County, southeastern Illinois, 182 miles S.E. of Springfield, on the Ohio River, 65 miles below Evansville, Indiana, and on the Baltimore and Ohio Southwestern and the Louisville and Nashville railroads. It is in a region in which coal and lead are found, and in which agriculture is extensively carried on. The city is an important shipping-point for the products of the region, and has mills, foundry, machine-shop and pork-packing industry. Population (12th census) 1900, 1,698.

SHAYS, DANIEL, an American agitator, the leader of Shays's Rebellion; born at Hopkinton,

Massachusetts, in 1747. During the Revolutionary War he attained the rank of captain in the Continental army. At the close of the war the people of western Massachusetts found themselves burdened with debts and taxes, and complained that the governor's salary was too high, the senate aristocratic, the lawyers extortionate, and that the courts were instruments of oppression, especially in the collection of debts. They demanded the removal of the general court from Boston, the relief of debtors, and the issue of a large amount of paper money. Parties of armed men interrupted the sessions of several county courts. Captain Shays was chosen as the chief leader. At the head of 1,000 insurgents he appeared at Springfield, Massachusetts, in December, 1786, to prevent the session of the supreme court at that place. The court adjourned without having transacted any business. In January, 1787, three bodies of insurgents concentrated upon Springfield, where they hoped to capture the Continental arsenal, which was defended by 1,000 militia. The largest body, under Shays, numbered 1,100 men, and approached by the Boston road. Meanwhile the state government had raised and equipped an army of 4,000 men under General Benjamin Lincoln, which army was then two days' march from Springfield. On January 25th, Shays attacked the arsenal, but was repelled by the militia, which fired into the ranks of the insurgents, killing three and wounding one. Shays's attempt to rally his men was unsuccessful. They fled precipitately, and were pursued by the state troops as far as Petersham (in Worcester County, Massachusetts). Here they were overtaken in a blinding snowstorm and made little resistance; 150 were captured and the rest dispersed. Several of the leaders were sentenced to be hanged, but they were finally pardoned. Shays, after living in Vermont about a year, asked and received pardon, and removed to Sparta, New York. In his old age he was allowed a pension for his services in the Revolutionary War. He died at Sparta, New York, Sept. 29, 1825.

SHEA, JOHN DAWSON GILMARY, an American historian; born in New York, July 22, 1824. He was educated at the Columbia College Grammar School, and afterward studied law, but did not practice. He edited the *Historical Magazine* from 1859 to 1865, and subsequently, the *Catholic News*. Mr. Shea was very prolific as author, translator and editor of historical and ecclesiastical works. He published, among others, *Discovery and Exploration of the Mississippi Valley* (1853); *History of the Catholic Missions Among the Indian Tribes*, translated from the German (1854); *Early Voyages Up and Down the Mississippi* (1862); *The Catholic Church in Colonial Days* (1886); and *Life of Pius IX* (1875). He edited the Cramoisy series of 26 volumes relating to the history of French colonization in America and 15 Indian dictionaries and grammars. Died in Elizabeth, N. J., Feb. 22, 1892.

SHEA—BUTTER. See OILS, Vol. XVII, p. 747.

SHEARMAN, THOMAS GASKELL, an American lawyer and publicist; born in Birmingham, England, Nov. 25, 1834. He moved with his parents to America in 1843, settled in New York, and later

studied law and was admitted to the bar. He began practice in New York City, and devoted his spare time to writing on legal and economical subjects. He became a firm supporter of the doctrine of free trade. Among his works are *Law of Practice and Pleadings*, with Tillinghast (1861-65); *Law of Negligence*, with Redfield (1870-88); *Talks on Free Trade* (1881); *Does Protection Protect?* (1883); *Distribution of Wealth* (1887); and *Natural Taxation* (1891). Shearman was counsel for Henry Ward Beecher during his trial. Died Sept. 29, 1900.

SHEBA. See YEMEN, Vol. XXIV, pp. 738, 739.

SHEBOYGAN, a city, the capital of the county of the same name in Wisconsin, is located on Lake Michigan, near the mouth of the Sheboygan River, and on the Chicago and North-Western railroad, 50 miles N. of Milwaukee, about 45 miles E. of Fond du Lac, and nearly 100 miles E. of Madison, the capital of the state. It has an excellent harbor, and steamship lines give it communication by water with Chicago, Milwaukee and other lake ports, making Sheboygan an important trade and shipping center. The city contains 18 churches, high and lower grade schools, Roman Catholic and Lutheran parochial schools, numerous benevolent and charitable institutions. It has public parks, in one of which mineral springs are found, whose waters are bottled and shipped extensively. It has gas and electric lights, water-works deriving their supply from Lake Michigan, two banks, two daily and eight weekly papers, a courthouse, a large number of stores, hotels, public halls and places of amusement. As a manufacturing center the city is the location of many undertakings of special value, including farming implements, hollowware, stone and enameled ware, sashes, doors, blinds and other products of the lumber industry; also tanneries, breweries, brick and plaster mills, flour-mills, etc. Of these varied industries the leading one in 1895 was the making of chairs, in which there were three factories, employing a large number of men, and having a daily output of 4,000 chairs. The municipal assessment in 1892 was \$5,415,980. Population 1890, 16,359; 1900, 22,962. See also SHEBOYGAN, Vol. XXI, pp. 782, 783.

SHEDD, WILLIAM GREENOUGH THAYER, an American theologian and author; born in Acton, Massachusetts, June 21, 1820. After studying theology at Andover, he was, in 1844, ordained pastor of the Congregational Church at Brandon, Vermont. In 1845 he became professor of English literature in the University of Vermont, and in 1852 professor of sacred rhetoric in Auburn Theological Seminary; two years later was made professor of church history in Andover Theological Seminary; in 1864 professor of Biblical literature in Union Theological Seminary, New York; and in 1874 professor of systematic theology in the same school. He was an uncompromising defender of Calvinism, and published several works relating to its doctrines, and, also, works on other subjects, among which are translations of Guericke's *Church History* (1857-63); and *St. Augustine's Confessions* (1860); *A History of Christian Doctrine* (1863); *Doctrine of Endless Punishment* (1886); *Orthodoxy and Heterodoxy* (1894); and *Dogmatic Theology* (1894). He also edited an

edition of Coleridge's works. Died in New York, Nov. 17, 1894.

SHEEP AND WOOL IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

SHEEP-DOG. See Dog, Vol. VII, p. 326.

SHEEP-TICK (*Melophagus ovinus*), a wingless dipterous insect, often very troublesome to sheep, on the skin of which they are parasitic. Like the fleas, the sheep-ticks have lost their wings, owing to their parasitic habits. They have a flattened body, with broad head and a long proboscis, which enables them to suck blood from their host. Most herdsmen practice dipping the sheep into various poisonous solutions which destroy the ticks. The true ticks (*Ixodes*) are members of the order *Acarina*, in the class *Arachnida*. See also TICK, in these Supplements.

SHEFFIELD, a city of Colbert County, northwestern Alabama, two miles N. of the county capital, Tuscumbia, on the Tennessee River, and on the Louisville and Nashville, Memphis and Charleston and Northern Alabama railroads. Sheffield is one of the youngest of the new industrial cities of the South; is situated in a region, part of which is a fertile agricultural section, and part being extremely rich in hematite iron-ore, and has iron-furnaces, railroad-shops and manufactures of brick and lumber. Population 1890, 2,731; 1900, 3,333.

SHELBURNE, a town and the capital of Shelburne County, southwestern Nova Scotia, about 40 miles E. of Yarmouth, the nearest railroad station, on the Dominion and Atlantic railroad, and about 100 miles in a direct line from Halifax, on an inlet from the Atlantic Ocean, forming a good harbor, and near the mouth of the Roseway River. The town has good water-power, and is engaged in iron-manufacture, ship-building, fishing and commercial pursuits. During the days of the American Revolution, Shelburne was a city of twelve thousand inhabitants, and the center of Tory influence. At the entrance to Shelburne harbor, on Cape Roseway, the southeastern point of McNutt's Island, in lat. $43^{\circ} 38.5'$ N. and long. $65^{\circ} 15.5'$ W., stand Shelburne lights, the highest of which is 120 feet above the sea. Population 1891, 1,300.

SHELBURNE, EARL OF. See LANSLOWNE, Vol. XIV, pp. 289, 290; and PITT, Vol. XIX, p. 138.

SHELBURNE FALLS, a village of Shelburne and Buckland townships, Franklin County, northwestern Massachusetts, 69 miles W. of Fitchburg, on the Deerfield River, and on the New York, New Haven and Hartford and Fitchburg railroads. Picturesque falls, 47 feet in height, furnish excellent water-power, which is made use of in running silk-mills, peg-mills, and a cutlery and hardware manufactory. The village is the seat of Arms Academy (Congregational), a co-educational institution for secondary instruction. Population of Shelburne township 1890, 1,553; 1900, 1,508; village not separately returned.

SHELBY, ISAAC, an American pioneer and soldier; born in North Mountain, Maryland, Dec. 11, 1794. He moved with his father to the site of the present town of Bristol, Tennessee, and engaged

with him in the cattle business. He served in the border Indian wars, and at the outbreak of the Revolution was made captain, and took part with Sevier (q.v., in these Supplements) in his capture of the British stores at Chickamauga, and in the battle of King's Mountain. He was elected to the North Carolina legislature, but left it to follow Sevier into South Carolina. He was influential in securing the separation of Kentucky from Virginia, and in 1792, when the new state was admitted to the Union, was chosen its first governor. In the War of 1812 he raised and organized a body of four thousand volunteers, and led them to the support of General Harrison, near Lake Erie. For this service he received a gold medal from Congress. He died July 18, 1826.

SHELBYVILLE, a city and the capital of Shelby County, southeastern central Illinois, about 30 miles S. of Decatur and 113 miles N.E. of St. Louis, on the Kaskaskia River, and on the Chicago and Eastern Illinois and Cleveland, Cincinnati, Chicago and St. Louis railroads. It is the center of an agricultural and coal-mining region, and has flour and woolen mills, manufactures of agricultural implements, a daily and four weekly newspapers, and a monthly periodical. Population 1890, 3,162; 1900, 3,546.

SHELBYVILLE, a city of southeastern central Indiana, and the capital of Shelby county, is located in Addison township, on the Big Blue River, and on the Cleveland, Cincinnati, Chicago and St. Louis and the Pittsburg, Cincinnati, Chicago and St. Louis railroads, 27 miles S.E. of Indianapolis. The surrounding country is largely agricultural, and to some extent manufacturing. Much of it is underlaid with bituminous coal, and along the creeks and rivers a considerable growth of hard and soft wood timbers is to be found. As a result, the city is the receiving and distributing point for the trade of a populous and productive section. The city has several churches, high and lower grade schools, three banks, two daily, semiweekly and weekly newspapers, and various industries, including saw, planing and flour mills, barrel and ice factories and manufactures of carriages and furniture. Grain and live-stock are extensively shipped. Pop. 1890, 5,451; 1900, 7,169.

SHELBYVILLE, a town and the capital of Shelby County, northern Kentucky, on Clear Creek, 20 miles W. of Louisville and 30 miles E. of Frankfort, and on the Louisville and Nashville and Southern railroads. It is the trading and shipping point of a region devoted to agriculture, stock-raising and tobacco-growing. It is the seat of several educational institutions; among them, Science, Hill School (Methodist Episcopal South), established in 1825; Sampson and Scarce's Academy; Stuart Female College (opened in 1839); and Shelbyville Male Academy. Population 1890, 2,679; 1900, 3,016.

SHELBYVILLE, a town and the capital of Bedford County, Middle Tennessee, about 50 miles S.S.E. of Nashville, on Duck River, and on the Nashville, Chattanooga and St. Louis railroad. It is in an agricultural and stock-raising district; is an important grain market; ships large numbers of mules, and has cotton and woolen mills, flour, saw and planing-mills, lumber-yards, lead-pencil and

carriage factories, and foundry and machine-shop. Population 1890, 1,823; 1900, 2,236.

SHELDON, a city of O'Brien County, northwestern Iowa, 36 miles W. of Spencer and 58 miles N.N.E. of Sioux City, on the Chicago, Milwaukee and St. Paul, Chicago, St. Paul, Minneapolis and Omaha and Illinois Central railroads. It is the center of a rich agricultural and stock-raising region, and has large flour-mills. Population 1900, 2,282.

SHELDON, CHARLES M., American clergyman (Congregationalist) and author; was born at Wells-ville, N. Y., in 1859, and educated at Brown Univ. and Andover Theological Seminary; was pastor of a church at Waterbury, Vt., 1886-89, and since then has been pastor of the Central Church, Topeka, Kans. Is the author of *In His Steps* (which has had a phenomenal sale), and of *The Crucifixion of Philip Strong; His Brother's Keeper*, etc.

SHELDON, HENRY CLAY, an American educator; born in Martinsburg, New York, March 12, 1845. He graduated at Yale in 1867, and afterward studied at Boston University and in Leipsic; was ordained in the Methodist Episcopal Church in 1873; chosen assistant professor of historical theology in Boston University in 1876; professor in 1882. He published *History of Christian Doctrine* (1886), and *History of the Christian Church* (1894).

SHELL. See GUNNERY, Vol. XI, p. 304 and AMMUNITION, Vol. I, p. 744.

SHELL LAKE, a village and the capital of Washburn County, northwestern Wisconsin; 16 miles N.E. of Cumberland and about 65 miles S. of Superior, on the Chicago, St. Paul, Minneapolis and St. Louis railroad. It is an important point in the great pine forest region of the state, and has a saw-mill with an annual capacity of 30,000,000 feet. Shell Lake was organized since 1890, and had a population in 1900 of 1,823.

SHELLS. See BRACHIOPODA, Vol. IV, pp. 189, 190; and MOLLUSCA, Vol. XVI, pp. 661, 686.

SHELTER ISLAND, an island and township of Suffolk County, southeastern New York, off the eastern end of Long Island, between Peconic and Gardiner's bays, and having communication by ferry with Greenport, on the Long Island railroad. It has a length of about six miles, but is very irregular in shape, being deeply indented on the eastern side by an inlet from Gardiner's Bay extending over half way across the island. It is noted as a summer resort and Methodist camp-meeting place; has good hotels, excellent bathing and fishing, and fine yachting. The island originally was the home of the Manhasset Indians, and in the colonial times was under the jurisdiction of Connecticut. Population 1890, 921; 1900, 1,066.

SHELTON, a town and the capital of Mason County, western Washington, on the Hammerslay Inlet, 22 miles N.W. of Olympia, with which it has steamer communication, and on the Peninsular and Shelton Southern railroads. It is engaged extensively in logging, and is an important shipping-point for lumber. Population 1900, 833.

SHELTON, FREDERICK WILLIAM, an American clergyman and author; born in Jamaica, Long Island, in 1814. He graduated at Princeton in 1834;

took orders in the Protestant Episcopal Church in 1847, and thereafter held pastorates in Huntington, Long Island, Fishkill, New York, and Montpelier, Vermont. In 1864 he moved to Carthage Landing, New York, and devoted himself to authorship. Among his works are *The Trollopiad*, a satirical poem (1837); *Up the River*, sketches on the Hudson (1853); and *Parish Sketch Book* (1855); besides numerous contributions to the *Knickerbocker Magazine*. He died June 20, 1881.

SHEMAKHA. See SHEMAHA, Vol. XXI, p. 794.

SHENANDOAH, a city of Page County, southwestern Iowa, 40 miles S.E. of Council Bluffs and 18 miles S.S.W. of Red Oak, on the Nishnabotna River, and on the Chicago, Burlington and Quincy, Humeston and Shenandoah and Omaha and St. Louis railroads. The city is in an agricultural district, and has foundry and machine-shop, railroad repair-shops, canning factory, manufactures of carriages; is the seat of the Western Normal College, and has, in the vicinity, probably the largest nurseries in the western United States. They comprise over two hundred acres devoted to raising plants, flowers and trees. Population 1890, 2,440; 1900, 3,573.

SHENANDOAH, a borough of Schuylkill County, eastern central Pennsylvania, in one of the most productive anthracite coal-mining areas of the state, on the Lehigh Valley and Philadelphia and Reading railroads, 12 miles N. of Pottsville, the county seat, and 105 miles N.W. of Philadelphia. The principal, if not the chief, industry in operation, is coal-mining, in which an immense number of hands are employed, and a total output of from a million to a million and a half tons produced annually, from 14 collieries, all within a radius of one mile from the borough. The city has one daily and five weekly papers, two banks, several churches, public and parochial schools, halls, gas and electric light plants, electric street-railway, brewery, and hat and cap factory. Population 1890, 15,944; 1900, 20,321. See also SHENANDOAH, Vol. XXI, p. 794.

SHENANDOAH RIVER. The largest tributary of the Potomac. It rises by two branches, in Augusta County, northwestern central Virginia, runs northeasterly through the Shenandoah Valley, intersecting Rockingham, Page, Warren and Clarke counties in Virginia, being joined in Warren County, near Front Royal, by the north fork, and finally, after passing through Jefferson County, West Virginia, it joins the Potomac, at Harper's Ferry. The river is navigable a hundred miles from its mouth for light boats. The valley of the Shenandoah was the scene of many stirring events during the Civil War, and in 1864 was laid waste by General Sheridan.

SHEN-SI OR SHENSE. See CHINA, Vol. V, pp. 637, 638.

SHEOL. See ESCHATOLOGY, Vol. VIII, p. 536; and PURGATORY, Vol. XX, p. 114.

SHEPARD, CHARLES UPHAM, an American mineralogist; born in Little Compton, Rhode Island, June 29, 1804. He graduated at Amherst in 1824; studied botany and mineralogy with Thomas Nuttall, at Cambridge; in 1827 became assistant in the laboratory of the elder Silliman at New Haven; in 1830-47 was lecturer on natural history at Yale;

professor at Amherst (1845-52), at the South Carolina Medical College (1854-61), and for a short time after the War. While at Charleston he discovered rich deposits of phosphate of lime in the vicinity of that place. From 1867 to 1877 he delivered lectures on natural history at Amherst, where he formed the finest collection of minerals and meteorites in the country. Professor Shepard was the author of a *Treatise on Mineralogy* and a *Report on the Geology of Connecticut* (1855). He died in Charleston, South Carolina, May 1, 1886.—His son, CHARLES UPHAM SHEPARD; born in New Haven, Connecticut, Oct. 4, 1842; graduated at Yale in 1863, and afterward studied at Göttingen; was professor of chemistry in the South Carolina Medical College (1867-87). He became interested in the development of the phosphate industries of South Carolina and Florida.

SHEPARD, ELLIOT FITCH, an American lawyer; born in Jamestown, Chautauqua County, New York, July 25, 1833, and was educated at the University of the City of New York. He was admitted to the bar in 1858, and practiced his profession in New York City until the breaking out of the Civil War. In 1861 he was placed in charge of the recruiting service at Elmira, New York, and aided in the enlistment of the Fifty-first Regiment of New York infantry, which was called the Shepard Rifles. At the close of hostilities he returned to the practice of law. He was the attorney for the New York Central railroad and the first president of the New York State Bar Association. In 1888 he purchased a controlling interest in the New York *Mail and Express*. His wife was the eldest daughter of William K. Vanderbilt. Died in New York, March 24, 1893.

SHEPHERD KINGS. See EGYPT, Vol. VII, p. 735.

SHEPHERDSTOWN, a town of Jefferson County, extreme northeastern West Virginia, 60 miles W. of Washington, District of Columbia, 12 miles above Harper's Ferry, on the Potomac River, on the Chesapeake and Ohio Canal, and on the Norfolk and Western railroad. It has cement-stone quarries, cement-mills, flour-mills and machine-shops, and is the seat of Shepherd College, one of the state normal schools. Population 1890, 1,515.

SHEPLEY, GEORGE FORSTER, an American jurist and soldier; born at Saco, Maine, Jan. 1, 1819. He graduated at Dartmouth in 1837, studied law at Harvard, and began practice at Bangor, Maine, in 1840. In 1844 he removed to Portland. From 1853 till 1861 he was United States district attorney for Maine. At the beginning of the Civil War he was commissioned colonel of the Twelfth Maine Volunteers, and took part in General Butler's expedition against New Orleans. At the capture of New Orleans he led the Third Brigade of the Army of the Gulf. On the occupation of that city he was appointed military commandant and acting major, and assigned to the command of its defenses. In June, 1862, he was made military governor of Louisiana, serving until 1864. He was, at the same time, promoted brigadier-general of volunteers. From 1864 till the close of the war Shepley was chief of staff to General Weitzel, who was in command of eastern

Virginia. On the capture of Richmond he was appointed first military governor of that city. In July, 1865, he resigned from the army, and in 1869 was appointed United States circuit judge for Maine, which office he held until his death, in Portland, Maine, July 20, 1878.

SHERBROOKE, a city and the capital of Sherbrooke County, southern Quebec, Canada, 80 miles E. of Montreal and 102 miles S.S.W. of Quebec, on the Magog River, at its junction with the St. Francis, and on the Boston and Maine, Canadian Pacific, Grand Trunk and Quebec Central railroads. It is the center of an agricultural region, has gas and electric light plants, bridges over both the St. Francis and Magog rivers. From the latter, which at this place falls 120 feet in half a mile, excellent water-power is derived, and utilized in woolen-mills (one of them employing over seven hundred hands), in worsted-mills, saw-mills, foundries, machine-shops, and bobbin, corset, furniture, carriage, ax, pail and broom factories. Copper, iron, chrome and asbestos are found in the vicinity, and with lime, lumber, and pulp are extensively shipped to the United States. The inhabitants are mostly French Canadians. Population, 1891, 10,110.

SHERBROOKE (ROBERT LOWE), VISCOUNT, an English statesman; born in Bingham, Nottinghamshire, in 1811. He graduated at Oxford in 1833; chosen fellow in 1835; was tutor for a time in the university; studied law, and was called to the bar in 1842; went to New South Wales and practiced his profession, remaining there until 1851; returned to England, and was elected to Parliament as a Liberal in 1852. He deserted Mr. Gladstone in 1865, and became leader of the Adullamites, who coalesced with the Tories in defeating the Liberal Parliamentary bill; was Chancellor of the Exchequer (1867-73); Home Secretary (1873-74); raised to the House of Lords in 1880. Died in London, July 27, 1892.

SHERIBON. See CHERIBON, Vol. V, p. 585.

SHERIDAN, FORT, a United States military post, in the Department of the Missouri, located within the limits of the town of Highwood, on Lake Michigan, and on the Chicago and North-Western railroad, 24 miles N. of Chicago. The post has its own railroad and telegraph station and post-office, and is situated on a reservation of 632½ acres, which was purchased by the business men of Chicago and ceded to the United States. In its equipments, Fort Sheridan ranks among the finest posts in the United States, having accommodations for 49 officers, 2 light batteries, 2 troops of cavalry and 8 companies of infantry. There is a complete system of sewers and a water-supply pumped from Lake Michigan. The garrison, in 1896, consisted of two troops of cavalry, a light battery and eight companies of infantry.

SHERIDAN, PHILIP HENRY, an American soldier; born in Albany, New York, on March 6, 1831. He received an appointment to a cadetship in the West Point Military Academy, graduating in 1853. He served in various portions of the country until 1861, at which time he had reached the rank of captain. On the outbreak of the war in 1861 he was made quartermaster of the Army of Southwest Missouri; at the beginning of the next year, chief quar-

termaster of Halleck's army in Mississippi. He was shortly afterward promoted colonel of the Second Michigan Cavalry, and



GEN. P. H. SHERIDAN.

in July, 1862, after having defeated a superior cavalry force at Booneville, was promoted brigadier-general of volunteers and assigned to the eleventh division of the Army of the Ohio, which was stationed in Kentucky, under General Buell. His first action in this part of the country was at Perryville, where Bragg almost succeeded

in breaking the Union line. Here Sheridan saved the day by his ability (displayed so often subsequently) of rallying and re-establishing a broken line. The enemy, when almost successful, was forced back through Perryville, and eventually obliged to retreat from Kentucky. Sheridan was then placed in command of the Army of the Cumberland, Buell having been superseded in command of the Division of the Ohio by Rosecrans. On December 31st the battle of Stone River, or Murfreesboro, was fought. Sheridan commanded the left of the Union right wing, which was ordered to hold its position while a new disposition was made of the left wing. Bragg, meanwhile, made a desperate effort to crush the right, but Sheridan held his position, twice changing his front to meet flank movements. For this he was appointed major-general of volunteers. In the battle of Chickamauga, which occurred Sept. 19-20, 1863, Sheridan's reinforcement of Thomas, who commanded in the center, materially aided the latter in making an orderly retreat to Chattanooga. Grant now arrived and Sheridan was employed directly under him, and in the battle of Mission Ridge attracted Grant's attention by his combination of judgment and dash. After Tennessee had been occupied, Sheridan was transferred to the Army of the Potomac; took part in the battle of the Wilderness, May 5-6, 1864, and thereafter led continual cavalry raids into the enemy's country, which were always successful, and did a great deal of damage. The reputation which he gained in these affairs led to his appointment, in August, 1864, to the command of the Army of the Shenandoah, and shortly after of the Middle Military Division, with the task of clearing the enemy out of the northwestern part of Virginia, whence Washington was continually threatened. Sheridan disposed his troops around Berryville, while Early, who commanded the Confederate force, was stationed over toward Winchester. During the month of August and the first part of September only a few cavalry skirmishes occurred, but on September 19th Sheridan crossed the Opequan, which separated the two armies, defeated the Confederates and captured three thousand men, and again, on the 22d, met Early at Fisher's Hill, defeated and drove him out of the valley, which was thereupon devastated to make it untenable. On the 19th of the following month, however, the Union forces were surprised at Cedar Creek by a Confed-

erate army and put to rout. Sheridan, at the time, was on his way back from Washington, and hearing the noise of battle twenty miles away at Winchester, rode hastily to the field and turned the defeat into a victory. This ride to Winchester is probably the best-known event in Sheridan's career. On November 8th he was appointed major-general in the regular army. In March, 1865, he rejoined Grant, and thereafter took part in all the movements of the Army of the Potomac. After the war, Sheridan was in command of the Department of the Gulf (1866-67), of the Missouri (1867-68), and afterward of the Division of the Mississippi. When Sherman was made general, Sheridan was promoted lieutenant-general. In 1870 he visited Europe to observe the progress of the Franco-Prussian war, and upon the retirement of Sherman in 1883, he was raised to the rank of commander-in-chief. He died in Nonquit, Massachusetts, Aug. 5, 1888. During his last illness Congress conferred upon him the rank of full general. Sheridan was personally very popular with both officers and men. He was trustful, modest, and always to be relied upon; combined in his character the boldness and dash of the dragoon with the foresight and judgment of the commander. Archibald Forbes compared Sheridan to Skobeloff in his innate genius for war and his personal magnetism. It is said that he never lost a battle, and invariably turned a defeat into a victory by his arrival. *The Saturday Review* said of his *Personal Memoirs* (New York, 1888): "We doubt if such a delicate piece of work was ever done with less egotism, and more consideration for his comrades of all ranks."

SHERMAN, a city and the capital of Grayson County, northern Texas, 67 miles N. of Dallas, 285 miles N.E. of Austin, and 13 miles S. of the Red River, on the Houston and Texas Central, Missouri, Kansas and Texas, St. Louis Southwestern, Texas Midland and Texas Pacific railroads. It is in a rich grain, cotton and fruit producing district, and is within fifty miles of a coal-producing region, and is an important shipping and manufacturing point, having cottonseed-oil and flour mills, nursery, cotton-compress, bag and rope, ice, cigar, furniture, carriage, broom and mattress factories, foundries, machine-shops and marble-works. The city has a national bank with a capital of \$600,000, a state bank with a capital of \$300,000, 3 daily and 4 weekly newspapers, water-works, electric lights, electric street-railway, churches and schools, including a commercial college, and is the seat of St. Joseph's Academy (Roman Catholic), Sherman Institute, North Texas Female College, and Austin College (Presbyterian), established in 1850 for the education of men. It had, in 1895-96, 8 instructors, 147 students and a library of 5,000 volumes. Population 1890, 7,335; 1900, 10,243.

SHERMAN, FRANK DEMPSTER, an American poet; born in Peekskill, New York, May 6, 1860. He was educated at Columbia College and Harvard; was fellow in Columbia in 1887, and later instructor in the Columbia School of Architecture. He published *Madrigals and Catches* (1887); *Lyrics for a Lute* (1890); *Little Folk's Lyrics* (1892); and, with John Kendrick Bangs, *New Waggings of Old Tales*

(1888). His poetry is particularly characterized by delicacy and metrical facility.

SHERMAN, JOHN, an American theologian; born in New Haven, Connecticut, in 1772; graduated at Yale in 1792; pastor of the First Congregational Church at Mansfield, Connecticut (1797-1805); in the latter year announced himself a believer in Unitarianism and resigned his pastorate; was for a time pastor of a Unitarian Church at Trenton Falls, New York, where he founded and conducted a school. He published *One God in One Person* (1805), the first formal defense of Unitarianism published in New England; *Philosophy of Language Illustrated* (1826); and *A Description of Trenton Falls* (1827). He died in Trenton Falls, New York, Aug. 2, 1828.

SHERMAN, JOHN, an American statesman; born May 10, 1823, in Lancaster, Ohio. When he was



JOHN SHERMAN.

but six years old his father died, leaving a large family in reduced circumstances, and he was subsequently adopted by a relative living at Mount Vernon, Ohio. At the age of 12 a sister took charge of him, and put him in a school at Lancaster, where he acquired an education. He studied law with his brother, C. T. Sherman, at Mansfield, where he afterward practiced for ten years, and where he was married, in 1848, to a daughter of James Stewart. In 1855 he was elected to the Thirty-fourth Congress, in the interest of the Free-Soil Party, and was re-elected to the Thirty-fifth and Thirty-sixth Congresses. He became a power on the floor and in committees, and was recognized as the foremost man in the House in matters affecting finance. He was again elected to Congress in 1860, and in the following year was chosen to the United States Senate, where he at once became a leader. He devoted himself to the study of financial questions, and was chairman of the Senate Finance Committee at the time the bill of 1873 was passed. In March, 1877, Senator Sherman was appointed, by President Hayes, Secretary of the Treasury, a position which he retained until the close of Mr. Hayes's administration in 1881, when he re-entered the Senate, and was re-elected in 1887 and in 1893. It was due to his management, while at the head of the Treasury, that the resumption of specie payments was effected in 1879 without disturbance to the financial or commercial interests of the country. He was a prominent candidate for the Republican Presidential nomination in 1880, and again in 1888. He published *Recollections of Forty Years in House, Senate, and Cabinet* (1895), which contains a complete and exhaustive history of the financial legislation in the United States, together with its effects, during the forty years of his public service. In 1897 he was appointed Secretary of State by President McKinley, but resigned in 1898. He is author of the

articles COINAGE LAWS; FINANCES OF THE UNITED STATES; and UNITED STATES NATIONAL DEBT, in these Supplements. Died Oct. 22, 1900.

SHERMAN, ROGER, a signer of the Declaration of Independence; born in Newton, Massachusetts, April 19, 1721. He was apprenticed to a shoemaker in his boyhood and followed this calling until 1743, when he moved to New Milford, Connecticut, and began keeping a store with his brother. He was chosen county surveyor in 1745, and for several years made astronomical observations for an almanac published in New York. He studied law, and was admitted to the bar in 1754, and soon after was chosen to the state legislature. In 1761 he moved to New Haven, became a judge of common pleas, was elected to the Continental Congress in 1774, and two years later was one of the committee to draft the Declaration of Independence. He also was one of the framers of the Articles of Confederation and of the Federal Constitution. He was elected to the United States Senate in 1791, but served only two years. Sherman was a member of the upper house of the Connecticut legislature for 19 years; treasurer of Yale College (1766-76); mayor of New Haven from 1784 till his death; and he also assisted in codifying the laws of Connecticut. As a member of the constitutional convention, Sherman, with Ellsworth, who was also a delegate from Connecticut, proposed the scheme for a constitution, which was finally adopted, called the "Connecticut Compromise," which divided the legislative branch of government into two houses, delegates to the first being elected by the people at large and the other by the states as units. This form of government was suggested by that in vogue in Connecticut. He died July 23, 1793.—His nephew, ROGER MINOT SHERMAN, was born in Woburn, Massachusetts, May 22, 1773. He was graduated at Yale in 1792; studied law, and was admitted to the bar in 1796. He moved to Fairfield, Connecticut, and began the practice of law; was elected to the general assembly in 1798, and later was chosen judge of the superior and supreme courts. He was also a delegate to the Hartford convention of Federalists which met in 1814 to protest against the continuance of the war with England, and he shared with the others the odium and the accusations of wishing to destroy the Union, to which this convention gave rise. He died December 30, 1844.

SHERMAN, THOMAS WEST, an American soldier; born in Newport, Rhode Island, March 26, 1813. He graduated at West Point in 1836. In the Mexican War he was brevetted major for gallant and meritorious conduct at Buena Vista, Feb. 23, 1847. During the Civil War he participated in the siege of Corinth, Mississippi; commanded a division in the Department of the Gulf from Sept. 18, 1862, till Jan. 9, 1863, and in the defense of New Orleans from Jan. 9 till May 19, 1863, when he joined the expedition to Port Hudson, Louisiana, commanding the second division of the Nineteenth Army Corps, which formed the left wing of the besieging army. Here, while leading a column to the assault on May 27th, he lost his right leg, and was, in consequence, invalided until Feb. 15, 1864. After this he commanded a battery of artillery in the eastern district

of Louisiana. On March 13, 1865, he was brevetted major-general. After the war he commanded successively the Third Artillery at Fort Adams, Rhode Island, the Department of the East, and the post of Key West, Florida. He was retired from active service as major-general on Dec. 31, 1870. He died in Newport, March 16, 1879.

SHERMAN, WILLIAM TECUMSEH, an American soldier; born in Lancaster, Ohio, Feb. 8, 1820.



GEN. W. T. SHERMAN.

Upon the death of his father he was adopted by Thomas Ewing, who procured an appointment for him at the Military Academy at West Point. He graduated in 1840, the sixth in rank of his class, and was appointed to the artillery. He served in Florida against the Seminoles, later in various garrisons and during the Mexican War as adjutant-general to General Kearny, Colonel Mason and General P. F. Smith. In 1853 he resigned his commission in the United States army and became the manager of a bank in San Francisco. In 1858 he entered a law partnership in Leavenworth, having begun studying law in 1843, though with no thought of practice. On Jan. 1, 1860, he became superintendent of the State Military Academy at Alexandria, Louisiana, and retained the post until Louisiana seceded from the Union, when he promptly resigned and accepted the presidency of the Fifth Avenue street-railroad. At the outbreak of the Civil War he was commissioned colonel in the United States army and given command of a brigade in Tyler's division of McDowell's army, and after the battle of Bull Run was made brigadier of volunteers and assigned to the Department of the Cumberland, under General Anderson, whom he superseded in the chief command, Oct. 8, 1861. Sherman was one of the very few men in the Union army who had any adequate idea of the magnitude which the war just commenced was to assume, and when he stated that it would take sixty thousand men for the defense of Kentucky and two hundred thousand for offensive operations, he was ridiculed, and even by some considered slightly insane. In November he was relieved by General Buell, and ordered to report to General Halleck, who was in command of the Department of the Missouri. He was then given command of a camp of instruction near St. Louis, but was able later to form a division for himself and take part in the battle of Shiloh, where he won especial mention by Grant and Halleck. He was soon after appointed major-general of volunteers, and took part in the operations around Corinth. Halleck was called to Washington in July, 1862, and from that time on Sherman was directly under Grant. In December, 1862, the first attack was made on Vicksburg, Sherman being sent down the east bank of the river to attack the city from the rear, while Commodore Porter's gunboats

were to bombard the place from the front. The expedition failed, owing to the loss of Holly Springs, the base of supplies, and Grant came to take personal supervision of the campaign. General McClernand was given command of the two corps under Sherman and Morgan, and Fort Hindman, one hundred miles up the Arkansas River, was captured by him. In the operations against Vicksburg which followed, the army was divided into four corps, of which Sherman commanded one, the Fifth. After the fall of the city, Sherman was made brigadier in the regular army, and was sent to Chattanooga, and bore the brunt of the battle which was fought there Nov. 24, 1863. On December 3d he was ordered to march to the relief of General Burnside, who was besieged at Knoxville by Longstreet, and arrived there just in time to prevent defeat. In March, 1864, Grant was made commander-in-chief of the Union forces, and at the same time Sherman was put in command of the military division of the Mississippi, and on the 10th of the following month received final orders from Grant to march upon Atlanta. His force consisted of the armies of the Cumberland, Tennessee and Ohio, under Generals Thomas, McPherson and Schofield, respectively, and numbered, in all, about ninety-nine thousand. The enemy's force was sixty thousand, under General Joseph E. Johnston, but the latter had the advantage of fighting from intrenchments. The armies met at Dalton, May 14th, and General Johnston commenced the retrogressive movement toward Atlanta, which he continued, after fierce battles at Resaca, New Hope Church and Kenesaw Mountain, until relieved by Hood. The latter followed a bolder course of action, and made frequent fierce but unsuccessful attacks on Sherman's flanks and rear, while the Union forces were gradually surrounding the city, and on September 1st, after a month and a half of fighting, evacuated the place. He next moved upon Nashville, but was here defeated by Thomas, who had been sent by Sherman to cut him off. For two months Sherman remained in Atlanta, which he had converted into a purely military station, and made further preparations for his march to Savannah. He had considerable difficulty in persuading Grant and the administration to sanction the attempt, but at last gained their consent, and after cutting telegraphic communication to prevent a countermand, which would otherwise have been sent him, started on his "march to the sea" with seventy thousand men. His army moved in two columns, along the line of the Georgia Central railroad, living on the country, and on December 21st, after having defeated the enemy at Fort McAllister, entered Savannah. After a month here he began to move northward, to the support of Grant, being unsuccessfully opposed by General Johnston, who, upon the news of the surrender of Lee, immediately sent to him to obtain terms of peace. Sherman gave him the same terms that Grant gave to Lee, which were considered too lenient by the Secretary of War, and Grant was sent South to complete negotiations. This gave rise to some hard feeling between Sherman and the War Department, but Sherman submitted. After the war, Sherman was in

command of the Division of the Mississippi for four years, being appointed, in 1866, lieutenant-general. When Grant, in 1869, became President, Sherman was raised to the rank of general, with headquarters in Washington. In 1871-72 he made a professional tour in Europe, and was placed on the retired list, Feb. 8, 1884. General Sherman was one of the most popular generals of the Civil War, and had an influence over his soldiers which was unsurpassed by that of any of his fellow-commanders. His *Memoirs* (published in 1875 and revised in 1886) show that he possessed an unusually keen knowledge of men and affairs. He constantly refused political preferment. He died in New York City, Feb. 14, 1891.

SHERRY. See WINE, Vol. XXIV, p. 607.

SHERWOOD FOREST. See NOTTINGHAM, Vol. XVII, pp. 597-599.

SHETLAND ISLES. See ORKNEY AND SHETLAND, Vol. XVII, pp. 845-848.

SHEVCHENKO, TARAS GREGOROVICH (1814-61). See RUSSIA, Vol. XXI, p. 110.

SHIELD. See HERALDRY, Vol. XI, pp. 685, 686.

SHIELD, HYDRAULIC. See HYDRAULIC MACHINERY, in these Supplements.

SHIELDS, CHARLES WOODRUFF, an American theologian; born April 4, 1825; graduated at Princeton College in 1844, and at the Princeton Theological Seminary in 1848. He was pastor of a Presbyterian church at Hempstead, Long Island (1849-50), and in Philadelphia (1850-65). In the latter year the chair of the harmony of science and revealed religion, the first of its kind in the country, was founded for him at Princeton. His aim is to establish and teach a philosophy of religion. Among his publications are *The Presbyterian Book of Common Prayer According to the Revision of the Westminster Divines* (1864); *Liturgia Expurgata* (1864); *Philosophica Ultima* (1877); *Religion and Science in Their Relation to Philosophy* (1891); *The Historic Episcopate* (1894); and *The Question of Unity* (1894).

SHIITES. See SUNNITES, Vol. XXII, pp. 663, 664.

SHIKOKU. See JAPAN, Vol. XIII, pp. 569 et seq.

SHILLABER, BENJAMIN PENHALLOW, an American humorist, known by his pen-name, "Mrs. Partington"; born in Portsmouth, New Hampshire, July 12, 1814. He worked as printer in his native state, in South America and in Boston; became an editor of the *Boston Post* in 1847; of the *Pathfinder* and of the *Carpet Bag* in 1850; of the *Post* again in 1853; of the *Saturday Evening Gazette* in 1856; published *Rhymes with Reason and Without; Poems; Life and Sayings of Mrs. Partington; Knitting-Work; Partingtonian Patchwork; Ike and His Friends; and Wide Swath*. He died Nov. 25, 1890.

SHILLING, an English coin in value one-twentieth of a pound sterling, containing 87.27 grains of silver. It is worth, in United States money, 24.3 cents. The shilling was also a common coin in the American colonies before the Revolution. The first shilling coined in America was minted at Boston, and known as the "New England shilling." Later followed the "Willow Tree," "Oak Tree" and

"Pine Tree,"—coins weighing 72 grains, which would be worth, in United States money to-day, 18¼ cents. The Maryland shillings were made in London, and had a value of 16.73 cents. In 1790 the New England and Virginia shillings were worth one sixth of a Mexican dollar; the New York and North Carolina shilling, one eighth of a dollar; the shillings of South Carolina and Georgia, three fourteenths; those of New Jersey, Pennsylvania, Maryland and Delaware, two fifteenths.

SHILOH. See PITTSBURG LANDING, in these Supplements.

SHIMODA. See JAPAN, Vol. XIII, pp. 571, 574.

SHIMONOSEKI OR AKAMAGASEKI, a town and port on the southwest point of the main island of Japan, commanding the straits of Shimonoseki, which separate the ken of Yamaguchi from the island of Kiushiu. The port, in 1864, was bombarded by the allied fleets of the English, French, Dutch and Americans in retaliation for injuries inflicted upon foreign ships passing through the straits. The entrance to the straits in 1872 was provided with four lighthouses. The treaty of Shimonoseki between China and Japan was concluded here, April 17, 1895. Population 1893, 33,725.

SHING-KING, a province. See CHINA, Vol. V, p. 641.

SHINGLES, a disease. See SKIN DISEASES, Vol. XXII, p. 123.

SHINTO, a religion. See JAPAN, Vol. XIII, p. 581.

SHIP-CANALS. See CANALS, Vol. IV, pp. 787, 794; and CANALS, in these Supplements.

SHIP-MONEY. See FINANCE, Vol. IX, pp. 179, 180.

SHIPPEN, EDWARD, an American jurist; born in Philadelphia, Feb. 16, 1729. He studied law in Philadelphia, and in the Middle Temple, London; was appointed judge of the Vice-Admiralty in 1752; prothonotary of the supreme court of the province in 1762; member of the provincial council in 1770. During the American Revolution he sympathized with the British, and consequently was put under parole not to aid them. In 1784 he was appointed president judge of the court of common pleas; in 1791 associate justice of the supreme court; chief justice of Pennsylvania (1799). He was a trustee of Pennsylvania University from 1791 until his death, in Philadelphia, April 16, 1826.

SHIPPENSBURG, a borough of Cumberland County, southern Pennsylvania (laid out by Edward Shippen in 1734), 41 miles W. of Harrisburg and 11½ miles N.E. of Chambersburg, on the Cumberland Valley, Philadelphia and Reading and Western Maryland railroads. It is in an agricultural and iron-ore producing region, has water-works, gas and electric lights, is the seat of the Cumberland Valley State Normal School, and manufactures clothing, hosiery, furniture, flour, carriages and fly-nets. Shippensburg was a frontier post in the colonial days, the first county courts sat here, and during the French and Indian war it was the headquarters of General Braddock's army. Population 1890, 2,188; 1900, 3,228.

SHIPPING, UNITED STATES LAWS ON. Congress has complete power to regulate commerce with foreign nations and among the states, which includes the right to determine what shall constitute an American vessel, to prescribe the rules and regulations which shall govern navigation and otherwise regulate all classes of foreign or interstate commerce. Many laws have been enacted upon the subject of navigation with the view to protect and encourage American shippers. Under the statute, every United States vessel engaged upon a foreign voyage must have with her, from the proper officers of her home port, a register to declare her nationality wherever she may be found, and every such vessel which is engaged in domestic commerce shall have an enrollment so that she may assert her nationality and may procure a coasting-license. Only such vessels as are built within the United States and belong wholly to United States citizens, and vessels which have been captured in war and condemned by a prize court, or which may be deemed forfeited for violation of United States laws, shall be entitled to registration as United States vessels. Vessels which have been wrecked upon the United States coast, and which have been purchased and repaired by citizens thereof, the costs of repairing amounting to three fourths of the cost of the vessel, may, under certain circumstances, be registered as a vessel of the United States. A vessel must be registered at its home port, which shall be the port at which it was built until after its first voyage, and thereafter at the port at or nearest which its owner resides, or if there be more than one owner, then at the port of the managing owner. Such port shall continue as its place of registration until a change of the owner's residence. A vessel shall not be registered at two ports at the same time. The registration of a vessel is procured upon a declaration under oath, giving the name of the vessel, her burden and destination, and upon a bond from the owner or husband of the vessel conditioned that the certificate of registry shall not be used for any other vessel. If the registry is obtained by false affidavit, or the condition of the bond is broken, the vessel is liable to forfeiture. The enrollment of a vessel for domestic commerce is procured in a similar manner. The certificate of registry or enrollment is evidence of the vessel's seaworthiness at the time she left port, the port from which she sailed, who is her master, insurance carried, and her nationality.

A license may be issued to vessels to carry on a coasting-trade, but the vessel must engage in the business for which she is licensed, and no other. A steam-vessel must apply annually for inspection of boilers and hull, to determine whether she is seaworthy; and if a passenger-vessel, she must carry life-preservers, and a certificate from the inspectors stating the number of passengers which she may carry. Severe penalties are provided for violation of these provisions. Vessels may be owned in common or in partnership, and the control of the ship will be subject to the same rights as other partnership property. The majority of part owners may employ a vessel in such manner as they choose, but if they do not employ it, then the minority may do so. If the minority

owners oppose an intended voyage, they may exact a bond from those who start the vessel upon the voyage, securing their interests in her. The owners of a vessel, as well as the master and the vessel, are liable for the expense of repairs. The owners are liable as common carriers for their own acts and the acts of their agents, but are not liable when they have no interest in the voyage, as when they have chartered the vessel to another, who makes the voyage upon his own responsibility. If the owner or the person who employs the vessel agrees to have the cargo insured, and neglects to do so, he is liable for loss thereof. They are also liable for loss of the cargo from theft, embezzlement, destruction by the master or crew, or by third persons, although not guilty of fraud or neglect. Part owners of a vessel are not responsible for the cargo, unless they are interested in the voyage. The liability of the owners of a vessel for loss of cargo has been limited by statute to the value of the vessel, unless the loss occurred through their own personal fault, and in case the vessel is lost their liability ends. See also NAVIGATION, Vol. XVII, p. 277; and SEAMEN, Vol. XXI, pp. 608, 609.

*SHIPPING ON THE GREAT LAKES. The chain of Great Lakes that lie in the heart of the North American continent, if designed for the purpose, could not have been placed to better advantage for the expansion of inland commerce. There is not a state north of the Ohio River and east of the Rocky Mountains in which bulky commodities do not feel the effects of the cheap transportation afforded by the lakes, and even states immediately south of that river, such as Kentucky, Tennessee, Alabama and Georgia, which are large producers of coal and iron, are forced to meet the conditions which lake transportation has brought to the iron and steel trade.

While the Great Lakes from their first discovery served as routes from the East to the West, it was not until a third of the nineteenth century had slipped away that anything approaching a permanent system of carrying Western products to the East was attempted. The first cargo of grain from Lake Michigan reached Buffalo about 1836, while the first vessel from the Lower Lakes to reach Chicago was in 1834. From that year down to the present time the development of this trade has been remarkable.

By an act of Congress passed in 1890 the Federal government pledged itself to the deepening of all the channels on the Great Lakes, so that boats drawing twenty feet of water can traverse them with safety. At the close of navigation in 1896 this work had been so far completed that a depth of 16½ feet was available throughout all the channels of the lake system and most of its harbors.

TRAFFIC. Owing to the fact that no accurate statistics have been, or can be, kept of the commerce passing to and from Lakes Huron and Michigan to Lake Erie, it is impossible to adequately present figures showing the immensity of this traffic, and its growth year by year. Estimates, however, have been made of the commerce passing through the Detroit River, and this comprises probably eighty per cent of the total commerce carried on the lakes.

As long ago as 1889, according to an estimate published by George H. Ely, the entire freight passing through the Detroit River was more than three times the foreign trade of the port of New York; it exceeded the aggregate foreign trade of all the seaports of the United States by ten million tons, and by over three million tons the total foreign and coastwise trade of Liverpool and London combined.

From the table compiled by L. E. Cooley of Chicago, and not including Canadian traffic:

YEAR.	TONS.
1883-----	17,695,174
1886-----	18,968,065
1891-----	23,209,619
1892-----	26,563,819
1893-----	23,091,889
1894-----	24,000,000
1895-----	30,000,000

With the commerce passing to and from Lake Superior, however, accurate statistics have been kept since 1855 by the United States officers in charge of the canal at Sault Ste. Marie. (See CANAL, in these Supplements.) The early commerce of the Great Lakes principally comprised the farm products of the West, with return cargoes consisting of coal, manufactured iron products and merchandise incidental to the building up of a new country.

The early commerce of Lake Superior, however, consisted principally of the copper ore from the famous Calumet and Hecla mines, and iron ore from the Marquette Range, in the upper peninsula of Michigan, and the same return cargoes as were sent to Lake Michigan. The bulk of the commerce of the Great Lakes has always been carried from the West to the East, consequently much higher rates have been obtained for cargoes going that way than for cargoes going westward.

The discovery and development of the Gogebic Iron Range in upper Michigan, and the Vermillion and Mesaba ranges in Minnesota, have made iron ore the controlling factor, of late years, in the regulation of transportation charges on the Great Lakes, and average rates are high or low as the demand for these ores varies. The ore traffic probably constitutes 35 per cent of the total traffic of the Great Lakes. An idea of its value can be gained from the

YEAR.	LAKE SUPERIOR REGION.	TOTAL FOR UNITED STATES.	PERCENTAGE OF LAKE SUPERIOR REGION.
	Long Tons.	Long Tons.	
1890-----	8,944,031	16,036,043	55.8
1891-----	7,621,465	14,591,178	52.2
1892-----	9,564,388	16,296,866	58.7
1893-----	6,594,618	11,587,629	56.9
1894-----	7,692,548	11,879,679	64.8
1895-----	10,300,000	16,000,000	64.4

From the opening of the "Soo" canal in 1855 down to and including 1878, the total amount of iron ore shipped from the Lake Superior region was 11,588,000 tons. Nearly the same amount was carried during the year 1895, and with the close of navigation in 1896 there has been shipped from this region a total of 110,000,000 tons of iron ore. As the supply seems practically inexhaustible, and the demand ever-increasing, there is no reason to believe the output will again fall below an annual production of 10,000,000 tons. The value of the total ore shipments at Lower Lake ports approximates \$500,000,000.

The grain traffic is an item of no small proportions.

The following table gives the receipts of grain (flour included as wheat) at Buffalo:

	BUSHEL.
1836-----	500,000
1846-----	6,500,000
1856-----	20,000,000
1866-----	52,000,000
1886-----	72,000,000
1891-----	164,500,000
1892-----	182,000,000
1893-----	189,000,000
1894-----	161,000,000
1895-----	164,000,000
1896 (estimated)-----	200,000,000

Of late years a considerable quantity of this grain traffic has been diverted to other Lake Erie ports, and there has always been more or less carried to Lake Ontario ports, or through to Montreal.

To illustrate the variety and comparative value of the products carried on the Great Lakes, the following table is compiled from the official reports of the officers of the "Soo" canal:

ITEMS.	1889	1891	1893	1895
Coal, hard and soft-----	\$5,702,190	\$8,776,362	\$10,528,420	\$6,993,361.25
Flour-----	11,143,535	18,900,715	29,682,696	33,383,632.50
Grain, other than wheat-----	2,090,580	1,011,462	1,346,993	4,164,347.00
Manufactured iron-----	1,577,250	2,128,000	2,852,300	3,683,150.00
Pig-iron-----	442,272	462,077	550,902	346,788.00
Salt-----	168,250	234,528	228,730	202,439.25
Copper-----	6,691,200	13,838,000	17,506,000	21,490,400.00
Iron ore-----	14,335,492	12,460,744	14,050,946	22,332,318.93
Lumber-----	5,679,972	6,593,490	10,593,810	8,888,400.00
Silver ore and bullion-----	914,589	266,211	379,861	11,200.00
Building-stone-----	335,380	440,800	194,260	238,760.00
Unclassified freight-----	18,744,600	25,025,580	24,910,800	27,798,480.00
Totals-----	\$67,825,310	\$90,137,969	\$112,825,718	\$129,533,276.93

following table, showing the production of the Lake Superior region as compared with the total production of the United States.

To one not familiar with figures of this kind they may not convey an adequate idea of their import, but when presented in comparison with

the Suez canal some idea can be gained of what they mean to the people of the United States. The official reports of the officers in charge of the Suez canal furnish the following comparative table:

YEAR.	SAULT TONNAGE.	SUEZ TONNAGE.
1855-----	100,000	-----
1865-----	400,000	-----
1875-----	1,250,000	2,000,000
1880-----	1,750,000	3,000,000
1885-----	3,250,000	6,350,000
1890-----	9,000,000	6,850,000
1892-----	11,200,000	7,700,000
1894-----	13,200,000	8,000,000
1895-----	16,806,000	8,450,000

NOTE.—The "Soo" canal is open to navigation during a season of about 225 days, while the Suez canal is open during the full year.

Let us now contrast lake with railroad transportation. There is probably no railroad in the country that carries freight for a less cost per ton per mile than the Lake Shore and Michigan Southern railway. The average cost for the past ten years on this road has been 4.35 mills as against 1.39 mills by lake. It will be noticed by reference to the following table, giving these figures in detail by years, that while the cost by rail has practically not varied during the entire period of ten years, the cost by lake has been reduced by over one half, and it is difficult to conceive of any improvements in railroad transportation which will make possible the profitable carrying of freight at anything like lake figures.

	IN VESSELS PASSING THROUGH ST. MARY'S FALLS CANAL.		ON LAKE SHORE & MICHIGAN SOUTHERN RAILWAY.	
	Tons Moved One Mile.	Cost per Ton per Mile.	Tons Moved One Mile.	Cost per Ton per Mile.
		Mills.		Mills.
1887-----	4,458,000,000	2.3	1,844,000,000	4.18
1888-----	5,173,000,000	1.5	1,799,000,000	4.30
1889-----	5,940,000,000	1.5	1,859,000,000	4.79
1890-----	7,207,000,000	1.3	2,157,000,000	4.58
1891-----	7,292,000,000	1.35	2,169,000,000	4.56
1892-----	9,222,000,000	1.31	2,435,000,000	4.36
1893-----	8,980,000,000	1.01	2,428,000,000	4.61
1894-----	10,927,000,000	.99	2,196,000,000	4.06
1895-----	12,505,000,000	1.14	2,476,000,000	4.10

VESSELS. Remarkable as has been the increase in commerce of the Great Lakes, the improvements in the vessels in which it has been carried are still more striking. The sailing-vessels of early days have been largely replaced by steamers, and those that remain are often found following in the wake of a steamer at the end of a tow-line. The practice of taking one or two barges or sailing-vessels behind the steamer is still quite common. Early in the decade of 1880-90 the iron steamer of 2,500 to 3,000 gross tons burden first appeared, and at that time it was thought to be the most that could be expected in the way of improving and cheapening lake transportation.

During the latter part of the decade, however, a new type of vessel, known as the "McDougall whale-

back," was put on the lakes, and sanguine movers of freight thought that they would eventually drive every other style of craft out of the business—an expectation hardly realized thus far. The principle involved was a reduced first cost per ton of capacity and estimated lower cost of operation, because of the fact that two or three barges with a small complement of men were to be towed behind a steamer of this construction. All of these ideas have not been found to work out in every-day practice, but that this style of boat is successful is shown by the fact that there are some forty of them on the lakes at the present time, and that new and larger ones were built in 1896, one of which will probably prove to be the equal in carrying-capacity of any vessel now on the lakes.

About the time of the appearance of the whale-back, the size of the regular or old style of vessel began to increase. These new boats are from 300 to 325 feet long, carry from 3,000 to 3,500 tons, and their number on the lakes is large. The success of these vessels suggested the idea that the growing trade of the lakes demanded still larger boats, but they perhaps would not have been built were it not for the fact that the Federal government had committed itself to a twenty-foot waterway throughout the entire lakes system. The present perfection of lake craft, as regards style and economy, is embodied in the newer and larger boats which have lately been built, and which are of a length running from 400 to 425 feet and a breadth or beam of 46 to 50 feet and designed to carry 7,000 tons when loaded to a full depth of 20 feet.

The total number of vessels on the Great Lakes on June 30, 1895, was 3,342, of a capacity of 1,241,459 gross tons, and in the following year there was probably put afloat a total capacity of 200,000 gross tons.

PASSENGER TRAFFIC. This form of business on the Great Lakes only recently received much attention. It is true that there always were lines of passenger-boats and a constant improvement in the facilities afforded by them, both as regard number and frequency of trips and character of the boats themselves. The traffic, however, has been largely confined to people living in towns and cities on or contiguous to the Great Lakes.

In 1892, the Northern Steamship Company of Duluth, Minnesota, undertook the building of two passenger-boats which in everything but size would equal anything afloat. The first one, the *North West*, was launched in the fall of 1893, and started on her route between Buffalo and Duluth in the spring of 1894. She was followed a year later by her sister ship, the *North Land*, and that they have been a success, and that this route is destined to furnish one of the greatest pleasure outings to be had on this continent, can be gained by a glance at the passenger traffic statistics of the "Soo" canal before and since the inauguration of the line.

CHARLES H. THORNTON.

SHIPPING-ARTICLES. See SEAMEN, Vol. XXI, pp. 605-608.

SHIP'S HUSBAND OR SHIP'S AGENT, an

agent appointed by the owner of the vessel to manage the vessel, attend to its equipment, see that proper repairs are made and that it receives the proper care while in port. He is usually interested as part owner of the vessel, but need not be so.

SHIP'S MAGNETISM. See *Variation*, under NAVIGATION, Vol. XVII, pp. 274, 275.

SHIPS OF WAR. See NAVY, Vol. XVII, pp. 284-289; and in these Supplements.

SHIP-WORM. See TEREDO, Vol. XXIII, pp. 184, 185.

SHIPWRECK. See WRECK, Vol. XXIV, pp. 686-688.

SHIRAS, GEORGE, an American jurist; born in Pittsburg, Pennsylvania, Jan. 26, 1832. He graduated at Yale College in 1853; studied at the Yale Law School and was admitted to the bar in Pittsburg, where he practiced for many years with considerable success, being concerned in many important and noted law suits. In 1892, he was appointed one of the associate justices of the supreme court of the United States, to succeed Joseph P. Bradley.



JUDGE SHIRAS.

He had taken no active part in politics, other than as a Presidential elector in Pennsylvania, in 1888.

SHIRÉ RIVER. See ZAMBESI, Vol. XXIV, p. 765.

SHIRLAW, WALTER, an American painter; born in Paisley, Scotland, Aug. 6, 1838. His parents brought him to America in 1840. He followed for some time the occupation of bank-note engraving, but later took up painting. In 1868 he was elected a member of the Chicago Academy of Design. Two years later he went to Munich, where he spent seven years (1870-77) in study. His first work of importance was the *Toning of the Bell* (1874), which was followed by *Sheep-Shearing in the Bavarian Highlands* (1876). The latter painting received honorable mention at the Paris exhibition of 1878. Other notable works of his are *Good Morning*, now in the Buffalo Academy; *Indian Girl*; *Very Old*; *Gossip* (1884); and *Jalousy* (1886), owned by the New York Academy of Design. On his return from Europe he took charge of the Art Students' League, New York, and for several years taught in the composition class. In 1888 he was elected a member of the National Academy.

SHIRLEY, WILLIAM, a colonial governor of Massachusetts; born in Preston, Sussex, England, in 1693. He studied law in England, and came, in 1734, to Boston, Massachusetts, where he practiced his profession. He was employed as commissioner in settling the boundary between Massachusetts and Rhode Island. In 1741 he was appointed royal governor of Massachusetts. He planned the successful expedition against Cape Breton in 1745 in which Louisburg was captured. Afterward he went to England, and was a commissioner at Paris, in 1750, to settle the northeastern boundary of New

England. In 1755, when the war with France was renewed, he was made commander-in-chief of all the British forces in North America. In 1756, General Abercrombie superseded Shirley, who was, however, made lieutenant-general in 1759, and afterward governor in the Bahamas. In 1770 he returned to Massachusetts, where he built a spacious mansion at Roxbury. He published *Electra*, a tragedy; *Siege of Louisburg*; and *Conduct of General William Shirley Briefly Stated*. He died in Roxbury, Massachusetts, March 24, 1771.

SHIRWA, a lake. See AFRICA, Vol. I, p. 256.

SHISDRA OR JISDRA, a town of central European Russia, in the government of Kaluga, 97 miles S.W. of Kaluga, on the Shisdra, a branch of the Oka, near a railway extending to Maltsov's works at Drita. It manufactures woolen cloth, and has glass-works, iron-works, tanneries and oil factories. Population, 11,703.

SHISHAK OR SHESHONK I. See EGYPT, Vol. VII, p. 742.

SHITTIM-WOOD, a sort of wood used, according to the Old Testament account, to build the Tabernacle. The species referred to is probably the *Acacia seyal*. The wood is hard and close-grained, and orange-brown in color.

SHOA. See ABYSSINIA, Vol. I, p. 64.

SHOCK. See SURGERY, Vol. XXII, pp. 680, 681.

SHODDY. See WOOL, Vol. XXIV, p. 661.

SHOEBILL. See STORK, Vol. XXII, pp. 577, 578.

SHOEBURYNNESS. See ARMY, Vol. II, p. 586.

SHOGUN. See JAPAN, Vol. XIII, pp. 582, 583.

SHOMER. See ARABIA, Vol. II, pp. 239, 259.

SHOOTING STARS. See METEOR, Vol. XVI, pp. 107-114.

SHORE, SIR JOHN. See INDIA, Vol. XII, p. 804.

SHORTHORNS. See AGRICULTURE, Vol. I, p. 387, 388.

SHORTHOUSE, JOHN HENRY, an English novelist; born in Birmingham in 1834. His novel, *John Inglesant*, a story of the times of Charles I, which was first printed privately, and published in 1881, gained him recognition at once. The book has a strong religious motive, and is refined in style. Among his other works are *The Platonism of Wordsworth* (1881); *The Little Schoolmaster Mark, a Spiritual Romance* (1885); *Sir Percival* (1886); *A Teacher of the Violin, and Other Tales*; and *The Countess Eve* (1888); and *Blanche, Lady Falaise* (1891).

SHOSHONE, a village and the capital of Lincoln County, southern Idaho, 145 miles S.E. of Boise City, on the Union Pacific railroad. It is the center of a stock-raising district, and has railway car-shops employing about two hundred men. Population 1900, 685.

SHOSHONE OR SNAKE INDIANS, a tribe of North American Indians. See INDIANS, Vol. XII, pp. 827, 832.

SHOSHONE FALLS. See UNITED STATES, Vol. XXIII, p. 808.

SHOT. See AMMUNITION, Vol. I, p. 745.

SHOTTERY, a village in Warwickshire, England, noted as the residence of Shakespeare's wife, Ann Hathaway. In 1892 "Ann Hathaway's cottage," the farm-house in which she is supposed to have lived, was bought for the nation.

SHRAPNEL. See AMMUNITION, Vol. I, pp. 744-45; and GUNNERY, in these Supplements.

SHREVE, a post village in Wayne Co., Ohio, in a farming district, 9 miles S. S. W. of Wooster; has 3 churches, a graded school, a newspaper office, a bank, and sash and blind factories. Population 1890, 1,012; 1900, 1,043.

SHREVE, HENRY MILLER, an American inventor; born in Burlington County, New Jersey, Oct. 21, 1785. He became interested in navigation and trade on the Western rivers, and was the first American to establish a carrying trade down the Mississippi to New Orleans. During the War of 1812 he carried supplies past the British batteries to Fort St. Philip by protecting his vessel with cotton bales. In 1815 he ascended the Mississippi to Louisville in the steamboat *Enterprise*, the first steamer that ever made the trip. Later he constructed the steamer *Washington*, which contained some improvements on Fulton's boats, principally in the saving of fuel. Fulton brought suit against him to establish his "right to navigate all vessels propelled by fire and steam" on the rivers of that territory, but lost his case. In 1826 Shreve was appointed superintendent of Western river improvements, and as such removed the snags and sawyers from the channel of the Red River for 160 miles. In order to remove obstructions from the Ohio he built the snag-boat *Heliopolis* in 1829. Died in St. Louis, Mo., March 6, 1854.

SHREVEPORT, a city, the capital of Caddo Parish, extreme northwestern Louisiana. It has communication with outside points by the Houston and Shreveport, St. Louis South-Western, Texas and Pacific, and Vicksburg, Shreveport and Pacific railroads; and, in addition to its large trade in cotton, has developed manufactures and a considerable trade in cattle. The city has numerous churches and schools, water-works, gas and electric lights, electric street-railways, several public buildings of note, including the Opera House, Board of Trade and Cotton Exchange, State Charity Hospital, and United States Marine Hospital; two national banks, with combined capital of \$300,000; incorporated bank, capitalized at \$150,000; private bank, three daily and four weekly newspapers. Its industries include cotton-compresses and gins, cottonseed-oil mill, lumber-mills, machine-shops, and ice factories. Pop. 1890, 11,979; 1900, 16,013.

SHREW-MOLE (*Scalops*), a genus of insectivorous mammalia, of the family *Talpidae*, very nearly allied to the moles. There are six incisors, two canine teeth, eight false molars, and six true molars in each jaw. The ear is destitute of auricle; the eyes are very small, and much concealed; the feet are five-toed, the forefeet large, as in the mole. The whole figure, and also the habits, resemble those of the mole. There are several species, all natives of North America.

SHREWSBURY, a post village in Worcester Co., Mass., 6 miles N. E. of Worcester; has 2 churches,

an academy; and manufactures tinware, boots, etc. Pop. 1890, 1,449; 1900, 1,626.

SHUBRA, a town in Egypt, on the right bank of the Nile, 4 miles N. of Cairo. Population 1882, 6,769.

SHUBRICK, WILLIAM BRANFORD, an American naval officer; born on Bull's Island, South Carolina, Oct. 31, 1790. He entered the navy as midshipman in 1806; attained the rank of lieutenant and commanded a gunboat in the defense of the navy-yard at Gosport in 1813; became third lieutenant on the *Constitution* in the same year; was commissioned captain in 1831; was in chief command of the naval force in the Pacific during the Mexican War; chairman of the Lighthouse Board in 1854-58; commanded a fleet in the expedition against Paraguay in 1858, and obtained reparation from that country for firing on the United States steamer *Water Witch*, the act which led to the sending of the fleet; retired in 1861, but remained chairman of the Lighthouse Board (1860-70). Died in Washington, D. C., May 27, 1874.

SHUFELDT, ROBERT WILSON, an American naval officer; born at Red Hook, Dutchess County, New York, Feb. 21, 1822. Entering the navy as midshipman in 1839, he had risen to the rank of lieutenant in 1854, when he resigned from the navy and became chief officer of the Collins line of Liverpool steamers. During the first part of the Civil War he was United States consul-general at Havana. In April, 1863, he was reinstated in the navy, with the commission of commander. He commanded the steamship *Conemaugh* in the blockade of Charleston, South Carolina, and took part in the engagements on Morris Island. In 1864-66 he commanded the steamer *Proteus*, of the eastern Gulf blockading squadron. On Dec. 31, 1869, he was commissioned captain, and commanded the monitor *Miantonomoh* in 1870, after which he had charge of the Tehuantepec and Nicaraguan surveying expeditions of 1870-71. In 1876 he became commodore. In 1879-80 he sailed to Africa and the East Indies to see and report as to the best means of reviving American trade with those countries. In 1883 he was made rear-admiral, and he retired in 1884. Died in Washington, D. C., Nov. 7, 1895.

SHULLSBURG, a city of Lafayette County, south-southwestern Wisconsin, 136 miles W. S. W. of Milwaukee and 24 miles E. N. E. of Dubuque, Iowa, on the Chicago, Milwaukee and St. Paul railroad; has 4 churches, a high school, banks, 2 newspaper offices, a grist-mill, and 2 smelting furnaces; and is an important shipping-point for cattle, hogs, grain, and butter. Lead and iron are found in the vicinity. Population 1890, 1,393; 1900, 1,250.

SHUMAGIN ISLANDS, a small archipelago in the northern Pacific Ocean, south of the peninsula of Alaska, from which it is separated by the Unga Straits. The larger islands of the group are Unga, Nagai, Korovin, Big and Little Koniushi, and Simeonof, on the first-named of which is the only settlement of any importance. The islands have a combined area of about six hundred square miles, are mountainous with little vegetation, and have numer-

ous streams abounding in salmon. The deeply indented islands furnish excellent harbors, and not far distant are good cod-banks. Lignite has been found on the island of Unga.

SIAM. Since the article in Vol. XXI, pp. 850-56, was written, Siam has been compelled to surrender to France about 110,000 square miles of her territory. The Siamese considered their eastern boundary to be the crest of a range forming the watershed on the east of the Mekong river. In April, 1893, the French governor of Indo-China sent troops to take possession of Stung Treng, on the left bank of the river, some miles north of the Cambodia line, and of the island of Khong, higher up the stream, asserting that the French had established posts there nine years before. Khong was invested by some Laotians, who, in turn, were driven away by fresh detachments of the French. M. Groscurin, a French inspector of militia, with some soldiers followed them across the river, and was shot by a mandarin, while his escort was killed. Notwithstanding the explanation of Siam that the inspector began an attack on the Siamese and was killed in open fight, gunboats were sent to Bangkok, firing on the Paknam forts as they went on to demand reparation. In July, an ultimatum was sent to the palace, requiring the payment of an indemnity for the killing of the inspector and his men, and an abandonment of the territory east of the Mekong. On the submission of Siam to these proposals, the French found a pretext for increasing their demands. They blockaded Bangkok and forced the King to new terms. On Oct. 2 a treaty was signed, under which Siam surrendered all the territory east of the Mekong and the Nam On rivers, agreed to build no forts within a strip 25 kilometers wide on the west bank of the Mekong, gave France the right of establishing stations on that bank, conceded special privileges of travel and of creating new consulates, and consented to pay a heavy indemnity for alleged previous aggressions. Thus Siam was stripped of a third of her territory.

In April, 1893, King Chulalongkorn opened the first railway in Siam, a narrow gauge, 14 miles long, from Bangkok to Paknam. Its capital was only \$165,000, of which the King contributed half. The line, in 1897, was completed to Korat, 165 miles N.E. of the capital, being worked regularly to Hinlap, 98 miles from Bangkok. Concessions for other roads have been obtained, and surveys are in progress, especially for a road across the Malay Peninsula, beginning at Sengora, on the Gulf. In 1898 there were 1,820 miles of telegraph in the kingdom. Bangkok has an electric street-railway, and Western ideas are making perceptible progress.

In 1895 the council of the state was superseded by a decree creating a legislative council, consisting of 43 members, appointed by the crown. It has legislative functions, and may promulgate laws with royal assent when the King is disabled. By an agreement of France and Great Britain, made in Jan., 1896, the integrity of Siam is guaranteed. The population of Siam before the French cessions was estimated at about 8,000,000, of whom 2,500,000 were Siamese, 2,000,000 Laotians, 1,000,000 Chinese,

and 1,000,000 Malays. In 1896 it was computed at 5,000,000. Bangkok, the capital, has over 250,000.

SIAMESE TWINS, THE. A pair of male human beings joined together by a partly fleshy and partly cartilaginous band attached to the epigastric region of each body, between the breastbone and the abdomen. They were named Chang (left) and Eng (right); and were born at Bangesau, Siam, April, 15, 1811, of a Chinese father and a Chino-Siamese mother. The connecting band was at first about 2 inches long above, and 4 inches below, but in course of time it became stretched till it was 8 or 9 inches in length; from above downward it measured 3 inches, and its greatest thickness was 1½ inches. The band was covered with skin, beneath which was normal subcutaneous and muscular tissue, portions of the muscles of one crossing those of the other. In the interior were prolongations of the two peritoneums. The two livers were close to the band, and were connected by small blood-vessels which were covered with a thin layer of liver tissue. There had been but one umbilicus, which had been attached to the middle of the under side of the band. When the middle point of the band was touched, both felt it; but when the band was touched on either side of the middle point, only the individual on that side felt it. The twins performed their physical functions separately, and differed greatly in appearance, size, strength, and disposition, Chang being considerably larger and stronger, and also irritable and intemperate, while Eng was patient and sober. Though they were thus two distinct beings, they nevertheless appeared most frequently to think, move, and act as one individual. Both twins desired that they should be separated by a surgical operation, but eminent European surgeons decided that such an operation would prove fatal. They were bought from their mother at Meklong, in Siam, and were brought to this country by Captain Coffin and Mr. Hunter in 1829, and were exhibited here and in Europe for about 25 years. In 1842 they married two sisters, and Chang had six children, and Eng five. Two of the children were deaf and dumb; the rest were in all respects normal. Owing to domestic quarrels, however, two houses were found necessary for the wives, the twins occupying each house alternately week and week about. Having accumulated a fortune of about \$80,000, they settled down as farmers, near Mount Airy, N. C., under the names of Chang and Eng Bunker. During the Civil War they lost most of their property, which consisted partly of slaves; and they again made an exhibition tour of Europe, appearing in London in 1869. In Aug., 1870, Chang had a paralytic stroke, but partially recovered. He died suddenly near Mount Airy, N. C., Jan. 17, 1874, while Eng was asleep; and Eng died from the shock 2½ hours later. Their two widows and eight children survived them.

SIBERIAN RAILROAD. See **ASIA**, in these Supplements, p. 265.

SIBILANTS. See "S," Vol. XXI, p. 120.

SIBLEY, a town, the capital of Osceola Co., Iowa, on the Burlington, Cedar Rapids and North-

ern and the Chicago, St. Paul, Minneapolis and Omaha railroads, 74 miles N.N.E. of Sioux City, in a farming and stock-raising district; is an important trade and shipping center. Pop. 1890, 1,090; 1900, 1,289.

SIBLEY, HENRY HASTINGS, soldier; born in Detroit, Mich., Feb. 20, 1811. After graduating at Detroit Academy and studying law, he became clerk to the sutler at Sault Ste. Marie, and later was a purchasing agent of John Jacob Astor's fur company, in which he acquired an interest in 1834. In 1849-53 he was the delegate in Congress from Minnesota territory, in 1857 a member of the constitutional convention, and on the admission of the territory as a state in 1858, was elected its first governor as a Democrat. In 1862 he commanded successfully the expedition against the Sioux, and was made brigadier-general and afterward brevet major-general. After serving a term in the state legislature in 1871, he retired to St. Paul, and became a regent of the State University, president of the State Normal School Board, and member of the U. S. Board of Indian Commissioners. Died in St. Paul, Minn., Feb. 18, 1891.

SIBLEY, HENRY HOPKINS, soldier; born in Natchitoches, La., May 25, 1816. After graduating from the United States Military Academy in 1838, he served in the Florida wars of 1838-39 and 1840-41, and took part in most of the important engagements of the Mexican War, from Vera Cruz to the capture of Mexico, receiving the brevet of major for gallantry at Vera Cruz. In the interval between the Mexican and Civil wars, he took part in several expeditions, among them the Utah expedition and the one against the Navajos. At the outbreak of the Civil War he entered the Confederate army, obtaining the rank of brigadier-general. Most of his operations were carried on in the Southwest, where he attempted the conquest of New Mexico. In 1869-73 he was brigadier-general under the Khedive of Egypt. Died in Fredericksburg, Va., Aug. 23, 1886.

SIBLEY, HIRAM, an American financier; born in North Adams, Mass., Feb. 6, 1807. In early life he was engaged in the shoemaking trade and manufacture of machinery, but was interested in telegraphy, and when the latter became an established fact, he and some other business men bought up the smaller lines and merged them into the Western Union Telegraph Co. In the face of powerful opposition he carried through Congress a bill securing a line to the Pacific Coast, and spent \$3,000,000 in the construction of a telegraph line to Asia by way of Bering Strait, but gave up the enterprise on the successful laying of the Atlantic cable. His attention was also given to railway-building, salt and lumber manufacturing, and seed-raising. He was a liberal giver to public and private charities, and founded Sibley College of Mechanic Arts of Cornell University, and Sibley Hall of Rochester University. Died in Rochester, N. Y., July 12, 1888.

SICILIAN VESPERS, the uprising of the Sicilians against the French usurper, March 30, 1282. See **CHARLES, COUNT OF ANJOU**, Vol. V. pp. 422-23.

SICILIES, THE TWO, the island and lower duchies of Italy, one kingdom from the accession of Roger I in 1131 to the conquest by Garibaldi in 1860. See **SICILY**, Vol. XXII, pp. 26-29.

SICKLES, DANIEL EDGAR, soldier; born in New York city, Oct. 20, 1823; was educated at the University of the City of New York; studied law, and was admitted to the bar in 1844. He became a member of the state legislature in 1847, city attorney of New York in 1853, and secretary of the American Legation in London in the same year. In 1855 he was sent to the state senate, and in 1857 and 1859 was elected to Con-



GENERAL D. E. SICKLES.

gress. On Feb. 27, 1859, he shot and killed Philip Barton Key for criminal relations with Mrs. Sickles, but, after a trial which lasted twenty days, was acquitted of the charge of murder. At the outbreak of the Civil War he entered the Union army as commander of the Excelsior Brigade, and was conspicuous for gallantry in the various battles of the Peninsular campaign, and at Antietam, Fredericksburg, Chancellorsville, and Gettysburg, where he lost a leg. In 1865-67 he was commander of the second military district, with headquarters at Columbia, S. C., whence, in 1867, he was removed by President Johnson. In 1866 he was appointed to the colonelcy of the Forty-second Infantry, and his gallantry at Fredericksburg was recognized by his promotion to major-general the following year. He was retired in May, 1869, with the rank of major-general, and was made minister to Spain one month later. He resigned in 1873, returned to New York city, and shortly after became president of the state board of civil service commissioners. In 1887 he was appointed commissioner of emigration, and in 1890, sheriff of the county of New York. He was elected to the Fifty-third Congress in 1892, and in the Presidential campaign of 1896 stumped the country in the interest of sound money.

SIDEREAL OR STELLAR SYSTEM. See **ASTRONOMY**, Vol. II, pp. 818-22.

SIDEREAL TIME. See **ASTRONOMY**, Vol. II, pp. 765-66; and **TIME**, Vol. XXIII, p. 392.

SIDERITE. See **GEOLOGY**, Vol. X, p. 228.

SIDGWICK, HENRY, an English author; born in Skipton, Yorkshire, May 31, 1838; educated at Rugby and Trinity College, Cambridge; in 1859 became fellow and lecturer at Trinity College; in 1875, reader in moral science, and in 1883 Knightsbridge professor of moral philosophy. He published *The Methods of Ethics* (1874, 3d edition 1884); *Principles of Political Economy* (1883, new edition 1887); *The Scope and Method of Economic Science*, British Association address (1885); *Outlines of the History of Ethics for English Readers*, enlarged from article in the **ENCYCLOPÆDIA BRITANNICA** (1888); *Elements of Politics* (1891); *Practical Ethics* (1898); and several articles, including

the article ETHICS, in this ENCYCLOPÆDIA. He took a prominent part in the foundation and management of Newnham College, for the higher education for women. Died Aug. 18, 1900.

SIDMOUTH, VISCOUNT, a British statesman. See ADDINGTON, HENRY, Vol. I, pp. 145-46.

SIDNEY, a town, the capital of Cheyenne Co., Neb., 102 miles E. of Cheyenne, Wyo. It is the center and supply-point of an agricultural and stock-raising region. A roundhouse and railroad repair shops are located here. Pop. 1900, 1,001.

SIDNEY, a village, the capital of Shelby Co., Ohio, on the Miami and Erie canal, 40 miles N. of Dayton, picturesquely situated on the west side of the Miami river, which furnishes good water-power; is the center of an agricultural region; has a high school, public library, one daily and four weekly papers, flour-mills, planing-mill, foundry, and machine-shops, and manufactures agricultural implements, etc. Pop. 1890, 4,850; 1900, 5,688.

SIDNEY, MARGARET, pseudonym of LOTHROP, HARRIET MULFORD; q. v., in these Supplements.

SIEMENS, ERNST WERNER, BARON, a German physicist and inventor; born in Lenthe, Hanover,

Dec. 13, 1816; educated at the Lübeck Gymnasium, and in the School of Artillery and Engineering at Berlin; joined the Prussian artillery in 1834, and having passed through the military schools, gained the rank of lieutenant in 1837. While holding this appointment he applied himself with great zeal to the study of practical chemistry and the physical sciences, and invented electroplating, the differential governor,

and the electric automatic recording telegraph. As member of a commission of the Prussian general staff for the introduction of electric in place of optical telegraphs, he proposed, in 1847, the use of subterranean conductors insulated by gutta-percha; and he executed successfully experimental lines coated with gutta-percha by means of a press invented by himself, which is still used in the manufacture of cables. With these insulated wires he succeeded, in 1848, with Professor Himly, in laying the first submarine mines with electric ignition, for the protection of the harbor of Kiel from the Danish fleet. In the same year he constructed the first great telegraph line in Germany, between Berlin and Frankfort-on-Main; and in 1849 the subterranean line between Berlin and Cologne. He left the government service in 1850, and devoted himself to scientific studies and private enterprises. In 1847 he had already laid the foundation of the telegraph works carried on afterward under the firm name of Siemens and Halske, in Berlin, which were destined to become one of the chief centers for the application of electricity to the industrial arts. Its world-wide reputation led him to open branch works in London and St. Petersburg.

Among his many achievements must be men-

tioned the invention and practical application of the quicksilver unit (Siemens unit), by means of which exact and comparative measurements became possible for the first time; the development of methods for testing underground and submarine cables and determining the position of faults; the invention of polarized relays; the so-called Siemens armature; the dynamo-electric machine, the principle of which he published first at the meeting of the Berlin Academy of Sciences on Jan. 17, 1867; the electric railway; the pneumatic dispatch-tube system; and the Siemens alcoholimeter, for registering the quantity of absolute alcohol contained in any alcoholic liquid passing through the instrument. He was ennobled by Emperor Frederick III, and received many other honors, including the degree of doctor from the University of Heidelberg and a membership in the Berlin Academy of Sciences. His lectures and papers have been published in the transactions of different learned and scientific societies and in various periodicals, including *Sitzungsberichte der Königlichen Preussischen Academie der Wissenschaften zu Berlin*; *Poggendorff's Annalen der Physik und Chemie*; and *Dingler's Polytechnisches Journal*. A collection of these lectures and papers was published under the title *Gesammelte Abhandlungen und Vorträge* (Berlin, 1881). Died in Berlin, Dec. 6, 1892.—For his brother, SIR WILLIAM (CARL WILHELM), see Vol. XXII, pp. 37-38.

SIEMENS-HALSKE PROCESS. See GOLD AND GOLD-MINING, in these Supplements.

SIEMERING, RUDOLF, a German sculptor; born in Königsberg in 1835. He executed a memorial of Albert the Great, and later a sitting-figure of King William I for the Berlin Exchange. In 1877 he erected at Marienburg a statue of Frederick the Great. His greatest work is the *Luther Memorial*, which was unveiled at Eisleben, Saxony, on Nov. 10, 1883, the 400th anniversary of the reformer's birth. The statue represents Luther in the act of burning the Pope's bull. Four bronze reliefs exhibit other incidents from the life of the reformer. He also made a memorial of the siege of Leipsic.

SIENKIEWICZ, HENRYK, a Polish novelist; born at Vola Okrzejska, in Lithuania, in 1846, and educated at the University of Warsaw. In 1876 he went with a company, including Madame Modjeska, to California, with the intention of founding an ideal Polish community. While in America he wrote letters on the Far West to Polish papers. On the failure of the colony he returned to Poland and devoted himself to a literary career, in which he achieved remarkable success. His works include psychological novels and historical romances inspired by patriotic sentiments, most of which have been translated into English by Jeremiah Curtin. He wrote *No Man Is a Prophet in His Own Country* (1872); *Yanko the Musician; With Fire and Sword* (1884); *The Deluge* (1886); *Bartek Victorious* (1886); *Pan Michael* (1888); *Without Dogma* (1890), translated by Iza Young; *Children of the Soil* (1895); and *Quo Vadis? A Narrative of the Time of Nero* (1895).

SIENNA. See PIGMENTS, Vol. XIX, p. 87.

SIERRA LEONE, a crown colony of Great Britain. (See SIERRA LEONE, Vol. XXII, pp. 44-45.)



BARON SIEMENS.

The district including Sierra Leone had, in 1891, an area of 15,000 square miles and a population of 180,000, while Sierra Leone had an area of 4,000 square miles and a population of 74,835, of whom 224 were whites. Freetown, the greatest seaport of West Africa, is the chief town, the headquarters of her Majesty's forces in West Africa, a second-class imperial coaling-station, and had, in 1891, a population of 30,033. In 1893 there were 85 elementary and six high schools, with an attendance of 10,500, and Fourah Bay College, affiliated to the University of Durham. The colony is administered by a governor, assisted by executive and legislative councils, in addition to which there is a supreme court, and in each district petty debt and police courts. The soil of the colony is fertile, producing fruits and all tropical plants, but the climate, especially in the wet season, is hot and unhealthful. The rainfall for the season at Freetown, amounts to 110 inches, of which two thirds fall in July, August and September. The chief products and exports are palm oil and kernels, benne-seed, ground-nuts, kola-nuts, India rubber, copal and hides, amounting, in 1894, to about \$2,130,000. The imports, which consist chiefly of cotton goods, spirits and tobacco, were valued, in 1894, at about \$1,190,000. Owing to the activity of the French in the neighboring colonies, trade in Sierra Leone has diminished within recent years.

SIERRA MADRE, a name given to central portions of the great chain of Cordilleras, or Rocky Mountains, in Mexico from lat 19° to 25° N., and in New Mexico to the great western range from lat. 34° to 38° N. The eastern declivity is gentle, but on the Pacific side the descent is abrupt, marked by precipices, steep slopes and magnificent scenery. Few of the peaks exceed ten thousand feet in height. These ranges contain some of the richest silver-mines in the world.

SIERRA MORENA. See SPAIN, Vol. XXII, p. 294; and GAVILIAN, in these Supplements.

SIERRA NEVADA. See CALIFORNIA, Vol. IV, p. 697.

SIERRA NEVADA. See SPAIN, Vol. XXII, p. 294.

SIEVERS, GEORG EDUARD, a German philologist; born in Lippoldsbuurg, Prussia, Nov. 25, 1850. He was educated at Leipsic and Berlin, and was professor of philology, successively, at Jena (1871-83), Tübingen (1883-87), Halle (1887-92), and Leipsic (1892). He published several editions of old songs or fables, such as *Tatian lateinisch und altddeutsch* (1872); *Das Hildebrandslied, die Merseburger Zaubersprüche und das Fränkische Taufgelöbniß* (1872); *Der Heliand und die Angelsächsische Genesis* (1875). Among his original works are *Paradigmen zur Deutschen Grammatik* (1874); *Angelsächsische Grammatik* (1881); *Allgermanische Metrik* (1892).

SIEVE-VESSELS, a characteristic member of the woody-tissue plants, and found in the bast region. They are long articulated tubes, rich in protoplasm and proteid substances, and communi-

cating with each other by perforated plates (sieve-plates), usually in the side walls, sometimes in the end walls. They are prominent in the distribution of proteid material.

SIGEL, FRANZ, an American soldier; born in Sinsheim, Baden, Nov. 18, 1824. After graduating from the military school at Carlsruhe, he killed a man in a duel while an adjutant under the Grand Duke of Baden. He resigned, with the intention of studying law, but becoming involved in the revolution of 1848, he had to flee the country. In 1849 he returned to engage in another insurrection, and became minister of war and chief commander of the revolutionary forces. On the overthrow of the provisional government, he fled to Switzerland, but being expelled from that country in 1851, he went to England, where he remained two years and then embarked for the United States. He taught mathematics in New York and became a professor in a German college in St. Louis; entered the army as colonel in 1861, and served with great distinction throughout the Civil War, rising to the rank of major-general; became registrar of New York City in 1871, and was United States pension agent for New York from 1886 to 1889.

SIGHT. See EVE, Vol. VIII, pp. 816, et seq. and SENSE-ORGANS, in these Supplements.

SIGILLARIA. See WAX FIGURES, Vol. XXIV, p. 460.

SIGISMUND, the name of three kings of Poland. See POLAND, Vol. XIX, pp. 290, 291, 293, 294.

SIGN. See *Zodiac*, under ASTRONOMY, Vol. II, p. 771.

SIGNALING. See TELEGRAPH, Vol. XXIII, p. 112.

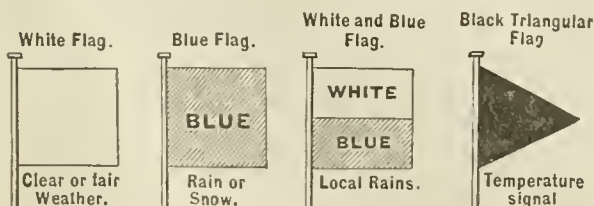
SIGNAL SERVICE, UNITED STATES. There are three systems of signaling authorized by acts of Congress, and they pertain to the army, the navy, and the Weather Bureau.

Army Signals. The value of a systematic use of signals was early recognized in this country. In 1860, Congress, made an appropriation for apparatus and equipments for field-signaling, and to have charge of them an officer was added to the staff of the army, with the rank of major. The position was first given to Albert J. Myer, who was the originator of a system which proved to be a great advance upon the crude methods formerly in use. Shortly after the opening of the Civil War, a camp was established at Georgetown, District of Columbia, where instructions were given to signal parties that were to be sent out with the armies in the field. In 1863 the signal corps began a separate existence, under a chief with the rank of colonel. At the close of the war the corps was reorganized; and when Congress fixed the peace establishment in 1866, provision was made for a chief signal-officer with the rank of colonel, but the only provision for a corps was a detail of six officers and not to exceed one hundred men from the engineer battalion. To the signal corps, a meteorological division was added in 1870, and the work of this division was the most important of the duties of the corps until July 1,

1891, when the Weather Bureau was transferred from the War to the Agricultural Department. According to the act of July 1, 1891, the signal corps consists of a chief officer with the rank of brigadier-general, a major, four captains, four first lieutenants, and an enlisted force of fifty sergeants. A school of instruction for military signaling is provided for at Fort Riley, Kansas. Instruction, during a course of six months, is given in the general principles of signaling, requiring a thorough knowledge of all the codes, including those of the United States navy. Cryptography is taught, and instruction given in electricity, topography, photography, and in the practical use of the various sorts of apparatus with which the corps is supplied, consisting of flags, the heliograph, the field-telegraph and telephone trains, used by day, and the torch, lantern, rockets, bombs and searchlight, employed at night. The code in use for visual signaling is based upon the Morse system of dots and dashes.

Naval Signals. For a general discussion of this subject, see SIGNALS, NAVAL, Vol. XXII, pp. 49, 50. The *General Signal-Book* and *Fleet Drill-Book* contain the United States code of day and night signals. The *Signal-Book* includes a large list of words and sentences, together with a list of geographical places, while the *Drill-Book* deals with the tactics and formation of a fleet or squadron. In order to signal a message from one ship to another, it is only necessary, since every vessel in the navy has a set of these books, to indicate the volume and number in that volume corresponding to the message to be transmitted. For night-signaling, the system of Lieut. E. W. Very of the United States navy is in use. According to it, fire-balls or stars are shot into the air, only two colors, red and green, being used, and with these any desired signal may be made. Electric lights are also employed for long-distance signaling, and searchlights are used for signaling a ship below the horizon, by reflecting the light on a cloud.

Weather-Signals. The United States Weather Bureau, an account of which is given under METEOROLOGY, in these Supplements, has perfected a system of publishing warnings and forecasts by means of signals. This system is illustrated below because of its utility throughout the land. In thousands of cities, towns and villages, flags were displayed upon the receipt of the forecasts telegraphed from Washington or other distributing centers. The weather and temperature forecasts are indicated by the following flags and their combinations:

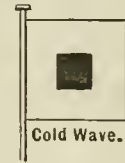


The temperature forecast is shown by placing the black triangular flag above the weather-flag

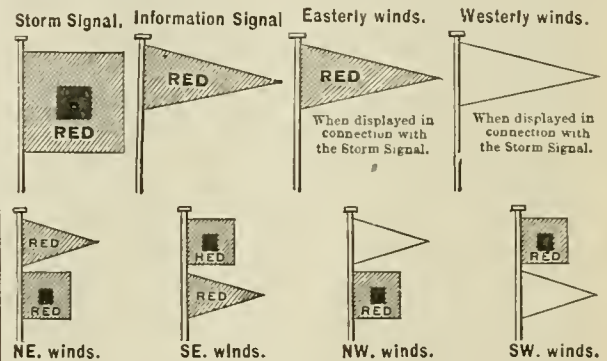
when higher temperature is forecasted, and below the weather-flag when lower temperature is predicted.

The approach of a cold wave is announced by the display of a white flag with a black center. This signal is also employed, in the growing season, to give warning of approaching frost.

White flag with black square in center.



On the Great Lakes and the sea-coasts the following signals are displayed in anticipation of dangerous winds:



[At night, red and white lanterns replace flags.]

When storms of exceptional violence are indicated, a double hoist of the storm-signal is made, and a special system of "emergency warnings" is employed. This system provides for warnings by telegraph to all postmasters in the threatened district, and has enlisted the co-operation of the revenue marine and other government services in giving widespread distribution to the warnings by means of rockets, steam-whistles and other signals which have been provided for use on such occasions.

A most important medium for the distribution of the forecasts and warnings is furnished by the press associations. The daily newspapers of the country give prominent notice to weather items of interest, and the millions of newspaper-readers in the larger cities receive daily and twice daily the latest weather information at the disposal of the bureau officials.

SIGNATURES. See ALCHEMY, Vol. I, p. 461.

SIGN LANGUAGE. See DEAF AND DUMB, Vol. VII, pp. 7, 8.

SIGOURNEY, a city and the capital of Keokuk County, northeastern Iowa, 25 miles E. of Oskaloosa and 75 miles N.W. of Burlington, on the Skunk River, and on the Chicago, Rock Island and Pacific and the Chicago, Milwaukee and St. Paul railroads. It is the center of a region rich in coal, building-stone, brick-clay and timber; is an important shipping-point and has manufactures of flour, woolens, cheese, iron, lumber

and buggies. Population 1890, 1,523; 1900, 1,952.

SIGOURNEY, LYDIA (HUNTLEY), an American authoress, born in Norwich, Conn., Sept. 1, 1791. For five years she taught a select class of young ladies at Hartford, and in 1819 she married Charles Sigourney, a Hartford merchant of literary and artistic tastes, and thenceforth devoted her leisure hours to literature. In her posthumous *Letters of Life* (1866) she enumerated 46 distinct works she had written, besides over 2,000 articles in prose and verse that she had contributed to 300 periodicals. Many of her books attained a wide circulation, both in the United States and in England. She died in Hartford, June 10, 1865.

SIGSBEE, CHARLES DWIGHT, American naval officer; born in Albany, N. Y., Jan. 16, 1845; graduated at the Naval Academy in 1863; and rose to the rank of captain March 21, 1897. He was on the *Brooklyn* in the battle of Mobile Bay, Aug. 5, 1864; and was later engaged in the Fort Fisher expeditions of 1864 and 1865. After the conclusion of peace he served on the *Wyoming*, *Ashuelot*, *Severn*, *Worcester*, and *Canandaigua*; and com-



CHARLES D. SIGSBEE.

manded the training-ships *Dale*, *Constellation*, and *Portsmouth*, and the famous corvette *Kearsarge*. He was long identified with the work of the hydrographic office and coast survey, commanding the *Blake* in extensive deep-sea explorations, especially in the Gulf of Mexico, the deepest area of which is named Sigsbee Deep. In connection with this work he invented instruments and methods which brought him many rewards and honors. He was several times assigned to duty at the naval academy, during one term of which he organized the school of mechanical drawing. He was an artist and writer of some ability, and sometimes employed his talent in caricature and humorous sketches for the press. On April 10, 1897, he was assigned to the command of the battleship *Maine*, which was destroyed by an explosion in Havana harbor on the night of February 15, 1898, a disaster which resulted in the loss of 266 lives and materially hastened the outbreak of the war with Spain. Captain Sigsbee was the last man to leave the wreck of his ship, and he was indefatigable in the subsequent labors attending the naval court of inquiry and the task of raising part of the wreck. This induced some breakdown in health; but soon after the outbreak of war he was appointed to command the auxiliary cruiser *St. Paul*. On June 22, soon after the *St. Paul* arrived off San Juan, Porto Rico, the Spanish cruiser *Isabella II* endeavored to draw the American ship under the guns of the forts, and manoeuvred so as to mask the movements of the torpedo-boat destroyer *Terror*, which came out under cover of the *Isabella's* gunfire and smoke, and headed for the *St. Paul*, with intent to destroy her with a torpedo. At 6,000 yards' distance Captain Sigsbee poured such a hail of shot into the destroyer that she sank before she

could be assisted back into the harbor. After the conclusion of peace Captain Sigsbee was assigned to the command of the *Texas*.

SIKHS AND SIKH WARS. See INDIA, Vol. XII, pp. 808-10.

SILICATE COTTON OR MINERAL WOOL. See IRON, Vol. XXIII, p. 307.

SILICIDE OF CARBON OR CARBIDE OF SILICON (CSi), a compound of carbon and silicon, formed by the action of carbon on silica or on silicon at very high temperatures, such as exist in the electric furnace. When pure, it forms colorless crystals, but it is usually green, from the presence of iron. It is very stable, and as it is one of the hardest substances known, it is manufactured on a large scale, especially at Niagara Falls, and, under the name of carborundum, used instead of emery.

SILICON. See CHEMISTRY, Vol. V, p. 521.

SILK-COTTON AND VEGETABLE SILK. See FIBRES, TEXTILE, Vol. IX, pp. 131-33.

SILK-MANUFACTURE IN THE UNITED STATES. Under SILK, Vol. XXII, pp. 63-72, will be found some notice of the early phases of the silk industry, and a general discussion of sericulture. But so rapid has been the growth of the industry in the United States since 1880 that it deserves special mention.

Silk-Culture. Numerous attempts to introduce silk-culture on a commercial basis in the United States have thus far been unsuccessful. In the early part of the seventeenth century bounties were offered to induce the Virginia colonists to plant mulberry trees and raise cocoons. In Georgia the production in 1759 reached 10,000 lbs., but the industry declined after the Revolution. About 1785 a Connecticut governor introduced into his family textiles made from home-grown silk from which a commencement-gown was made for President Stiles, of Yale. In 1825 silk-culture received a new impulse. A mania for silk-culture arose in the Eastern States. Peter S. Duponceau opened a reeling-establishment at Philadelphia, urged upon Congress the benefits to be derived from proper legislation, and under the stimulus of high protective duties brought the interest to a fair degree of prosperity; but the reduction of duties in 1833, the crisis of 1837, and a wild speculation which collapsed in 1839, were disastrous to it.

In California the culture was begun in 1854, was encouraged by state bounties in 1865-66, and later fostered by the Agricultural Department. The Centennial Exposition of 1876 awakened new interest in the subject, and an association was formed to induce persons to enter upon the raising of cocoons. In Kansas silk-culture was encouraged by both State and Federal aid; but in all these cases the production was small and the results were unsatisfactory.

Raw Material. Raw and waste silks to the value of \$11,448,178 were imported into the United States in 1881, and in 1890 the amount reached \$24,325,531. These are the figures of the Bureau of Statistics, and do not include transportation charges or Japanese export duties. The increase is greater than the value would indicate, owing to the decline in price from 1880 to 1890. The countries from which the largest importations are made are

Japan, China and Europe, in the order named, the first furnishing about one half of the entire supply. The tendency has been steadily toward an increased use of finer grades of raw silk, due to the better quality of goods manufactured.

Manufacture. In its early stages, the manufacture of silk was a household industry, but in 1810, a mill, run by water and equipped with a single spinning-frame, was started at Mansfield, Connecticut, and in 1815 the Horstmann Company began operations at Philadelphia with the production of trimmings and military goods partly or wholly of silk. The Cheney family, father and sons, began the manufacture of spun silk in 1850, at South Manchester, Connecticut, and about the same time John Ryle became superintendent of a little silk-mill at Paterson, New Jersey, which he later purchased and enlarged, at first engaging in the manufacture of sewing-silk, the production of which had been greatly stimulated by the invention and introduction of the sewing-machine. He later built a number of looms for silk piece-goods, the first to be operated successfully in America, and since then the industry has developed so extensively, that Paterson became known as the "Lyons of America," having a silk-ribbon mill, which, in 1896, was the largest of its kind in the world. Until 1861, the manufacturers were unaided by a protective tariff of any sort, but with the high duties of the Civil War there was a great increase in output and diversification of product of the silk-mills.

The growth of the silk industry can best be appreciated by a glance at some of the figures bearing upon it. The reports for 1850 show the value of sewing-silk, which was the principal output, to have been \$1,209,426, while the value of all other silk products was but \$600,050. In 1860, of the silk goods consumed in this country, but 13 per cent were manufactured here; in 1870, 23 per cent; in 1880, 38 per cent, and in 1890, 65 per cent, or \$69,154,599 out of a total consumption of \$105,920,689. The more important lines of manufacture include a variety of products, sewing-silk and machine-twist being the earliest and among the most important. Fringe, knitting, embroidery and floss silks are produced by the manufacturers of spun silk, machine-twist and sewing-silks, and the product has been developed largely since 1880. Broad silks include such textiles as dress-goods, satins, tailors' linings, tie-silks and scarfs, millinery goods, etc.

The production of ribbons stands second to that of broad silks, and during the decade from 1880 to 1890 there was a very rapid increase in output, the value for the latter year being almost three times that for the former. Some other products deserving of mention are handkerchiefs, laces, braids and bindings, velvets and plushes, upholstery goods, trimmings, and hosiery and knit goods.

Owing to changes in classification, a comparison of tables of production for 1880 and 1890 cannot be satisfactory. The following is a table of values of finished goods for the year 1890:

Machine-twist and sewing-silk	\$7,068,213
Fringe, knitting, embroidery, floss-silk	1,849,631
Broad silks	21,042,526
Handkerchiefs, ribbons, laces	19,256,421
Braids and bindings	2,771,382
Velvets and plushes	3,141,026
Upholstery goods	7,630,541
Dress and cloak trimmings	4,493,757
Military trimmings	232,600
Hosiery and knit goods	1,156,172
Other products	602,330
Total	\$69,154,599

In addition to the pure manufacture of silk, connected with it we have the "thrown silk," and "dyeing and finishing" industries, each deserving a special mention.

Thrown Silk. Raw silk as reeled from the cocoon differs from the fiber or filament forming the material for other textiles, in that while it is necessary to spin the latter down to a thread of sufficient fineness to weave, it becomes necessary in the use of raw silk to twist or "throw" it together, in order to make a thread coarse enough to weave. Hence those engaged in this preparatory process are known as "throwsters," and the warp and weft produced by them being known respectively as "organzine" and "tram." Silk material is thus twice included in reports,—when it appears, first, as raw silk in the returns of a "throwster," and secondly, as "thrown silk," reported as raw material in the returns of a weaver. The value of silk products thus twice included in the census of 1890 was \$15,537,520.

Dyeing and Finishing. Engaged in the industry of dyeing and finishing silks, in 1892, were 52 establishments, employing 1,745 hands, and paying \$1,013,325 in wages. An interesting fact in connection with these establishments is the fact, that although there was an increase in all the expenses in 1890 as compared with 1880, yet the returns show that the value of the work done decreased. Dyers and finishers explained this decrease as being due to the fact that competition and improved processes had materially reduced charges for work, and besides, owing to the manufacturers turning out a superior article, it is not necessary to use as large a quantity of chemicals and dyestuffs as formerly.

Labor and Wages. The returns show that the average number of employees in 1890 was 50,913, while in 1880 it was 31,337,—an increase of 19,576, or 12.47 per cent.

Notwithstanding the growth of the industry, the decrease in the number of children employed is very noticeable, due largely to the stringent laws which have been enacted in several states regulating the employment of children in factories.

The total amount paid in wages in 1890 was \$19,680,318, as against \$9,146,705 in 1880,—an increase of \$10,533,613, or 115.16 per cent. Although the increase in the number of employees during the decade from 1880 to 1890 was large, and the decline in prices for the output was estimated to average 25 per cent, yet the per capita wages rose from an average of \$262 in 1880 to \$387 in 1890. The average of hours of daily labor was from 9.17

in Ohio to 10.25 in Rhode Island; and the weekly earnings of skilled labor for men were from \$8.96 in Ohio to \$13.12 in California; for women, \$3.93 in Maryland to \$6.39 in New Jersey; for children, \$3.10 in Rhode Island to \$4.70 in California.

Number and Distribution of Establishments. The census of 1880 reported 382 establishments engaged in the silk industry in that year, while the reports for 1890 gave 472,—an increase of 90, or 23.56 per cent. The figures for 1880 include some establishments engaged exclusively in silk dyeing and finishing, none of which are included in the returns for 1890.

Silk-manufacturing concerns were, in 1890, located in 18 states, those having a production in excess of \$1,000,000 being New Jersey, \$16,809,927; New York, \$11,165,918; Pennsylvania, \$9,362,063; Connecticut, \$9,037,032; Massachusetts, \$3,352,296.

In 1872, at Paterson, New Jersey, the manufacturers of silk organized the "Silk Association of America," with headquarters in New York City.

Machinery. The period from 1880 to 1890 was marked by a decrease in the employment of hand-looms. In 1880 the total number of looms employed for both broad and narrow goods was 8,474, of which 3,153 were hand and 5,321 were power looms, while in 1890, out of an aggregate of 22,569 looms, 1,747 were hand and 20,822 were power looms.

The following tabular statement shows the increase in the number of spindles of the various kinds employed in 1890 over 1880, together with percentages of such increase:

SPINDLES.	1890	1880	INCREASE. PER CENT.
Winding, cleaning and doubling-----	369,035	164,218	124.72
Spinning and twisting-----	718,360	262,312	173.86
Braiding-----	167,403	81,607	105.13
Totals-----	1,254,798	508,137	146.94

The improvement from 1880 to 1890 in machinery and appliances employed in silk-manufacture was very great, among the most important being the adaptation of the swivel-loom attachment to the power-loom, by means of which swivel or embroidered effects are produced even more satisfactorily than was formerly achieved by the hand-loom, which had been regarded as the only loom on which swivel-work could be done, and with a capacity of production many times greater than the latter. The speed of spinning-frames has been accelerated, the standard for spindles now being 10,000 revolutions per minute the "first time over" and 7,500 the "second time over."

Artificial Silk. In closing this article it will be of interest to note the discovery of a chemical process for silk-production by Dr. Frederick Lehner of Zurich, Switzerland. The process consists in adding to alcohol ether solution dilute sulphuric acid, which breaks down the nitrates, leaving a yellowish fluid, which on cooling can be drawn out into fine threads. The threads, how-

ever, in this condition, retain their nitrate characteristics, and are almost as inflammable as gun-cotton. They are therefore submitted to a process of denitration, in which, by the use of ammonium sulphide, the nitric acid is all neutralized. Artificial silk-manufacture, however, can only be said to be in an experimental stage.

Another process is that devised by Chardonnet, at Reims, France. The materials used are wood, which is worked into a paste; nitric and sulphuric acids, and ether and alcohol. The wood paste is dipped in the acids, dried and then placed in a bath of ether and alcohol at 90°. The result is a kind of glue which is subjected to high pressure in metal cylinders, and run into pipes of the size of ordinary gas-pipe. These pipes are laid horizontally, after the manner of footlight-pipes in theaters, having numerous small faucets at regular intervals. The opening of one of these faucets permits an extremely fine thread to emerge from a glass tube. These threads are twisted together, rendered incombustible, and the acid neutralized. The "silk" is then ready for spinning.

SILKWEED, one of the common names of species of the genus *Asclepias* (q.v., in these Supplements), more commonly called milkweeds.

SILKWORM. See SILK, Vol. XXII, pp. 57, 58.

SILL, EDWARD ROLAND, an American poet; born in Windsor, Connecticut, April 29, 1841. He graduated at Yale in 1861, and until 1866 traveled for his health in California. He then returned to the East, and after studying theology for a time, taught school in Ohio, and did literary work in New York until 1871, when he went again to California, becoming principal of the Oakland High School, and in 1874 professor of the English language and literature at the University of California, where he remained until 1882, when he removed to Cuyahoga Falls, Ohio. He wrote *The Hermitage, and Other Poems* (1867), a collection of verses termed by the author a "booklet"; and *The Venus of Milo, and Other Poems* (1883). He died in Cleveland, Ohio, Feb. 27, 1887.

SILOAM. See JERUSALEM, Vol. XIII, p. 638.

SILPHIUM, a genus of plants belonging to the family *Compositæ*, whose species, commonly known as rosin-weeds, are among the characteristic plants of the prairie flora of the United States. They are tall plants, with large coarse leaves, and mostly large heads of yellow flowers. The most famous species is *S. laciniatum*, the compass-plant.

SILURES. See HEREFORD, Vol. XI, p. 730.

SILURIAN PERIOD. See GEOLOGY, Vol. X, pp. 331-340.

SILVER AND SILVER-MINING.—*Distribution.* Until about thirty years ago there was no large production of silver, aside from that which occurred in the native state, or nearly pure, and the world's supply was, principally from South America and Mexico; but since then, and chiefly within the two decades just past, discoveries of silver in combinations with other minerals, together with the elaboration of methods of mining and extraction, have brought about results even

more revolutionary, perhaps, than in the case of gold.

The larger part of this development has been in the United States; and the first great impetus came from the discovery of the Comstock lode in Nevada, which was a nearly perpendicular vein of decomposed quartz carrying both gold and silver in native form, as well as in combinations with iron, sulphur and other elements. The Comstock has produced great bodies of such sulphide ores as silver-glance and stephanite, the former of which contains 87 per cent and the latter 68 per cent of pure silver. This is a true fissure vein, the most frequently found of all silver-bearing formations. For occurrence and precipitation of silver as well as gold in veins, see GOLD, in these Supplements.

The marvelous extent and richness of the Comstock mine stimulated a search, which has resulted in the location of many veins and deposits of silver, and which differ widely in their character and formation.

Perhaps the most important and foremost of the greater discoveries is that of the Leadville mines. As the occurrence of silver in a formation like that of Leadville was wholly foreign to experience, it is not strange that its discovery was accidental. The mineral there is found in nearly horizontal deposits of soft carbonate of lead mingled with oxides of iron and manganese. Granite forms the basis of the hills, and is covered with sedimentary limestones and shales, with a top-covering of overflow or intrusive porphyry. The ore is usually found lying upon the limestone, and underneath the porphyry, often in successive alternate layers. There is but one noteworthy instance of similar deposits, which occur at Aspen, in the same state (Colorado). They are of lesser extent.

Next in importance are the silver-lead or galena deposits. These are, in the great majority of cases, but not always, in veins of quartz intersecting porphyritic or metamorphic rocks. The ore (galena) is a steely-blue sulphide of lead, more or less mingled with iron or copper pyrites, and carries silver in varying proportions. These veins have a wider distribution and are more frequently found than any. Perhaps the most important are the mines of the San Juan district of Colorado, the Cœur d'Alène in Idaho, and Granite Mountain in Montana. The copper-silver mines, the most important of which are at Anaconda, Montana, are quite as worthy of mention as those already given. These are essentially copper-mines, but their enormous output and percentage of silver render them of consequence as silver-producers. The nature of the ore is chiefly sulphides and oxides of copper, carrying both silver and gold, with a remarkable proportion of copper.

At Eureka, Nevada, the ore is a rich chloride of silver in iron gangue; but the most notable chlorides are those of the Lake Valley mines at Kingston, New Mexico. A party of prospectors found, several years ago, some detached brown boulders upon the surface of the ground near the head of Lake Valley. Upon investigation they

proved to be iron-stained chloride of silver, so rich and massive that fragments could only be removed by cutting, as they flattened under the hammer. A very slight fire caused the silver to fall in drops. For years the veins eluded search, but they were found at length, and their richness may be judged from the statement that \$500,000 was taken from a space no greater than the size of an ordinary room. This ore is also in iron gangue. The history of silver-mining shows that in the larger number of cases the ore-bodies of high grade and purity are less apt to be continuous than the sulphides and carbonates of moderate richness, although there are exceptions to the rule. At the Beaver mine, near Port Arthur, on the north shore of Lake Superior, the ore is found in the Cambrian shales (virtually the oldest of all sedimentary rocks), at the point of contact with a greenstone or diorite trap, which has overflowed and covered up the underlying shales. The vein-stuff consists of a pink talc and fluor-spar, with quartz, and contains native silver, silver-glance, zinc-blende and iron pyrites. The gangue matter is a fluor-silicate of magnesia. For a brief period this mine was regarded as a wonder. It produced masses of silver as great as 300 pounds in a single lump, and ore that ran \$8,000 to the ton, but was worked out and considered practically worthless in two or three years. About fifty miles from the Beaver, out in the lake, the Silver Islet mine produced a large amount of pure silver from a formation very similar, and the workings, which were carried below and underneath the lake (Superior), were regarded as indicating still greater richness, when they were hopelessly drowned out. There are mines in Central and South America, however, which have produced nearly pure silver for 200 years, and are still very rich. A solid mass of silver was found in Peru weighing 800 pounds.

Production. The output of silver in the United States in 1895 was 41,238,764 ounces fine, having a commercial value, at 63.3 cents per ounce, of \$26,928,712. This is a decline of 7,608,111 ounces from the amount produced in 1894. Leadville produced over \$5,000,000, and the entire output of the Leadville mines in 1895, including gold, lead and copper, was \$8,522,082. The Mexican silver product for 1895, according to the returns of the Mexican treasurer, was, in Mexican dollars, \$47,652,223. The commercial value of this output (outside of Mexico) would be but a little more than one half this amount. In 1893 the silver output of the entire world, figured at its commercial value, was \$134,241,121. In 1894, at the same valuation, it was \$105,429,034. The figures for 1895 are not yet accessible, but the amount of production will show a still further falling off, and the best authorities state that it is certain to decline for a number of years. This decline is, of course, mainly owing to the depreciation in the market price of silver, as the mines of the world are in condition to produce more than ever before, if worked at full capacity.

Mining The problems yet to be solved in

mining and extracting silver are similar to those in the case of gold, but intensified by the difference in value. Although the mining of silver is conducted in the same manner as gold-mining, and is susceptible to the same progressive influences, the race between them is somewhat unequal just now, when it comes to the extraction of the metals. The tendency is becoming very general to extract the gold right at home (virtually at the mouth of the mine) by processes comparatively inexpensive; but nearly all silver ores have to be smelted, and as it is impracticable to smelt the larger number of them at home, they must be transported to a smelting-plant which buys and treats many ores of different varieties and qualities. It is not only a question of fuel, but of fluxes; in other words, a matter of chemistry. In mixing different varieties, one ore may furnish flux for another of very different character. At Leadville the conditions have been simple from the beginning, and it is one of the rare instances where such is the case. The lead carbonates are remarkably pure argentiferous ores, and so "free-milling" that they may be said to be practically self-sufficient. The fluxes are limestone and hematite, and the fuels used are coke and charcoal, and all are easily obtained, so that the converting is about as simple a process as that of iron ore in a blast-furnace. The Leadville ores are not rich, in the ordinary sense of the term, but the large percentage of the by-product (lead) has rendered their working profitable even when, as in some cases, they contained not more than five, or even three dollars in silver to the ton. At the Anaconda mines, in Montana, the ores are more refractory, but the enormous extent and uniformity of the bodies, and the investment of large capital, the establishing of their own smelting-plant, and working upon a vast scale, have combined to reduce operations to a minimum of cost. Formerly, the company exported the copper mat for refining, but now they not only smelt and refine their product, but deliver to the market such stuffs as pig, bar, plate and electrolytic copper. Their employees are thousands in number; they produce 4,000 tons of ore a day, and their business amounts to \$1,000,000 a month. Since 1885 they have produced upward of 600,000,000 pounds of copper. In their case the copper is the prime consideration, and silver and gold are by-products. In value, the proportion of silver in their output is about 25 per cent, with about 3 per cent of gold and 72 per cent of copper. In the cases of most mines the conditions are not so favorable. Transportation is generally high, and such mines as are remote from the smelter must contain ores rich enough to stand the expense of shipping the body product, or else concentrate the ores before shipping.

Ore Treatment. In many cases, and according to circumstances (it being oftentimes a question of plentiful water-supply), concentration is effected at small cost. To concentrate the ore is to remove a large part of the earthy and refuse

matter and retain the mineral portion. This may be done in various ways. One method, long in use, is to force an upward current of water through a cylinder containing the ore, by which the lighter earthy and gangue matters are floated away, and the heavier ones sink and remain. Another process is by means of an endless table or great belt. The finely powdered ore is fed on the belt, which is fitted with transverse cleats, and travels up an inclined plane. As the ore moves upward, jets of water playing upon it form a light current, which washes away the light and worthless part of the slimes, while the mineral portions remain in the cleats until, in passing over a roller at the upper end, they are submerged into boxes containing water, and so washed off and collected. The concentrates are then dried before shipment. Ten, twenty, even fifty, tons of ore, have thus been reduced into one. The smelting of ores is something more than a mechanical process. When associated with copper and other metals, as silver usually is, the reducing and subsequent refining are really matters of experienced chemical technics. Any attempt at adequate description would require much space, but some brief idea of the requirements and processes may be obtained from the articles under COPPER, Vol. VI, pp. 347-352; GOLD, Vol. X, pp. 745-752; ASSAYING, Vol. II, pp. 724-728; and METALLURGY, Vol. XVI, p. 58. It seems probable that new scientific appliances, and the constant cheapening tendency in means of transportation, will afford the ultimate solution of the perplexities in the silver question. It is not likely that the noble metal will again recover its former price; but the need and universal demand for it must ever remain, and there can be no doubt that ways will be devised for producing it in sufficient amount and at a price which will still yield good profits to the miners. To show how each year brings changes in the aspect of this industry, as in nearly all others, a comparison is drawn between the present conditions of transportation in the San Juan region and those of twenty years ago. In 1876, ore from Silverton was shipped to the smelter at Pueblo by burro-trains, and it required ten burros to carry a ton of ore, at a cost of \$80.00. When through rail-connection was established in 1882, the freight rate was \$16, while to-day it is \$8 a ton, and a train will carry hundreds of tons.

Mines. Among the notable silver mines of the present are, besides the Comstock, the Printer Boy, Agassiz and Silver Cord, at Leadville; the Mollie Gibson and Smuggler, at Aspen; the Bi-Metallic, Hope, Granite Mountain and Anaconda, in Montana; the Bunker Hill, Tiger and Sullivan, in Idaho; the Silver King, in Arizona; Lake Valley, in New Mexico; Potosi, in South America; the Veta Grande, in Zacatecas, Mexico; and the Veta Madre, in Guanajuato in the same state. The last named is probably the greatest silver and gold mine in the world, and has been worked for two hundred years.

J. F. CARGILL.

SILVER CHLORIDE CELL. See ELECTRICITY, § 106, in these Supplements.

SILVER CITY, a city and the capital of Grant County, extreme southwestern New Mexico, 48 miles N. W. of Deming and 10 miles S. W. of Fort Bayard, on the Atchison, Topeka and Santa Fé railroad. It is situated in a farming and grazing section, is an important trade center, has large interests in the mining of gold, silver and copper, and contains a smelter, silver-reduction mills and flour-mills. Population 1890, 2,102; 1900, 2,735.

SILVER-COINAGE, LAW OF. See COINS AND COINAGE, and FINANCES OF THE UNITED STATES, in these Supplements.

SILVER CREEK, a village of Chautauqua County, extreme western New York, on Lake Erie, at the mouth of Silver Creek, 9 miles E. N. E. of Dunkirk and 31 miles S. S. W. of Buffalo, and on the Lake Shore and Michigan Southern, the New York, Chicago and St. Louis and the Western New York and Pennsylvania railroads. It is in a region devoted to agriculture and the raising of grapes, and contains important manufactures of milling machinery. Population 1900, 1,944.

SILVERING. See MIRROR, Vol. XVI, pp. 500, 501.

SILVER LEGISLATION. See COINAGE LAWS, and FINANCES OF THE UNITED STATES, in these Supplements.

SILVER-PLATING. See ELECTRO-METALLURGY, Vol. VIII, p. 116.

SILVER QUESTION. See FREE SILVER, in these Supplements.

SILVERSIDE OR SILVERFISH, a name popularly applied to any member of the family *Atherinidae*, because of the broad silvery bands along the sides. Especially is the name applied to *Menidia boscii* of our Northern coasts. In the United States the fresh-water silverside (*Labidesthes sicculus*) is common in the Northern states east of the Mississippi. The name is locally given to other fresh-water fishes. See also ATHERINA, in these Supplements.

SILVERTON, a town and the capital of San Juan County, southwestern Colorado, on the Animas River, and on the Denver and Rio Grande and the Silverton railroads, 285 miles W. S. W. of Pueblo. It is situated in the midst of lofty mountains, being but two miles from the Sultan Mountain, and has an elevation of 9,700 feet. The town has gold and silver mines and smelting works. Population (12th census) 1900, 1,380.

SIMARUBACEÆ, a family of tropical plants of about a hundred species, and closely related to the *Rutaceæ*. It is distinguished by the abundance of bitter substances contained in the bark and wood, which, under the name of quassia, are used in medicine. *Ailanthus glandulosus*, the Chinese sumach, or tree-of-heaven, a rapidly growing shade-tree, with very long pinnate leaves and an offensive odor, has been introduced into the United States, and in some places has become a pest.

SIMCOE, a town and the capital of Norfolk County, southwestern Ontario, 8 miles N. of

Lake Erie and 80 miles S. W. of Toronto, on the Lynn River, and on the Grand Trunk railroad. It is situated in a region producing fruit, grain and live-stock, and has excellent water-power, which is utilized in saw, flour and woolen mills, a canning factory, distillery, brewery, soap, potash and leather manufactures. Population 1891, 2,674.

SIMCOE LAKE, an irregularly shaped body of water in southwestern central Ontario, between Georgian Bay and Lake Ontario. It has a length of 30 miles from north to south; is about 18 miles broad at its widest part; has an elevation of 170 feet above Lake Huron, which it reaches by way of Lake Couchiching, the Severn River and Georgian Bay. The lake is usually frozen over in the winter; has several islands, and is surrounded by heavy woods.

SIMEON STYLITES. See MONACHISM, Vol. XVI, p. 701.

SIMIADÆ. See APE, Vol. II, p. 149.

SIMMONS, EDWARD EMERSON, an American painter; born in Concord, Massachusetts, Oct. 27, 1852. He received his education in art at Paris, as the pupil of Boulanger and Lefebvre. Much of his time was spent at St. Ives, England, which he made his home for a number of years, and where he painted, exhibiting in London, Paris and New York. In 1891-92 he visited the United States and painted portraits in New York and Boston. He received several medals, received honorable mention at the Paris Salon of 1882, and in 1888 was elected a member of the Society of American Artists. In addition to his portraits, the best known of his larger works is *The Carpenter's Son* (1890).

SIMMONS, FRANKLIN, an American sculptor; born in Webster, Maine, Jan. 11, 1842, and at an early age showed ability in plastic work, executing portrait-busts as soon as he graduated from college. Going to Washington during the Civil War, he found employment in the cutting of busts of statesmen and soldiers, and in executing in bronze several statues for public monuments. In 1867 he settled in Rome and opened a studio, where, among other works, he executed statues of Roger Williams and Governor King for the state collection in Washington; a statue of General Grant for the rotunda in Washington; a bronze statue of Roger Williams for Providence, Rhode Island; a statue of Longfellow for Portland, Maine; and in 1892 a bust of Phillips Brooks. His ideal works include *Medusa*; *Washington at Valley Forge*; *Jochebed*; *Penelope*; and the *Seraph Abdiel*.

SIMMONS, SIR JOHN LINTORN, an English soldier; born in Langford, Somerset, in 1821, and received his education at Elizabeth College and the Military Academy at Woolwich. Entering the Royal Engineers in 1837, he served for a number of years in North America, being appointed inspector of railways and secretary to the railway commissioners. Upon the dissolution of the commission he was, for a time, secretary to the railway department of the Board of Trade, and in 1853 went to Turkey, where he was em-

ployed on several important missions, becoming her Majesty's commissioner with the Turkish army under Omar Pasha. He took an active part in the Crimean campaign, being present at the battle of Eupatoria, at the siege of Sebastopol, and commanding a division at the passage of the Ingur. In 1857 he was the British commissioner for the regulation of the Turco-Russian boundary; from 1858 to 1860, consul-general at Warsaw; in command of Royal Engineers from 1860 to 1865, and in the latter year became director of the School of Military Engineering at Chatham, holding this position until 1867, when he was appointed lieutenant-governor; later, governor of the Royal Military Academy. From 1875 to 1880 he was inspector-general of fortifications, and was then attached to the special embassy during the Congress of Berlin, and was appointed to assist Lord Ampthill at the Berlin conference on the Greek frontier question. He was appointed governor and commander-in-chief of Malta in 1884 and held this position until 1888, when he was sent as envoy extraordinary and minister plenipotentiary to the Vatican. He was the recipient of medals and decorations from the governments of Turkey, France and England, in recognition of his services on the Danube and in the Crimea.

SIMON, JULES FRANÇOIS SUISSE, French statesman and economist; born in Lorient, Morbihan, Dec.



JULES SIMON.

31, 1814. After a brilliant educational career in his native city and at Vannes, and as a pupil of Victor Cousin, he became lecturer on the history of philosophy in Paris. For a time he edited a philosophical review entitled *La Liberté de Penser*. In addition to editing the works of Bossuet, Descartes, Malebranche and Arnauld, M. Simon published numerous works, such as *La Liberté de Conscience*, *Le Travail*, *Souvenirs du 4 Septembre*, and *Dieu, Patrie, Liberté*. He was elected a member of the French Academy in 1875, and in 1882 became the permanent secretary of the Academy of Moral and Political Science. After the revolution of 1848 he represented the department of the Côtes-du-Nord in the Constituent Assembly, and a year later became a member of the Council of State, until its reconstitution in 1849. In 1863 he entered the legislative corps and soon became the leader of the Republican members. He was elected a life Senator in 1875, and after proving his ability in minor government positions became Premier in 1876. A letter from the President in the following year caused M. Simon to resign his Premiership. He always advocated free trade. At the conclusion of the labor conference of 1890 M. Simon was present in Berlin, and the German Emperor sent him a collection of the musical works of Frederick the Great as a souvenir. He died in Paris, June 8, 1896.

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SIMONE DA PESARO. See CANTARINI, SIMONE, Vol. V, p. 28.

SIMPLON (Ital., *Sempione*), a famous mountain of Switzerland, one of the Lepontine Alps, in the east of the canton of Valais, near the Piedmontese frontier. It rises to the height of 11,124 feet. The Simplon road, one of the greatest engineering achievements of modern times, leads over a shoulder of the mountain from Brieg, in Valais, to Domo d'Ossolo, in the north of Piedmont, 42 miles long, 30 feet wide, passing through several tunnels, over 611 bridges, and having 10 houses of refuge on the course. The road was commenced in 1800, under the direction of Napoleon, and was completed in 1806. Close to the highest point is the New Hospice, one of the 20 edifices on this route for the shelter of travelers. It was greatly damaged by storms in the years 1834, 1839 and 1850. This pass was also the seat of a hospice mentioned as early as 1235. The Swiss government decided to begin in 1896 the construction of a double tunnel across the Simplon, the plan being to have two tunnels 66,000 feet long, and separated 35 feet, with connections every 670 feet. One tunnel will be completed for railway traffic first, while the other will be utilized for purposes of ventilation, by which means 1,800 cubic feet of air can be passed into the underground passages every second. It was calculated that the construction would require 5½ years, and the cost would be about \$11,000,000.

SIMPSON, JOHN PALGRAVE, an English author; born in Norfolk, England, in 1806; received his education under a private tutor and at Corpus Christi College, Cambridge. A severe reverse of fortune caused him to devote his attention to literature, and for many years he contributed to *Blackwood's Magazine*, *Fraser's Magazine* and *Bentley's Miscellany*. He wrote *Second Loves*, and *Other Tales* (1846), and produced about sixty pieces of different kinds. He also published a *Life of Karl Maria von Weber*. His death occurred in London, Aug 19, 1887.

SIMPSON, MATTHEW, an American Methodist Episcopal bishop; born in Cadiz, Ohio, June 20, 1811. He was educated at Madison College, in Pennsylvania; studied medicine, but abandoned this profession for the ministry, becoming a circuit preacher of the Christian Church. In 1837 he became vice-president and professor of natural history at Allegheny College; in 1839 was elected president of the Indiana Asbury University, now De Pauw. He was elected a bishop in the Methodist Episcopal Church in 1852 and in 1857 went abroad, traveling through Europe, and the countries on the east of the Mediterranean. He acted as president of Garrett Biblical Institute at Evanston, Illinois, in 1859, but later removed to Philadelphia, and during the Civil War did much in



BISHOP SIMPSON.

many Northern cities, by his addresses, to arouse sentiment in favor of the Union. He visited Europe in 1870, 1875 and 1881, on the last trip attending the Methodist Ecumenical Council and delivering the opening address. In 1874 he made a tour of the Methodist missions in Mexico. He was a popular preacher, being highly esteemed by President Lincoln, at whose funeral he officiated. Among his works are *One Hundred Years of Methodism* (1867); and *Cyclopædia of Methodism* (1878). He died in Philadelphia, June 18, 1884.

SIMPSON, WILLIAM, a Scotch artist; born in Glasgow, Oct. 28, 1823. He began life as an architect, and then commenced his career as an artist, being apprenticed to a lithographing firm. After spending some years in London he went through the war in the Crimea as an artist, and published sketches in two volumes, entitled *Campaigns in the East*. Mr. Simpson published other works relating to his extensive travels in the East, having visited many countries while on the staff of the *Illustrated London News*.

SIMS, CHARLES N., an American clergyman; born in Union County, Indiana, May 18, 1835; graduated at Indiana Asbury (now De Pauw) University in 1859, having in 1857 entered the Methodist ministry. After serving as president of Valparaiso College from 1860 to 1862, he became pastor at Richmond, Indiana. Subsequently, he held pastorates in Methodist Episcopal churches at Wabash, Evansville and Indianapolis, Indiana; at Baltimore, Maryland; Newark, New Jersey, and Brooklyn, New York. In 1880 he was chosen chancellor of Syracuse University; was commissioner to the Onondaga Indians in 1882-83; delegate to the Methodist Episcopal General Conference in 1884, and again in 1888. His *Life of Thomas Eddy* was published in 1879, but his literary work consisted largely of contributions to the periodicals.

SIMS, GEORGE ROBERT, an English journalist; born in London, Sept. 2, 1847, and educated at Hanwell College and afterward at Bonn. He first joined the staff of *Fun*, on the death of Tom Hood the younger, in 1874, and the *Weekly Dispatch* the same year. In 1873 he became a contributor to the *Referee*, under the pseudonym of "Dagonet," and in 1879 became editor of *One and All*. Taking to the dramatic field, he produced his first play, *Crutch and Toothpick*, at the Royalty Theater, in April, 1879. This was followed by *The Lights of London*; *Romany Rye*; *In the Ranks*, and others that have become popular in the United States. Mr. Sims's revelations of the condition of the poor in London, depicted in a series of letters to the *Daily News*, entitled *How the Poor Live* and *Horrible London*, did much to turn public attention to the housing of the working classes and to bring about the Royal Commission.

SIMS, JAMES MARION, an American surgeon; born in Lancaster County, South Carolina, Jan. 25, 1813. He was graduated at South Carolina College in 1832, and studied medicine in Charleston and Philadelphia, taking his degree from Jefferson Medical College in 1835. He practiced first in his native county and then at Montgomery, Alabama, where

he established a reputation as a surgeon by his treatment of strabismus, club-foot, lockjaw in infants and by the invention of the silver suture for treating vesico-vaginal fistula and of the "Sims speculum." In 1853 Dr. Sims removed to New York City, and there, in the face of opposition, he opened a hospital for the treatment of diseases of women, in 1855, and two years later secured an appropriation of \$50,000 from the New York legislature for a suitable building.



JAMES MARION SIMS.

He went to Europe in 1861, and practiced in Dublin, London, Paris and Brussels, receiving decorations from various European countries. In 1868 he returned to New York, but at the beginning of the Franco-Prussian War he went to Paris and there organized the Anglo-American ambulance corps. He later returned to New York, where he became a member of the board of surgeons of the Woman's Hospital, and was at one time president of the American Medical Association. Besides his contributions to medical journals, he published *The Story of My Life* (1884). He died in New York, Nov. 13, 1883.

SIMS, RICHARD, an English topographical and genealogical bibliographer; born in Oxford, in 1816, and was educated at New College there. Entering the British Museum (q.v., in these Supplements) as an attendant in the manuscript department in 1841, he became a transcriber in 1859, then a junior assistant, and in 1868 a senior assistant. His entire life was passed in the service of the museum. He published *A Handbook to the Library of the British Museum*, and a number of handbooks and catalogues relating to heraldry, topography, autographs and manuscripts. His *Manual for the Genealogist*, etc., and *Index to Pedigrees and Arms in the Herald's Visitations* are invaluable works for the genealogist and herald. He died May 24, 1896.

SIMS TORPEDO. See TORPEDO, Vol. XXIII, p. 451.

SIMULIUM OR SAND-FLIES. See MOSQUITO, Vol. XVI, p. 866.

SINALOA, a state of northwestern Mexico, bounded on the west and southwest by the Pacific Ocean and Gulf of California, by Sonora on the northwest, Chihuahua on the northeast, Durango on the east and Tepec on the southeast. The eastern parts are traversed by spurs of the Sierra Madre, whose slopes are heavily wooded and whose valleys are fertile. The coast is low and unhealthy, and intersected by lagoons. Several rivers, none of which, however, are navigable, take their rise in the mountains and flow across the state. The climate of the highlands is mild and equable, and the rainy season, from June to September, is well-defined, but on the coasts the rainfall is light and vegetation scanty. Gold and silver mining is the chief industry, agricultural products being sufficient only for home consumption, and there is a considerable

manufacture of cottons. Its capital is Culiacan, and Mazatlan the chief port. The old capital of Sinaloa, which at one time had a population of 10,000, had in 1893 about 3,000. Population of the state in 1893, estimated, 245,000. A concession was granted about 1880 to an American company of communists to establish an ideal community at Topolobampo, on the coast in the northwestern section of the state. A colony was started by A. K. Owen, but the plans failed, and in 1896 the settlement was almost wholly abandoned.

SINAPIS. See MUSTARD, Vol. XVII, p. 112.

SINDHIA OR SCINDIA. See INDIA, Vol. XII, p. 804.

SINGALESE, OR SINHALESE. See CEYLON, Vol. V, pp. 366, 367.

SIN-GAN-FOO. See SE-GAN-FOO, Vol. XXI, pp. 621, 622.

SINGH, RANJIT OR RUNJEET. See PUNJAB, Vol. XX, p. 111.

SINGLE TAX. A plan of taxation first proposed by Henry George in his work entitled *Progress and Poverty*. It contemplates the raising of all public revenues for national, state, county or municipal purposes, by a single tax upon land values, irrespective of improvements.

This form of taxation according to its author can be instituted, since in all our states some tax is now levied, upon land values, by the simple and easy way of abolishing, one after the other, all other taxes now levied, and commensurately increasing the tax on land values, until we draw upon that source alone for all expenses of government.

The benefits to be derived from such a tax system, if we accept the claims of its supporters, would be to take the weight of taxation off the agricultural districts, where land has little or no value, irrespective of improvements, and put it on towns and cities, where bare land rises to an enormous value; to dispense with a multiplicity of taxes and a horde of tax-gatherers; to do away with the fraud, corruption and gross inequality inseparable from the present method of taxation; to give us as perfect freedom of trade with all the world as now exists between our states, thus destroying the trusts, monopolies, and corruptions which are the outgrowth of the tariff; to make the holding of land unprofitable to the mere owner and profitable only to the user, rendering it impossible for speculators and monopolists to hold natural opportunities unused or only half used, and, by thus throwing open to labor the illimitable field of employment which the earth offers to man, would solve the labor problem, raise wages, make over-production impossible, render labor-saving inventions a blessing to all, and cause such an equitable distribution of wealth as would give to all comfort, leisure, and participation in the advantages of an advancing civilization.

SING SING, a village of Westchester County, southeastern New York, situated on the east bank of the Hudson River, 31 miles above New York City, and on the New York Central and Hudson River railroad. The village, lying upon rocky hills, with its streets rising one above another, affords a view of perhaps the most beautiful river landscape along

the valley. Just north of the village is the long peninsula known as Croton Point, jutting out into the river and separating the broad Tappan Zee and Haverstraw Bay. This point is noted for its vineyards. Near the village the Croton aqueduct crosses Kill Brook by a stone arch of 88 feet span, 70 feet above the stream, with a second bridge beneath this arch for highway uses. Sing Sing prison, of the state penal institutions, is located a mile south of the village. Sing Sing has numerous industries, including the manufacture of pills, porous plasters, cotton-gin machinery, gas and water pipes, steam-engines, boots and shoes, and files. Besides good public schools, there are located here four military schools for boys, a seminary for girls, and two business colleges. Population 1900, 7,939.

SINIM. See CHINA, Vol. V, p. 626.

SINKING FUND. See NATIONAL DEBT, Vol. XVII, p. 245.

SINTERS. See *Opal*, under MINERALOGY, Vol. XVI, p. 390.

SION, MOUNT. See *Zion*, under JERUSALEM, Vol. XIII, p. 639.

SIOUX CITY, a city and the capital of Woodbury County, western Iowa; on the east bank of the Missouri River; about 88 miles above Omaha and 512 W. of Chicago, and on the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul, Minneapolis and Omaha, the Illinois Central, the Sioux City, O'Neill and Western, the Sioux City and Northern and the Sioux City and Pacific railroads. Commercially it is noted for the enterprise and substantial character of its jobbing-houses, which cater to the trade and supply an annually increasing demand for particular lines of merchandise in all parts of the west and northwest. The city is well built, many miles of the streets are paved with the latest improved material, and a reliable system of sewerage is employed. It is lighted by gas and electricity, maintains adequate fire and police departments, and possesses accommodations for passenger and freight traffic equal to those of any city of equal prominence. Among the buildings of note are a city hall and public library, United States government building, Young Men's Christian Association building, and a large union depot. The river at this point is crossed by a bridge 2,000 feet long, erected at a cost of \$1,000,000. The city has numerous churches, some of the denominations having very fine edifices, a good public-school system, three daily, a semi-weekly, and 13 weekly papers, and a monthly periodical. The University of the Northwest is also located here. The returns for 1890 reported 195 manufacturing establishments, with a combined capital of \$4,938,606, giving employment to 2,997 persons, to whom were paid \$1,862,612 in wages, and paying \$10,329,994 for materials, from which were turned out products valued at \$14,164,667. The principal industry was the slaughtering and packing of cattle, hogs and sheep. The products from manufactures included flour, starch, soap, stoves, engines, agricultural implements, tile, household furniture, shoes and clothing. There were 17 banks, with a combined capital of \$3,575,000. Pop. 1890, 37,806; 1900, 33,111.

SIOUX FALLS, a city and the capital of Minnehaha County, southeastern South Dakota, on the Big Sioux River, and on the Black Hills and Fort Pierre, the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul, Minneapolis and Omaha, the Great Northern and the Illinois Central railroads. The river here falls nearly one hundred feet, affording an immense water-power, which is utilized in running large flour-mills. Large quantities of red jasper or granite, quarried here, are shipped to all parts of the world. Stock-raising and agricultural interests are also important. The city has paved streets, gas, and electric lights, water-works, numerous churches, good public schools, and is the seat of Sioux Falls University (Baptist), All Saints School (Protestant Episcopal), a Norwegian-Lutheran College, the State School for Deaf Mutes, and the South Dakota Penitentiary. There are 4 national and 3 state banks, with combined capital of \$650,000, and 3 daily, 1 semiweekly, 6 weekly and 5 monthly periodicals. Sioux Falls is the seat of the Protestant Episcopal bishopric of South Dakota and of the Roman Catholic episcopal see of Sioux Falls. Population 1890, 10,177; 1900, 10,266.

SIOUX INDIANS. According to the government report for 1895 there were at all agencies 24,907 Indians classified under the general heading Sioux. Numerous minor bands, such as the Blackfeet, Yankton, Sans Arc, Brule and Loofer, once looked upon in statistical work as distinctive tribes, are now reported among the Sioux. The Sioux were distributed in South Dakota, at the Yankton agency, 1,735; Pine Ridge agency, 6,355; Crow Creek, 2,027; Cheyenne River, 2,539; Rosebud, 4,316; Sisseton agency, 1,863. In North Dakota, at Standing Rock agency, there were 3,763, and at Devil's Lake agency 1,021; and in Nebraska, at the Santee agency, there were 1,288. For a general description, see **INDIANS**, Vol. XII, pp. 827, 828, 831. For the outbreak of 1889, see **GHOST DANCE**, in these Supplements.

SIPHONOPHORA. See **HYDROZOA**, Vol. XII, p. 564.

SIPHONOPODA. See **MOLLUSCA**, Vol. XVI, pp. 666-670.

SIPUNCULACEA or **SIPUNCULOIDEA**. See **POLYZOA**, Vol. XIX, pp. 429-431.

SIRENIA. See **MAMMALIA**, Vol. XV, pp. 389-391.

SIRENIDÆ. See **ICHTHYOLOGY**, Vol. XII, pp. 786, 787.

SIRIUS. See **ASTRONOMY**, Vol. II, pp. 817, 818.

SIROCCO. See **AFRICA**, Vol. I, p. 256.

SISAL HEMP. See **YUCATAN**, Vol. XXIV, p. 758.

SISCOWET or **SISKOWIT**, a variety of the great lake trout or namaycush (*Salvelinus namaycush*). This variety occurs in Lake Superior. Probably owing largely to the nature of its food, it becomes exceedingly fat. This is the principal difference from the ordinary namaycush (q.v., in these Supplements).

SISTER DORA. See *Dora Wyndlow Pattison*, under **PATTISON**, **MARK**, in these Supplements.

SISTERS OF CHARITY. See **CHARITY**, **SISTERS** OF, in these Supplements.

SISTERS OF MERCY. See **MERCY**, **SISTERS** OF, in these Supplements.

SITKA, the capital of Alaska, is on the W. coast of Baranof Island, in latitude 57° 2' N.; a deep harbor, dotted with islands in front and snow-clad mountains, rising behind. Sitka was founded by the Russians in the eighteenth century, and was for a long time the headquarters of the Russian-American Fur Company. Its principal buildings are the Greek church and the old Russian palace, now a storehouse. The climate, though not severe, is cold; the mean temperature being 42° F.; oats cannot ripen here. The rainfall is 84-86 inches; one hundred fair days means an exceptionally fine year. The Presbyterian mission in 1878 established here an industrial school, a hospital and a museum. Population 1890, 1,188, including 859 Indians and 31 Chinese. It has become a resort for tourists from Puget Sound and British Columbia, as well as of miners proceeding to the gold-mines on the Yukon River.

SITTING BULL, a chief and medicine-man of the Sioux Indians of Dakota, whose Indian name was Tatanka Yotanka; was born on Willow Creek, about 1837. From early manhood he showed a hostility toward the whites that was unconquered to the last, and became the leader of the unruly members of the tribe. His band made attacks on both white settlers and small Indian reservations, and in 1862 engaged in a massacre in Minnesota and at Spirit Lake, Iowa, after which they were driven into the Big Horn Region and the Yellowstone, and at the battle on the Mussel Shell were defeated in 1868. From this time until 1876 Sitting Bull was constantly on the war-path, fighting Indians and raiding Montana settlements. On the failure of his band to return to its reservation, the expedition was organized in which General Custer and his entire force perished. After this, Sitting Bull was pursued by General Terry, but escaped with his band into Canada. On a promise of pardon, he surrendered to General Miles in 1880 and returned to Dakota, but continued to stir up trouble, being influential in 1888 in preventing the Indians from selling their land to the United States government, and on the Messiah craze breaking out among the Indians in 1890, he added so much to the excitement that his arrest was determined upon. A party of Indian police were sent to his camp on the Grand River, Dec. 15, 1890, and in the fight which ensued in the attempt to prevent an arrest, Sitting Bull, among several others, was killed.

SIVA. See **BRAHMANISM**, Vol. IV, pp. 207-209.

SIVATHERIUM, a genus of extinct ruminating mammals, whose remains were found in tertiary strata in the southern range of the Himalayas. *S. giganteum* was an extremely large ruminant, with two pairs of horns.

SIWAH, **OASIS** OF. See **AFRICA**, Vol. I, pp. 249, 250.

SIX NATIONS or **IROQUOIS**. See **IROQUOIS**, in these Supplements.

SIX-PRINCIPLE BAPTISTS. See **BAPTISTS**, in these Supplements.

SJÖBERG, **ERIK**. See **SWEDEN**, Vol. XXII, p. 757.

SKAGERRAK OR SKAGER-RACK. See NORTH SEA, Vol. XVII, pp. 563, 564.

SKANEATELES, a village of Onondaga County, central New York, beautifully situated at the northern end of Skaneateles Lake, and on the Skaneateles railroad, 7 miles E.N.E. of Auburn and 18 miles W.S.W. of Syracuse. It is the center of a district devoted to agriculture and teazel-raising. The outlet of the lake furnishes good water-power, which is utilized in manufacturing. The village contains a large number of summer residences, flour and woolen mills, iron-works, lime-kilns, paper-mills, carriage factories, a union school and academy and a public library. Population 1900, 1,495.

SKATE, a fish. See RAY, Vol. XX, p. 299.

SKEAT, WALTER WILLIAM, an English philologist and Anglo-Saxon scholar; was born in London, Nov. 21, 1835, and educated at King's College School and Christ's College, Cambridge, graduating as fourteenth wrangler in 1858. He became fellow of his college in 1860, and four years later was mathematical lecturer there; filled for some time curacies at East Dereham and Godalming; in 1878 was elected the first Elrington and Bosworth professor of Anglo-Saxon at Cambridge, and re-elected to a Christ's College fellowship in 1883. He was the first director of the Dialect Society (established 1873), and he contributed, by his exhaustive labors on Langland and Chaucer, and innumerable editions of Early-English works, more than any scholar of his time to a sound knowledge of Middle English. His chief work is an *Etymological English Dictionary* (1882), with a useful abridgment, the *Concise Etymological Dictionary* (1882), to which he afterward added *Principles of English Etymology* (vol. I, the Native Elements; vol. II, the Foreign Elements, 1887-91). Of early English texts he has published editions of parallel extracts from 29 MSS. of *Piers the Plowman* (1866); *The Vision of William Concerning Piers the Plowman* (five parts, 1867-85); *The Lay of Havelock the Dane* (1868); *Barbour's The Bruce* (3 parts, 1870-77); *Chaucer's Treatise on the Astrolabe* (1872); *Chaucer's Minor Poems* (1888); *The Kingis Quhair* (1884); *Chaucer's Canterbury Tales* (1884); with other specimens of Early-English literature issued by the Clarendon Press, the Scottish Text Society, and other philological textual and dialect societies. He also published a *Mesogothic Glossary* (1868); the *Gospel of Mark* in Gothic, and was chosen by the syndics of the Cambridge University Press to complete an edition of the Anglo-Saxon gospels begun by the late J. M. Kemble.

SKELTON, SIR JOHN, a Scotch author; born in Edinburgh, July 18, 1831; educated at the universities of St. Andrews and Edinburgh, and in 1854 was called to the Scotch bar. In 1868 he became secretary of the board of supervisors (the local government board for Scotland), and in 1892 became chairman of the same board. From 1854 on, he was a frequent contributor to the leading magazines under the pseudonym of "Shirley." Some of his historical writings include *Mainland of Lethington and the Scotland of Mary Stuart* (1893). He has also published *Pauperism and the Boarding-Out of*

Pauper Children (1876); and *Handbook of Public Health* (1890). Died in Edinburgh, July 20, 1897.

SKENE, WILLIAM FORBES, a Scotch archaeologist; born in Inverie, Kincardineshire, June 7, 1809, and received his early education at the High School of Edinburgh. He then studied in Germany, and at the Universities of Edinburgh and St. Andrews. He afterward entered the legal profession as a "Writer to the Signet." His first large work, published in 1837, when he was but 28 years old, *The Highlanders of Scotland, their Origin, History and Antiquities*, gave him a high place as a historian and archaeologist. He was subsequently elected to memberships in numerous archaeological and art societies, and in 1881 was appointed historiographer for Scotland in the room of Dr. Hill Burton. He edited *The Dean of Lismore's Book* (1862); *Chronicles of the Picts and Scots* (1868); *The Four Ancient Books of Wales* (1869); and in addition to his first work, published *Celtic Scotland* (1876-80); and *The Gospel History for the Young* (1884). He died in Edinburgh, Sept. 3, 1892.

SKIN. See ANATOMY, Vol. I, pp. 897, 898.

SKINK. See LIZARD, Vol. XIV, p. 735.

SKIN-MOTHS, same as DERMESTIDÆ. See COLEOPTERA, Vol. VI, p. 130.

SKIPJACK. A popular name applied rather indefinitely to fishes which have a habit of leaping out of the water. The bonito (*Sarda*), the blue-fish (*Pomatomus*), the saury (*Scomberesox*), the saber-fish (*Trichiurus*)—all represented on our Atlantic coast—have received the name in certain localities. The Ohio herring (*Clupea chrysochloris*), an economically unimportant fish of the Mississippi River system, is often called skipjack.

SKIPPER. A name for the small, dark-yellow butterflies of the family *Hesperiidæ*. They are usually called hesperians. The name also is applied to a so-called flying-fish of European and American waters, the saury (*Scomberesox saurus*). See SAURY, in these Supplements.

SKIRRET. See HORTICULTURE, Vol. XII, p. 288.

SKOBELEFF, MIKHAIL DMITRIEVITCH, a Russian general; born in the Riazan district, about 1843. He was educated in a military school at St. Petersburg, and saw service first in the Polish insurrection of 1863. In 1866 he became a member of the general staff, and in 1869 was sent to Turkestan, where he remained for some years, and greatly distinguished himself in 1873-76 by gallant service in the Khiva and Khokand wars, becoming a major-general. He was also conspicuous in the Turkish war in 1877. He died July 7, 1882, in Moscow.

SKOWHEGAN, a town and the capital of Somerset County, southwestern central Maine, 50 miles W. of Bangor and 30 miles N.N.E. of Augusta, on the Kennebec River and on the Maine Central and the Skowhegan and Norridgewock railroads. The river has here a perpendicular fall of thirty feet, which furnishes excellent water-power for manufactories of flour, pulp, lumber, oilcloth, axes and scythes. The town has electric light and power plants, water-works, numerous churches, a public library, books and newspapers. Skowhegan was

originally known as Canaan; received the name of Milburn, and in 1836 was given its present name. Population, town and village, 1900, 5, 180.

SKULL. See MAMMALIA, Vol. XV, pp. 355, 356.

SKULL, VERTEBRAL, THEORY OF. See SEGMENTATION OF THE VERTEBRATE BRAIN AND HEAD, in these Supplements.

SKULL-CAP, a popular name for any plant of the genus *Scutellaria*. It is so called because the upper part of the calyx of the flower comes down upon the lower, when the petals are gone, in a manner resembling a helmet. It is a perennial, and grows in damp places. The *S. galericulata* is the common skull-cap of the northern United States, of Canada and Europe. It bears an axillary blue flower. The *S. lateriflora* is known as the *madweed* or *mad-dog-weed*, because of a popular, but unfounded notion, that it is a specific for hydrophobia.

SKUNK-CABBAGE OR SKUNKWEED is the common name of the *Symplo carpus foetidus*, of the family *Araceae*. It grows in meadows and marshy places, and is frequent in America south of the St. Lawrence to North Carolina and east of the Mississippi; is a monocotyledon, sending up in early spring, and in advance of leaves, a shell-shaped yellow and purple spathe, out of which, close to the ground, comes a spadix bearing four-petaled flowers. The leaves, which arise from the ground around the spathe, are large, broad, entire and veiny, and have an unpleasant mephitic odor, whence the name. The fruit is oval and fleshy, having large purple seeds within it.

SKY-LARK. See LARK, Vol. XIV, pp. 314, 315.

SLAGS. See METALLURGY, Vol. XVI, pp. 62, 63; IRON, Vol. XIII, p. 292; and IRON AND STEEL, in these Supplements.

SLANDER. See LIBEL, Vol. XIV, pp. 505-507.

SLATER, a town of Saline County, northwestern Missouri, 12 miles W. of Glasgow and 96 miles E. of Kansas City, on the Chicago and Alton railroad. It is situated in a district producing large quantities of grain and live-stock, and has a large flour-mill. Population 1890, 2,400; 1900, 2,502.

SLATER, SAMUEL, an American manufacturer; born in Belper, England, June 9, 1768. He received a good education, and served as an apprentice at cotton-spinning with Jedediah Strutt, the partner of Arkwright. Having learned of the act passed by the United States Congress in 1789 for the encouragement of manufactures, and of the bounty offered by the Pennsylvania legislature for the introduction of the Arkwright patent, he determined to introduce the invention into the United States, believing himself able to construct the machinery from memory, since the laws of England forbade the communication of models of new machinery to foreign countries. Slater accordingly went to Pawtucket, Rhode Island, early in 1790, and entered into an agreement to construct and work the new cotton-spinning machinery, and on Dec. 21, 1790, he started a mill at Pawtucket, which was practically the beginning of the cotton-spinning industry in the United States. With his brother John he erected cotton-mills in Slatersville, Rhode Island, in 1812, at Oxford (now Webster), Massachusetts, and in 1815 added woolen-

mills. These enterprises made him very wealthy. In 1796 he opened a Sunday-school for his employees, one of the first institutions of the kind in the United States. He died in Webster, Massachusetts, April 21, 1835.—His nephew, JOHN FOX SLATER, also a manufacturer and philanthropist; born in Slatersville, Rhode Island, March 4, 1815. He extended the cotton-manufacturing business and gained large wealth by profitable investments. His home was at Norwich, Connecticut, where he gave liberally toward the foundation of Norwich Free Academy. In 1882 he established the "Slater Fund" of \$1,000,000, for the education of the freedmen in the South. He died in Norwich, May 7, 1884.

SLATINGTON, a borough of Lehigh County, eastern Pennsylvania, on the Lehigh River, and on the Central of New Jersey, the Lehigh and North-eastern, the Lehigh Valley and the Philadelphia and Reading railroads; 16 miles N.W. of Allentown. It has extensive slate quarries, school-furniture factory,

SLAVE COAST. See AFRICA, Vol. I, p. 269.

SLAVE-TRADE. See SLAVERY, Vol. XXII, pp. 137-141, 143, 144.

SLAVIC LANGUAGES. See SLAVS, Vol. XXII, pp. 147-151.

SLEEPER, a name sometimes given to certain fishes which lie quietly for long periods, especially the nurse-sharks or sleeper-sharks (*Somniosus*).

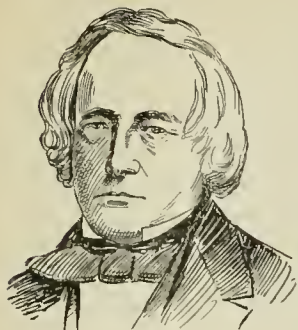
SLEEPY EYE, a village of Brown county, southern Minnesota, 48 miles W. of Mankato and 26 miles S.E. of Redwood Falls, on the Chicago and Northwestern Railroad. It is an important grain-buying center, and has several grain warehouses and elevators, a flour-mill, brewery and creamery. The village has several churches, a State high-school and two parochial schools, and is lighted with electricity. The place was named after an Indian chief, who, during the massacre of 1861, was friendly to the whites. Population, 1890, 1,513; 1900, 2,046.

SLEMMER, ADAM J., an American soldier; born in Montgomery county, Pennsylvania, in 1828; was graduated at West Point, July 1, 1850. He was engaged in services on the frontier, also as professor of mathematics at the United States Military Academy until 1860, when he was sent South, and had charge of one of the forts in Charleston harbor. Later, he was transferred to Florida, and secured possession of Fort Pickens, Jan. 10, 1861, holding it until relieved by the United States government. In May, 1861, he was promoted major of the sixteenth infantry, and later, served in the Southwestern armies. He fought at Corinth, Miss., and became brigadier-general, but was so severely wounded at Stone River as to incapacitate him for further active service. Subsequently he was promoted to be colonel, by brevet, of the fourth infantry, and placed in command of Fort Laramie, Kan., where he died Oct. 7, 1868.

SLICKENSIDES. See GEOLOGY, Vol. X, p. 297.

SLIDELL, JOHN, an American lawyer; born in New York City, in 1793; graduated at Columbia College, and after studying law, removed to New Orleans in 1819, where he made the study of commercial law a specialty and soon acquired a large practice. In 1842 he was elected to Congress as a

States-rights Democrat. President Polk sent him in 1845 to Mexico as United States Minister, but he returned again in 1847,



JOHN SLIDELL.

never having been formally received by the Mexican government. From 1853 till 1861 he was in the United States Senate, but rarely spoke, except in committees, where he exerted great influence. When Louisiana seceded, he withdrew from the Senate. In September, 1861, he was appointed Confederate Minister to France, and set out with James M. Mason for Southampton in November. Captain Wilkes, United States Navy, seized them on the high seas and brought them as prisoners to the United States, where they were confined in Fort Warren, Boston harbor, till Jan. 1, 1862, when they were released on the demand of the English government. Then they set out on their mission to France, but they could not induce the French government to recognize the Confederate States. Yet the sympathy of Napoleon III proved of great value, for by his secret influence Mr. Slidell was able to begin the negotiation of a Confederate loan of fifteen millions of dollars, and obtained a ship, the *Stonewall*, for the Confederate navy. After the war, Mr. Slidell settled in England and remained in London till his death, which occurred July 29, 1871.

SLIDE-RULE, an instrument having sliding parts which bear numerous graduations so arranged that some function of a number on one piece is formed opposite it on another piece. By shifting one or more of the parts, various calculations, principally based on logarithms, can be made. As a rule, both opposed scales are graduated to the logarithms of the numbers thereon. Straight rules and slides constitute the common form, though they have been made circular. Draftsmen and designers of machinery use them to assist in rapid calculation.

SLIME-MOULDS, the common name of a group of problematical organisms, whose adult body consists of a mass of naked protoplasm. They are generally regarded as plants of low grade, and often associated with the fungi. They are saprophytic, living upon decaying organic substances, such as old tan, decaying leaves, logs, etc.

SLIME-TABLE, an inclined table, used as a buddle in the separation of ores. The Evans revolving table is the most common form. It is about fourteen feet in diameter, circular, and slightly elevated at the center. The slimes to be separated are run in through a trough at the highest point of the table, where a distributor is located. The upper and central part of the table is stationary, and the outer and lower portion revolves. The ore and water, being fed from the center, wash down on to the rotating part of the table, and are carried around and separated, so that the sand and water fall into a trough and the ores into two hutches, one of which receives that which is imperfectly separated, so that it may

be subjected to a second washing. Soft pine wood is commonly used for the surface of the table, though cement and hard rubber have been used. The speed of rotation is once in 80 seconds, and a table will wash a little more than a ton an hour. Another form of slime-table is made on the same principle, but the table is inverted, the center being the lowest, or discharge point. Stationary tables are also made, in which the feed-spout and water-pipes travel around, instead of being fixed, as in the revolving table. One of the latest improvements in slime-tables is a double or two-story affair, by which the material can be worked better and faster. It is always desirable to classify the material to some extent before separation on the slime-table.

C. H. COCHRANE.

SLIPPER ANIMALCULE. See **PARAMECIUM**, in these Supplements.

SLOANE, WILLIAM MILLIGAN, an American educator and critical author; born in Richmond, Ohio, Nov. 12, 1850, his father being the Rev. James Benwick Wilson Sloane, pastor there of the Reformed Presbyterian Church, and a noted abolitionist. The lad's earliest recollections are of aiding the passage of runaway slaves to Canada. In 1855 the family removed to New York City, its home being the scene



WM. M. SLOANE.

of many interesting conferences, in which the leading abolitionists took part. The son was sent to Mount Washington Collegiate Institute; entered Columbia College in his fourteenth year, graduating in 1868, and taught Latin and Greek for four years at the Newell Institute, Pittsburg. In 1872 he went to Berlin to study philology; and the next year became secretary to George Bancroft, then Minister for the United States to Germany, in which capacity Sloane assisted the historian in preparing the tenth volume of the *History of the United States*, and was for a time secretary to the legation. He went to Leipsic in 1876, and took his degree of Ph.D., his dissertation being *Arabic Poetry Before the Time of Mahomet*. He returned to the United States, and in 1877 became adjutant professor, and later professor of Latin at Princeton; and in 1883 was transferred to the chair of history. He subsequently made repeated visits to Europe, spending most of his time in France. During these visits he had access to the government archives of France, Great Britain and Italy, the result of his well-directed research appearing in his critical *Life of Napoleon Bonaparte*, which began to appear November, 1890, in the *Century Magazine*. This was republished in book form, the first volume appearing November, 1896, with entirely new illustrations, reproduced from many famous original paintings. Among his other literary works are *The Life and Work of J. R. W. Sloane* (1888), a biography of his father; *The French War and the Revolution* (1893), giving a succinct view of

European and American history for the quarter of a century previous to the outbreak of the French revolution; and edited the *Life of James McCosh* (1896). He was editor of the *New Princeton Review* (1885-88); one of the editors of the *American Historical Review*, and a contributor to the leading magazines. In November, 1896, he was appointed Seth Low professor of history in Columbia University, New York City.

SLOCUM, HENRY WARREN, an American soldier; born in Delhi, Onondaga County, New York, Sept. 24, 1827; graduated at West Point in 1852, and after serving in the artillery until 1856, resigned. He afterward practiced law at Syracuse, and served one term in the legislature of New York, but upon the outbreak of the war re-entered the army as colonel of the Twenty-seventh New York Infantry. He was wounded at the first battle of Bull Run, and in August following was made brigadier-general. In the Peninsula campaign he was promoted to major-general of volunteers, and in the campaigns of the following spring commanded the Twelfth Army Corps, with which he participated in the battles of Chancellorsville, Fredericksburg and Gettysburg. He was conspicuous in the Southwest in 1864, succeeding General Joseph H. Hooker as commander of the Twentieth Corps, and accompanying Sherman on his march to the Carolinas in command of the left wing of the army. In 1865 he located at Brooklyn, and was defeated for the office of secretary of state of New York on the Democratic ticket. In 1868 he was elected to Congress as a Democrat, re-elected in 1870 and again in 1884. From 1876 to 1878 he was president of the board of city works in Brooklyn, and as one of the commissioners of the Brooklyn bridge was in favor of making it free to the public. He died in Brooklyn, April 14, 1894.

SLOE. See PLUM, Vol. XIX, p. 230.

SLOT-MACHINES. Mechanisms for the sale of some commodity which is obtained by dropping a small coin in the slot are not of modern origin, though they have come largely into use since 1880. They are variously called slot-machines, nickel-in-the-slot machines, penny-in-the-slot machines and vending-machines, the latter name being used by the United States Patent Office in classifying them. They came into popularity with the success of the automatic weighing-machines, which have been introduced widely in railway stations, hotels and other public places. The machines for selling chewing-gum have met with almost equal success, while the phonographic machines are also said to have proved remunerative. As a rule, other machines have brought financial disaster to their backers, owing largely to abusive treatment received from the public. People who are otherwise honest think it smart to beat a slot-machine, and the irresponsible small boy finds continual amusement in trying to investigate the interior of the boxes. The stamp-vending machines, newspaper-machines, cigar-machines and others of the sort have proved commercial failures.

Gambling-machines of various sorts have proved profitable to their projectors. The laws of the United States render null and void any patent for a gambling-machine, hence every successful gambling-

machine has had numerous copyists, who shared in the profits of manufacture until the fad gave out or until police interference rendered the machine unprofitable. The most successful of the gambling-machines was named the "jack-pot." It had a glass front, inclosing drawers which were charged in the morning with one dollar's worth of nickels. When nickels were dropped in the slot, about one fourth of them fell into a secret drawer in the rear and the remainder fell into one of two or three front drawers in sight within the glass. Once in about twenty-five times one of the nickels unlocked a front drawer and let out the coins behind the glass, and these would then become the property of the person who dropped in the last coin. With this arrangement the proprietor of the machine reaped 25 per cent of the money handled and the gamblers always had the chance of winning what money was in sight in one of the drawers for five cents.

The mechanical arrangement of the machines is varied. Many of them use a balance, which is upset by the weight of the coin, unlocking a drawer, slide, or, in the case of a weighing-machine, a pointer. This is not always satisfactory, since the weight of the coin is so small that jarring will often open it without a coin. A preferable arrangement is a round bar having a slot deep enough to take in half a coin, and connected with an outside knob or handle. Ordinarily, the bar can be turned round and round from the outside with no result; but, when a coin is dropped in, it slips half-way into the slot in the bar and connects it with an adjoining part, so that turning the outer handle releases the commodity on sale and at the same time drops the coin into the interior drawer.

The beating of slot-machines by the use of lead nickels is provided against in some machines by forming the sides of the slot of sharp-sliding jaws, which cut into a piece of lead, reducing its size, as it is forced in, so that it fails to work the locking mechanism. The device is not a sure thing, however, and is not much used, the average slot-machine being at the mercy of any one provided with brass, iron or lead slugs the size of the required coin.

The weighing-machines have proved most profitable, partly because it is practicable to build them in a very substantial manner, and partly because there is no expense for the wares sold. The chewing-gum machines pay fairly, as the gum is a cheap article, and the manufacturers use it to advertise other goods. The stamp-machines, designed to sell two 2-cent stamps for five cents, were a failure, and swamped the company which put them on the market. A number of dice-machines and playing-card machines, of a gambling nature, have met with more or less temporary success. The various newspaper-machines all failed because of the antipathy of the newsboys, who invariably wrecked them in some manner. When all other devices failed, the simple poking of matches into the slot and breaking them off usually stopped further sales by the machine for the time.

C. H. COCHRANE.

SLOYD (Swed., *slöjd*; cf. Eng., *sleight*). See MANUAL TRAINING, in these Supplements.

SLOVAK LANGUAGE. See SLAVS, Vol. XXII, p. 153.

SLOVENISH LANGUAGE AND LITERATURE. See SLAVS, Vol. XXII, p. 150.

SLUGS. See MOLLUSCA, Vol. XVI, pp. 660-663.

SLUG-WORMS, the popular name for the larvæ of the hymenopterous saw-flies of the family *Tenthredinidæ*. These larvæ are very destructive to the foliage of fruit and ornamental trees, such as pear, rose, vine, linden and many others. Various poisonous solutions are sprayed over the trees to prevent their ravages. Commonly they are called slugs, but this is incorrect, for the true slugs are gasteropodous mollusks of the order of air-heathers (*Pulmonata*).

SLUSHING PROCESS. See COAL, in these Supplements.

SMALL-ARMS. See GUN-MAKING, Vol. XI, pp. 278-285; and in these Supplements.

SMALLEY, GEORGE WASHBURN, an American journalist; born in Franklin, Suffolk County, Massachusetts, June 2, 1833; graduated at Yale College in 1853; studied law at the Harvard Law School and practiced his profession at Boston until 1861. At the breaking out of the Civil War he became a correspondent of the *New York Tribune*. He served in that capacity until 1863, accompanying the Union army to North Carolina, Virginia and



GEORGE W. SMALLEY.

Pennsylvania, and furnishing descriptions of the battles he witnessed that secured for their author a national reputation. In the latter year he was appointed to a position in the editorial department of the *Tribune*, and afterward was sent to Europe by that paper, establishing a London bureau. His principal professional work while abroad was letters descriptive of the war between Austria and Prussia, descriptive of the Franco-Prussian War, of the death and burial of the German emperors, and of the social and political conditions existent in the countries he visited. In 1895 he became correspondent in the United States for the *London Times*. He published two notable works from his London correspondence to the *N. Y. Tribune*, viz., *London Letters*, and *Some Others* (2 vols., 1893), and *Studies of Men* (1896).

SMART, HENRY, an English organist and composer; born in London, Oct. 26, 1813; declined a commission in the Indian army to take up the study of law, but soon gave this up for music, which he studied under W. H. Kearns, although largely self-taught. He became organist of the parish at Blackburn in 1831, holding the position until 1836; and during this time composed his first important work, an anthem for the tercentenary of the Reformation, in 1835. In 1836 he removed to London, becoming organist to St. Philips Church; was appointed to the same position at St. Luke's, where he remained until 1844, when he was chosen as organist at St. Pancras Church. Mr. Smart's works include

an opera, *Bertha* (1855), and numerous oratorios and cantatas. He died in London, July 6, 1879.

SMECTYMNUUS. See MILTON, Vol. XVI, p. 328.

SMELL, DEVELOPMENT OF. See SENSE-ORGANS, in these Supplements.

SMELT. See SALMONIDÆ, Vol. XXI, p. 223.

SMELTING. See METALLURGY, Vol. XVI, p. 57; and IRON, Vol. XIII, p. 291.

SMERDIS. See PERSIA, Vol. XVIII, p. 567.

SMET, PETER JOHN DE, a Belgian missionary; born in Termonde, Dec. 31, 1801. In 1821, together with five other theological students, he sailed from Amsterdam in company of Bishop Verinx. In 1828 he went to St. Louis and assisted in establishing the University of St. Louis, and in 1838 was sent to establish a mission among the Pottawatomies. Under his direction a chapel was built, a school-house erected, and most of the tribe converted to Roman Catholicism. On April 30, 1840, he attached himself to the yearly caravan of the American Fur Company, to proceed as missionary among the Flat Head Indians of the Rocky Mountains. In 1841 he returned to St. Louis, but soon set out anew for Indian conversions, taking with him two other missionaries and several lay brothers, who were expert mechanics. After crossing the Platte River, on September 24th, the party reached Bitter Root River, where they made a settlement, and the Mission of St. Mary's was organized by the building of a house and chapel.

In December, 1843, he, together with five Jesuits and six sisters, left Antwerp, and reached Fort Vancouver in August, 1844, and located themselves on the Willamette River. In October, 1844, a convent was built for the women, and in 1845 a number of French missions were established among various tribes of Indians. On different occasions he efficiently interceded to prevent strife between the United States government and the Indians; he was also instrumental in ending the Sioux war. He wrote *The Oregon Missions and Travels Over the Rocky Mountains*; *Indian Letters and Sketches*; *Western Missions and Missionaries*, and *New Indian Sketches*. He died in St. Louis, Missouri, May 23, 1872.

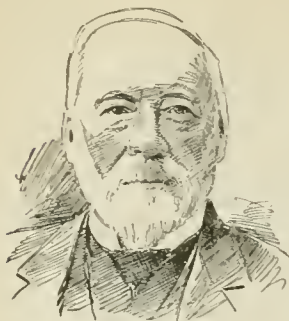
SMETHPORT, a borough and the capital of McKean County, northern Pennsylvania, 26 miles N.N.W. of Emporium and 20 miles S.E. of Bradford, on the Bradford, Bordell and Kinzua and the Western New York and Pennsylvania railroads. It is situated in a rich lumber-producing region, and has tanneries, bark-extract mills, and two large saw-mills which turn out annually ten million feet of lumber. Population 1890, 1,150; 1900, 1,704.

SMEW. See MERGANSER, Vol. XVI, p. 35.

SMILAX. See SARSAPARILLA, Vol. XXI, p. 313.

SMILES, SAMUEL, an English writer of industrial biographies; was born at Haddington, Scotland, in 1812. He was educated for the medical profession, and practiced for some time as a surgeon, but, abandoning medicine, he took to journalism, as editor of the *Leeds Times*. In 1845 he was appointed secretary of the Leeds and Thirsk railway, and for the next twenty years was connected with that and other English railways. While at Leeds

a number of young men interested in self-culture asked Smiles to talk to them on *Self-Help*, the result of which was the now famous book on that subject, which appeared in 1859. The success of the book was immediate, the English sales amounting since to over one hundred and fifty thousand copies, while it has not only been reprinted and sold by tens of thousands in the United States, but has been translated into 17 languages.



SAMUEL SMILES.

At Leeds Mr. Smiles made the acquaintance of George Stephenson, the great engineer, of whom he wrote a *Life* in 1857. To the *Self-Help* series, the chief value of which is their stimulating effect on young men, their author added *Character* (1871); *Thrift* (1875); *Duty* (1880); and *Life and Labor* (1887). Other inspiring and helpful works, enforcing everyday precepts by example, he also published, the more notable of which are *Lives of the Engineers* (1861); *Industrial Biography* (1863); *Lives of Boulton and Watt* (1865); *Thomas Edward*, the life of a Scotch naturalist (1876); *George Moore*, merchant and philanthropist (1878); *Robert Dick* (baker of Thurso), geologist and botanist (1878); *James Nasmyth* (1883); *Men of Invention and Industry* (1884); *Jasmin*, the barber-poet and philanthropist (1891); and *A Publisher and His Friends*, incidents in the career of John Murray (1891). In addition to these varied works illustrative of character and conduct of self-made men, Mr. Smiles has published two volumes of an historical character, entitled *The Huguenots in England* (1867); and *The Huguenots in France after the Revocation of the Edict of Nantes* (1873). In 1878 he received the degree of LL.D. from the University of Edinburgh.

SMILLIE, GEORGE HENRY, an American artist, son of James Smillie (1807-85), a Scotch engraver; born in New York City, Dec. 29, 1840, where he studied art and executed an occasional order during his early career. He passed nearly the entire year 1871 in the Yosemite Valley, among the cañons of the Colorado and at other scenic points in the West, engaged in sketching and painting. During 1884 he visited Europe and continued his studies. He was an academician of the National Academy, and a member of art societies in the United States and Europe. He excelled both in oil painting and in water-colors, some of his work being *Boquet River and Hills* (1869); *Under the Pines of the Yosemite* (1872); *Sentinel Rock*; and *Study on the Au Sable River* (1882).—His brother, JAMES DAVID SMILLIE, also an artist; born in New York City, Jan. 16, 1833. He studied under his father the art of engraving, and, after practicing that profession for some years, turned himself to drawing and painting. In the latter department he was largely self-taught, studying among the great mountain-ranges of the United States, and in 1862 making a short visit to Europe. From the nature of his studies, most of his work as an artist was in landscape painting. Mr. Smillie

was one of the original members of the American Water-color Society, and was elected to the National Academy in 1876. Among his paintings are *Evening Among the Sierras of California*; *The Lifting of the Clouds*; *White Mountains*; *A Scrub-Race on the Western Prairies*.

SMITH, ANDREW JACKSON, an American soldier; born in Bucks County, Pennsylvania, April 28, 1815. After graduating at the United States Military Academy he was, in 1838 appointed a first lieutenant in the First Dragoons, rising to the rank of major in 1861, previous to which time he had seen almost continual service on the frontier. Toward the close of 1861 he became colonel of cavalry, chief of cavalry of the Department of the Missouri in March, 1862, and later in the same year of the Department of the Mississippi, and the following year was commissioned brigadier-general of volunteers, and participated in the attack on Chickasaw Bluffs, the capture of Arkansas Post, the siege of Vicksburg and the Red River expedition. In 1864 he was commissioned major-general of volunteers, and was sent to drive Price from Missouri. This being accomplished, he re-enforced General Thomas and took part in the pursuit of Hood into Tennessee. He served under General Canby in 1865, and commanded a corps at the capture of Mobile. At the close of the war he was mustered out of the volunteer service, and in 1869 resigned his commission in the regular army, having during 1867-68 been chief of the department of Missouri. The same year in which he left the army he was appointed postmaster at St. Louis. By act of Congress, Jan. 22, 1889, he was reappointed colonel of cavalry and placed upon the retired list. He was recognized as being one of the ablest generals in the Union army during the Civil War, was noted for his courage and sound judgment, popular with his men and trusted by his superiors.

SMITH, BUCKINGHAM, an American antiquarian and historian; born on Cumberland Island, Georgia, Oct. 31, 1810, and after graduating at Harvard Law School returned to a family estate in Florida, and was elected a member of the territorial legislature. From 1850 to 1852 he was secretary of legation in Mexico, and during his residence there made researches in Mexican history and antiquities and Indian philology. Being appointed secretary at Madrid in 1855, he there continued his philological researches in the Spanish libraries and archives, and also made a special study of the colonial history of Florida and Louisiana, thus rendering valuable services to the historians Bancroft, Sparks and Parkman. Returning to Florida in 1859, he became a judge, and subsequently served several terms in the state senate. As an editor he produced translations of the *Narrative of Cabeza de Vaca* (1851); *Letter of Hernando de Soto and Memoir of Hernando de Escalante Fontaneda* (1854). He also translated *The Career of Hernando de Soto in the Conquest of Florida* (1864); and in addition wrote numerous articles for magazines on the early history of Florida. A part of Mr. Smith's library was purchased after his death by the New York Historical Society. He died in New York, Jan. 5, 1871.

SMITH, CHARLES EMORY, an American journalist; born Feb. 18, 1842, in Mansfield, Connecticut,



CHARLES E. SMITH.

and educated at Union College. Upon his graduation, in 1861, he became connected with the Albany (New York) papers, and served there in an editorial capacity on the *Express*, and later on the *Journal*. In 1880 he assumed charge of the *Philadelphia Press*. In 1874 he was president of the New York State Press Association, a delegate in 1876 and again in 1888 to the National Republican

Convention, and represented the United States at St. Petersburg from 1890 to 1892.

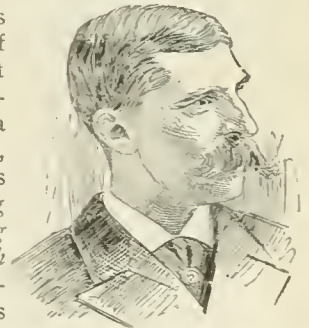
SMITH, EDMUND KIRBY, an American soldier; born in St. Augustine, Fla., May 16, 1824; graduated at West Point in 1845, and served as assistant professor of mathematics there from 1849 to 1852. In January, 1861, he was promoted major, United States Army, but on the secession of his native state, in May of the same year, he resigned his commission and joined the Confederate Army. In the Confederate service he advanced so rapidly that he became lieutenant-general in 1862, and full general in February, 1864. In February, 1863, he was assigned to the command of the Transmississippi department, which he fully organized, and the following year opposed and defeated Banks in the Red River campaign. His forces were the last to surrender. In 1866-68 General Smith was president of the Atlantic and Pacific Telegraph Company; in 1870-75 was chancellor of the University of Nashville, and thereafter professor of mathematics in the University of the South, Sewanee, Tennessee. Died there, March 28, 1893.

SMITH, ELI, an American missionary; born in Northford, Connecticut, Sept. 15, 1801. He studied at Yale and Andover theological schools, graduating from the latter in 1826, and in the same year went to Malta, where he superintended the American Board's printing-office. After serving for a time as a missionary in Syria, and traveling through Greece with Dr. Anderson, and through Georgia and Armenia with Dr. Dwight, he settled at Beirut in 1833, and was the companion of Professor Edward Robinson in his explorations of Palestine. His intimate knowledge of Arabic enabled him to render important service in the production of a new and improved form and font of Arabic type, which was cast under his supervision at Leipsic in 1839. He published *Missionary Researches in Armenia*, and from 1847 until his death he was engaged in translating the Bible into the Arabic language, which work was subsequently completed by Dr. Cornelius V. Van Dyke, New York (1866-67). He died at Beirut, Jan. 11, 1857.

SMITH, ERMINNIE ADELLE, an American scientist; born in Marcellus, New York, April 26, 1836. After being educated at Mrs. Willard's Seminary in

Troy, New York, she was married in 1855 to Simeon H. Smith, her maiden name being Platt. She became deeply interested in the study of geology making one of the finest private collections in the country; and while educating her sons in Germany devoted herself to the study of science and language, graduating from the School of Mines at Freiberg. On her return to America she gave several courses of lectures, and in 1878 engaged in ethnological work under the Smithsonian Institution, being assigned to a study of the language, customs and myths of the Iroquois Indians. In order to more fully carry out her work she lived for two summers among the remnants of the Tuscaroras in Canada. As a result of her study she obtained and classified over fifteen thousand words of the Iroquois dialect; and compiled an Iroquois-English dictionary, which was in course of printing at the time of her death. She was appointed commissioner of the department of woman's work, to represent New Jersey, at the New Orleans Exposition in 1885. She died in Jersey City, June 9, 1886.

SMITH, FRANCIS HOPKINSON, an American artist, author and engineer; born in Baltimore, Maryland, Oct. 23, 1838. As an engineer he built numerous public works, many of which were under contract with the United States government. He achieved a reputation as an artist, particularly by his works in water-colors, among which are *In the Darkling Wood* (1876); *In the North Woods* (1884); and *A January Thaw* (1887). His professional life has been spent in New York. Mr. Smith has also done some literary work of value, his writings including *Well-worn Roads* (1886); *Old Lines in New Black and White* (1886); *A Book of the Tile Club* (1887); *Colonel Carter of Cartersville* (1891); and *Tom Grogan* (1895).



F. HOPKINSON SMITH.

SMITH, GEORGE, an English Assyriologist; born in London, March 26, 1840. While pursuing his trade of bank-note engraver he studied the cuneiform inscriptions in the British Museum, and through the kindly notice and assistance of Sir Henry Rawlinson and Dr. Birch was appointed an assistant in the department of antiquities in that museum. He helped the former to prepare the third volume of *Cuneiform Inscriptions*, and through his skill as interpreter of the Assyrian monumental writing not only was able to fix the dates of important events in the history of the East, but discovered the *Chaldean Account of the Deluge*. He likewise furnished the key to the interpretation of the Cypriote character and script. In 1872 he was sent by the proprietors of the *Daily Telegraph* to Nineveh in quest of discoveries. The collections he brought home were presented to the nation. The British Museum commissioned him (1873) to return and complete the excavations he had begun among the ruin-mounds of ancient Assyria, an account of

which expedition, entitled *Assyrian Discoveries*, was published in 1875. He wrote the article **BERNOULLI**, in this *ENCYCLOPEDIA*. While on a third visit to the same regions he suddenly died, in Aleppo, Syria, Aug. 19, 1876.

SMITH, GEORGE BARNETT, an English author and reviewer; born in Ovenden, Yorkshire, May 17, 1841, and educated at the British Lancastrian School in Halifax. Going to London in 1864, he was engaged on the staff of the *Globe* and afterward on the *Echo*, in the meantime contributing literary articles to the *Edinburgh Review*. His contributions later became extended over a wide range of periodicals. His critical, literary and biographical articles are to be found in the *Cornhill Magazine*, *Fraser's* and *Macmillan's Magazines*, the *Fortnightly* and *British Quarterly Reviews*, and this *ENCYCLOPEDIA*, for which he wrote the article on **ELIZABETH BARRETT BROWNING**. Some of his larger works include *Life of Mr. Gladstone* (1879); *The Prime Ministers of Queen Victoria*; *History of the English Parliament* (1894); *Canada* (1898). He also edited *Illustrated British Ballads*.

SMITH, GERRIT, an American philanthropist; born in Utica, New York, March 6, 1797. His father had been associated with John Jacob Astor in the fur trade, and had purchased vast tracts of land in the northern part of the state of New York. Gerrit settled at Peterboro, New York, and devoted himself to the management of his estate. He was prominent in the work of the Anti-Slavery Society, and a willing contributor to every assault on the slavery system. In 1852 he was elected to Congress. He was twice nominated for governor of New York, the first time in 1840, and again in 1858, the latter time on a platform of prohibition and abolition. The war for the preservation of the Union enlisted his sympathies and active support; but at its close he was in favor of universal amnesty, and in 1867, with Horace Greeley, he signed the bail-bond of Jefferson Davis. Originally trained in orthodox belief, he became afterward a Universalist and extreme rationalist, and frequently preached in a church which he had built at Peterboro. He died in New York, Dec. 28, 1874.

SMITH, GOLDWIN, an English educator, essayist and historian; was born at Reading, Berkshire, Aug. 13, 1823, and educated at Eton and Oxford. He gained, in 1842, the Hertford scholarship, and in 1845 the scholarship founded by Dean Ireland. In the latter year he graduated as first class in classics, and in 1847 was elected fellow of University College. He acted as secretary to the Oxford University Commission, and was a member of the Popular Education Commission

appointed in 1858, and compiled the government *Blue Book* on the subject. In 1858 he was ap-

pointed regius professor of modern history at Oxford, and held this chair till 1866. His tenure of the chair was marked by the delivery of a number of brilliant lectures. Professor Goldwin Smith was a prominent champion of the American Federal Government during the Civil War. In 1864 he visited the United States, and on his return he published *England and America* (1865) and *The Civil War in America*. In November, 1868, having resigned his chair at Oxford, he filled for a time the chair of English and constitutional history in Cornell University at Ithaca, New York. In 1871 he removed to Toronto, Canada, where he has since resided. Here at various times he edited the *Canadian Monthly*, *The Week* and *The Bystander*. His political writings in many instances provoked a good deal of criticism, which, however, is but a tribute to the importance of his utterances. On some subjects of Canadian national interest he held views that did not recommend themselves to many of the inhabitants of the Dominion, but there are few who deny the purity of his motives or are uninfluenced by the excellence of his style. During his occasional visits to England Mr. Goldwin Smith wrote much for the English reviews, and during the Home Rule controversy of 1886 his voice was raised on the platform and in the press, in the opposition to Mr. Gladstone's proposals.

Mr. Goldwin Smith's writings, which are distinguished by a great power of luminous expression, embrace *Lectures on the Study of History* (Oxford, 1861); *Irish History and Irish Character* (1861); *Three English Statesmen* (Pym, Cromwell, and Pitt); a monograph on *Coxeper*, the poet (1880), for Morley's English Men of Letters Series; *Jane Austen* (1890), in the Great Writers Series; *False Hopes*, a brochure on Socialistic Fallacies; *The Moral Crusader*, a memoir of William Lloyd Garrison (1892); *The United States*, an outline, remarkable for its acute and compact thought, on American political history from 1492 to 1871; *Essays on Questions of the Day* (1804); *A Trip to England* (1894), a *résumé* of English historical and social life, designed for tourists; *Oxford and her Colleges* (1895), and two volumes of metrical English translations from the chief Latin and Greek poets, entitled *Bay Leaves* (1893), and *Specimens of Greek Tragedy* (1894). To these works have to be added his later writings, *Guesses at the Riddle of Existence* (1896), a collection of essays and reviews on ethical and religious subjects; and a political history of England, the crowning work of the author's literary life, entitled *The United Kingdom* (2 vols. 1899).

SMITH, GREEN CLAY, an American soldier; born in Richmond, Kentucky, July 2, 1830. After serving as a volunteer in the cavalry, during the Mexican War, he graduated from Transylvania University and Lexington Law School, and in 1853 began the practice of his profession at Covington. At the outbreak of the Civil War he was a member of the Kentucky legislature, and became known as a defender of the national government. He was appointed colonel of the Fourth Kentucky



GOLDWIN SMITH.

cavalry early in 1862, and in June of the same year was commissioned brigadier-general of volunteers. Having been elected to Congress, he resigned his commission in the army in 1863. General Smith was a candidate for the Vice-Presidency before the Republican Convention in 1864, and came within one vote of receiving the nomination. In 1866 he was appointed territorial governor of Montana, where he remained three years. He was ordained to the ministry of the Baptist Church in 1869, and devoted himself to work as an evangelist; was the candidate of the Prohibition party for President in 1876. He was called in 1890 to the pastorate of the Metropolitan Baptist Church in Washington, District of Columbia, where he died June 29, 1895.

SMITH, GUSTAVUS WOODSON, an American soldier; born in Scott County, Kentucky, Jan. 1, 1822; graduated at the United States Military Academy in 1842, and was for the two years following engaged as an engineer in the construction of fortifications; for the next two years was assistant professor of engineering at the United States Military Academy, but at the outbreak of the war with Mexico he entered upon active service, and was given charge of the sappers, miners and pontoniers at the siege of Vera Cruz, and in the subsequent operations of the war took a prominent part, receiving the brevets of first lieutenant and captain. He was again assistant professor of engineering at West Point from 1849 to 1854, but in the latter year resigned his commission in the army. After this he was at various times engaged in the construction of government buildings, and in iron-works at Trenton, New Jersey. In 1858 he was appointed street commissioner of New York City, and held this position until 1861, when he returned to Kentucky and entered the Confederate service, being commissioned major-general in September of the same year. Early in 1862 he succeeded General Joseph E. Johnston, who had been severely wounded at Fair Oaks, in the temporary command of the Army of Northern Virginia. He later commanded at Richmond, and in 1864-65 was commander of the state forces of Georgia. In 1866-70 he was in charge of the Southwest Iron Company's works at Chattanooga, Tenn.; and in 1870-76 was insurance commissioner of Kentucky. In 1876 he removed to New York. Died there, June 23, 1896.

SMITH, HENRY BOYNTON, an American Presbyterian clergyman; born in Portland, Maine, Nov. 21, 1815; graduated at Bowdoin College in 1834, and studied theology at Andover and Bangor theological seminaries, and subsequently at Halle and Berlin, Germany. From 1842 to 1847 he was pastor of the Congregational church at West Amesbury, Massachusetts, and from 1847 to 1850 professor of mental and moral philosophy at Amherst College. In 1850 he was called to the chair of church history in the Union Theological Seminary at New York City, and in 1854 he became professor of systematic theology there. He held this position for twenty years, after which he resigned on account of ill-health. He was

the founder, in 1859, of the *American Theological Review*, consolidated in 1862 with the *Presbyterian Review*, and in 1871 with the *Princeton Review*. He was the editor and part translator of Gieseler's *Church History* (1859-63); editor of revised translations of Hagenbach's *History of Christian Doctrine* (1861-62); and Stier's *Words of the Lord Jesus* (1864-65). His own writings include a *History of the Church of Christ in Chronological Tables* (1859); and, published after his death, an *Introduction to Christian Theology* (1883); and a *System of Christian Theology* (1884). He died in New York, Feb. 7, 1877.

SMITH, HOKE, an American lawyer and journalist; born in Newton, North Carolina, Sept. 2, 1855. He went to Georgia in 1872 to study law, and while studying engaged in teaching school. He was admitted to the bar in 1873, and soon became conspicuous in both legal and political circles, canvassing northern Georgia in 1877 in behalf of the movement to have the state capital transferred to Atlanta.

In June, 1887, he organized and became president of the *Atlanta Evening Journal*, which became popular by its support of tariff reform. In March, 1893, President Cleveland appointed him Secretary of the Interior, but being out of sympathy with the administration on the financial question, he resigned in August, 1896.

SMITH, JAMES, a signer of the Declaration of Independence; born in Ireland about 1720; emigrated to America, and settled in Pennsylvania in 1729. Upon the call for volunteers against Great Britain in 1774, he enlisted the first company raised in Pennsylvania. He was one of the delegates to the convention called for June 18, 1776, and proclaimed himself in favor of declaring the colonies independent of the mother country. He participated in the deliberations of the Pennsylvania constitutional convention of July 15, 1776, and five days later he was elected a representative in the Continental Congress, where he served until 1778, going the next year to the legislature of Pennsylvania as a representative, and in 1784 he was again elected to Congress. He died in York, Pennsylvania, July 11, 1806.

SMITH, JOSEPH. See MORMONS, Vol. XVI, pp. 825-828.

SMITH, MELANCTON, an American naval officer; born in New York City, May 24, 1810. In 1826 he entered the United States navy as a midshipman, and during the interval from this time to 1839 was on duty in the Pacific and West India squadrons, at the naval school, and at the navy-yards in Brooklyn and Pensacola. He was ordered to the *Poinsett* in 1839, to assist the land forces in the Seminole campaign in Florida, and from this time until 1861 he was on duty, at va-



HOKE SMITH.

rious times, in the Mediterranean squadron, at the Brooklyn and Pensacola navy-yards, on store and receiving ships, and as inspector of lighthouses. From 1861 to 1863 he was attached to the Gulf blockading squadron, taking part in the attacks on New Orleans and Port Hudson. In December 1864, and January, 1865, he engaged, while commanding the frigate *Wabash*, in the attacks on Fort Fisher. He was commissioned a commodore in 1866 and a rear-admiral in 1870. In the latter year he was appointed commandant of the Brooklyn navy-yard, and in 1871 was placed upon the retired list. After his retirement he became governor of the Naval Asylum in Philadelphia. He died in Green Bay, Wisconsin, July 19, 1893.—His son, JAMES SMITH, was an officer on board the *Congress* when the latter was sunk by the *Virginia*.

SMITH, MUNROE, an American educator; born in Brooklyn, New York, Dec. 8, 1854; graduated at Amherst College in 1874, took his degree in law at Columbia College, and later studied at the universities of Berlin, Leipsic and Göttingen. Returning to America in 1880, he became lecturer on Roman law in Columbia, and at the same time instructor in history. In 1883 he was appointed adjunct professor of history, and in 1891 professor of Roman law and comparative jurisprudence at Columbia. From 1886 to 1893 he was managing editor of *Political Science Quarterly*, and contributed articles to various periodicals.

SMITH, ROBERT ANGUS, a Scotch chemist; born near Glasgow, Feb. 15, 1817; studied at Glasgow, and under Liebig at Giessen, and after returning to England was employed on a government sanitary mission in the towns of Lancashire. He made investigations in regard to the effect of carbonic-acid gas on the circulation of the blood, and devoted himself to a special study of disinfectants, doing much to promote the use of carbolic acid. At one time he was inspector-general of alkali works in the United Kingdom, and for a time inspector of the pollution of rivers. His taste for the study of antiquities is shown in his monographs on Iceland, his *Loch Etive and the Sons of Uisnach*, and *Science in Early Manchester*. Some of his other works include a *Life of Dalton*, and *History of the Atomic Theory up to his Time*; a *Memoir on the Action of Disinfectants*; *Air and Rain*. He died in Manchester, May 12, 1884.

SMITH, ROBERT PAYNE, an English Orientalist; born in Gloucestershire, in November, 1818, and graduated at Oxford. After taking orders in the Church of England, he became sublibrarian at the Bodleian library in 1857, regius professor of divinity in 1865, and dean of Canterbury in 1871. In 1873 he visited the United States as a delegate to the General Conference of the Evangelical Alliance. He was a member of the Committee on Old Testament Revision. His works include a Latin catalogue of Syriac manuscripts in the Bodleian library; *Commentary on St. Luke's Gospel*; a translation from the Syriac of Cyril of Alexandria; a translation, from the same language, of the *Ecclesiastical History of John of Ephesus* (1860);

Messianic Interpretation of the Prophecies of Isaiah (1862); *Prophecy as a Preparation for Christ*; and contributions to various works. He died April 1, 1895.

SMITH, ROSWELL, an American publisher; born in Lebanon, Connecticut, March 30, 1829; graduated from Brown University, and in 1850 married Annie Ellsworth, granddaughter of Chief Justice Ellsworth. After studying law, Mr. Smith settled in Lafayette, Indiana. While in Europe in 1868, he made the acquaintance of Dr. J. G. Holland, and together with the latter and Charles Scribner founded *Scribner's Monthly* in 1870. Having, in 1881, obtained a controlling interest in the monthly, he changed the name to the *Century Magazine*, and became founder and president of the Century Publishing Company. *St. Nicholas*, a magazine for children, was founded by him in 1873. About this time he established, in England, an agency for the sale of his magazines, thus bringing about the circulation of American magazines there, where they soon became popular. Among his other undertakings was the organization of the *Century Dictionary* enterprise, under the editorship of Prof. W. D. Whitney. Mr. Smith died in New York City, April 18, 1892.

SMITH, SAMUEL FRANCIS, an American clergyman and hymn-writer; born in Boston, Massachusetts, Oct. 21, 1808; graduated from Harvard, and Andover Theological Seminary. Entered the Baptist ministry in 1832; professor of modern languages at Waterville, Maine (1834-42); in 1842 removed to Newton, Massachusetts, where he conducted the *Christian Review* for seven years and wrote hymns. In 1875-76, and again in 1880-82, he visited the chief missionary stations in Europe and Asia. His most noted compositions are *My Country, 'tis of Thee*, the national anthem, which was written while he was a theological student at Andover in 1832; and *The Morning Light is Breaking*, a favorite missionary hymn, written at the same time and place. An enthusiastic reception was given him on April 3, 1895, in Music Hall, Boston; on the same day, in many schools all over the country, the children paid him the compliment of singing his great national anthem. He died in Boston, Nov. 16, 1895.



REV. SAMUEL F. SMITH.

SMITH, SIR WILLIAM, an English classical scholar; born in London, England, May 20, 1813; graduated from London University; professor of the Greek and Latin languages and literature at New College, St. John's Wood, London; editor of the *Quarterly Review* from 1867 till his death. He edited classical and Biblical dictionaries, the best known of which are devoted to *Greek and Roman Antiquities* (2 vols., 2d. ed. 1891); *Biography and Mythology* (1849); *Geography* (1852-57); *The*

Bible (1860-63); and *Christian Antiquities*; also an *English-Latin Dictionary* (1871) and *A Biblical and Classical Atlas* (1875). He was for several years classical examiner in the University of London, and was knighted in 1892. He died Oct. 7, 1893.

SMITH, WILLIAM FARRAR, an American soldier; born in St. Albans, Vermont, in 1824; graduated at West Point in 1845; served there as assistant professor of mathematics (1846-48). In 1859-61 he was engineer-secretary of the United States Lighthouse Board. In August, 1861, he became brigadier-general of volunteers and participated in the Virginia Peninsular campaign. In July, 1862, he was appointed major-general of volunteers, and led his division at South Mountain and Antietam. On Oct. 27, 1863, he saved the Army of the Cumberland from capture by a skillful movement at Brown's Ferry. He resigned his army commission in 1865, when he became president of the International Telegraph Company. In 1875 he was made police commissioner of New York City, and subsequently became president of the board. In the army he was known as "Baldy Smith." By act of Congress he was reappointed major-general, February, 1889, and placed on the retired list.

SMITH, WILLIAM HENRY, an English statesman; born in London, June 24, 1825; the son of the well-known newsdealer and publisher of the same name, and a partner in his firm; entered Parliament in 1868 as a Conservative, defeating John Stuart Mill, and remained in the Commons up to his death; Financial Secretary of the Treasury from 1874 to 1877, when he was appointed First Lord of the Admiralty. In January, 1886, he was appointed Chief Secretary for Ireland, but the Salisbury government fell immediately afterward. In Lord Salisbury's second administration he was appointed Secretary of State for War. When the ministry was reconstructed on the resignation of Lord Randolph Churchill, Mr. Smith became First Lord of the Treasury, and leader of his party in the House of Commons. He was a member of the first and second London school boards, and gave much interested attention to educational problems. Died at Walmer Castle, Oct. 6, 1891.

SMITH, WILLIAM HENRY, a newspaper man; born in Austerlitz, N. Y., Dec. 1, 1833; removed, when a lad, to Ohio; joined the staff of the *Cincinnati Gazette*; was twice secretary of state of Ohio; Chicago manager of the Associated Press (1870); collector of customs for Chicago under President Hayes, whose literary executor he subsequently became; in 1883 effected the union of the Western and New York Associated Press organizations, presiding over the consolidation for several years; published *St. Clair Papers* (2 vols., 1882); *Biography of Charles Hammond*; and *Political History of the United States*. Died at Lake Forest, near Chicago, July 27, 1896.

SMITH, WILLIAM ROBERTSON, a Scotch Orientalist and theologian; born at Keig, Aberdeenshire, Scotland, Nov. 8, 1846. From his father, a Free Church minister, he received his early education, supplemented by a university course at

Aberdeen, where he graduated, with a scholarship in mathematics, in 1865. He subsequently studied theology at Edinburgh, and at Bonn and Göttingen. In 1870 he was elected to the chair of Hebrew and Old Testament exegesis at the Free Church College, Aberdeen, which turned the bent of his mind from the metaphysics of science to Biblical criticism, and, later on, was to get him into much



WILLIAM ROBERTSON SMITH.

trouble for his views on Bible interpretation, especially the rejection of the Mosaic authorship of the Book of Deuteronomy. These views were first enunciated in the articles ANGEL (see Vol. II, pp. 26-28) and BIBLE (see Vol. III, pp. 634-648), contributed in 1875 to this ENCYCLOPÆDIA, which expressed views at variance with the "standards" of the Free Church of Scotland, under whose auspices he held his professorship at Aberdeen. The views so fearlessly expressed by the writer of the articles were those with which German scholarship has made the world familiar. Their publication led to a prosecution for heresy, in which Professor Smith so admirably defended himself that no formal judgment was passed by the church on his opinions. He had, however, raised such a polemical storm throughout Scotland that when his later article on HEBREW LANGUAGE AND LITERATURE appeared in 1880, in the same ENCYCLOPÆDIA (see Vol. XI, pp. 594-602), he was forbidden to teach for two sessions, and finally removed from his chair without a trial. During his suspension Professor Smith traveled in Egypt and Arabia, and when he was dismissed he was invited by six hundred prominent Free Churchmen in Edinburgh and Glasgow to deliver two series of lectures, which were republished in *The Old Testament in the Jewish Church* (1881) and *The Prophets of Israel, and Their Place in History* (1882). In 1881 Professor Smith, who had settled in Edinburgh, became associated with Professor T. Spencer Baynes in the editorship of the ENCYCLOPÆDIA BRITANNICA, and on the death of his colleague in 1887, he became editor-in-chief. In 1883 he was appointed lecturer on Arabic at Cambridge; two years afterward was elected to a fellowship in Christ's College, and in 1889 succeeded to the chair of Arabic at the university. In the intervals of teaching he indulged his taste for travel, and was assiduous as a writer on Oriental subjects, and especially those in the departments of Biblical research. The fruit of his Arabian travels appeared in 1885, in a work on *Kinship and Marriage in Early Arabia*. The variety, scope and learning of his publications embody immense erudition. (For a list of his contributions to this ENCYCLOPÆDIA, see INDEX.) During the years from 1889 to 1891 he delivered, at Aberdeen, the Burnett lectures on Semitic peoples and their religion, which in 1889 were embodied in the vol-

ume, *Religion of the Semites: Fundamental Institutions*. The main topic of this book is the origin and theory of sacrifice. Professor Smith also prepared the volume on *Isaiah* (1879) for Professor Perowne's *Cambridge Bible for Schools*. He was an able and fearless investigator and writer. He died at Cambridge, March 31, 1894.

SMITH CENTER, a city and the capital of Smith County, northern Kansas, 65 miles N. of Russell, and 100 miles N.W. of Salina, on the Chicago, Rock Island and Pacific railroad. Grain and live-stock are extensively produced, and limestone is found in the vicinity. The city is a shipping-point and trade-center. Population 1900, 1,142.

SMITH COLLEGE, a non-sectarian institution of learning for the education of young women in letters, sciences, music and art, founded at Northampton, Massachusetts, in 1871, by Miss Sophia Smith. In 1875 a charter was granted it by the state of Massachusetts. The course is four years in letters, sciences and art, and three years in music. Up to 1895, 1,006 students had graduated here. In that year there were 60 instructors and 850 students, with a library of 6,000 volumes, an endowment fund of \$500,000, and an annual revenue, from all sources, of \$124,603. There are 18 buildings on the campus, besides an observatory and a botanical garden. The founder, Sophia Smith (a niece of the philanthropist, Oliver Smith (1766-1845), who bequeathed his large fortune to the "Smith Charities," a benevolent undertaking that expends the interest of its funds of over \$1,000,000 in marriage portions to poor young couples,) was born in Hatfield, Massachusetts, Aug. 27, 1796. At the age of 65 she inherited a fortune and resolved to found an institution that should give to young women the same educational advantages obtained by young men in the best universities. Besides giving \$387,468 to Smith College, she endowed a preparatory school at Hatfield, Massachusetts, with \$75,000. She died June 12, 1870.

SMITH'S FALLS, a village of Lanark County, extreme eastern Ontario, Canada, 12 miles E. of Perth, and about 55 miles S.S.W. of Ottawa, on the Rideau River and canal, and on the Canadian Pacific railroad. There is good water-power here, and the village has saw, shingle, flour, woolen and carding mills, farm-implement and malleable iron works, foundry, bolt and stove factories. Population 1891, 3,864.

SMITHSON, JAMES, an English philanthropist; born in England about 1754. He was a natural son of Hugh Smithson, third duke of Northumberland. For a time he bore the name of James Lewis Macie, but in 1791 changed it to James Smithson. In 1786 he graduated at Oxford, with a high reputation as a chemist. He spent much time in traveling on the European continent, engaged in scientific observations, carrying with him a portable laboratory, and formed a large collection of gems and minerals; was elected a member of the Royal Society of England, and of the French Institute. He bequeathed his property, about £120,000, to a nephew, on the condi-

tion that, should the latter die without heirs, the estate be "left to the United States, for the purpose of founding an institution at Washington, to be called the Smithsonian Institution, for the increase and diffusion of knowledge among men." The nephew died in 1835, without heirs, and the property came into the possession of the United States government, amounting to \$508,318.46. He died in Genoa, Italy, June 27, 1829.

SMITHSONIAN INSTITUTION. James Smithson's bequest has been swelled by subsequent additions to about \$900,000, held, as a deposit, at 6 per cent in the United States Treasury. The



THE SMITHSONIAN INSTITUTION.

board of regents is composed of the chief justice of the United States; three Senators, appointed by the Vice-President of the United States; three Representatives, appointed by the Speaker of the House; and six citizens, chosen by Congress. The President and Vice-President of the United States, and Cabinet officers, and such honorary members as they may elect, form a board of visitors. The secretary is in reality the general manager of this institution, which has grown to vast proportions, and includes under its supervision a Bureau of Publications, a Bureau of Ethnology (with special appropriation from Congress), an Astrophysical Observatory, a National Zoölogical Park, and a National Museum, these two last institutions being now sustained entirely by funds appropriated yearly by Congress. The library and the assembly hall complete the list of buildings, of imposing proportions, wherein are deposited the superb collections of the Smithsonian Institution and its annexes.—**JOSEPH HENRY** was the first secretary (1846-77), and organized the system under which the establishment was set to work; also the meteorological bureau, that was transferred later to the government as the Weather Bureau.—The second secretary, **SPENCER FULLERTON BAIRD** (1877-88), secured the erection of the museum building and conducted extensive biological researches in the waters of North America.—The third secretary, **SAMUEL PIERPONT LANGLEY** (1888), established the Zoölogical Park and the Astrophysical Observatory, and secured important donations and bequests. See also **SOCIETIES**, Vol. XXII, p. 223; and **NATIONAL MUSEUM**, in these Supplements.

SMITHSONITE. See MINERALOGY, Vol. XVI, p. 398.

SMITH-WILLIAMS, MRS. MARIAN MCKENZIE, an English singer; born in Plymouth, England; was awarded the Parepa-Rosa scholarship, the Westmoreland scholarship, and the gold medal for declamatory singing at the Royal Academy of Music, London, being a pupil of Randegger for voice-culture and Walter Lacy for elocution. She was a high-class oratorio singer, and achieved great success in ballad and classic concerts. She was elected an associate member of the Royal Academy of Music.

SMOKELESS POWDER. See GUNPOWDERS, in these Supplements.

SMOLT, a growth stage. See SALMONIDÆ, Vol. XXI, pp. 224, 225.

SMUTS, a name given to species of the parasitic order *Ustilagineæ*, a group of fungus plants which produce, usually in connection with the grains of cereals, masses of black spores, known as "smut." The best-known smuts are those which infest oats, rye, corn and wheat.

SMYRNA, a town of Kent County, northern central Delaware, 12 miles N. of Dover and 36 miles S. of Wilmington, on Duck Creek, and on the Philadelphia, Wilmington and Baltimore railroad. It is an important shipping-point for peaches, which are very extensively raised in the surrounding country; has ship-building interests, and contains farm-implement works, peach-basket factories, and manufactures of hosiery, shirts and phosphate. Population 1890, 2,455; 1900, 2,168.

SMYRNA, GULF OF, an inlet of the Ægean Sea, on the west coast of Asiatic Turkey, so-called from the city of Smyrna, which stands at its head. It is forty miles long, is about twenty miles in greatest breadth, and contains several islands. Its waters are deep, and it affords good anchorage.

SMYTH, CHARLES PIAZZI, a Scotch astronomer; born in Naples in 1819, and died in February, 1900; was educated in England, and adopted astronomy as his life-work. He commenced his astronomical service at the Cape of Good Hope Observatory, under Sir T. Maclear, in 1835, and subsequently assisted in the re-measurement of La Caille's South African arc of the meridian. He was appointed, in 1845, to succeed Thomas Henderson, first astronomer royal for Scotland in the Royal Observatory, Edinburgh. He applied himself at once to clearing off five years' arrears of computation and printing, and next to continuing meridian star observations. In 1858 he was appointed to prepare for the government all the meteorological deductions furnished by 55 observing-stations. In 1856, soon after his marriage, he spent several months in testing, with his wife, the qualities of the Peak of Teneriffe for star-observation above the level of the clouds. In 1859 he visited the Russian observatories. In 1864 and 1865 he visited the great pyramid in Egypt. In 1872 he began to compose a comprehensive star catalogue and ephemeris of all the Edinburgh and best contemporary observations

of the same stars, which new kind of catalogue was published in 1877 in the fourteenth volume of the Edinburgh Observatory publications, and in 1886 as the fifteenth volume. Then, with imperfect instruments and insufficient means for rectifying their errors, in his secluded residence in the little town of Ripon, he endeavored, on his own scanty resources alone, to complete a sixteenth quarto volume of the Edinburgh Observatory series, devoted to spectroscopy. He applied for retirement in 1888, and was rewarded with a small pension. Among his other works are *Life and Work at the Great Pyramid* (3 vols., 1867), and *Antiquity of Intellectual Man* (1869).

SMYTH, EGBERT COFFIN, an American divine, the son of William Smyth (1797-1868), a professor at Bowdoin, and the author of numerous mathematical text-books; born in Brunswick, Maine, Aug. 29, 1829. Graduating from Bowdoin College in 1848, he studied divinity at Bangor, Maine, and was successively professor of rhetoric (1854-56) and of natural and revealed religion (1856-63) at Bowdoin College. In 1863 he was called to the chair of ecclesiastical history in Andover Seminary, and in 1878 was appointed president of the faculty. In 1886 he was called before the board of visitors to answer 16 counts relating to doctrines inculcated by five professors, and the board found that the president himself taught beliefs inconsistent with the creed of the seminary. The supreme court of Massachusetts declared the decision void, through violation of technicalities. Dr. Smyth edited the *Andover Review* from its creation in 1884.—His brother, SAMUEL PHILLIPS NEWMAN SMYTH, an American clergyman and author; born in Brunswick, Maine, June 25, 1843; graduated from Bowdoin in 1863 and Andover Seminary in 1867; served as officer in the Maine Volunteers during the Civil War. He filled the pulpits of Congregational churches in Providence, Rhode Island, and Bangor, Maine (1870-75), of the First Presbyterian Church, Quincy, Illinois (1876-18), and of the First Congregational Church, New Haven, Connecticut, after 1882. In sympathy with his brother in the "new theology" movement, he wrote *The Religious Feeling* (1877); *Old Faiths in New Light* (1879); *The Orthodox Theology of To-Day* (1881); *Personal Creeds* (1890).

SMYTH, JOHN. See INDEPENDENTS, Vol. XII, p. 725.

SNAGBOAT, a steamboat provided with machinery and tools for removing snags that impede navigation. Lieutenant-Colonel Charles R. Suter of the United States Snag-Boat Service has designed the latest form. They are very strongly built, of iron and steel, and have twin bows, between which there is an opening of about twenty-five feet. These bows are connected, some fifteen feet or more from the prows, by a very stout steel beam, named the butting-beam, because it is run up against and under the snags to raise them so that they can be sawed off or hoisted by means of sheer-legs, derricks and tackle. After the trunks of the snags are sawed off, the roots are usually hauled to some deep spot and sunk.

One of the snag-boats will butt with a force of 800 tons, while the capstans and purchases have a pulling-power of 225 tons. The government snagboats are principally employed on the Mississippi and Missouri Rivers, and some of them remove as many as 2,000 snags in a year.

SNAKE INDIANS. See **INDIANS**, Vol. XII, p. 827.

SNAKE-POISONING OR SNAKE-BITES. See **SNAKES**, Vol. XXII, p. 191.

SNAKE RIVER, the largest affluent of the Columbia River, rises among the Rocky Mountains, near the western border of Wyoming, sweeps in a rough semicircle through southern Idaho, forming here the famous Shoshone Falls, and, turning north, divides Idaho from Oregon and partly from Washington. At Lewiston it turns westward, and in southern Washington, under the name of the Lewis River or Fork, joins the Columbia, after a course of some one thousand and fifty miles. It traverses a very mountainous country, flowing through deep lava-walled cañons, and is navigable for steamboats only to Lewiston (160 miles). In Idaho its waters are of value to the herds on the winter range. Its chief affluents are the Boise, Owyhee, Malheur, Salmon, Clearwater and Palouse. For **SNAKE PLAIN AND RIVER**, see **IDAHO**, Vol. XII, p. 697; and **OREGON**, Vol. XVII, p. 822.

SNAPDRAGON. See **HORTICULTURE**, Vol. XII, p. 249.

SNAPPER, a common name for the voracious carnivorous fishes of the family *Lutjanidae*. There are several species in the United States. Among them may be mentioned the red-snapper (*Lutjanus vivanus*), of the Gulf states. This is a large, red-colored fish, valuable as food. The gray mangrove snapper is *L. griseus*. Young bluefish are often called snappers. The term is also often applied to the well-known snapping-turtle (*Chelydra serpentina*).

SNAPPING-TURTLE. See **TORTOISE**, Vol. XXIII, p. 458.

SNEEZING. See **RESPIRATION**, Vol. XX, p. 479.

SNELUS, GEORGE JAMES, an English scientist and metallurgist; born in Camden Town, London, June 25, 1837. His widowed mother being in straitened circumstances, he became, quite early in life, a teacher of science and art; later was able to attend Owens College, Manchester, and in the examinations of May, 1864, was awarded, in competition with students from all parts of Great Britain and Ireland, the first of the Royal Albert scholarships, besides the gold medal for physical geography and a three years' free education at the Royal School of Mines. These years witnessed a series of triumphs for Mr. Snelus, who finally graduated as an associate in mining and metallurgy. Appointed chief chemist of the Dow-laid Works in 1867, he was chosen, in 1871, by the British Iron and Steel Institute, to go to the United States and investigate the Danks rotatory puddling process. (See **IRON**, Vol. XIII, p. 323.) On his return he began working on a new process

for making steel, which proved so novel and successful that in 1883 he was awarded a gold medal by the Iron and Steel Institute for being "the first to make pure steel from impure iron in a Bessemer converter lined with basic materials." Millions of tons of steel have been made according to this process from phosphoric iron, until then worthless for that purpose. He was awarded a gold medal at the Paris Exposition in 1878 for his fine exhibit illustrating the making of steel all over the world, and was elected a fellow of the Royal Society in 1887. Among his many monographs, the best, perhaps, is one entitled *Iron and Steel in Chemistry as Applied to the Arts and Manufactures*. See also **IRON**, Vol. XIII, pp. 334, 346.

SNIDER RIFLE. See **GUNMAKING**, Vol. XI, p. 282.

SNIPEFISH, a number of strange fishes with long jaws. The best example is the exceedingly rare *Nemichthys*, from the deep seas. The name is also given to species of *Macrorhamphosus*, a fish with long triangular mouth, allied to the sticklebacks, and found on English coasts.

SNOHOMISH, a city and the capital of Snohomish County, northwestern central Washington, 38 miles N. N. E. of Seattle, on the Snohomish River, and on the Everett and Monte Cristo, the Great Northern and the Seattle, Lake Shore and Eastern railroads. It is in a district rich in timber and devoted largely to farming and hop-raising, has steamboat connection with Seattle, and contains numerous saw and shingle mills, several sash and door factories, and water-works; is lighted by electricity and traversed by electric street-railways. There are schools, banks, several churches, a triweekly and three weekly newspapers. Population 1890, 1,993; 1900, 2,101.

SNOILSKY, KARL JOHAN GUSTAF, COUNT, a Swedish poet; born in Stockholm, Sweden, Sept. 8, 1841; graduated from the Upsala University, entered the Ministry of Foreign Affairs and rose to be chief of division. His poems having grown very popular, he gave up diplomacy for the profession of letters in 1879; in 1890 was appointed librarian of the Royal Library at Stockholm; was elected a member of the Swedish Academy in 1876. He translated many of Goethe's *Lieder*, and wrote *Dikter* (1861, 1869, 1881, 1883 and 1887); *Orchideer* (1862); *Sonnetter* (1871); *Seenska Bilder* (1886).

SNOW. See **METEOROLOGY**, Vol. XVI, p. 154.

SNOW, FRANCIS HUNTINGDON, an American educator and scientist; born in Fitchburg, Massachusetts, in 1842. He graduated at Williams College in 1862, and later at Andover Theological Seminary; went to Kansas, in 1866, to take the chair of science in the first faculty of the University of Kansas, where he remained, being elected president of the University in 1889. While in charge of the natural history departments he collected over 200,000 specimens, and first put into practical operation the plan of exterminating chinch-bugs by infection with a fungus disease.

SNOWBALL. See GUELDER ROSE, Vol. XI, p. 244.

SNOWBERRY, a name given to the fruit of two plants common in the United States and Canada: 1. *Symphoricarpos racemosus*, a member of the honeysuckle family, with clusters of snow-white berries in autumn; and 2. *Chiogenes hispida*, one of the heaths of cool peat-bogs and low mossy woods, with slender, creeping stems, small leaves beset with rusty bristles, and white berries in summer.

SNOWBIRD. See BUNTING, Vol. IV, p. 525.

SNOWDEN, JAMES ROSS, an American numismatist; born in Chester, Pennsylvania, in 1810; graduated from Dickinson College; studied law, and began practicing it at Franklin, Pennsylvania; elected member, later speaker, of the Pennsylvania legislature (1842-44); state treasurer (1845-47); treasurer of the United States mint at Philadelphia (1847-50) and director of the same mint (1853-61). He gave his whole attention to the study of old coins and the history of coinage in all times and countries. He wrote *The Mint at Philadelphia* (1861); *The Coins of the Bible, and Its Money Terms* (1864); also two beautifully illustrated volumes devoted to the coins and medals in the collection of the United States mints (1861). He wrote an *Historical Sketch of the Six Nations of Indians* (1867). He died in Hulmeville, Pennsylvania, March 21, 1878.

SNOWDROP TREE. See ARBORICULTURE, Vol. II, p. 320.

SNOWFLAKE. See *Leucium*, under HORTICULTURE, Vol. XII, p. 252.

SNOW-GOOSE. See GOOSE, Vol. X, p. 777.

SNOW HILL, a city, chartered in 1894, and the capital of Worcester County, extreme southeastern Maryland, 20 miles S.S.E. of Salisbury and 5 miles from Chincoteague Sound, at the head of navigation, on Pocomoke River, and on the Philadelphia, Wilmington and Baltimore railroad. It has steamboat communication with Baltimore, and does a large shipping-trade in oysters, lumber, fruit and garden-truck. The other industries include flour, saw and planing mills. Population 1890, 1,483; 1900, 1,596.

SNOW-PLOWS. Special mechanical devices for removing snow-drifts are now made and used on all the principal North American railways, and such machines have also recently been exported from the United States to Hungary and Russia. A pattern known as the "Leslie," which may be taken as fairly typical, is arranged on an 8-wheel car, and consists of a horizontal driving-shaft 9 inches in diameter, and provided with 12 cutting-blades. The other end of the shaft is connected with an engine located in the car, and capable of generating 800 horse-power and of rotating the plow with a load at a speed of 120 to 220 times in a minute. This cutting-wheel is inclosed in a drum-casing open at the front end, so arranged that the snow can be thrown out either side to a distance. The steam necessary to drive the engine is supplied by the locomotive behind it, from which it is carried by an extensible pipe-

connection. A second locomotive is required for pushing, and behind this follows the train, usually containing another locomotive and some freight-cars to give added weight. In operation such a mechanism, with its attachments, has removed a drift 1,386 feet long and 11 feet high in less than 8 minutes.

SOAKING-PITS. See IRON AND STEEL, in these Supplements.

SOANE, SIR JOHN, an English architect; born in Reading, Sept. 10, 1753. He studied architecture, and was awarded a traveling-scholarship of the Royal Academy; architect of the Bank of England in 1788; designed several of the fine country seats of the English nobility; and was elected professor of architecture at the Royal Academy in 1806. At his death he bequeathed to the nation his own house in Lincoln's Inn Fields, and the valuable art and antiquarian museum it contained, including pictures by Hogarth, Reynolds, Turner, models by Flaxman, the manuscript of Tasso's *Gerusalemme Liberata*, etc. Published a compilation of his plans for *Public and Private Buildings* (1828). He died in London, Jan. 20, 1837.

SOAP-NUT. See NUT, Vol. XVII, pp. 664, 665.

SOAPSTONE, a form of talc known as steatite. See MINERALOGY, Vol. XVI, p. 414.

SOAPWORT, the common name of species of *Saponaria*, a genus of the family *Caryophyllaceae*, or pinks. The common soapwort is *S. officinalis*, often cultivated in old gardens under the name bouncing-bet.

SOBIESKI, JOHN, a general and king. See POLAND, Vol. XIX, pp. 295, 296.

SOCIALISTIC LABOR PARTY. See LABOR PARTIES, in these Supplements.

SOCIAL SCIENCE. See ETHNOGRAPHY, Vol. VIII, pp. 613-626.

SOCIAL WAR. See ROME, Vol. XX, pp. 759-761.

SOCIETY ISLANDS. See TAHITI, Vol. XXIII, p. 22.

SOCINIANISM. See SOCINUS, Vol. XXII, p. 230; and UNITARIANISM, Vol. XXIII, pp. 725, 726.

SOCIOLOGY. See ETHNOGRAPHY, Vol. VIII, pp. 619-621.

SOCORRO, a town in the department of Santander, Colombia, formerly the capital of the department. It is situated on a plateau, at an altitude of 4,100 feet, 140 miles N.N.E. of Bogotá. The town was first founded in 1540, on the site of an Indian city, but in 1681 was removed to its present location. In 1810 it was one of the first towns to throw off the Spanish yoke, and even as early as 1781 it was the scene of a formidable revolt. Its principal industry is the weaving of mantles and Panama hats, which are largely exported. Population, about 18,000.

SOCORRO, a city and the capital of Socorro County, southwestern central New Mexico, charmingly situated in the valley of the Rio Grande, on the Atchison, Topeka and Santa Fé railroad, in the midst of many of the most valuable mines of the

territory, and is surrounded by a farming, grazing, and fruit-raising region. Medicinal springs are also found in the vicinity. The city is engaged extensively in the mining of gold, silver, and lead, having large smelting-works and stamp-mills, and is also an important shipping-point and supply-center. Socorro has public schools, churches, banks, and newspapers, and is the seat of the State School of Mines. Pop. 1890, 2,295; 1900, 1,512.

SODA-ASH. See SODIUM AND SODA, Vol. XXII, p. 243.

SODOM, a city. See DEAD SEA, Vol. VII, p. 2

SÖDERHAMN, a seaport town in Gefleborg province, Sweden, 43 miles N. of Gefle; has a royal arms-factory, and exports iron, wood, an dwood-pulp. Population 1898, 10,775.

SOILS. See AGRICULTURE, Vol. I, pp. 306-07; and HORTICULTURE, Vol. XII, pp. 217-18, 232.

SOKOTRA, an island. See SOCOTRA, Vol. XXII, p. 331; and AFRICA, in these Supplements.

SOLANACEÆ, a large family of gamopetalous plants, containing about 1,500 species, and commonly known as the nightshade family, and characterized by the rank-scented foliage, alternate leaves, regular flowers and two-celled ovary. The best-known genera are *Solanum*, a huge genus, to which belong the potato and egg-plant; *Capsicum*, yielding the red peppers; *Lycopersicum*, the tomato; *Atropa*, yielding the medicinal belladonna; *Nicotiana*, the tobaccos; *Datura*, the Jamestown or jimson weeds, etc.

SOLAN GOOSE. See GANNET, Vol. X, pp. 70, 71.

SOLANINE. See DULCAMARA, Vol. VII, p. 520.

SOLANO. See SPAIN, Vol. XXII, p. 296.

SOLANUM, the type-genus of the great family *Solanaceæ*, or nightshades. It is characterized by its wheel-shaped corolla, long anthers connivent in a cone about the style, and opening by terminal pores, and fruit a berry. The common potato (*S. tuberosum*) is the best-known species.

SOLAR CYCLE. See CALENDAR, Vol. IV, p. 669.

SOLARIO, ANDREA. See SCHOOLS OF PAINTING, Vol. XXI, pp. 437, 438.

SOLAR PARALLAX. See PARALLAX, Vol. XVIII, pp. 245-252.

SOLAR SYSTEM. See ASTRONOMY, Vol. II, pp. 778-790.

SOLDIERS' HOMES. The National Home for Disabled Volunteer Soldiers, in 1896, comprised seven branches,—the Central, at Dayton, Ohio, with 4,767 members; the Northwestern, at Milwaukee, Wisconsin, 2,230; the Eastern, at Togus, Maine, 1,777; the Southern, at Hampton, Virginia, 3,000; the Western, at Leavenworth, Kansas, 2,261; the Pacific, at Santa Monica, California, 1,233; and the Marion, at Marion, Indiana, 1,209; total, 16,477 members. The requirements for admission are an honorable discharge from the United States service, and disability which prevents the applicant from earning his living. Soldiers or sailors who have pensions exceeding \$16 a month are not eligible for admission.

There is also a United States Home for Regu-

lar Army Soldiers, located in the District of Columbia, and which is open to all soldiers who have served twenty years as enlisted men in the army (including volunteer service, if any), and all soldiers of less service who have incurred such disability in the line of duty, while in the regular army, as unfits them for further service.

Finally, the following states have opened and continue to maintain state homes for disabled volunteer soldiers: California, Colorado, Connecticut, Idaho, Illinois, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Vermont, Washington, Wisconsin. On Jan. 1, 1896, these state homes were giving shelter and sustenance to 7,126 veterans, the Quincy (Illinois) home having the largest number (1,055) and the Bath (New York) home the next largest (1,045).

SOLEIDÆ, a family of flat-fishes closely allied to the flounders (*Pleuronectids*). The typical form is the common sole (*Solea*) of the English coast, and its allies. Certain true *Pleuronectids* are sometimes incorrectly called soles. A near relative of the sole (*Achiurus lineatus*), which is commonly called hog-choker, referring to its lack of value, occurs on the Atlantic coast of North America. See also SOLE, Vol. XXII, p. 249.

SOLEMN LEAGUE AND COVENANT. See COVENANTERS, Vol. VI, p. 530.

SOLENOGASTRES, a name which Gegenbaur applied to an order of animals which he ranked near the worms. The doubtful genera, *Neomeina* and *Chatoderma*, were thus united. These are now believed to be primitive and degenerated mollusks, and are placed in the class *Amphineura* and order *Aplacophora*, the above name being dropped. These animals are worm-like, with mantle enveloping the body, and containing spicules. Little is known of their development.

SOLENOGLYPHA, a suborder including those venomous serpents with erectile poisonfangs. The group is opposed to *Proteroglypha*. Some of the most poisonous snakes are classed in this division. The Old-World vipers (*Viperidæ*) and puff-adder (*Crotto*) and the New-World *Crotalidæ*, including the rattlesnakes, copperheads and moccasins are examples of the suborder. The members of the suborder are viviparous.

SOLENT, THE, the strait between the Isle of Wight and the mainland of England, between West Cowes and The Needles. At Hurst Castle, which guards its entrance on the southwest, the Solent is less than a mile in breadth, and along this narrow passage the tide flows with a rapidity which at certain times no boat can stem. The average width is over two miles, and the straits offer a safe anchorage for ships. Hurst Castle itself consists of a central tower, or keep, surrounded by several smaller towers, and mounted with heavy guns.

SOLEY, JAMES RUSSELL, an American educator and author; born in Roxbury, Massachusetts, Oct. 1, 1850. Graduated from Harvard in 1870; assistant professor of the English branches at the

United States Naval Academy (1871); full professor of the same branches (1873); on special duty at the Paris Exposition of 1878, he brought home an exhaustive report on the European naval colleges; was placed in charge of the library and war records of the Navy Department in Washington (1882-83); after 1885 lectured on international law at the Newport Naval War College, and on naval history at the Lowell Institute, Boston. He published *History of the Naval Academy* (1876); *The Blockade and the Cruisers* (1883); *The Boys of 1812* (1887); and contributed to several other important works.

SOLFERINO. See FUCHSIN, in these Supplements.

SOLFERINO, BATTLE OF. See AUSTRIA, Vol. III, p. 139; and FRANCE, Vol. IX, p. 624.

SOLIDUS. See NUMISMATICS, Vol. XVII, p. 655.

SOLIFUGÆ OR SOLPUGIDA. See ARACHNIDA, Vol. II, pp. 280, 281.

SOLIS, JUAN DIAZ DE. See ARGENTINE REPUBLIC, Vol. II, pp. 488, 489.

SOLITAIRE. See BIRDS, Vol. III, p. 732.

SOLLAS, WILLIAM JOHNSON, an English geologist and zoölogist; born in Birmingham, May 30, 1849; graduated at the Royal School of Mines, and at St. John's College, Cambridge in 1873, of which he was elected a Fellow in 1882; lecturer on geology in the Cambridge University Extension work (1873); professor of geology and zoölogy in the University College, Bristol (1880); professor of geology and mineralogy in the University of Dublin (1883); was awarded the Bigsby medal of the Geological Society (1893). He wrote a memoir on the *Relations of Fossil to Recent Sponges* and another on the *Anatomy of Living Sponges*, and was the author of the article SPONGES in this ENCYCLOPEDIA.

SOLLER, a small town and seaport of the Balearic Isles, in Majorca, 14 miles N. of Palma. It exports oranges and wine. Its harbor, four miles to the northwest of the city, can receive vessels of 150 tons, and is provided with two light-houses. Population, 8,300.

SOLOMON, J. SOLOMON, an English artist; born in Southwark, London, September, 1860; entered the School of the Royal Academy in 1877; became a pupil of Cabanel in Paris (1879); traveled the next year in Germany, Holland and Italy; opened a studio in London, and exhibited for the first time; then returned to Cabanel's for nine months, exhibiting at the Paris Salon, *Portrait of Dr. Stevens*, and at the Royal Academy an exquisite canvas, *Waiting*. His reputation dated from his *Cassandra*; *Samson*; *Niobe* (Salon medal, 1889); and a superb *Portrait of Sir John Simon*. Among his later portraits are those of *Mrs. George Mosenthal*; *Mrs. Patrick Campbell*; the actress; and *I. Zangwill*, the author. He was elected an associate Royal Academician in 1896.

SOLOMON BEN GABIROL. See AVICEBRON, Vol. III, p. 152.

SOLOMON'S SEALS. See BOTANY, Vol. IV, p. 98.

SOLOMON'S TEMPLE. See *Jewish Architecture*, under ARCHITECTURE, Vol. II, pp. 392, 393.

SOLOR ISLANDS, THE, a group of islands in the Malay Archipelago, lying east of Flores, and belonging to the Netherlands residency of Timor. They consist principally of Solor, area 105 sq. miles, pop. 15,000; Adanara, 302 sq. miles, pop. 36,000; Lomblem, 520 sq. miles, pop. 120,000; and Pantar, 275 sq. miles, pop. 60,000. Solor and Adanara are separated from Flores by narrow straits. Lomblem and Pantar lie in succession farther east. Solor has little cultivated land, the natives being sailors and fishermen. Much sulphur and saltpeter are found. Adanara, a lovely island, is governed by an independent rajah. The people are Malays, partly Mohammedans and partly Roman Catholics. Lomblem is also beautiful, the natives Malays; those of Pantar being Papuans. The Solor Islands are mountainous; the volcano Lobetolle, in Lomblem, is 4,914, and the mountains of Pantar, 3,332, feet high. They are clothed to their summits with forests.

SOLOTHURN. See SOLEURE, Vol. XXII, p. 250.

SOLOVIEV, SERGEI MIKHAILOVICH. See RUSSIA, Vol. XXI, p. 108.

SOLSTICE. See ASTRONOMY, Vol. II, pp. 770, 771.

SOLUTION. See CHEMISTRY, Vol. V, pp. 484, 484, 485; and in these Supplements.

SOLWAY FIRTH, in its upper part the estuary of the river Esk, in its lower as an inlet of the Irish Sea; separates the northwest of Cumberland from the south of Scotland. Its entire length is 36 miles; its breadth varies from 1½ to 22 miles. The principal rivers flowing into it are the Annan, Nith, Dee and Urr from the Scottish side, and the Eden and Derwent from the English side. Its most striking feature is the rapidity of its ebb and flow. The spring tides rush in from three to six feet high, and at the rate of eight to ten miles an hour, often inflicting serious damage on the shipping. After they have retreated, great stretches of the bed of the firth are left bare, and in some places one can even cross over from shore to shore. Near Annan the Solway is spanned by a railway viaduct 1,960 yards long, constructed in 1866-69, at a cost of one hundred thousand pounds; almost destroyed by floating ice in January, 1881; re-opened to traffic in 1884.

SOLWAY MOSS, a district of Cumberland, about seven miles in circumference, lying west of Longtown, and immediately adjoining Scotland; once a bog, now drained and cultivated; historically notable as the scene (1542) of the rout of a Scottish host under Oliver Sinclair by a handful of English borderers under Thomas Dacre. In 1771 the boggy ground, surcharged with moisture, swelled and burst like a torrent, destroying some thirty small villages.

SOLYMAN. See SOLIMAN, Vol. XXII, p. 251.

SOMALILAND. See SOMALI, Vol. XXII, pp. 255, 256; and AFRICA, in these Supplements.

SOMATOPLASM. See HEREDITY, in these Supplements.

SOMERSET, a city and the capital of Pulaski County, southeastern Kentucky, 6 miles N. of the Cumberland River, and 79 miles S. of Lexington, on the Cincinnati, New Orleans and Texas Pacific railroad. It is in a fruit, grain and lumber producing region; near by are extensive coal and iron mines, whose products are shipped in large quantities from the city. There are numerous churches, high and grammar schools, banks and newspapers. Pop. 1890, 2,625; 1900, 3,384.

SOMERSET, a village of Perry County, southeastern central Ohio, 24 miles S. of Newark and 20 miles S.W. of Zanesville, on the Baltimore and Ohio railroad. The surrounding region abounds in coal, iron ore, and deposits of potter's clay, and the village has carriage-works, saw-mills, planing-mills and flour-mills. Population 1890, 1,127; 1900, 1,124.

SOMERSET, a borough and the capital of Somerset County, southwestern Pennsylvania, 36 miles N.N.W. of Cumberland, Maryland, and 66 miles E.S.E. of Pittsburgh, on the Baltimore and Ohio railroad. It is in a region producing lumber, containing deposits of coal and limestone, and has a creamery, foundry, tannery, flour-mill and manufactures of maple-sugar. Population 1890, 1,713; 1900, 1,834.

SOMERSWORTH, a township of Strafford County, southeastern New Hampshire, including the village of Great Falls, 5 miles N. of Dover, on the Salmon Falls River, and on the Boston and Maine railroad. There is abundant water-power, which is utilized in various manufacturing industries. Great Falls is situated on an eminence known as Prospect Hill, and contains cotton factories which employ about three thousand hands, woolen mills, shoe factories, and oil-distributing stations, foundry, machine-shop, and electric street-railway. Population of city of Somersworth 1890, 6,207; 1900, 7,023.

SOMERVILLE, a city of Middlesex County, northeastern Massachusetts, a suburb of Boston, joining the latter on the northwest, and having with it both steam and street railway connection. It is located on the Mystic River, and on the Boston and Maine and Fitchburg railroads. Formerly a part of Charlestown, it was, in 1842, set off as a separate corporation, and has become very largely a residence for business men of Boston. The city is built upon seven hills, upon one of which, Quarry Hill, a powder-house was erected in 1703, which has since been carefully preserved, and was made the center of a public park. On Prospect Hill, Jan. 1, 1776, Washington raised the first colonial Union flag, and on Winter Hill the strongest works in the vicinity were erected during the siege of Boston. From Governor Winthrop's Pen Hill farm, on the Mystic River, the first vessel built in the colony was launched in 1631. The churches of the city are numerous, the public schools well equipped, in addition to which there are a public library, charitable institutions, an insane asylum, three public

parks, banks and weekly newspapers. The industrial returns for 1890 showed 387 establishments, with combined capital of \$3,788,018, paying to 3,126 persons \$1,716,496, and for materials \$4,369,064, from which products were turned out valued at \$7,324,082. Population 1890, 40,152; 1900, 61,643.

SOMERVILLE, a borough and the capital of Somerset County, northern central New Jersey; 36 miles W.S.W. of New York City, and 11 miles W.N.W. of New Brunswick, on the Raritan River, and on the Central Railroad of New Jersey. It has numerous churches, grammar and public schools, a Baptist classical school, public library, two national and a savings bank, two monthly and three weekly periodicals; is lighted with gas and electricity; contains water-works, and has woolen-mills, carriage factories, sash and door works, and manufactures of brick, soap, shirts and shoes. Population 1890, 3,861; 1900, 4,843.

SOMERVILLE, a town and the capital of Fayette County, southwestern Tennessee, 52 miles E.N.E. of Memphis, on the Loosahatchie River, and on the Memphis and Charleston and Tennessee Midland railroads. It is surrounded by a grain and cotton producing region, has flour-mills, and is the seat of an academy and female institute. Population 1900, 777.

SOMME, a river. See SOMME, Vol. XXII, p. 261.

SOMNAMBULISM. See SLEEP, Vol. XXII, pp. 157, 158.

SONATA. See MUSIC, Vol. XVII, p. 95.

SONGHAY. See SOUDAN, Vol. XXII, p. 279.

SONGKOI or **SANGKOL.** See TONG KING, Vol. XXIII, pp. 439, 440.

SONG OF BIRDS. See BIRDS, Vol. III, pp. 770, 771.

SONG OF SOLOMON or **SONG OF SONGS.** See CANTICLE, Vol. V, pp. 32-36.

SONGS. See MUSIC, Vol. XVII, pp. 83-90.

SONOMETER, an instrument having a sounding-board and movable bridges over which musical strings may be stretched with varying tension, in order to study the laws of vibration. By its use the number of vibrations of all the notes in the scale have been determined. The name is also applied to a mechanism for testing metals for flaws, in which a striker, an induction-coil and a telephone are combined. See also SCHISOPHONE, in these Supplements.

SONORA, a state of extreme northwestern Mexico, bordering on the United States on the north, Chihuahua and Durango on the east, Sinaloa on the south, and the Gulf of California on the west. The state has an area of 77,534 square miles, and its surface varies from low and flat to mountainous in the eastern portions, which are intersected by the Sierra Madre Range. The soil, while fertile in the river valleys, in other parts of the country can only be utilized for agriculture by means of irrigation. The mountains are rich in gold, silver and lead, and along the Yaqui River deposits of coal have been found, the products being shipped to Arizona by

the Sonora railway, extending from Guaymas, on the Gulf, to Benson, on the Southern Pacific railroad. The principal rivers are the Mayo and Yaqui, and the chief trading-points Guaymas and Pitic. A large portion of the state is occupied by Indian tribes, some of whom subsist partly by agriculture, but the greater portion are wild and nomadic, retaining their old customs and languages, and being practically independent. For administrative purposes Sonora is divided into the departments of Arispe and Horcasitas, and has its capital at Ures. Population (estimated), 1895, 191,281.

SONORA, a city and the capital of Tuolumne County, eastern central California, 60 miles E. of Stockton, and 36 miles from Milton, the nearest railroad station, on the Southern Pacific railroad. It is engaged principally in gold-mining, being the oldest gold-mining settlement in the state. The fruit-growing and lumbering interests are large, and in the vicinity there are quarries of marble, slate and soapstone. The industries of the city comprise sash and door factories, planing-mills, pickle and cider factory, foundry and machine-shop. Pop. 1890, 1,441; 1900, 1,922.

SONS OF THE AMERICAN REVOLUTION. See COLONIAL SOCIETIES, in these Supplements.

SONS OF THE REVOLUTION. See COLONIAL SOCIETIES, in these Supplements.

SONSONATE, a town of Central America, on the Sonsonate River, and on the Santa Ana and Acajutla railroad, in San Salvador, 40 miles N.W. of the city of that name. Founded about the time of the Spanish conquest. Population, over 12,000.

SOO-CHOW-FOO, three cities of China. See SU CHOW, Vol. XXII, p. 617.

SOOTY TERN. See TERN, Vol. XXIII, p. 189; and EGG-BIRD, in these Supplements.

SOPHIE MAY. See CLARKE, REBECCA SOPHIA, in these Supplements.

SOPHOCLES, EVANGELINUS APOSTOLIDES, a Greek scholar; born in Tsangaranda, Thessaly, March 8, 1807; having emigrated to America, he entered Amherst College in 1829; tutor at Harvard (1842-49); assistant professor and then full professor of ancient, Byzantine and modern Greek at the same university (1849-83). He prepared a number of text-books for the branches under his supervision, among them a *History of the Greek Alphabet* (1848); *Glossary of Later and Byzantine Greek* (1860); *Greek Lexicon of the Latin and Byzantine Periods* (1870). He died in Cambridge, Massachusetts, Dec. 17, 1883.

SOPHONISBA, a heroine. See MASINISSA, Vol. XV, p. 609.

SORATA OR ILLAMPU. See PERU, Vol. XVIII, p. 672.

SORB OR SERVICE TREE. See HORTICULTURE, Vol. XII, p. 276.

SORBISH LANGUAGE. See SLAVS, Vol. XXII, pp. 153, 154.

SORCERY. See MAGIC, Vol. XV, p. 199.

SOREL OR RICHELIEU RIVER. See ST. LAWRENCE, Vol. XXI, p. 181.

SOREL, a city and the capital of Richelieu County, southern Quebec, at the junction of the Richelieu River, and on the Atlantic and Lake Superior and the Canadian Pacific railroads, 45 miles N.E. of Montreal. It is an important shipping-point for grain, and its excellent harbor forms a winter refuge for steamboats. Boat-repairing is an important industry, besides which there are manufactures of engines, milling-machinery, plows and leather goods. The population, of whom not more than 300 were English-speaking, was in 1891, 6,669.

SOREL, AGNES (1409-50), lady of honor to the Queen of France, and mistress of Charles VII, over whom she exercised a powerful influence. See CHARLES VII, Vol. V, p. 411; and CŒUR, JACQUES, Vol. VI, p. 109.

SORGHUM. See MILLET, Vol. XVI, p. 321; and SUGAR, Vol. XXII, p. 628.

SORICIDÆ. See MAMMALIA, Vol. XV, p. 403.

SORIN, FATHER ÉDOUARD, a Franco-American Roman Catholic clergyman and educator; born in Ahuille, near Laval, France, Feb. 6, 1814; went to the United States in 1841 to organize a branch of the religious Congregation of the Holy Cross. He labored long among the Indians of western Indiana. The bishop of Vincennes gave him some land in 1842, upon which to erect the first buildings of what was to become the Notre Dame University (q. v., in these Supplements); he was its first president, and remained connected with it till his death. Died in Notre Dame, Ind., Oct. 31, 1893.

SORREL, a plant. See HORTICULTURE, Vol. XII, p. 288.

SORREL TREE OR SOURWOOD, the local name of *Oxydendrum arboreum*, a member of the heath family. It is a handsome tree of the rich woods of the Allegheny region, with smooth lanceolate-pointed leaves (like those of the peach), and ample panicles of long one-sided racemes of white flowers.

SOTERIOLOGY, the doctrine of salvation. See PAUL, Vol. XVIII, pp. 423-427.

SOTHERN, EDWARD ASKEW, an English actor; born in Liverpool, England, April 1, 1830. His relatives intended him to enter the church, but he chose a theatrical career, and played his first engagement in the island of Jersey. In 1852 visited the United States, and, under the stage-name of "Douglas Stuart," played *Dr. Pangloss*, in Boston, but was not well received. He became a member of a company in New York, and in 1858 achieved a great success as Lord Dundreary in *Our American Cousin*. Later, he played several rôles with great success, among which were David Garrick, The Crushed Tragedian, and Brother Gam. He died in London, Jan. 20, 1881.

SOTHERN, EDWARD HUGH, second son of the above, was born at New Orleans, La., Dec. 6, 1859, and in 1876 took to his father's profession, making his début with him at Abbey's Theatre, New York. For four years subsequently he appeared at the Boston Museum, first with John McCullough, and afterwards with John T. Raymond. His first pro-

nounced success was at the Lyceum Theatre, New York, where he appeared with Helen Dauvrey in



EDWARD HUGH SOTHERN.

One of Our Girls, in *The Love Chase*, and in *A Scrap of Paper*. In 1886 he won further success in the plays *Lord Chumley* and *Captain Letterblair*, and later made a great hit with *The Prisoner of Zenda* and *An Enemy to the King*. In these plays he had as leading lady Miss Virginia Harned, whom he married at Philadelphia Dec. 3, 1896.

SOTHIAC CALENDAR. See EGYPT, Vol. VII, p. 729.

SOTHIS, heliacal rising of. See EGYPT, Vol. VII, pp. 728, 729.

SOTO, FERNANDO DE. See DE SOTO, Vol. VII, pp. 131, 132.

SOUARI-NUT. See NUT, Vol. XVII, p. 664.

SOUL. See ANTHROPOLOGY, Vol. II, pp. 109, 110; and ANIMISM, Vol. II, pp. 55, et seq.

SOULE, JOSHUA, an American clergyman; born in Bristol, Maine, Aug. 1, 1781. He entered the Methodist Episcopal Church at the age of 16, beginning his career as "the boy preacher," traveling about the country, and at the same time pursuing theological studies. At 23 he was already presiding-elder for the state of Maine, and was one of the committee of the General Conference that drafted the fundamental law of the church in 1813; in 1820 was elected a bishop, but refused the office, accepting pastorates in New York and Baltimore. In 1824 he was re-elected bishop, and, the General Conference having reversed the points of discipline that had caused him to refuse in the first place, he now accepted the appointment. Later, he joined the Separatists, who organized the Methodist Church South, and his Northern brethren refused to consider him any longer a bishop. He died in Nashville, Tennessee, March 6, 1867.

SOULÉ, PIERRE, an American statesman and soldier; born in Castillon, France, September, 1802. He was taught at the Jesuit colleges in Toulouse and at Bordeaux, but declined to enter the Roman Catholic priesthood. While editing a paper in Paris he attacked the ministry of Charles X, and was compelled to leave France. He first went to Haiti, from there, in 1826, to Baltimore, and a little later, to New Orleans. He was desirous of studying the English language, and he did so diligently in his spare hours, while doing gardener's work for a living. When he had acquired English, he began studying law, was soon admitted to practice, and proved highly successful in his handling of cases. In 1847 he was appointed to fill a vacancy in the United States Senate, and was afterward elected for a full term. In 1853 he was sent as minister to Spain, and while there engaged in a duel with the Marquis de Turgot, and crippled the latter for life; in June, 1855, resigned, and returned to New Orleans; in 1860-61 declared himself strenuously

opposed to secession. He remained in New Orleans until the city fell into the hands of the Union troops in 1862, when he became a prisoner in Fort Lafayette, New York harbor. On his release he went to Nassau, West Indies, but later joined the staff of General Beauregard and repaired to Richmond, where, in 1863, he was made a brigadier-general and commissioned to raise a foreign legion. He failed to do so, however, and then went to Havana. At the close of the war he returned to his home in New Orleans. He was connected with Dr. Gwin's plan for the colonization of the Sonora province, Mexico, a project warmly indorsed by Emperor Maximilian. It failed, and the resources of Soulé became exhausted. He resumed, for a time, the practice of the law, but his strength soon ebbed out, and he died in poverty in New Orleans, Louisiana, March 26, 1870.

SOULOQUE, FAUSTIN ELIE. See HAYTI, Vol. XI, p. 546.

SOUND. See ACOUSTICS, Vol. I, pp. 100-119.

SOUND DUES. See NAVIGATION LAWS, Vol. XVII, p. 279.

SOUNDINGS, DEEP-SEA. See DREDGE, Vol. VII, pp. 461, et seq.

SOUND-LENS. A device for focusing or diverging sound-waves in a manner similar to that by which a glass lens converges light rays. A bladder arranged in the form of a convex lens, when filled with carbon dioxide, will constitute such a sound-lens. Slight sounds can be heard at a considerable distance by placing it midway between the ear and the source of the sound.

SOURIS, a town. See PRINCE EDWARD ISLAND, Vol. XIX, p. 740.

SOUR-SOP, the fruit of *Anona muricata*, a West Indian plant of the custard-apple family, to which the common papaw of the United States belongs.

SOUSA, JOHN PHILIP, an American orchestra and band leader and composer; born in Washington,

District of Columbia, in 1854; when not yet twelve years of age he was known as phenomenally gifted with musical talent, being a professional performer in theater orchestras. At the age of 13 he became infatuated with the life of a circus musician, and surreptitiously joined a traveling company of performers, playing in the circus band. Upon the discovery of his youthful adventure he was apprenticed by his father to the Marine Corps for a term of five years: This discipline ultimately led to his connection with the Marine Band at Washington, the finest organization of its kind in the country. When 17 years old he became leader of an orchestra in a comic opera troupe, remaining with it several years. Finally, he was persuaded to rejoin the Marine Band, of which in time he became the leader, retaining the position for twelve years. In 1892, with the assistance of David Blakely, Mr. Sousa was enabled to form the



JOHN PHILIP SOUSA.

organization identified with his name. His performances proved immensely popular, as well as exceptionally profitable. His compositions are widely known, among the best being *Sheridan's Ride*; *The Liberty Bell*; *The High School Cadets*, etc.; an opera, one of six, *El Capitan*, has also met with general favor.

SOUSA OR SOUZA, MARTIN ALFONSO DE. See BRAZIL, Vol. IV, p. 228.

SOUTH AFRICAN REPUBLIC OR TRANSVAAL ("across the Vaal"), a British suzerainty (British suzerainty restricted to control of foreign relations) in southeast Africa, bounded on the north by the River Limpopo, on the east by the Lebombo Range and Zululand, on the south by Zululand, Natal and the Orange Free State, and on the west by Khamaland and Bechuanaland. Its greatest length from north to south is 425 miles, its greatest breadth from east to west 375 miles, and its area 119,139 square miles. The white population, according to a very incomplete census taken in 1896, is 245,397 (137,947 males, and 107,450 females); the native population being estimated at 622,544; total, 867,941. The natives are inferior to their neighbors, the Zulus, in physique, but are more inclined to industrial pursuits. The capital of the Transvaal is Pretoria (white population 10,000); but it is surpassed by Johannesburg (population 1896, 102,714, of whom 51,225 are white). The country is a plateau, sloping inland from the mountains forming its eastern frontier, whose height is 700 feet, and whose seaward face is abrupt and precipitous. The center of the South African Republic is traversed by several ranges running at right angles to the main chain, the chief being the Magaliesberg, which forms the watershed of the Vaal and Limpopo systems, and has an average height of 5,000 feet, with peaks rising to 9,000 feet. Physically, the South African Republic consists of three great divisions known as the High, Terrace and Bush country respectively. The first has an area of about 40,000 square miles, and is an elevated, well watered region, well adapted for grazing and agriculture. The second lies along the mountain-slopes and has an area of 20,000 square miles. It is well-wooded and its pastures feed large herds of cattle. The Bush country has an area of nearly 60,000 square miles, lies lower than the other two divisions, and in its northern part has a tropical climate. Its grass, though excellent fodder in winter, is too rank for domesticated animals in summer. Under irrigation, fruit-trees, the sugar-cane, coffee, indigo and tobacco thrive, and wheat also as a winter crop. The large game, once common everywhere, have now retired to the remoter parts of this region, where lions, rhinoceroses, etc., are still to be met with, and crocodiles infest the rivers. Taken as a whole, the Transvaal is a fertile country, well adapted to the cultivation of most tropical and semi-tropical crops. Its wheat, in particular, is of the finest quality and has already earned for the Transvaal the title of "the granary of South Africa." There are about 50,000 acres under cultivation, and of the 30,000 farms marked out, 16,000 are the property of private persons. Sheep, cattle and horses thrive, except in districts

infested by the dreaded tsetse-fly; but as the winter is also the dry season, it is necessary to move the flocks and herds when the pastures become bare. The remedy for this lies in a system of irrigation. North of the parallel of lat. 25° S., fever is common, but elsewhere, and especially in the more elevated districts, the country is remarkably healthy. The mineral wealth of the Transvaal is very great. Gold is mined to a great extent throughout the country to the south and principally in the Rand, near Johannesburg, where coal is also worked as well as in the east of the country (output in 1897, 1,600,212 tons). In 1894 the output of gold in the Rand alone amounted to 1,949,939 ounces, valued at £6,718,068; in 1897 the value was £11,476,260; total from 1884 to 1897, £53,810,508. Iron has been found, and a silver-mine close to Pretoria yields over 9,000 tons of ore annually. Copper, cobalt, and plumbago are found in many places.

The great lack of the country is a port, as it is 100 miles from the sea at the nearest point, and its trade is therefore carried on through Cape Colony, Natal, or Delagoa Bay. A railway of 334 miles through the Orange Free State from Norvalspont, Orange river, via Bloemfontein, to Vaal river, constructed by the Cape Colony government, was, by agreement with the South African Republic, continued in 1894 to Pretoria via Germiston, 78 miles, and 1,040 miles from Capetown. The Natal line, finished in 1895, terminates at Charlestown, about 158 miles from Elsburg, near Germiston. A line from the Portuguese boundary to Pretoria, 295 miles, was open in 1895. The total mileage open in Sept., 1898, was 774; under construction, 270; and projected, 252. The South African Republic joined the Postal Union in 1892; 2,000 miles of telegraph connect the principal districts with each other and with the surrounding states. Weights and measures are the same as in Cape Colony, and the currency is English money only. The revenue in 1897 amounted to £4,480,218; and the expenditure to £4,394,066. The public debt was £2,673,690.

The principal exports are wool, cattle, hides, grain, ostrich-feathers, ivory, gold, and other minerals. The imports on which dues were charged for 1893 amounted to £5,371,701; in 1897 to £13,563,827. The import duties for 1893 amounted to £692,831; for 1897 to £1,287,039.

The United Dutch Reform Church has most adherents (30,000). There are over 60 English schools in the state, 40 of which were in Johannesburg, besides village and ward schools, 429 in number, a gymnasium, and a model school. In 1897 £140,286 was voted for 11,552 pupils, and £50,000 for a university.

All able-bodied citizens may be called upon to defend the state, which supports only a small force of horse artillery. About 27,000 Boers, between 18 and 50 years of age, are liable to serve. Swaziland (q.v., under AFRICA, in these Supplements) was placed under the administration of the Republic in 1895, a small part having been absolutely incorporated in 1890.

HISTORY. The earliest settlers in the Transvaal were the Boers, who crossed over from Natal and

established a republic in 1840, their leaders being Maritz, Potgieter and Pretorius. The republic was acknowledged by Great Britain at the Sand River convention, signed on Jan. 17, 1852, and existed till April 12, 1877, when the Transvaal was annexed to Cape Colony, on the ground that the native policy of the republic threatened to bring about a general Kafir rising in South Africa. The annexation was protested against by the Volksraad, and as a result of the war of 1880-81, culminating in the massacre of the British at Majuba Hill, February, 1881, the Boers recovered virtual independence. By a convention, Aug. 3, 1881, the suzerainty of the British crown was recognized. This convention, however, created a good deal of friction, and by a treaty, signed in London, February, 1884, the causes of disaffection were removed, boundaries were fixed, the suzerainty of the British crown confirmed, and terms arranged which it is hoped may secure a peaceful and prosperous future. A diplomatic agent represents Great Britain at Pretoria. Under the constitution, which was amended again in 1895, the executive consists of a president, elected for five years by all first-class burghers and assisted by a council of five members. The legislative power of the state is vested in two Volksraaden of 24 members each, elected for four years, one half retiring every two years. The electors comprise two classes—first-class and second-class burghers. The first-class burghers, who vote for both Volksraaden, comprise all male whites, residents of the republic before May 29, 1876, who took part in the war of 1881 and 1894, and their male children from the age of 16. The second-class burghers, who vote only for the second Volksraaden, include the naturalized male alien population and their male children from the age of 16. Naturalization is obtained after two years' residence, by taking the oath of allegiance and paying £2. Second-class burghers may become first-class burghers by special vote of the first Volksraad, but only after 12 years' naturalization. Sons of aliens, though born in the Republic, have no political rights, but by registration at the age of 16 may at the age of 18 become naturalized burghers, and may, by special act of the first Volksraaden, be made first-class burghers 10 years after they are eligible for the second Volksraaden, or at the age of 40. Members of both chambers must be 30 years of age, possess fixed property, profess the Protestant religion, and never have been convicted of any criminal offense. The members of the first chamber are elected from and by the first and second-class burghers, those of the second chamber from and by the first and second-class burghers conjointly, each for four years. The president and commandant-general are elected by the first-class burghers only.

Two laws were passed during the latter part of 1896 by the legislature, by means of which President Krüger is invested with extraordinary powers over the press and aliens. The first reads:

"The state president has at all times the right, with the advice and consent of the executive council, to prohibit entirely or temporarily the circulation of publications, the contents of which are, in

his opinion, contrary to good morals or dangerous to the peace and order of the republic." The second reads: "All aliens inciting to disobedience or transgression of the law by word of mouth, in writing or by public means, by which public peace and order are or can be endangered, may be expelled by order of the president."

On Feb. 3, 1898, Krüger was elected president for his fourth term of five years.

THE UITLANDERS. Some years after the London convention of 1884, the discovery of rich gold-fields in the Transvaal led to an immediate influx of a miscellaneous population. These various elements were named by the Boers, Uitlanders, meaning "outlanders, or foreigners." They went to the Transvaal under the guarantee of fair treatment, the republic being under British suzerainty. The total population of Uitlanders at present is estimated at about one hundred and fifty thousand. They constitute the mining, industrial, and commercial population, and the material wealth of the country is undoubtedly due to them. The Uitlanders discovered and wrought the mines, paid the taxes, built the towns, constructed the railroads, established commerce, settled on the land. Previous to the arrival of the Uitlanders the republic was in a state of bankruptcy; now, by the taxes paid by the newcomers, there is a surplus in the treasury. There may be an undesirable element among the Uitlanders, but the practical denial of citizenship to the upbuilders of the commercial prosperity of the republic is a constitutional grievance which will always give rise to friction until remedied. The discontent of the Uitlanders with this state of affairs and the hostility of the Boers led to a condition of affairs that induced the ill-advised and premature effort of Jameson to aid his countrymen in Dec., 1895, by an expedition whose destination was at first unknown, but whose progress was brought to a disastrous termination at Krugersdorp the following month. See JAMESON, L. S.; KRÜGER, S. J. P.; and RHODES, CECIL, in these Supplements; and TRANSVAAL, Vol. XXIII, pp. 516-19. For the recent history, including Mr. Krüger's war ultimatum of Oct. 9, 1899, and its consequences in the overthrow of the Republic, and its reincorporation with the possessions of the British Crown, see the BOER WAR, in these Supplements.

SOUTH AMBOY, a borough of Middlesex Co., N. J., at the mouth of the Raritan River, and on the Central of New Jersey, the Raritan River, and the Pennsylvania railroads, 27 miles S. W. of New York, has churches of six denominations, two public and a Roman Catholic parochial school, and the Stevensdale Institute; is a large coal-shipping point, and has iron and asphaltum works, potteries, and machine-shops. Population 1890, 4,330; 1900, 6,349.

SOUTHAMPTON. This English port has come prominently to the front in connection with its new docks and the facilities furnished thereby. The grammar-school founded by King Edward VI was rebuilt in 1895, and the Royal South Hants Infirmary was enlarged in 1889. Pop. (1891) was 93,600. See SOUTHAMPTON, Vol. XIX, p. 534.

SOUTHAMPTON, a village of Suffolk County.

New York, on the southern shore of Long Island, on the Long Island railroad, 90 miles E. of Brooklyn and 10 miles S.W. of Sag Harbor. It contains four churches, public school and kindergarten; the Rogers Memorial Library was incorporated in 1893 and moved into its new home in 1895; has brick and tile works; is the center of an agricultural region; and is a summer-resort. It is the oldest town in the state, having been settled in 1640, by English colonists from Lynn, Massachusetts. Pop. 1900, 2,289.

SOUTHAMPTON, a village and port of entry of Bruce County, Ontario, at the mouth of the Sauguen River, which flows into Lake Huron. It is at the terminus of the Wellington, Grey and Bruce branch of the Grand Trunk railway, about 60 miles N.E. of Goderich. It ships lumber, railroad ties, furniture and flour; has fishing interests; has a mineral spring, and is a summer-resort. Population 1895, 1,437.

SOUTHAMPTON DOCKS, at Southampton, England. The new dock, the Empress, was opened by the Queen, July 26, 1890. It is of an irregular quadrangular shape; the northwest, northeast and southwest wharves being each 850 feet long, and the southeast 800 feet. The entrance, opening on the Solent, to the southeast, is 175 feet wide, with side-walls 200 feet long. At low water the depth is in all portions 26 feet. The tidal dock, basin and close dock altogether give a quay space of 11,250 lineal feet. This dock was acquired by the London and South-Western Railway Company in 1891, and in 1895, in view of the selection of Southampton as a port of call for the newly christened America Line, the company constructed a new graving-dock about 500 feet long, 110 feet wide and 27 feet deep at low water. This, the largest graving-dock in Great Britain, was opened by the Prince of Wales in 1895. The united area of the three largest docks is 44½ acres. In September, 1895, an addition of 3,550 feet to the south extension of the new sea-wall was completed, the depth alongside the new quay-wall being at low water 28 feet. These various improvements provide accommodation for the largest sized vessels at all times and under all conditions. Direct connection, by 15 miles of railway, is provided. The docks are lighted by electricity. Besides the above, the Town quay has a length of 6,072 feet.

In 1893 the Inman Line of Atlantic steamers changed its name to the American Line, and decided to make Southampton its port of entry, and the *New York* of that line made its first entrance to Southampton docks, March 4th, the occasion being publicly celebrated. The chief advantage gained by the change is in the mails and passengers reaching London more rapidly. The port is also the mail-packet station for the West Indies, Brazil, the Cape, etc.

SOUTHAMPTON WATER, a fine inlet of Hampshire, England, stretching northwest from the point at which the Solent and Spithead unite. It is 11 miles long and about two miles wide. The Isle of Wight, which intervenes between the Southampton Water and the Channel, forms a magnificent natural breakwater. The chief rivers which fall into this

inlet are the Test or Avon, the Itchen, and the Hamble.

SOUTH AUSTRALIA. (For general article, see **SOUTH AUSTRALIA**, Vol. XXII, pp. 283-86.) The constitution of 1856 is in force, except that in 1894 the electoral franchise was extended to women. Capital, Adelaide; pop. 1898, 146,125.

POPULATION. In 1898 there were 358,224 white inhabitants, and about 3,000 aborigines.

EDUCATION. In 1897 there were 278 public schools and 377 provisional schools, the number of children under instruction during 1897 being 61,643. There is a training-college for teachers. The University of Adelaide is authorized to grant degrees in arts, law, medicine, and sciences. Its endowments amount to \$320,000 and 50,000 acres of land. There are several denominational colleges. There were 233 private schools, with 11,572 pupils, in 1897.

RELIGION. The aggregate number of churches and chapels in the colony in 1896 was 963. At the census of 1891 the numbers belonging to the leading denominations were as follows: Church of England, 89,271; Roman Catholics, 47,179; Wesleyans, 49,159; Lutherans, 23,328; Presbyterians, 18,206; Baptists, 17,547; Methodists, 11,654; Bible Christians, 15,762; Congregationalists, 11,882; Hebrews, 840. No aid from the state is given for religious purposes.

REVENUES AND EXPENDITURES. The revenue for 1897-98 was estimated at \$12,833,055, and expenditure \$12,994,695. The greater part of the revenue of the colony is derived from customs duties, inland revenue, posts and telegraphs, railways, and territorial receipts; while the main portion of the expenditure is on account of public works, railways, and interest on public debt. The total revenue averages \$39 per head, of which customs and other sources of taxation contribute \$11.75.

THE PUBLIC DEBT of the colony, dating from 1852, amounted on Dec. 31, 1897, to \$122,040,000. Three-fourths of the public debt has been spent on railways, waterworks, and telegraphs, the net earnings of which exceed the interest payable. The railways show a profit of about four per cent per annum.

THE REAL PROPERTY of the colony in 1894 was valued at \$255,360,000, personal property at \$162,906,500.

INDUSTRY. At the end of 1897, out of a total of 578,361,600 acres, 7,694,347 were alienated; the total land inclosed amounted to 34,655,774 acres, of which 2,604,122 acres were under cultivation in 1896-97. Of this, 1,522,668 acres were under wheat, 449,167 under hay, 13,054 under orchards, 18,761 in vineyards, and 507,484 fallow. The gross produce of wheat in 1879-80 was 14,260,964 bushels; in 1884-85, 14,621,755 bushels; and in 1897, 4,014,852 bushels. In 1884, 473,535 gallons of wine were produced, of which 50,080 gallons were exported; in 1897-98, 1,283,094 gallons were made, and 515,714 gallons exported. The live-stock in 1897 numbered: horses, 164,820; cattle, 274,255; sheep, 5,032,541. In 1897, out of the total area, 156,763 square miles were held under pastoral leases, and the number of leases was 788.

The mineral wealth as yet discovered consists chiefly in copper and silver. The value of the copper-ore produced and exported in 1897 was \$23,200, and of copper, \$1,191,385, and the total value of all minerals produced \$1,834,875; in 1887 it was \$1,599,770; 1886, \$1,376,400; 1885, \$1,722,255; 1884, \$1,459,750.

In 1897 there were 738 factories in the colony, employing 12,685 people. There were 28 iron and brass furnaces, employing 1,543 people, and 18 manufacturers of agricultural implements, 184 people.

COMMERCE. In 1897, 18,119 tons of bread-stuffs were exported. The total value of imports in 1894 was \$31,133,450; exports, \$36,508,870; in 1897, imports, \$35,631,925; exports, \$34,642,075. In 1897 the chief exports were wool, wheat flour, and copper.

SHIPPING. In 1897, 1,178 vessels, of 1,774,476 tons, entered; and 1,191 vessels, of 1,785,673 tons, cleared the ports of the colony; and the total shipping belonging to the colony was 326 vessels, of 52,870 tons.

COMMUNICATIONS. In 1898 the colony possessed 5,014 miles of made roads. It had 1,870 miles of railway open for traffic in December, 1897, besides a number of lines in course of construction. The railways have proven a good source of income to the government, paying about 3 per cent profit.

There were 5,862 miles of telegraph and telephone in operation at the end of 1897, with 14,447 miles of wire. Inclusive of the total is an overland line running from Adelaide to Port Darwin, a distance of 2,000 miles, in connection with the British Australian cable. The receipts exceed the cost of the department after paying interest on moneys borrowed for construction. Attached to the telegraph department, telephone exchanges have been established.

In 1897 there were 681 post offices in the colony; and during 1897 there passed through them 19,128,982 letters, 2,039,686 packets, and 9,421,986 newspapers.

SOUTH BEND, a city of Indiana (described under **SOUTH BEND**, Vol. XXII, p. 286). The railroads that pass through it are the Chicago and Grand Trunk, the Lake Shore and Michigan Southern, the Michigan Central, the Indiana, Illinois and Iowa and the Vandalia Line. Besides carriage and wagon making, it is largely engaged in the manufacture of furniture, sewing-machine fixtures, patent medicines, paper, flour, woolen goods, chinaware and brick. In 1890 it had 161 manufacturing establishments, representing 46 industries and a capital of \$10,141,642. The city is supplied with artesian water from 32 flowing wells, pumped into a reservoir distributed by the standpipe system of water-works; has an excellent sewerage system, and is connected with Mishawaka, four miles distant, by electric surface road; has 27 churches, and is an educational center. Population 1890, 21,819; 1900, 35,999.

SOUTH BERWICK, a village of York County, southern Maine, on the Salmon Falls River. It is about 45 miles S.W. of Portland, and is connected therewith by the Portland, Saco and Portsmouth (Boston and Maine) railroad, 10 miles E. of Rochester. It manufactures shoes and woolen goods. The

academy was chartered in 1791. Population 1880, 1,092; 1890, 3,434; 1900, 3,188.

SOUTH BETHLEHEM, a borough of Pennsylvania, opposite Bethlehem, on the Lehigh River, and on the Lehigh Valley and the Philadelphia and Reading railroads. The borough has two systems of water-supply. It contains manufactories of steel, zinc, boilers and shovels; of silk, ordnance and armor-plates. It is the seat of Lehigh University (q.v., in these Supplements), and of Bishop Thorpe's School for Girls. Population 1900, 13,241.

SOUTHBORO, a town of Worcester County, central Massachusetts, on the New York, New Haven and Hartford railroad, 29 miles W. of Boston. It is in the center of an agricultural and dairying district, and manufactures boots and shoes. It has a public library, and its chief educational institution is St. Mark's Academy. Population 1890, 2,114; 1900, 1,921.

SOUTH BOSTON, a town in Halifax County, southern Virginia, on the Norfolk and Western and the Southern railroads, 32 miles N.E. of Danville. It is in the center of a tobacco-growing section; has several factories, a high-school, and an institute for girls. Population 1890, 1,789; 1900, 1,851.

SOUTHBRIDGE, a town of Worcester County, central Massachusetts, on the Quinnebaug River and the New York and New England railroad, about 32 miles E. of Springfield. It has a public library, is the center of a local trade, and manufactures optical instruments, cotton goods, carriages, boots and shoes and shoe-knives, etc. Population 1880, 6,464; 1890, 7,655; 1900, 10,025.

SOUTH CAROLINA had in 1900 a population of 1,340,316, that of 1890 having been 1,151,149, the



SEAL OF THE STATE OF SOUTH CAROLINA.

gain constituting an increase of 15.59 per cent. The census reports of 1890 gave the number of cities with a population of 8,000 or over at three, in which resided 78,915 of the people of the state, constituting 6.86 per cent of the whole number. In 1880 the number of similar cities was two, the number of residents 60,020, the percentage of urban population 6.03. The density of population was 33.30 to the square mile; the number of males, 572,337; the number of females, 578,812; the percentage of native-born population was 99.46; the number of negroes was 688,934, an increase of 84,602; the Chinese numbered 34, and the civilized Indians 173.

The gross area of South Carolina is 30,570 square miles, 400 square miles of which are water surface.

The area devoted to the culture of the cereals in South Carolina in 1889, was 1,774,438 acres, and the amount produced 17,475,090 bushels. Of the entire acreage, 75.86 per cent was under corn, 6.51 per cent under wheat, 17.36 per cent under oats, 0.04 per cent under barley, 0.23 per cent under rye, and no

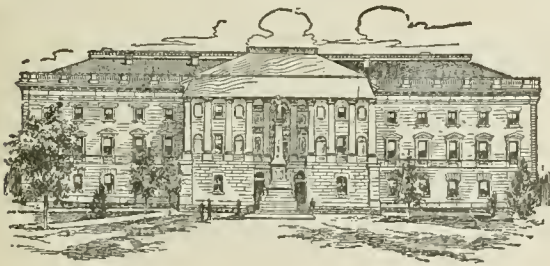
appreciable per cent under buckwheat, although some was raised. The area and production of the cereals is given in the following table:

GRAIN.	ACRES.	BUSHEL.
Corn	1,345,990	13,770,417
Wheat	115,510	658,351
Oats	308,056	3,019,119
Barley	688	9,428
Rye	4,129	17,303
Buckwheat	65	472

The following comparative statistics are from the reports of 1880 and 1890:

	1880.	1890.
Total number of farms.....	93,864	115,008
Average number of acres in a farm.....	143	115
Total acreage of the farms of the state.....	13,457,613	13,184,652
Percentage of improved land in farms.....	31	40
Value of land, fences, buildings, implements, machinery and live-stock.....	84,079,702	119,849,272
Number of horses.....	60,660	59,888
Number of mules and asses.....	67,005	86,306
Number of cattle, all kinds.....	363,709	268,293
Number of milch cows, included in above.....	139,881	107,184
Number of swine.....	628,198	494,696
Number of sheep.....	118,889	79,421
Acres mown for hay.....	2,837	29,132
Tons of hay produced.....	2,706	27,000
Acres under sweet-potatoes.....	39,059	46,086
Bushels sweet-potatoes produced.....	2,189,622	3,063,940

The census of 1890 showed South Carolina standing fifth among the states in the area of cotton grown in 1889. The acreage was 1,987,469, the product 356,409,630 pounds, or 747,190 bales. As compared with 1879 the acreage was increased 623,220 and the production 119,695,386 pounds. The state had 9.85 per cent of the total area under cotton in the United States, 45.68 per cent of the



CAPITOL BUILDING, COLUMBIA.

increase in acreage, produced 10 per cent of the total crop of the year, and showed 50.57 per cent of the total increase in pounds over the crop of 1879. It was in South Carolina that cotton was first grown in the United States, and out of a total production of 2,000,000 pounds in 1791, 1,500,000 pounds were estimated to have been produced in that state. It maintained the lead until between 1820 and 1830, when it yielded first place to Georgia. At the first

census of agriculture, that of 1840, it stood fifth in rank, in 1850, fourth, in 1860 and 1870, seventh. Since that time its importance as a cotton-producing state has steadily increased. In 1889 the acreage cultivated in cotton amounted to 10.29 per cent of the entire land area, a larger proportion than obtained in any other state. Every county produced cotton in the year last mentioned—18, or more than one half, each reporting over 50,000 acres devoted to its cultivation, 10 from 25,000 to 50,000 acres, 4 from 10,000 to 25,000 and 3 from 1,000 to 10,000 acres. The increase in area devoted to cotton, in relation to population, was exceeded only by Texas. Since the Federal census returns but one complete report on agricultural matters has been made. In 1894 the following facts were given out as having been collected by the county assessors: Wheat, 144,250 acres, producing 807,000 bushels; corn, 1,672,500 acres, producing 18,750,000 bushels; hay, 157,500 acres, producing 240,000 tons; oats, 340,000 acres, yielding 4,000,000 bushels; rye, 4,203 acres, from which 20,000 bushels were harvested; Irish potatoes, 4,000 acres, the product 250,000 bushels.

Rice is one of the staple products of South Carolina, the state standing second in 1889, Louisiana alone exceeding the area devoted to its culture, which in the year mentioned was 42,238 acres. The production was given at 30,338,951 pounds, 23.59 per cent of the total crop of the United States. In 1895 the crop was 850,000 bushels. The production of rice has steadily fallen off in all parts of this country during the last half of the century. In 1840 South Carolina produced over 30,000,000 pounds more than the entire crop of the United States in 1889. For many years the state led in the production of rice, and with Georgia raised upward of 90 per cent of the total amount, for several decades. In the cultivation of sugar-cane South Carolina occupied the last place among the six states reported as producing sugar and molasses in 1889. The area devoted to its cultivation, which was 3,395 acres, was almost 100 per cent greater than the area of 1879, and up to 1896 the increase was maintained at almost the same ratio. Tobacco was not grown for the market to any great extent in South Carolina up to 1885. In the census year 394 acres was reported and the product given at 222,898 pounds. In 1894 one county alone, Darlington, produced over 1,000,000 pounds. The money value of the crop for that year was \$120,000, the acreage more than three times greater than that of the census year. Other agricultural industries of South Carolina are stock-raising, fruit-growing, and, subsequent to 1893, dairying, including cheese and butter making; and products, other than those already mentioned, are peanuts, broom-corn, beans and peas.

The mining of phosphate rock was an important industry up to 1893, when, on August 27th, the state was visited by a disastrous cyclone, which virtually destroyed the mining-plants located on the rivers, more than six months being required to place them in operation again. The amount of rock mined in 1892 was somewhat in excess of 600,000 tons, and

the mills did a business of \$5,000,000. The production has not since, up to 1897, reached the above figures. The output of 1894 was given at 201,400 tons; the royalty paid to the state, \$87,657. From January, 1895, to January, 1896, the total royalties amounted to \$109,710, the levy being 50 cents per ton. In 1892 the state received \$152,286, the royalty at that time being \$1 per ton.

The latest complete manufacturing statistics are those of the eleventh decennial census, and show South Carolina to have had 2,382 specified manufacturing industries, in which \$29,276,261 were invested as capital, and which furnished employment for 24,662 persons, whose annual wages approximated \$6,590,983. The cost of the materials used was estimated at \$18,873,666, and the value of the finished products \$31,926,681. The principal lines of manufacture were: cotton goods, \$9,800,798; fertilizers, \$4,417,658; lumber products, \$2,694,311; flouring and grist-mill products, \$2,083,126; and tar and turpentine, \$1,524,100. Other industries of importance were oil, cotton-seed and cake, cooperage, and cars and shop construction.

After the taking of the census came a great increase in all branches of manufacturing industry, the cotton-mills of the state showing the largest gain. In 1894 there were 59 mills, running 629,675 spindles, 23 of the mills having been established within the year mentioned. At the same time there were 17,000 looms in the state, and five corporations were chartered with a capital stock of almost \$500,000. The cotton worked up in the mills of the state in 1895 was estimated at 120,000,000 pounds. The total number of corporations receiving charters in 1895, almost all of which were formed for manufacturing purposes, represented their capital stocks as aggregating \$5,267,700. The cotton-seed industry was inaugurated subsequent to 1890, and is one of the thriving and growing lines of manufacturing business. In 1895 the amount of seed crushed was estimated at 75,000 tons, of a total value, when converted into oil, hulls, meal and ash, very near \$1,000,000.

The production of gold in South Carolina was given at 2,266 fine ounces, of the value of \$46,853, in the census reports of 1890. In 1893 the number of ounces was 5,598, the value about \$112,000. Some silver is also found in the state, but not in paying quantities. The number of persons engaged in mining gold and silver in 1889 was 135, employed principally at two mines. The total value of all mineral products in 1889 was given at \$3,022,285, which included, in addition to gold and silver, manganese, granite, limestone, mica and phosphate rock, already mentioned.

The fisheries of South Carolina gave employment in 1889 to 1,776 persons, the capital invested amounted to \$145,586, the value of the products was \$205,845, the vessels engaged numbered 14, the boats 1,114, their combined value was \$49,000. The main portion of the returns came from general fisheries, oysters contributing \$27,029 to the total value. Legal protection is given to the business, a terrapin inspector appointed by the governor enforces the laws relative to this remunerative branch of the in-

dustry, and the fisheries of the state become the source of a larger revenue each succeeding year.

The report of the state superintendent of education for 1895 gives the following facts relative to educational matters in South Carolina:

Number of white pupils enrolled in the schools,	103,729
Number of colored pupils enrolled in the schools,	119,292
Total enrollment.....	223,021
Loss from 1894.....	3,745
Average attendance of white pupils.....	74,359
Average attendance of colored pupils.....	84,895
Total average attendance.....	159,254
Total number of white teachers employed....	2,696
Total number of colored teachers employed....	1,869
Total number of teachers employed.....	4,565
Total amount of wages paid to teachers during year.....	\$447,810
Number of new schoolhouses erected during year,	99
Value of the above.....	\$ 9,999
Number of schoolhouses in state for whites....	2,421
Value of the above.....	\$557,036
Number of schoolhouses in state for negroes....	1,631
Value of the above.....	\$189,350
Total expenditures for school purposes, 1895....	\$563,743

Educational institutions receiving financial assistance from the state are as follows: Clemson Agricultural College, enrollment for 1895, 372; income for the year, \$107,788, of which the state gave \$88,399. The South Carolina Military Academy had 146 cadets enrolled during 1895, 68 of whom were beneficiaries and for whose maintenance the state appropriated \$18,000. The Winthrop Normal and Industrial College, at Rock Hill, was opened October, 1895, with an enrollment of 304 women, the institution being for females only. The college has a farm of 147 acres, the intention being to cheapen the cost of tuition by supplying all products that the farm will produce. The cost of the institution was \$200,000, of which the town of Rock Hill gave \$60,000. The appropriation for the first year was \$70,510. Those able to pay tuition are charged \$40 per annum for the same. Other expenses aggregate \$93 for the term of nine months. More than one hundred applicants were turned away, at the time of opening, for lack of room. The South Carolina College had, in 1895, 180 students, 20 more than in 1894 and 112 more than in 1893. The legislature enacted a law in 1894, opening the doors of this institution to women, who had formerly been debarred from entering. The expenditures for 1895 were \$25,000. Claflin College, a part of the College of South Carolina, received state aid to the amount of \$18,266. Students to the number of 570 attended during the year 1895.

Of the denominational educational institutions in South Carolina the African Methodist Episcopal Church controls Allen University, at Columbia; the Presbyterian Church the Presbyterian College of South Carolina, at Clinton; the Associate Reformed Presbyterian Church has Erskine College, at Due West; the Baptist Church has Furman University, at Greenville; the Lutheran Church has Newberry College, at Newberry; and the Methodist Episcopal South Church has Wofford College, at Spartansburg. Non-sectarian institutions are the College of Charleston, at Charleston; South Carolina College, at Columbia; and Claflin University, at Orangeburg.

In 1890 there were 3,815 church organizations in

South Carolina, 3,967 edifices, a membership of all denominations amounting to 508,485, which constituted 44.17 per cent of the total population. All Baptist bodies numbered 1,676; all Methodist bodies, 1,456; all Presbyterian, 339; and Protestant Episcopal, 131. The total value of all church property in the state amounted to \$5,636,236.

The comptroller-general of South Carolina reported the total receipts of the state from all sources for the fiscal year ending Oct. 31, 1895, at \$1,971,892. The largest source of revenue was general taxes, including back taxes and railroad assessments, which produced \$854,537; the next largest was the receipts from the state dispensary, amounting to \$802,231. (For facts relating to the state dispensary, see LIQUOR LAWS IN THE UNITED STATES, in these Supplements.) The expenditures for the same period amounted to \$1,890,776. The amount of cash in the state treasury, Nov. 1, 1895, was \$272,196. The taxable property of the state amounted, at the close of 1895, to the sum of \$169,449,251; the amount of state tax assessed against the counties was \$762,315; the total poll-taxes of the state were \$251,155. At the date above mentioned the state had no indebtedness.

The charitable, correctional and penal institutions of South Carolina embrace the following, the location, number of inmates and expenditures for 1895 being also given:

INSTITUTION.	LOCATION.	INMATES.	EXPENDITURES.
State Hospital for the Insane.	Columbia ----	827	\$113,232
Deaf, Dumb and Blind Asylum	Cedar Springs	132	17,288
South Carolina Penitentiary.	Columbia ----	990	109,448

The penitentiary is almost self-sustaining, the proceeds of the farm of 4,712 acres contributing the larger portion of the expenditures.

The railroads of South Carolina are all operated and controlled by three corporations, the Southern Railway, the Seaboard Air Line and the Atlantic Coast Line. Railway construction was commenced in the state in 1830, when the South Carolina railroad was surveyed. It was completed in 1833, and was the first road in the United States to use American-built locomotives. The total mileage in 1895 was 2,567, the aggregate valuation for purposes of taxation \$23,797,652. In the five years succeeding 1890 the mileage was increased almost 500, the valuation more than \$6,000,000.

South Carolina had three ports of entry in 1895, Beaufort, Charleston and Georgetown. The aggregated value of the shipments of domestic products for the preceding year had been \$16,477,409, and the imports of foreign goods amounted in value to \$678,406. Shipments and receipts of goods by water have largely decreased within recent years. In 1891 Charleston alone received imports amounting to \$1,056,920, and shipped products of the value of \$21,857,470.

The latest statistics relative to the banks of the

state were given out in 1893, when there were 55 banking institutions in the state, 14 being national banks, 21 state banks and 20 savings banks. The last-named institutions had an aggregate capital of \$1,250,000, deposits amounting to \$6,600,000 and surplus of almost \$700,000. The national banks reported a total capital of \$1,750,000, and the state banks gave the same item at \$1,125,000.

At the close of 1895 the militia force of South Carolina, composed of state volunteer troops (white) and National Guard (colored), was as follows: Number of companies, 95; commissioned officers, 357; non-commissioned officers and privates, 3,173. The state volunteer troops were made up of 30 companies of cavalry, 2 companies of artillery and 49 companies of infantry. The naval militia, with a total strength of 177 officers and enlisted men, was divided into 3 companies. The National Guard was composed of 11 companies, forming the first regiment of infantry, and made up of 397 officers and enlisted men. The state appropriation for the year was \$10,000.

Jan. 1, 1899, there were published in South Carolina 139 newspapers, of which 13 were daily, 1 tri-weekly, 12 semi-weekly, 98 weekly, 2 fortnightly, 3 semimonthly, 8 monthly, and 2 quarterly. Papers were published in all of the 41 counties of the state, and in 67 of the cities, towns, and villages, of which 41 were county seats.

The following is a list of the principal cities and towns of South Carolina, the populations as given being from the census of 1900: Charleston, 55,807; Columbia, 21,108; Greenville, 11,860; Spartanburg, 11,395; Sumter, 5,673; Beaufort, 4,110; Camden, 2,441; Florence, 4,647; Newberry, 4,607; Anderson, 5,498; Orangeburg, 4,455; Georgetown, 4,138; Rock Hill, 5,485; Chester, 4,075; and Union, 5,400.

A constitutional convention, consisting of 160 members, elected in August, 1895, met September 10th of the same year and proceeded to frame a new constitution for South Carolina. The convention adjourned after a session lasting until December 4, having agreed on a constitution that went into effect Jan. 1, 1896.

The one particular feature of interest to the citizens of the state was the section prescribing the qualifications for suffrage. The requirements in this connection were as follows: Residence in the state two years, in the county one year and in the polling-precinct in which the elector offers to vote, four months, and the payment, six months before any election, of any poll tax then due and payable. Ministers and school-teachers were entitled to vote after six months' residence in the state. Registration was required, and upon applying for registration the person so applying must be able to read any section of the constitution submitted to him. The foregoing were the requirements up to January, 1898, after which time a person applying for registration, if otherwise qualified, must be able to both read and write any section of the constitution submitted to him by the registration officer, or show that he owns and has paid all taxes collectible during the previous year on property in the state assessed at three hundred dollars or more. The payment of all taxes, including poll-tax, is made a prerequisite to voting. Persons convicted of crime, the insane, etc., are disqualified from registering or voting.

The beginning of the sessions of the state legislature was changed to the second Tuesday of January, and the sessions limited to forty days, the time limitation not to apply to the first four sessions after the adoption of the

constitution. The legislature had certain restrictions placed over it, and was directed to enact certain special acts. Among the latter was the requirement for a provision for the punishment of any officer from whom a person in custody is taken by a mob and suffers bodily violence or death, as well as to provide for the maintenance of a civil action for damages against the county in cases of lynching when death ensues; and further, for an action by the county for the damages against the parties engaged in the lynching.

The common schools were liberally provided for, and pensions were to be allowed to indigent or disabled Confederate soldiers, resident of the state, and to indigent widows of deceased Confederate soldiers.

A provision was also introduced into the constitution, prohibiting the granting of divorces, and a section was attached, providing that the marriage of a white person with a person of any degree of negro blood should be unlawful and void, and the parties to such marriage subjected to legal punishment, to be provided by the legislature.

Little change was made in the constitution superseded by the new one in regard to the executive department of the state government. A board of pardons was to be provided, who were to hear all petitions for pardon and to report to the governor, who, however, was allowed to accept or reject the recommendations.

In the judicial department an additional judge was added to the supreme court, making the number four. Another appellate tribunal was provided, consisting of the judges of the supreme court and the circuit judges sitting together. This appellate court was to hear and determine constitutional questions solely. Magistrates were provided in place of trial justices, and salaries were to be paid instead of the fees arising, as was theretofore the rule.

The following is a list of the governors of South Carolina, together with their respective terms of office: John Rutledge, 1775-78; Rawlins Lowndes, 1778-79; John Rutledge, 1779-82; John Mathews, 1782-83; Benjamin Guerard, 1783-85; William Moultrie, 1785-87; Thomas Pinckney, 1787-92; Amaldus Vanderhorst, 1792-94; William Moultrie, 1794-96; Charles Pinckney, 1796-98; Edward Rutledge, 1798-1800; John Drayton, 1800-2; James B. Richardson, 1802-4; Paul Hamilton, 1804-6; Charles Pinckney, 1806-8; John Drayton, 1808-10; Henry Middleton, 1810-12; Joseph Alston, 1812-14; David P. Williams, 1814-16; Andrew J. Pickens, 1816-18; John Geddes, 1818-20; Thomas Bennet, 1820-22; John L. Wilson, 1822-24; Richard J. Manning, 1824-26; John Taylor, 1826-28; Stephen D. Miller, 1828-30; James Hamilton, 1830-32; Robert Y. Hayne, 1832-34; George McDuffie, 1834-36; Pierce M. Butler, 1836-38; Patrick Noble, 1838-40; B. K. Hennegan, 1840-40; J. P. Richardson, 1840-42; James H. Hammond, 1842-44; William Aiken, 1844-46; David Johnson, 1846-48; W. B. Seabrook, 1848-50; John H. Means, 1850-52; John L. Manning, 1852-54; James H. Adams, 1854-56; R. F. W. Alston, 1856-58; William H. Gist, 1858-60; Francis W. Pickens, 1860-62; M. L. Bonham, 1862-64; Andrew G. McGrath, 1864-65; Benjamin F. Perry, 1865-65; James L. Orr, 1865-68; Robert K. Scott, 1868-73; Franklin J. Moses, Jr., 1873-75; Daniel H. Chamberlain, 1875-77; Wade Hampton, 1877-79; William D. Simpson, 1879-80; T. B. Jeter, 1880-80; Johnson Hagood, 1880-82; Hugh S. Thompson, 1882-86; John P. Richardson, 1886-90; Benjamin R. Tillman, 1890-94; John Gary Evans, 1894-97; W. H. Ellerbe, 1897-. See SOUTH CAROLINA, Vol. XXII, pp. 286-289.

SOUTH CAROLINA COLLEGE, a co-educational institution located at Columbia, South Carolina; founded in 1801, and organized as a college in 1806; re-organized in 1880, with two branches, as the South Carolina Agricultural and Mechanical College at Columbia (for whites) and Claflin University at Orangeburg (for blacks). It had, in 1896, 175 students, 12 instructors and a library of 30,000 volumes.

SOUTH CAROLINA DISPENSARY PLAN. See LIQUOR LAWS, in these Supplements.

SOUTH DAKOTA, one of the north central group of states, the twenty-seventh to adopt a con-



SEAL OF SOUTH DAKOTA.

stitution and the fortieth in order of admission to the Union.

(For matter pertaining to the history of Dakota Territory prior to the division of the same into states, see NORTH DAKOTA, in these Supplements.)

On Feb. 22, 1889, President Cleveland signed the bills creating the two states of North and South Dakota. The act relating to South Dakota provided for the holding of an election May 14th to choose delegates to a constitutional convention, to meet at Sioux Falls, July 4th. The people were also to vote for or against the Sioux Falls constitution, adopted in September, 1885, and if a majority should favor the constitution, its provisions were to be incorporated into the new constitution, which was to be perfected by the convention, and its adoption submitted to the vote of the people on October 1st. If the new constitution should be accepted, South Dakota was to become a state by proclamation of the President.

The bill provided for the following grants of public domain:

	ACRES.
For university purposes	46,080
For public buildings at the capital	32,000
For public buildings at the capital (additional) ..	50,000
For agricultural colleges	120,000
For the School of Mines	40,000
For the Reform School	40,000
For the Deaf and Dumb Asylum	40,000
For the Agricultural College	40,000
For the State University	40,000
For normal schools	80,000
For general educational and charitable purposes.	170,000

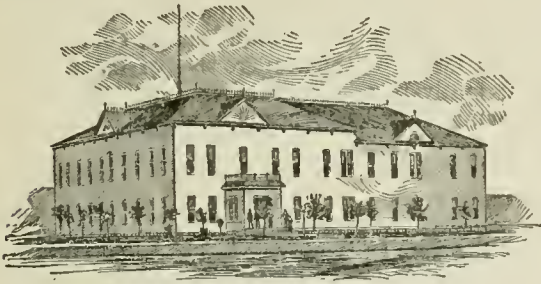
The state was also to become entitled to the sixteenth and thirty-sixth sections of every township, or to sections in lieu thereof, the proceeds from the sale or lease of which should form a permanent public-school fund. This fund was also to receive five per cent of the net proceeds derived by the United States from the sale of lands subsequent to admission. All lands and buildings already set apart for the penitentiary at Sioux Falls were to be given to the state. The new state was to constitute

one judicial circuit and to be entitled to two representatives in Congress.

In accordance with the terms of the act, a convention of 75 delegates met at Sioux Falls on July 4th. The question of the adoption of the constitution of 1885 into the new constitution received 37,710 votes out of a total of 41,123.

A digest of the constitution prepared by the convention for submission to the vote of the people is given herewith:

The powers of the government of the state are divided into three distinct departments—the legislative, executive, and judicial. The legislative power is vested in a legislature, which consists of a senate of not less than 25 nor more than 45 members, and a house of representatives, which consists of not less than 75 nor more than 135 members. The ses-



CAPITOL BUILDING, PIERRE.

sions of the legislature are to be held biennially, except in the case of emergency. The term of office of the members of both houses is for the period of two years. Bills may originate in either house, and a bill passed in one house may be amended in the other. The powers of the legislature are restricted in certain enumerated matters, to prevent abuses which have occurred in other states. Among these private or special laws so prohibited are granting divorces; changing the name of persons or constituting one person the heir-at-law of another; locating or changing county seats; regulating county and township affairs; incorporating cities, towns and villages, or interfering with municipal government; remitting fines, penalties or forfeitures; granting special or exclusive privileges, immunities or franchises; releasing or extinguishing indebtedness, liability or obligation to the state or to a municipality; and the legislature shall not authorize any game of chance, lottery or gift enterprise.

The executive power is vested in a governor who holds his office for the term of two years. A lieutenant-governor is elected at the same time and for the same term. The election for these offices is held at the time and places of choosing members of the legislature. The governor has the power of veto, but upon reconsideration by both houses, if the bill so vetoed shall receive a two-thirds vote in its favor the same shall become a law regardless of the disapproval of the governor. The same rule obtains in the case of the veto by the governor of the separate items of an appropriation bill.

The lieutenant-governor is presiding officer of the senate, but has only a casting vote therein. He is next in succession to the governor, followed, in the

event of his own inability to serve, by the secretary of state. The officials to be chosen by the electors at the time of the election of the governor and lieutenant-governor are the secretary of state, auditor, treasurer, superintendent of public instruction, commissioner of school and public lands, and an attorney-general, who severally hold their offices for the term of two years. The treasurer shall not hold his office for more than two consecutive terms.

The judicial powers of the state, with some exceptions expressed in the constitution, are vested in a supreme court, circuit courts, county courts and justices of the peace, and such other courts as may be created by law for cities and incorporated towns. The supreme court has appellate jurisdiction only, co-extensive with the state, and a general supervisory control of the inferior courts, under limitations and regulations prescribed by statute. The supreme court consists of three judges, which number, after five years from the date of admission of South Dakota as a state, may be increased to five, not more. The judges first elected shall serve for a term of four years, those subsequently elected for a term of six years.

The circuit courts have original jurisdiction of all actions and causes, both at law and in equity, and such appellate jurisdiction as may be conferred by law. The constitution divided the state into eight circuits, and provided for future increase of both circuits and judges by the concurrence of both houses in the act.

Each county, when organized, is entitled to a judge of the county court, whose term of office is for two years. The county courts are courts of record, and have original jurisdiction in all matters of probate, guardianship, the settlement of the estates of deceased persons, and other civil and criminal jurisdiction, conferred by law. Limitations to jurisdiction in regard to amounts involved are placed on this court, except in probate, guardianship and estate matters.

A bill of rights is included in the constitution, composed of 27 sections, which is a model of its kind, and embodies the best principles of free government, gleaned from an experience of more than a century.

The following are some of the principal provisions: Class legislation is prohibited; elections are to be free and equal; all courts shall be open, every man having his remedy by due course of law, without denial or delay; excessive bail or fines and cruel punishments are inhibited; the right to bear arms in defense of themselves and the state is assured to the citizens; treason against the state is defined, and protection against wrongful conviction provided for; it is expressly declared that all political power is inherent in the people, and all free government founded on their authority, and is instituted for their equal protection and benefit; and they have the right in lawful and constituted methods to alter or reform their forms of government in such manner as they may think proper. "And the state of South Dakota is an inseparable part of the American Union, and the constitution of the United States is the supreme law of the land."

South Dakota is bounded on the N. by the seventh standard parallel ($45^{\circ} 57' N.$) which separates it from North Dakota; on the east by Lake Traverse, Big Stone Lake, the Big Sioux River and the meridian of $96^{\circ} 20' W.$ of Greenwich, which separate it from Minnesota and Iowa; on the west by the Greenwich meridian of 104° , which forms the line between it and Montana and Wyoming; while its southern boundary is the 43d parallel of north latitude and the Missouri River, which separate it from Nebraska. The southern boundary is therefore on the parallel of Detroit, Boston, and the south of France. The area is one and one half times as great as that of England, seven times that of Belgium, more than five times that of Denmark, six times that of Holland and more than one third that of France.

The population of South Dakota in 1900 was 401,570. In 1890 the population of that part of Dakota territory which now constitutes South Dakota was 328,808, the gain during the decade making an increase of 72,751. The gain in population in 1880 of North and South Dakota combined over Dakota territory amounted to 278.41 per cent. The position given to South Dakota by the eleventh decennial census was 37; that of Dakota territory in 1880 was 40. The gross area of South Dakota is 77,650 square miles, of which 800 square miles is water surface, and 76,850 square miles, or 49,184,000 acres, is land surface. The density of population in 1890 was 4.28 to the square mile, that of Dakota territory in 1880 having been but 0.92. The percentage of native-born population was 72.31, that of the foreign born 27.69, the corresponding percentages in Dakota territory in 1880 having been 61.68 and 38.32, respectively. The male population numbered 180,250, the female 148,558, the relative proportion of females to males being 82,418 to each 100,000. The proportion in Dakota territory in 1880 was 64,257 females to each 100,000 males. The number of negroes in South Dakota in 1890 was 591, the number in North Dakota being 373, a total in the two states of 914, Dakota territory in 1880 containing but 401. The number of Chinese was given at 195, the number of civilized Indians at 782.

The showing made by South Dakota in the reports made by the eleventh census, especially in agricultural matters, was a surprising one, taking into consideration the scattering settlement that had been made. The following table shows the acreage and production of the cereals, as well as other facts of interest:

Total acreage devoted to the cereals	3,701,604
Production of the cereals in bushels.....	38,141,603
Percentage of the whole area under corn....	20.35
Percentage of the whole area under wheat....	61.05
Percentage of the whole area under oats.....	15.68
Percentage of the whole area under barley....	2.63
Percentage of the whole area under rye.....	0.25
Percentage of the whole area under buckwheat,	0.04
Total number of acres under corn	753,309
Total number of bushels of corn produced....	13,152,008
Total number of acres under wheat.....	2,259,846
Total number of bushels of wheat produced..	16,541,138
Total number of acres under oats.....	580,289
Total number of bushels of oats produced....	7,406,846
Total number of acres under barley.....	97,370
Total number of bushels of barley produced..	902,005
Total number of acres under rye	9,229

Total number of bushels of rye produced.....	65,183
Total number of acres under buckwheat	1,561
Total number of bushels of buckwheat produced	11,423

For many items of interest, see that portion of the article on North Dakota, in these Supplements, which deals with agricultural matters.

The total number of farms in South Dakota in 1890 was 50,158, which were divided, according to size, as follows: Thirty-nine were under 10 acres, 62 were 10 and under 20 acres, 557 were 20 and under 50 acres, 1,769 were 50 and under 100 acres, 46,043 were 100 and under 500 acres, 1,501 were 500 and under 1,000 acres, and 187 were 1,000 acres and over. The average size of the farms of the state was 227 acres. Of the whole number, 43,555 were cultivated by the owners, 1,294 were rented for a fixed money value, and 5,309 were rented for a share of the products. South Dakota could contain 216,669 farms of the average size of those already under cultivation, the number reported in 1890 occupying only 23.17 per cent of the land area of the state.

South Dakota had 499 specified manufacturing industries at the date of taking the eleventh decennial census, in which the capital invested aggregated the sum of \$3,207,796, and which furnished employment for 2,422 persons, whose annual wages amounted to \$1,098,418. The cost of the material used was estimated at \$3,523,840, and the value of the products at \$5,682,748. The leading line of manufacture was flouring and grist-mill products, amounting to \$2,793,701, followed by printing and publishing to the amount of \$627,828; all kinds of lumber, \$437,784; brick and tile, \$134,650; and blacksmithing and wheelwrighting, \$122,414.

The report of the superintendent of public instruction of South Dakota, made at the close of 1894, disclosed the following facts in relation to the public schools of the state. The total number of persons of school age was 105,175, of whom 54,483 were males and 50,692 were females. The total number of pupils enrolled in rural, village, city, state and denominational schools was 90,855. Of these, 1,888 attended denominational, 941 the state, 16,151 the village and city, and 71,875 the rural schools. The total number of teachers in all of the above-named schools was 4,982, of whom 1,454 were males and 3,528 were females. The total amount paid instructors of all grades was \$923,266. The rural schools numbered 3,321, the village and city schools 111, the state schools 6, and denominational schools 16, making the total number of schools of all classes 3,454. The total value of school property of all kinds was given at \$4,503,013, the receipts for maintenance of all save denominational schools was \$2,233,427, and the disbursements for the same \$1,792,124. The total school indebtedness of rural schools was \$957,514, of the village and city schools \$609,402, making the total school indebtedness \$1,566,916.

Much interest has been taken in the cause of education during the entire time of South Dakota's statehood, and the advances made have been very rapid. Educational associations are held at differ-

ent points in the state, which have been of great benefit to teachers. All counties have normal institutes, and from the group of educational institutions that give collegiate and normal training to their students have come the greater part of the teachers of the state. The leading institution of higher education in South Dakota is the University of South Dakota (q.v., in these Supplements). There are several denominational colleges, among them being the Dakota University at Mitchell, and Black Hills College at Hot Springs, Methodist Episcopal; Pierre University at East Pierre, Presbyterian; Sioux Falls University, Baptist; Scotland Academy, Presbyterian; Augustana College, Lutheran; Redfield College, Congregational; and several others of less prominence. The state maintains a school of mines at Rapid City, and the State Agricultural College, with experiment station attached, is located at Brookings. For the State University, the Agricultural College, United States Experiment Station, State School of Mines, State Normal School and State Geological Survey, South Dakota appropriates about \$60,000 annually; the United States government, \$36,000.

In 1890 South Dakota had 1,589 church organizations, 774 edifices, a total membership of 85,490, which constituted 26 per cent of the population, and church property of the value of \$1,761,277. The Adventists had 38 organizations; the Baptist bodies, 90; the Roman Catholic, 177; the Congregational, 138; the Lutheran, all bodies, 432; the Methodist, all bodies, 306; the Presbyterian, all bodies, 134; the Protestant Episcopal, 83, and the United Brethren, 33.

The State Auditor reported, under date of Dec. 1, 1895, the following facts: Assessment for 1895, \$121,751,151; for 1894, \$128,046,765; 1893, \$136,032,840; 1892, \$127,377,990. The railroad, telegraph, telephone, express, and sleeping-car companies, which were assessed by the state board, paid taxes during the years named on assessments as follows: 1895, \$9,418,613; 1894, \$9,417,579; 1893, \$9,164,496; 1892, \$9,120,625. It is thus shown that the decrease in valuations was in other directions than that of corporation property. During 1894 the state suffered a great loss by reason of the defalcation of the state treasurer, the funds embezzled amounting to \$367,020. The treasury for a time was bankrupt, but was replenished by the issuance of revenue warrants; \$127,552 in cash was soon recovered, together with certain property of the defaulting treasurer, and the exact loss to the state cannot be definitely ascertained until the property is realized on. The report referred to showed the total bonded debt of the state to have been \$1,138,200. The aggregated valuations, as taken from the county duplicates, showed the following as the basis of taxation for 1896: Lands, \$74,018,000; town lots, \$16,863,655, and personal property, \$20,550,405. The legislature which met Jan. 8, 1895, made appropriations for the succeeding two years, the amount for 1895 being \$290,687, and for 1896, \$289,574. These amounts did not include interest on bonds, nor salaries of state officials.

The railroads of the state had a total mileage, at

the close of 1895, of 2,860; 5,046 persons had been employed by the 14 different lines, to whom wages to the amount of \$2,950,507 had been paid during the year.

In April, 1895, the Yankton Sioux Indian reservation was thrown open for settlement. This tract consisted of 168,000 acres of excellent land, which the state authorities had attempted to take possession of under an act passed by Congress, March 2, 1895, permitting states to select school lands from the surplus of surrendered Indian reservations. The right of the state was contested and the matter carried before the Secretary of the Interior, who decided adversely to South Dakota.

The state institutions of South Dakota did not include an asylum for the blind up to 1895, when the legislature of that year authorized the location of one at Gary. Theretofore the indigent blind had been maintained at the Iowa College for the Blind, at an annual expense of from \$300 to \$500. The School for Deaf Mutes, at Sioux Falls, expended during 1893-94 the sum of \$27,000. The pupils numbered 47, 29 of whom were boys and 18 girls. The expenditures of the Insane Hospital at Yankton, for 1894, were \$76,766; the average number of patients for the year being 361. An additional hospital for the insane was authorized by the legislature in 1893, but up to 1896 it had not been erected. It was to be located at Redfield. The cost of maintenance of the Soldiers' Home, at Hot Springs, for 1894 was \$24,725. The expenditures of the penitentiary, at Sioux Falls, reached \$31,627 in 1894; the number of prisoners averaging for the year, 117. A farm of 160 acres, adjoining the penitentiary buildings, has been paid for out of the earnings of the convicts. The Reform School is located near Plankinton, on a farm of 640 acres of good land; the number of boys confined during 1894 was 65; the number of girls, 22. The expenditures for 1893-94 amounted to \$19,849.

The mineral deposits of South Dakota are of a varied character, and of such extent and importance as to ultimately reach a large annual value. The census reports of 1889 give the total value of the output at \$3,685,862. Gold leads all of the mineral products of the state, both in the extent of its deposits and the value of the annual output. For 1889, the gold and silver mined reached a value of more than \$3,250,000. In 1894, gold alone yielded a return of \$4,000,000, the output of the preceding year being but a trifle less. In 1893, silver returned \$181,527, the product being much decreased as compared with 1890, 1891 and 1892. Copper is abundant in ore of 35 per cent purity, yielding \$112 per ton of ore. Lead is found in large quantities around the towns of Galva and Carbonate, but the industry had not been developed to any great extent up to 1896. The same state of affairs existed in regard to the extensive deposits of iron ore in the Black Hills. Manganese ores of 46 per cent purity were discovered in the Black Hills country early in 1890, and large shipments were made from Custer County in 1892, but the industry fell off and was not made prominent thereafter. The same section of the state has rich deposits of nickel, and tin has

been known to exist since 1877 in the northwestern section of that country, the first found in the United States. The total production of tin-bearing rock in the United States in 1889 was 28,000 tons, distributed as follows: California, 5,000 tons; Virginia, 1,000 tons; and South Dakota 22,000 tons. Analyses made of the tin ores have showed them to contain from 74.5 per cent to 76.7 per cent of pure tin; the Cornish tin, long considered the best of the world, shows only 72.3 per cent pure. Over four thousand separate veins of tin ore had been discovered, located and recorded up to 1895. Phosphatic minerals are found in the veins of tin ore, including apatite, heterosite, triphylite and autunite, as is also graphite. Beryls of large size have also been found in the veins, as well as garnets, in all mines worked up to 1896. Ilmenite, zircons and corundum have occasionally been met in the same formations. Other mineral products also found in the Black Hills include mica, immense deposits of granite and many other varieties of stone. In 1889 but three states were reported as producing grindstones—South Dakota, Ohio and California. Those coming from Dakota were from Lawrence County, and were of the value of \$7,131. The granite is of so coarse a quality as to disintegrate rapidly when exposed to the weather. In three of the eastern counties of the state excellent building-stone is found, of a quality that has led to its being extensively shipped to other states. Quartzite, or Sioux Falls granite, is found in large deposits in the eastern portion. It is composed almost entirely of quartz, and is usually intensely compact and hard. It varies in color from light pink to Indian red, with shades of purple. Extensive quarries of this rock have been opened about Sioux Falls and Dell Rapids, which have been worked since 1885, and the material has become well known throughout the country. Tests made in Chicago, where it has been used for paving purposes, show a crushing-strength of 22,000 pounds to the square inch. Sandstone is found in many sections of South Dakota, but the limestone is confined to the Black Hills, where is found a purple variety, susceptible of a high polish, resembling the variegated marble of Tennessee. The kind used for the production of lime consists of 98.75 per cent of calcium carbonate. Portland cement is easily made near Yankton. Almost \$150,000 worth was shipped out of the state in 1892-3, much of which was used at the World's Fair at Chicago. Potters', fire and brick clays abound in many parts of the state. The only coal or lignite known to exist in South Dakota is found in the Black Hills district, but, in addition to being of poor quality, is situated unfavorably for mining, being too far from railroad facilities to be handled with profit. Natural gas has been found at several points, but up to 1896 had not been sufficiently developed to displace other fuels to any great extent.

The average rainfall of South Dakota, as reported by the Signal Service of the United States, is about 22 inches. While different localities vary in average, the fall is sufficient for agricul-

tural purposes in all sections except in the uplands of the west central portion, which are too arid for successful cultivation without irrigation. South Dakota is supplied with the means for irrigation as no other state in the Union is. An immense basin underlies all that part of the state lying between the Missouri and the James Rivers, extending slightly to the eastward of the James, north of the city of Mitchell. At any point in this region, which includes portions of thirty counties, except upon some of the highest divides of limited extent, artesian wells may be made by boring down from one hundred to fifteen hundred feet, the depth varying inversely with the altitude. At lower levels, near the James and Missouri rivers, the pressure often reaches as high as 175 pounds to the square inch, and has been successfully utilized as power for operating flour-mills, city water-works, etc. The artesian wells in the basin above described number about one hundred. A flow of more than 3,000 gallons per minute has been obtained from a well with an 8-inch opening. The surface of this section is generally level or gently undulating; the soil is mainly a rich black loam, of the same nature and origin as that of Iowa and Illinois. The arid belt lies farther to the westward, and water for irrigation is obtained from the larger streams. The clay soil of this belt produces very nutritious grasses, which change early in the season to natural hay, accessible for the rest of the year. This was the favorite grazing-region for the immense herds of buffalo that formerly made it their home.

The Black Hills region lies in the southwestern part of South Dakota, within the embrace of the North and South forks of the Cheyenne River, including an area of thirty-five hundred square miles. Up to 1874 this country was practically unknown, since which time it has become self-sustaining, agriculturally, and has developed some of the richest gold and tin mines in the world. The entire area of the hills is well wooded. The density and dark color of the forests covering the mountain-sides suggested the name of the region. The heavy, or Norway pine, is the most abundant and valuable tree. Black and white spruce cover the valleys of the central and northern portion. Burr-oaks, in small groves, grow on the eastern slope of the range. White elm is found along the valleys of the eastern side. Aspen, white birch, ash, mulberry, box-elder, ironwood and juniper grow sparingly in many localities. The heavy pine furnishes logs for the mills from 30 to 50 feet in length, 12 to 14 inches in diameter. Estimates made in 1894 place the amount of virgin forest in the hills at one thousand square miles. The Black Hills country is especially well adapted to the culture of fruit, and the valleys are exceedingly productive.

The fisheries of South Dakota reported, in 1889, 62 persons engaged, \$2,142 capital invested, and products to the amount of \$10,866 sold. The carp industry was given an extensive trial, \$8,389 having been invested in the business and \$89 realized from sales. The first reports were made in 1882, when 25 carp were placed in waters within the

state. In 1886 over 25,000 were planted, and the entire sales given in were 68 sold for stocking and 560 pounds for food, of the aggregate value given above.

During 1893-94, 378 domestic incorporations took papers under the laws of South Dakota, 232 of which were for profit and 146 of which were for charitable and benevolent purposes. In 1894 there were 23 state banks incorporated, 4 failed and 4 went into voluntary liquidation. The state banks doing business at the close of 1894 had an average reserve of 33.42 per cent, which was almost 20 per cent in excess of the reserve required under the law. The total number of banks in the state was 230, of which 140 were state, 40 national and 50 private institutions.

South Dakota had in 1895 about 80,000 adults liable to military service. The authorized strength of the National Guard was 3,057, and the organized force consisted of about 750 officers and enlisted men, formed into a regiment of infantry consisting of 3 battalions of 4 companies each, a battalion of infantry and a battery of artillery. In 1894 the state appropriation was \$4,000, and that from the Federal government \$3,486.

January 1, 1899, there were 276 papers published in South Dakota, of which 17 were daily, 1 semi-weekly, 242 weekly, 3 semimonthly, and 13 monthly. Papers were published in 54 of the 71 counties of the state, and in 152 of the cities, towns, and villages, of which 52 are county seats. The number of post offices was 669, 214 of which were money-order offices, 44 were Presidential, 8 being second-class, and 36 third-class.

The following is a list of the principal cities and towns of South Dakota, with the populations of 1900: Sioux Falls, 10,266; Yankton, 4,125; Pierre, 2,306; Aberdeen, 4,087; Huron, 2,793; Watertown, 3,352; Lead City, 6,210; Deadwood, 3,498; Mitchell, 4,055; and Rapid City, 1,342.

The following is a list of the governors of South Dakota, since the formation of the state, together with their respective terms of office: Arthur C. Mellette, 1889-93; Charles H. Sheldon, 1893-97; Andrew E. Lee, 1897-.

See also DAKOTA, Vol. VI, pp. 773, 774. For map of South Dakota, see Vol. VI, pp. 772, 773.

SOUTH DAKOTA, UNIVERSITY OF, a state, non-sectarian institution, located in Vermilion, South Dakota, in 1862, by the territorial government, which granted it 86,000 acres of land and a yearly appropriation. It was not organized, however, before 1882, when it was opened for students. There were in 1896 three brick-and-stone, well-equipped buildings, 14 instructors and 300 pupils. Degrees are given in letters, sciences, music and art; also school teachers' certificates. In 1896 the institution had in invested funds \$45,000, and an income, from all sources, of \$27,300.

SOUTHDOWN SHEEP. See AGRICULTURE, Vol. I, p. 392.

SOUTH EASTON, a borough of Northampton County, eastern Pennsylvania, on the south bank of the Lehigh River, opposite Easton, and on the

Delaware River, opposite Phillipsburg, New Jersey, on the Lehigh Valley railroad. It has manufactories of wire and cotton goods. Population included in Easton city, 1900, 25,238.

SOUTHERN BAPTIST THEOLOGICAL SEMINARY. See THEOLOGICAL EDUCATION, in these Supplements.

SOUTHERN RAILWAY ASSOCIATIONS. See RAILROADS, in these Supplements.

SOUTH FRAMINGHAM, a town of Middlesex County, northeastern Massachusetts, 23 miles E. of Worcester, and 21 miles W.S.W. of Boston, on the Boston and Albany and the New York, New Haven and Hartford railroads. It has extensive straw-goods factories, manufactories of woolens, rubber goods, boots and shoes and paper, and is the seat of a state normal school. Population of Framingham town, 1890, 9,239; 1900, 11,302.

SOUTH GEORGIA ISLANDS. See GEOLOGY, Vol. X, p. 219.

SOUTH HADLEY, a township of Hampshire County, western central Massachusetts, 14 miles N. of Springfield and 5 miles S.E. of Northampton, on the Connecticut River, which at this place has a fall of forty feet, and on the Boston and Maine and the New York, New Haven and Hartford railroads. The township contains the villages of South Hadley and South Hadley Falls, and has cotton, woolen and saw mills. It had an assessed value in 1894 of about two million dollars. It is the seat of Mount Holyoke Female Seminary (q.v., in these Supplements). Population 1890, 4,261; 1900, 4,526.

SOUTHINGTON, a town of Hartford County, central Connecticut, 23 miles N. of New Haven, on the Quinipiac River, and on the New York, New Haven and Hartford railroads. It has important manufactories of cutlery, carriages, wood screws, paper bags, ceiling and floor plates. The Lewis High School is located here; there are also a national and savings bank. The surrounding towns are manufacturing centers. Population town and borough, 1900, 5,890.

SOUTH McALESTER, a town of the Choctaw nation, southeastern Indian Territory, 64 miles W. of Wister Junction, on the Choctaw, Oklahoma and Gulf railroad. It is an important trading-point, in the center of a rich coal-mining country; has a bank and weekly papers, and in 1895, when Congress by special act detailed a part of the United States Geological Survey to make a survey of the territory, South McAlester became the headquarters of the survey. Population 1900, 3,479.

SOUTH MOUNTAIN OR BOONSBORO, Maryland. The name given to an engagement, which took place Sept. 14, 1862, on South Mountain near Boonsboro, Washington County, Maryland, between the Confederates under Gen. R. E. Lee and the Federal division of General Burnside's corps, resulting in the retreat of the Confederate forces. The purpose of the latter had been to assist Stonewall Jackson's capture of Harper's Ferry by opposing the Union troops' passage of

Catoctin Creek. This proved unsuccessful, as the Union regiments carried the eminence and outflanked the Confederates, who withdrew during the night, leaving their dead behind.

SOUTH NORWALK, a city of Fairfield County, S. W. Connecticut, 33 miles from New Haven and 42 miles from New York City, on the Norwalk River and Long Island Sound, and on the New York, New Haven and Hartford railroad. There is regular steamer communication with New York City during the summer months for passenger-boats, and all the year round for freight-boats. Among the improvements in the city are a public high-school, opera house, public library, a system of electric railroads, besides national and saving banks, and a daily newspaper. Population (1900), 6,591.

SOUTH OMAHA, a city in Douglas County, Nebraska, four miles south-west of Omaha (founded in 1885), on the Burlington Route, the Chicago, St. P., Minn. and Om.; the Fremont, Elk. and Mo. Valley; the Mo. Pac., and the Union Pacific R. R. It is a growing town, being the seat of one of the largest meat-packing plants in the U. S. Possesses a number of banks, newspapers, churches, schools, and fine public buildings. Pop. (1890), 8,062; (1900), 26,001.

SOUTH ORANGE, a village of Essex County, northeastern New Jersey, 5 miles N. W. of Newark and 15 miles W. of New York City, on the Rahway River and on the Delaware, Lackawanna and Western railroad. Its picturesque location among the Orange Mountains has made it a favorite place of residence for many New York business men, who have beautified the village by many beautiful homes. It has manufactories of hats and gelatin, contains public and private schools and a public library, and is the seat of Seton Hall College (Roman Catholic). Population 1890, 3,106; 1900, 4,608.

SOUTH-SEA BUBBLE. See **FINANCE**, Vol. IX, p. 183.

SOUTH-SHETLAND. Same as **NEW SOUTH SHETLAND ISLANDS**, Vol. XVII, p. 407.

SOUTHWELL, ROBERT, (1560-95.) See **ENGLISH LITERATURE**, Vol. VIII, p. 418.

SOUTHWORTH, CONSTANT, a New England colonist; was born in Leyden, Holland, in 1614. He was the son of Edward Southworth, a merchant, who was intrusted with the business interests of the Leyden Pilgrims, and who died in 1621. Constant Southworth was taken to Plymouth, Massachusetts, in 1621, by his widowed mother, Alice (Carpenter) Southworth, who was afterward married to Governor William Bradford. He was carefully educated; became a magistrate, and several times represented the colony in the legislature. He was one of the founders of Duxbury; was for a time assistant governor of Plymouth, and governor of the colony at Kennebec. He was supposed to have written the supplement to *New England's Memorial*, the work of his cousin, Nathaniel Morton. He died at Duxbury, Massachusetts, about 1685.

SOUTHWORTH, EMMA DOROTHY ELIZA

NEVITT, an American authoress; born in Washington, District of Columbia, Dec. 26, 1819; graduated in 1835 from her stepfather's (J. L. Henshaw's) school. She was married in 1840; taught school from 1844 to 1849; wrote her first story, *The Irish Refugee*, for the Baltimore *Saturday Visitor*; wrote *Retribution* for the Washington *National Era*, and published it in book form in 1849; published her collected works in 1872, and removed from near Washington to Yonkers, New York, in 1876. She wrote about sixty novels, many of which have been translated into French, Spanish and German. Among her later works are *The Lost Heir of Linlithgow* (1872); *Red Hill Tragedy* (1877); and *The Phantom Wedding* (1878). She died June 30, 1899.

SOVEREIGN. See **MINT**, Vol. XVI, pp. 482, 483.

SOVEREIGNTY. See **LAW**, Vol. XIV, pp. 356-360.

SOWING AND SOWING-MACHINES. See **AGRICULTURE**, Vol. I, pp. 320, 321; and **DRILLS**, in these Supplements.

SOYER, ALEXIS, a French cook and author of books on gastronomy; born in Meaux, in 1809. Although showing a real aptitude for the lyric stage, he devoted himself to the trade he had been apprenticed to—high-class cookery. He made his reputation first as "chef" of the Reform Club, London, from 1837 to 1850, and as an adviser on cookery matters benefiting the British soldiers' diet during the Crimean War. Wrote *The Gastronomic Regenerator* (1847; 9th ed., 1861); *The Modern Housewife* (new ed., 1872); *Culinary Campaigns* (1857). Died in 1858.

SOY SAUCE. See **GRAM**, Vol. XI, pp. 36, 37.

SPACE. See **PSYCHOLOGY**, Vol. XX, p. 54; and **MEASUREMENT**, Vol. XV, pp. 659, et seq.

SPAIN. (For general article, see **SPAIN**, Vol. XXII, pp. 293-365. For a discussion of the Cuban insurrection, see **CUBA**, in these Supplements; and for an account of the Philippine Islands trouble, see **PHILIPPINE ISLANDS**, in these Supplements.) The constitution proclaimed in 1876 remains in force, with the exception that an act of 1890 grants the electoral privilege to all male Spaniards 25 years of age who enjoy full civil rights, and have been citizens of a municipality for at least two years.

The present reigning sovereign, belonging to the younger branch of the "Bourbons of Spain," is Alfonso XIII, son of the late King Alfonso XII, and Maria Christina, daughter of the late Karl Ferdinand, Archduke of Austria, and was born after his father's death, May 17, 1886, succeeding his sister, under the regency of the Queen Dowager Maria Christina, his mother.

The King has a civil list, fixed by the Cortes, 1886, of one million four hundred thousand dollars, exclusive of allowances to members of the royal family; the Queen Regent having the administration and usufruct of the said sum until the King becomes of age. The annual grant to the Queen, as mother to the King, was fixed by the Cortes, in 1886, at \$50,000. To the immediate successor (his

eldest sister, Princess of Asturias) was assigned \$100,000, and \$50,000 to his second sister.

The following is the strength of the regular army of Spain in peace and war:

	PEACE.	WAR.
Infantry	63,991	132,000
Cavalry	14,386	17,156
Artillery	12,063	12,166
Engineers	5,539	11,027
Administration	1,500	11,140
Sanitary, etc.	2,197	483
Gendarmerie	14,697	.....
Customs' service	14,186	.....
Total	128,559	183,972

The annual contingent of men called to the colors in time of peace is 80,000. There are thirteen military schools and colleges.

The following statement of Spain's naval strength in 1898 includes ships built and building, but excludes training-ships, transports, and non-effective vessels:

Battleship, first-class, 1; port-defense ships, 2; cruisers, first-class, 4; cruisers, second-class, 5; cruisers, third-class, 4; gunboats, 60; torpedo craft, 27; total, 103. After the outbreak and continuance of the Cuban insurrection a number of war-vessels were purchased or ordered, in France, Germany, and Great Britain.

This navy was manned, in 1898, by 14,000 seamen and petty officers, and 9,000 marines; and was officered by one admiral, 24 vice- and rear-admirals, 148 captains, and 696 other naval officers; while the engineering branch numbered 150 officers. The navy, like the army, is recruited by conscription, naval districts for this purpose being formed.

COLONIES. Of Spain's once vast colonial empire only a few scattered remnants remained to her at the end of 1897; the war of 1898 with the United States resulted in depriving her of the best portions of these, including Cuba, Porto Rico, the Philippine and Sulu islands, and Guam. In June, 1899, she sold to Germany her remaining Pacific islands, including the Carolines, the Palaos, and the Ladrone or Marianne islands (except Guam). The only colonies that now remain to her are the following scattered possessions in northwest Africa:

COLONIAL POSSESSIONS.	AREA SQ. MILES.	POPULATION.
Rio de Oro and Adrar	243,000	100,000
Ifni (near Cape Nun)	27	6,000
Fernando Po, Annobon, Corisco, Elobey, San Juan	850	30,000
Total	243,877	136,000

FINANCE. In 1896-97 the ordinary revenue was \$164,482,289, and the expenditure was \$161,791,131; the probable revenue for 1897-98 was \$161,251,605; and expenditure, \$171,135,724. The budget estimates for 1898-99 were, revenue, \$173,163,374; expenditure, \$173,695,883.

The amount of both external and internal debt of Spain, Jan. 1, 1898, was \$1,415,230,000, the annual interest of which amounted to \$79,847,336. In addition, there were obligations incurred by Spain with regard to the island of Cuba amounting to over \$50,000,000; a debt to the United States of America of \$600,000; debt to the civil corporations and clergy, \$145,167,200.

AREA AND POPULATION. The area of continental Spain (including the Canaries) was reported in 1887 at 197,670 square miles, with a total population of 17,565,632. Of this number, 8,612,524 were males, and 8,953,108 were females. The estimated population in 1892 was 17,974,323.

The following was the population of the chief cities in 1887:

TOWN.	POPULATION.	TOWN.	POPULATION.
Madrid	470,283	Palma (Baleares)...	60,514
" (1890)	499,270	Lorca	58,327
Barcelona	272,481	Córdoba	55,614
Valencia	170,763	Bilbao	50,772
Seville	143,182	Gracia	45,042
Málaga	134,016	Oviedo	42,716
Múrcia	98,538	Santander	41,829
Zaragoza	92,407	Alicante	39,638
Carthagena	84,171	Coruña	37,251
Granada	73,006	Almeria	36,200
Cádiz	62,531	Gijón	35,170
Valladolid	62,018	Burgos	31,301
Jeres de la Frontera.	61,708	Alcoy	30,373

EDUCATION. The latest returns show that 68 per cent of the total population could neither read nor write, 3 per cent could read only, 29 per cent could read and write. Since 1881 great reforms have been made in the educational system, and large sums of money expended.

RELIGION. There were in 1887, 6,654 Protestants, 402 Jews, 9,645 Rationalists, 13,175 of religion not stated; the remainder were Roman Catholics, the national church.

TRADE AND COMMERCE. The imports in 1898 aggregated \$119,185,150; the exports, \$171,949,411.

The merchant navy of the kingdom consisted, on Jan. 1, 1898, of vessels of 100 tons and over, of 436 steamers of 341,951 net tonnage, and 1,145 sailing-vessels of 164,504 net tons.

In 1898, there entered 17,355 vessels of 13,278,151 gross tons, of which 8,490 of 5,495,903 gross tonnage carried the Spanish flag; and cleared 16,957 of 13,995,920 gross tonnage, of which 7,792 of 5,322,412 gross tonnage carried the Spanish flag.

PRODUCTION AND INDUSTRY. The vine is the most important culture; in 1897 the exports of wine were valued at \$22,666,540. Wheat, rye, barley, and maize are the leading cereal crops. The number of farm animals in 1895 was estimated as follows: Horses, 383,113; mules and asses, 1,496,703; cattle, 2,071,326; sheep, 16,469,303; goats, 2,820,827; pigs, 7,910,368. In 1896 the mineral products amounted to 1,830,771 tons of coal; 7,008,000 tons of iron ore (including pyrites); quick-silver, 1,665 tons; lead 170,790 tons; copper ore, 2,825,000 tons; zinc, 45,000 tons; salt, 350,000 tons; together with 7,846,080 ounces of silver.

The total value of the mineral production was \$28,000,000.

RAILWAYS, ETC. On Dec. 31, 1897, there were 8,020 miles of railways open for traffic, all lines being private corporation property. On Jan. 1, 1895, there were 23,636 miles of telegraph lines, with 1,421 offices.

SPALAX. See **MAMMALIA**, Vol. XV, p. 419.

SPALDING, MARTIN JOHN, an American Roman Catholic archbishop; born in Marion County, Kentucky, May 23, 1810; graduated from St. Mary's Seminary in 1826, received his D.D. degree from the Urban College of the Propaganda, Rome, Italy, in 1833; was ordained a priest in 1834, and made pastor of the cathedral at Bardstown, Kentucky, and professor of philosophy in the seminary there, of which he became president in 1838. In February, 1848, he was appointed coadjutor bishop of Louisville, and in 1850 he succeeded to the bishopric. While bishop he built a handsome cathedral at Louisville, recalled the Jesuits, and helped found the Trappist Abbey at Gethsemane, Kentucky. He established all over his diocese branches of the Society of St. Vincent de Paul (a charitable guild). During the Civil War he did much toward providing for the sick and wounded Union soldiers. He succeeded Mgr. Kenrick as archbishop of Baltimore in 1864. He published *Papal Infallibility* in 1870. He died in Baltimore, Maryland, Feb. 7, 1872.

SPANIARD'S BAY, a town and fishing settlement of Newfoundland, 7 miles S. of Harbor Grace, on the west side of Conception Bay. The town is surrounded by lofty hills, and is devoted almost exclusively to the cod-fishing industry. Population, about 1,200.

SPANIELS. See **DOG**, Vol. VII, p. 328.

SPANISH FLY. See **CANTHARIDES**, Vol. V, pp. 31, 32.

SPANISH FORK, a city of Utah County, central Utah, near the eastern shore of Utah Lake, 58 miles S.S.E. of Salt Lake City and 12 miles S. of Provo, on the Rio Grande Western and the Union Pacific railroads. It is an important trade-center for a rich and extensive agricultural district, and has several churches, public and denominational schools, a bank and newspaper. On June 20, 1866, the battle of Diamond Creek was fought here. Population 1890, 2,214; 1900, 2,735.

SPANISH GRASS. See **ESPARTO**, Vol. VIII, p. 547.

SPANISH LANGUAGE AND LITERATURE. See **SPAIN**, Vol. XXII, pp. 346-365.

SPANISH MACKEREL. See **MACKEREL**, Vol. XV, p. 159.

SPANISH SUCCESSION, WAR OF. See **FRANCE**, Vol. IX, pp. 581-583.

SPARIDÆ. See **ICHTHYOLOGY**, Vol. XII, pp. 688, 689.

SPARKS, ELECTRIC. See **ELECTRICITY**, § 14, in these Supplements.

SPARKS, JARED, an American historian and biographical writer; born in Willington, Connecticut, May 10, 1789; graduated from Harvard

in 1815; studied theology, and was ordained minister of the First Unitarian Church of Baltimore; chaplain to the United States House of Representatives in 1821; retired from the ministry, and was proprietor and editor of the *North American Review* (1824-31); studied colonial archives in Europe. He was appointed professor of history at Harvard University in 1839, and was its president (1849-53). He edited, for the government, George Washington's correspondence, papers, etc., in nine volumes, and was accused of injuring their historical value by taking liberties with the text. Wrote also *Gouverneur Morris* (3 vols., 1832); edited the *Works of Benjamin Franklin* (10 vols., 1836-40), and prepared numerous volumes of American biographies. He died in Cambridge, Massachusetts, March 14, 1866.

SPARROW-HAWK. See **HAWK**, Vol. XI, p. 534.

SPARTA, a town and the capital of Hancock County, northeastern central Georgia, 53 miles E.N.E. of Macon, on the Georgia railroad. It is the center of a fertile region, producing corn, oats, sweet-potatoes, butter and live-stock. Population 1890, 1,540; 1900, 1,150.

SPARTA, a city of Randolph County, southwestern Illinois, 21 miles N.E. of Chester, and 50 miles S.E. of St. Louis, Missouri, on the Centralia and Chester and the Mobile and Ohio railroads. It is the center of a region which produces large quantities of wheat, and also contains natural gas, coal and limestone. The industries include a woolen-mill, canning-works, creameries and agricultural-implement works. Population 1890, 1,979; 1900, 2,941.

SPARTA, a city and the capital of Monroe County, southwestern central Wisconsin, on the La Crosse River, 25 miles E.N.E. of La Crosse, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It is the center of a fruit-raising and agricultural district; is noted for its iron mineral springs, which has made it a popular resort, and is an important manufacturing center, its industries including planing, paper and flour mills, carriage factories and machine-shops. Population 1890, 2,795; 1900, 3,555.

SPARTANBURG, a city and the capital of Spartanburg County, northwestern South Carolina, on the Glen Springs, Port Royal and Western Carolina and the Southern railroads. Gold and iron mining and quarrying of limestone are carried on in the surrounding district. The city has brick-works and carriage factories, banks, a high-school, a daily, a semiweekly and four weekly newspapers. It is the seat of Wofford College (Methodist Episcopal), founded in 1854, for the education of men. In 1895 it had 8 instructors, 144 students and a library of 10,000 volumes. Population 1890, 5,544; 1900, 11,395.

SPARTIANUS, ÆLIUS. See **AUGUSTAN HISTORY**, Vol. III, p. 74.

SPASM. See **CRAMP**, Vol. VI, p. 543.

SPATANGOIDA. See **ECHINODERMATA**, Vol. VII, pp. 630, 631.

SPATHE. See BOTANY, Vol. IV, p. 120.

SPALDING, LEVI, an American clergyman; born in Jaffrey, New Hampshire, Aug. 22, 1791; graduated from Dartmouth in 1815, and from Andover Theological Seminary in 1818, and was ordained shortly after. In 1820 he was sent to Gaffna, Ceylon, by the American Board of Foreign Missions, and remained there doing efficient missionary work during fifty-four years, with only one visit to the United States during over half a century. He translated a number of school-books, tracts and hymns into the Tamil language, prepared a *Tamil-English Dictionary*, and translated a revised edition of the Scriptures into the same language; superintended a large boarding-school for native girls. His familiarity with the language was unequalled in the colony. He died in Ceylon, Asia, June 18, 1873.

SPAVIN, an affection of the hock joint or joint of the hind-leg of the horse between the knee and the fetlock. It is known as "bog-spavin" when caused by an excess of synovia or joint-oil, and as "bone-spavin" when there is a deposition of abnormal bony substance. The first form is the more common, and is easily cured by complete rest and solid bandaging of the part affected. The second form is more serious, and needs iodine blisters and firing, to bring about an absorption of the bony excrescence. The cause of this very frequent trouble is attributed to strains, especially when horses have to stand frequent sudden starts, pulling a heavy weight. See HORSE, Vol. XII, p. 178.

SPEAKER OF THE HOUSE. See PARLIAMENT, Vol. XVIII, pp. 311, 312; and CONGRESS, in these Supplements.

SPEAKING TRUMPET. See TRUMPET, Vol. XXIII, p. 594.

SPEAR. See ARMS AND ARMOUR, Vol. II, pp. 553, et seq.

SPEAR, CAPE. See ST. JOHNS, Vol. XXI, p. 175.

SPEARMINT. See MINT, Vol. XVI, p. 491.

SPECIAL ISSUE, a legal term used to denote a denial of a material allegation contained in the plaintiff's declaration or plea which brings into the controversy a certain and specific matter consisting of a material allegation necessary to the cause of action. Thus, in an action of tort a special issue would be the plea of not guilty by statute. In an action of debt on simple contract a special issue would be raised by the plea of the statute of limitations. The whole question is also discussed under the head of PLEADING, Vol. XIX, pp. 217, 220.

SPECIFIC GRAVITY. See HYDROMETER, Vol. XII, pp. 536-542; also *Relative Atomic Weights*, under CHEMISTRY, Vol. V, pp. 467-472.

SPECIFIC HEAT. See HEAT, Vol. XI, pp. 557, 579, 582.

SPECIFIC PERFORMANCE, the actual carrying out of the provisions of a contract by the party obligated to do so. It may not mean a complete literal performance, but must be at least a substantial execution of the obligations. In

many cases when contracts are entered into, one of the parties neglects or refuses to carry out the provisions, but in all such cases the party injured by the breach may maintain a suit at law to recover such damages as he can show resulted to him on account of the breach. This remedy in many cases is adequate, but sometimes it may happen that such a remedy will not compensate the injured party for the damage he will suffer. In such cases, instead of considering the contract broken, and suing for damages, he may generally institute a suit in chancery to enforce a specific performance. See CONTRACT, Vol. VI, p. 324; and SALE, Vol. XXI, p. 207.

SPECIFIC VOLUME OR DENSITY OF GASES. See HEAT, Vol. XI, pp. 569-571.

SPECTRA, SOLAR AND STELLAR. See SUN, Vol. XXII, pp. 646, 647, 651.

SPECTROPHOTOMETER, an instrument used in studying spectra for comparing their relative intensity, or that of corresponding bands of color, by means of a standard. The amount of angular change of an adjustable prism required to tone down the brighter of the two, measures the difference in intensity. In the instrument devised by Prof. C. C. Hutchins, of Harvard, a long slit is placed at the focus of a lens having a focal length of 40 feet. The ray from the slit passes through the lens and falls upon a large flat grating, mounted to turn about an axis through the middle line of the ruled surface of the grating. The spectrum is then projected by the same lens upon a horizontal arc of forty feet radius, and is observed a trifle to one side of or above the slit.

SPECTROSCOPE. See SPECTROSCOPY, Vol. XXII, pp. 373-375.

SPECTRUM ANALYSIS. See SPECTROSCOPY, Vol. XXII, pp. 377-381.

SPECULUM. See TELESCOPE, Vol. XXIII, p. 146.

SPEEDING, JAMES, an English author; born in Mirehouse, near Bassenthwaite, in June, 1808. From Bury St. Edmunds, where he was head of the school, he proceeded in 1827 to Trinity College, Cambridge, of which he became a scholar, and from which he graduated in 1831 and was later elected one of its fellows. From 1837 to 1841 he held a post at the Colonial office; in 1842 he accompanied Lord Ashburton to America as private secretary; and in 1847 he was offered the post of permanent Under-Secretary of Foreign Affairs, at £2,000 a year. But he had already devoted himself to the task of his life—to re-edit Bacon's works, and began with a virulent attack against Macaulay's essay on Bacon. He published successively *Works of Lord Bacon* (7 vols., 1857-59); *Life and Letters of Lord Bacon* (7 vols., 1870-76); *Life and Times of Bacon* (2 vols., 1878). He was a man of great erudition and thorough independence of opinion. He died in London, March 9, 1881.

SPEED, JAMES, a United States Attorney-General; born March 11, 1812, in Jefferson, Kentucky; graduated at Catholic College, Bardstow, in 1828; admitted to the bar, and practiced

in Louisville; taught in the law department of University of Louisville; kept out of state politics by his anti-slavery sentiments; opposed secession and was accredited with great influence in keeping Kentucky from disunion; aided in recruiting Union troops at the request of his old friend, President Lincoln; state senator from 1861 to 1863; Attorney-General of the United States from 1864 to 1866; resigned,



JAMES SPEED.

owing to disapprobation of President Johnson's course. He died in Louisville, June 25, 1887.

SPEED-RECORDER OR TACHOMETER.

An instrument for recording the speed of motors or other machinery. The Haussalten speed-recorder is used on the principal railways of Europe to preserve a record of the speed of the trains, the duration of the stoppages, etc. The mechanism is inclosed in a case about 12 inches in diameter, and directly connected with one of the driving-wheels of the locomotive. It has clockwork which is normally kept wound up by the locomotive, but which requires to be wound up by hand if the locomotive stops more than fifty minutes. The case contains a weight, which is raised and dropped at regular intervals. The faster the train is going, the higher the weight is raised. Its highest points are recorded by dots on a sheet of paper that is ruled and arranged to travel over drums. The ruled lines are horizontal, and each one is marked with the speed which dots on that line would indicate. The time in minutes is recorded on the roll as it travels, so that this record made automatically shows all the variations of speed made during a run. It serves another purpose also, that of keeping a check on engineers whose carelessness causes them to allow the wheels of the locomotive to slip frequently. Every such slip is shown on the record by the sudden change in speed, and as slipping is bad for the driving-wheels, engineers are obliged to be careful, knowing that they will be censured if they allow much of this on their engines. The time lost at stations and sidings also becomes a matter of record, and is valuable evidence in case accidents are being investigated.

Engineer W. D. Weaver, of the United States Navy, in 1895 introduced a speed-recorder for making a record of the speed of steamships. It is specially designed for noting the speed made during trial trips. It is made to time the rotation of the propeller-shafts, and has a clock mechanism with a paper tape passing over recording-pens that make a mark at each electrical contact. A governor is used to regulate accurately the speed at which the tape runs out. One pen takes a record of the current from a chronometer, and another pen is operated by the observer to note the instant of reaching and leaving the range. Other pens are provided to record the rotations

of the shafts, whether there be one, two or three, as in the case of twin and triple propellers.

C. H. COCHRANE.

SPEEDWELL. See VERONICA, under HORTICULTURE, Vol. XII, p. 253.

SPEIER OR SPEYER. See SPIRES, Vol. XXII, p. 404.

SPELT. See WHEAT, Vol. XXIV, p. 532.

SPELTER. See ZINC, Vol. XXIV, p. 786.

SPENCER, a town of Owen County, southwest central Indiana, on White River, and on the Indiana and Vincennes railroad, 52 miles S.W. of Indianapolis, Indiana. It is the center of a farming, stock and lumbering region; has coal mines and quarries; manufactures lumber and staves, and has a pork-packing establishment. It has two weekly newspapers, and its population was, 1890, 1,868; 1900, 2,026.

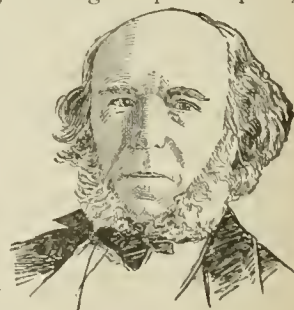
SPENCER, a town and the capital of Clay County, northwest Iowa, on the Little Sioux River, and on the Chicago, Milwaukee and St. Paul railroad, 80 miles S.W. of Fort Dodge. It is in a farming and stock-raising district, ships pressed hay, and has wagon-shops, machine-shops and brickyards; a national bank, with a capital of \$100,000, and other banks, and three weekly newspapers. Population 1890, 1,813; 1900, 3,095.

SPENCER, a town of Worcester County, Massachusetts, about 12 miles W. of Worcester. It is the seat of a high-school, and contains a public library, founded in 1875; has an electric railway, a national bank, with a capital of \$150,000, shoe factories, woolen and cloth mills, and three newspapers. Population 1880, 7,466; 1890, 8,747; 1900, 7,627.

SPENCER, a village and the capital of Van Buren County, central Tennessee, 80 miles E.S.E. of Nashville. At it is located Burritt College, founded in 1848, a Christian institution for the education of both sexes. The college has 10 instructors and (1895) 164 students; its total annual income is \$25,000; it has 3,550 volumes in its library, and W. N. Billingsley, A.M., is its president. The population of the village was, 1880, 217; 1890, 138.

SPENCER, a village and the capital of Roane County, western West Virginia, on Spring Creek, and on the Ohio River railroad. It has a tannery, a grist-mill, four churches and two weekly newspapers. Population 1880, 226; 1890, 431.

SPENCER, HERBERT, an English philosopher, founder of the system of synthetic philosophy; was born in Derby, April 27th, 1820. His father was a teacher of mathematics and fond of the natural sciences, especially giving attention to entomology. He educated his son at home, and instilled into him a love of observation. The boy was an only surviving child, lacking vigorous health, but fond of making experiments and collections illustrative of



HERBERT SPENCER.

natural history. A part of the time he was under the tutelage of his uncle, Thomas Spencer, rector of the parish of Hinton. Poor health and a dislike for the classical languages restrained young Spencer from a university training, but at the age of seventeen he entered the office of Mr. Charles Fox, a railway engineer, and was engaged in this employment for about eight years, contributing now and then to *The Civil Engineers' and Architects' Journal*. During this time, in 1842, he contributed a series of letters to the *Nonconformist* on *The Proper Sphere of Government*. These letters point out that human progress grows out of environment, and constantly tends toward conditions of stable equilibrium. They indicate the early drift of his mind, for in 1850 he elaborated the ideas thus put forth into his first important book, called *Social Statics* (revised edition, 1892). The position he took in these books is known as the *laissez-faire* theory, and all his life through Mr. Spencer was an uncompromising advocate of individual liberty with the least possible interference on the part of the state. In the first edition of *Social Statics* there was some small taint of socialism, but in his last edition he carefully eliminated it all. This work treats of ethical and political notions for which he was seeking the philosophical basis. That basis may have been suggested by Von Baer, for it states, "The truth of all organic development is a change from a state of homogeneity to a state of heterogeneity," a principle that runs through all Spencer's systematizing. He developed it more and more in articles contributed to the leading reviews.

In 1848 he took up his residence in London, and joined the staff of *The Economist*. He also found work to do for the *Edinburgh* and *Westminster Reviews*, and through this association made friends of George H. Lewes and his consort, George Eliot.

Because of his adoption of the principles of evolution, as outlined by the ethical and social growth of mankind in his *Social Statics*, superficial lovers of coincidences have seen fit to announce that he anticipated Darwin's doctrine nine years before *The Origin of Species* was published. This is more curious than important. It is true that a relation did exist between the work of the two men. Spencer was a great coiner of phrases, and invented many terms that became current in the discussion of Darwinism. On the other hand, Darwin contributed a vast mass of facts that were of great assistance to Spencer in working out his system of philosophy. But the doctrine of evolution was by no means the discovery of either. It is as old as Democritus of Abdera. It was a speculation of Oken and Goethe. It is more than suggested by Leibnitz and Lamarck. Hegel had applied it to questions of history. The function of Darwin was to supply the scientific proofs of evolution for natural history. The all-mastering aim of Spencer was to apply it to psychology and society. The fundamental characteristics of Spencer's history are, that he saw the principle of development to be of universal application; that the world's knowledge was sufficiently ripe and

ample to work out an all-embracing system of philosophy verifiable by facts, and, above all, that he felt in himself the vocation and competence to do such a work. Whether Spencer is to be called a deductive or an inductive reasoner, is a matter of but little moment. Thus far, no philosophical systematizers have been able to escape the necessity of using deductive processes, and Spencer was no exception to the rule. It is in the inductive verification of his postulates that his extraordinary skill, power, analysis and originality are chiefly to be found.

Perhaps the part of Spencer's life from 1850 to 1860 may be called one of incubation. It certainly was not one of extraordinary productiveness. He spoke to the world through the periodical press. His essay on *The Development Hypothesis*, published in the *Leader* (1852), indicates that he was reaching now toward a definite basis and method of work. *The Principles of Psychology* first came out in 1855, but at the time attracted little attention, although his speculations were destined to work a prodigious change in the study of that subject. Still, men like Mill, Grote, Tyndall and Huxley recognized the powerful grasp of Spencer's reflection and logic, and encouraged him to a grander work. His psychological doctrine was that mental faculties and powers are acquired by the slow modifications of living organisms influenced by environment, experience, association, heredity and selection. It is the doctrine of the differentiation of mental faculties by processes equivalent to the differentiation of species by natural selection. Other publications of this period are *Manners and Fashions* (1854); *The Jealousies of Science* (1854); and *Progress, Its Law and Cause* (1857).

In 1859 Mr. Spencer prepared a prospectus of his system of synthetic philosophy, and the next year announced it to the world. He proposed a scheme requiring him to complete 11 volumes in 20 years. He was 33 years at work upon it, and then it had exceeded the original compass he had designed for it.

The work falls into five divisions: 1. The proper scope and limitations of philosophy; 2. Biology; 3. Psychology; 4. Sociology; 5. Morals and the laws of social development. The first work in this series took the title of *First Principles*, and appeared in 1862. To the disciples of an intuitive philosophy as well as to orthodox readers, the first part of this book, treating of "the laws of the knowable," were highly offensive. The second part, which found in matter, motion and force the sufficient grounds of human development, gave a materialistic aspect to the whole system in the minds of conservative critics. Spencer's position is the existence of an unknowable power lying beyond the ken of philosophy, and this is essentially agnosticism; secondly, the existence of likenesses and differences within the observation of man which are the manifestations of this unknown power. Phenomena invariably present themselves in two ways: when contemplated discretely they give rise to the relation of

time and space; contemplated in continuity, they give rise to the conceptions of matter and motion. From matter and motion is deduced the doctrine of force and its persistence. Force never disappears—it is only transformed. We have here an unfolding of the doctrine of the “correlation of forces.” Evolution is the integration of matter with an accompanying dissipation of motion, a process by which an indefinite homogeneity passes to a definite heterogeneity. This principle applies to all phenomena. Particular integrations of matter become diverse in structure through their varied surroundings. Each differentiation gives rise to new differences. Thus dissimilar products tend to separation, and so division of aggregates and dissipation of forces go on to the end, an end which is the highest complexity arrived at—a stable equilibrium. This is the basis of the Spencerian philosophy, and from these principles he goes on to interpret life, mind and society in the terms of matter, motion and force.

The Principles of Biology (2 vols., 1864), constitutes the second part of the system of synthetic philosophy. The aim of this work is to show that consciousness is a product of a continuous evolution, on lines corresponding to Darwin's theory of structural and functional continuity in plants and animals. Perceptions of matter, motion, space and time, assumed in the “First Principles,” are here shown to have been acquired empirically by men, partly through the persistence of corresponding external phenomena, and partly through the transmission of the accumulated ancestral experience in the form of modified structure.

The Principles of Psychology came out in two volumes in 1872, and is a re-casting of the earlier work of 1855. It shifts around the scientific grounds of psychology from a dialectic to a physiological basis.

The fourth branch of the synthetic philosophy is treated in *The Principles of Sociology*, which came out in 1876. It is now published in three volumes. The preparation of this work involved immense labor and erudition. Three years before, he had put out a tentative volume, under the title *The Study of Sociology*, which had a very wide circulation. In it he opened this most complex, extended and debatable ground. At the same time he called to his aid three assistants and began to issue *Descriptive Sociology*, a gigantic collection of facts that he and they were gathering for the generalization of Spencer's philosophy. It was to be in eighteen parts and present ethnic data classified and put forth in quarto form. Its scope embraced the highest modern civilization, the manners and customs of aborigines and those in the lowest scale of social life. It ranged from Papuans and negroes to the French, the English and the Germans. At this time Spencer was his own publisher, having been driven to assume this responsibility in order to gain a hearing that the timidity of the publishing-trade refused him. In 1881 the *Descriptive Sociology* ceased with the eighth part, because there was no money available

for its production. The psychological branch of Mr. Spencer's inquiry now embraces three parts: *Ceremonial Institutions* (1879); *Political Institutions* (1882); and *Ecclesiastical Institutions* (1885)—the three volumes constituting the work known as *The Principles of Sociology*.

Heredity is one of the principles by which individuals have been brought into a social unity. Society is an organism, in Mr. Spencer's view, because it has interdependence of parts and laws of growth. Unlike the individual organism, “there is no social sensorium”; but otherwise it truly gives rise to a political development which Spencer calls a super-organic evolution.

The culminating and crucial part of Mr. Spencer's system deals with morals. To this all the rest is auxiliary. He opened the subject in *The Data of Ethics* (1879); he completed it in three parts, of which the first comprised the *Data* named and the *Induction of Ethics*; and second, *The Ethics of Individual Life* and *The Ethics of Social Life*; *Justice* (1891); and the third *Negative Beneficence* and *Positive Beneficence* (1893). In this work he renounced all former adherence to an intuitive basis of morality. For him, conscience is the product of evolution. Perhaps here Mr. Spencer's work was the most unsatisfactory to himself as it is the most debatable to others. Here he most felt the infirmity and inadequacy of his methods. He confessed that the conditions of human life were too complex for “definite conclusions throughout its entire range.”

To those who seek an intuitive or purely metaphysical basis for their creed or rules of conduct, the synthetic philosophy is most unsatisfactory. As the work went on, controversy concerning it increased. Obscure pulpits hurled their tiny shafts at it; prancing pigmies thought they demolished it. The work necessarily gave ground for reflective criticism. A system to be inductively verified must rest on a knowledge well-nigh omniscient. This Spencer was not, although probably nearer it than all but the best few of his predecessors or contemporaries. Some of his data have been abandoned. New light will constantly creep into spaces where he found obscurity. Yet the sublimity of his conception, his grasp upon bewildering masses of fact, his strong and subtle analysis that reduced this mass to order, his persistent logic and his almost unexampled industry and perseverance make him one of the most commanding intellects of the world.

To the accomplishment of his self-imposed task he devoted all his strength, resources and time. Before he had put the capstone to his edifice, he had passed the Psalmist's allotment of years to the life of man. He rejected all distractions from his work; refused academic honors and memberships of domestic and foreign learned societies that were offered to him; and nursed his fragile health to the end. It is an extraordinary career.

Few words remain to be said. His books were generally translated into French; many of them into most of the languages of Europe, and some

into Japanese and Chinese. His influence went widely beyond the United Kingdom. His epigrammatic speech, his theories, his method, have percolated into the thought of the present day. His political views brought him to the front not infrequently as a controversialist, and to nothing was he more bitterly opposed than to socialism, especially that phase of it which would reduce the individual to a part of a mechanism. His theories of evolution led him to regard the individual man as the highest specialization, the grandest production of evolution yet reached, and he had no mind to see personal liberty restricted further than was absolutely necessary for the cohesion of society.

Less important publications came from him, some of them enjoying marked popularity. His essays on style, manners, progress, science, population, nebular hypothesis, etc., reappeared in America in volumes entitled *Essays, Moral, Political and Aesthetic; Illustrations of Universal Progress and Recent Discussions*.

His treatise on *Education* (1861) went through more editions than any of his books, and exerted a decided influence upon the theories of pedagogics. His *Classification of the Sciences* (1864) aimed to substitute a better scheme for the fantastic plan of Comte. To these works may be added *Essays, Scientific, Political and Speculative* (3 vols., 1858 to 1892); *Spontaneous Generation* (1870); *The Coming Slavery, or Man Versus the State* (1874), a plea for the highest personal liberty; and *Factors of Organic Evolution* (1887).

D. O. KELLOGG.

SPENCER, JOHN CANFIELD, an American public man; born in Hudson, New York, Jan. 8, 1788. From 1807 to 1809, immediately after his graduation from Union College, he was private secretary to Governor D. D. Tompkins. He was admitted to the bar of New York in 1809, and was successively judge-advocate general in the northern army in 1813; assistant attorney-general for western New York in 1815; a member of Congress in 1817-19; member of the state legislature, 1820-21 and 1824-28; a member of the commission for the revision of New York statutes in 1827; secretary of state for New York, 1839-40; United States Secretary of War, 1841-43; Secretary of State, 1843-44. He resigned the state portfolio because of his objection to the annexation of Texas. He edited Tocqueville's *Democracy in America* (1838). He died in Albany, New York, May 18, 1855.

SPENCER, JOHN POYNTZ SPENCER, EARL, a British statesman; born at Spencer House, England, Oct. 27, 1835; received his education at Harrow School and at Trinity College, Cambridge, where he graduated in 1857. In December, 1868, he was appointed Lord-Lieutenant of Ireland. He retained that office till the resignation of the Gladstone ministry in February, 1874. On the return of the Liberals to office in May, 1880, he was appointed Lord-President of the council; was nominated Lord-Lieutenant of Ireland on the resignation of Earl Cowper, May 4, 1882, retaining his seat in the cabinet. He arrived in Dublin Castle on May

6, on the evening of which day Lord Frederick Cavendish, the newly appointed Chief-Secretary, and Mr. Thomas A. Burke, the Under-Secretary, were stabbed to death by assassins in the Phoenix Park, close to the castle. After this it fell to Lord Spencer to administer the provisions of the crimes act. In 1892 Lord Spencer was made first Lord of the Admiralty in Mr. Gladstone's fourth ministry, a position he retained in Lord Rosebery's cabinet, 1894-95. In 1892 he sold the famous Spencer collection of books, known as the "Althorp Library," to a Mrs. Rylands, who donated it to the city of Manchester. This library was valued at two million five hundred thousand dollars.

SPENCER, SARA ANDREWS, an American reform advocate; born in Savona, New York, Oct. 21, 1837. From 1856 until 1864 as Sara Andrews she was engaged in teaching. She married Platt R. Spencer in 1864, and went with him to Washington, District of Columbia. There she became interested in the woman's-suffrage movement; was instrumental in securing favorable legislation and was officially connected with the national and district suffrage associations. She published *Problems on the Woman Question* (1871); and *Thirty Lessons in the English Language*; and was the principal of the Washington Spencerian Business College.

SPERMAPHYTA. See VEGETABLE KINGDOM, Vol. XXIV, pp. 130, 131.

SPERMATOPHYTES, the highest grand division of plants, sometimes called phanerogams or flowering-plants, and distinguished from all those below it by the production of seeds. It is subdivided into two main groups—(1) gymnosperms, in which the seeds are not inclosed in a seed-vessel, represented by pines, firs, cedars, etc.; and (2) angiosperms, in which the seeds are inclosed in a seed-vessel, represented by the ordinary flowering-plants. Angiosperms are further subdivided into monocotyledons, represented by the lilies, grasses, etc., and dicotyledons, including the crowfoots, peas, mints, etc. See also CLASSIFICATION and MORPHOLOGY, in these Supplements.

SPERMATOOZOA. See REPRODUCTION, Vol. XX, pp. 411-413; and EMBRYOLOGY, in these Supplements.

SPERM OIL. See WHALE OILS, Vol. XXIV, p. 529.

SPERMOPHILUS. See MARMOT, Vol. XV, pp. 559, 560.

SPEYER. See SPIRES, Vol. XXII, p. 404.

SPEZZIA, an island off the coast of Morea, Greece, and at the entrance of the Gulf of Nauplia or Argolis. It is 28 miles S. of Nauplia; its area is 26 square miles, and population, 6,899. The town of Spezzia, on the north coast, has a fine harbor; has a population of 6,490, the people being engaged in commerce and navigation. The island is remarkable for the salubrity of its climate. It was anciently known as Pityusa, on account of its pines. To the south of the island is the smaller island, Poulo Spezzia.

SPHENOID BONE. See ANATOMY, Vol. I, pp. 823, 824.

SPHINCTER MUSCLES. See ANATOMY, Vol. I, p. 836.

SPHYGMOGRAPH, an instrument for recording the pulsations of the heart through the medium of the pulse. It is attached to the wrist by a band, a sensitive disk being placed upon the pulse artery. The pulsations act upon the disk so as to move a stylus, held by an armature, across the surface of a moving strip of paper, producing a waved tracing, which has a regular form if the pulse is normal. Various stimulants produce abnormal and irregular tracings, the waves being much broader than the normal where the heart is excited by stimulants, and much narrower than the normal during the reaction following the use of stimulants.

SPICE ISLANDS. See MOLUCCAS, Vol. XVI, p. 696.

SPIDER. See ARACHNIDA, Vol. II, pp. 290-299.

SPIDER-CRAB, certain decapod crustaceans of the family *Maiidae*. The long slender legs give them a spider-like appearance. The best-known representative is the giant Japanese spider-crab (*Macrocheira*), which has a spread of legs of 18 feet, and even more in some specimens. Its size is not approached by that of any other crustacean.

SPIEGEL, FRIEDRICH LOUIS ERNST, a German Orientalist; born in Kitzingen, Bavaria, July 11, 1820; studied at Erlangen, Leipsic and Bonn. Later, in the pursuit of Oriental knowledge, he spent some time at Oxford, London, and Copenhagen. In 1849 he was made professor of Oriental languages at Erlangen. He published a number of works upon subjects in his special line; among them are *Introduction to the Traditional Writings of the Parsees* (1860); *Grammar of the Ancient Bactrian Language* (1867); and *Comparative Grammar of Old Iranic Languages* (1882).

SPIELHAGEN, FRIEDRICH, a German novelist; born in Magdeburg, Germany, Feb. 20, 1829. He studied at Berlin, Bonn, and Greifswald; began teaching in a gymnasium at Leipsic in 1854, but soon turned to literature, which he adopted as a profession. He brought out a large number of novels of such a class as to entitle him to a foremost place among German fiction-writers. Among his works are *Clara Vere* (1854); *On the Downs* (1858); *Problematic Characters* (1861); *Through Night to Light* (1862); *At the Twelfth Hour* (1863); *The Rose of the Court*; *The Hohensteins* (1864); *Rank and File* (1866); *Hans and Margaret* (1868); *The Village Coquette* (1869); *Hammer and Anvil* (1869); *The Skeleton in the House* (1879); *Quisisana* (1880); *Angela* (1875); *Uhlenhans* (1883); *A New Pharaoh* (1888); *Discoverers and Inventors* (1890); and *Poems* (1891.)

SPIKE OR SPIKELET. See BOTANY, Vol. IV, p. 134.

SPIKE, OIL OF. See LAVENDER, Vol. XIV, p. 352.

SPINAGE OR SPINACH. See HORTICULTURE, Vol. XII, pp. 285-288.

SPINAL COLUMN. See SKELETON, Vol. XXII, pp. 110-112.

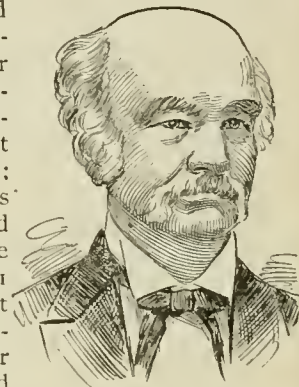
SPINAL CORD OR MEDULLA SPINALIS. See ANATOMY, Vol. I, pp. 865-867.

SPINAL CURVATURE. See SURGERY, Vol. XXII, p. 692.

SPINDLE TREE, STAFF TREE OR BITTERSWEET FAMILY. See ARBORICULTURE, Vol. II, p. 320.

SPINEL. See MINERALOGY, Vol. XVI, p. 386.

SPINNER, FRANCIS ELIAS, an American financier; born in Mohawk, New York, Jan. 21, 1802; learned the harness and confectionery trades; engaged in business for himself in 1822, in Herkimer, New York; became auditor of the port of New York in 1845; a member of Congress from 1855 to 1861; and was Treasurer of the United States from 1861 to 1875. During this last period his curious signature upon the paper money of the United States was probably the most familiar autograph in the world. He resigned his office June 30, 1875, and lived in retirement in Jacksonville, Florida, until his death there, Dec. 31, 1890.



FRANCIS E. SPINNER.

SPINNING-JENNY. See COTTON, Vol. VI, pp. 490, 491.

SPIRAEA. See HORTICULTURE, Vol. XII, pp. 252, 253.

SPIRAL. See INFINITESIMAL CALCULUS, Vol. XIII, pp. 51, 52.

SPIRIT LAKE, a town and the capital of Dickinson County, northwestern Iowa, 1 mile S. of Spirit Lake and 56 miles W.N.W. of Algona, at the junction of the Burlington, Cedar Rapids and Northern and the Chicago, Milwaukee and St. Paul railroads. It is the center of a region abounding in small fruits; is devoted to agriculture; has become noted as a summer resort, and contains a state fish-hatchery. Population 1890, 782; 1900, 1,219.

SPIRIT-LEVEL. See SURVEYING, Vol. XXII, p. 718.

SPIROMETER, a mechanism or device for measuring the capacity of the human lungs. It is made in various ways, the most common form being a vessel having a float set in the top, in which it is closely fitted, so that the blowing in of air through a tube below will tend to raise the float. An index is attached for noting the rise, from which the capacity of the lungs may be inferred.

SPIRULIDÆ. See MOLLUSCA, Vol. XVI, p. 669.

SPITHEAD, a celebrated roadstead on the

south coast of England, off Portsmouth, being the eastern division of that strait which separates the Isle of Wight from the mainland. It is protected from winds, except those from the southeast, and from its secure anchorage, nearness to Portsmouth, and its proximity to the Continental coasts, is a favorite rendezvous for the British navy. It is 14 miles long by about four miles in average breadth, and is strongly fortified.

SPITZKA, EDWARD CHARLES, an American neurologist; born in New York City, Nov. 10, 1852. After graduation at the University of the City of New York, he studied in Leipsic and Vienna; was appointed professor of anatomy and physiology of the nervous system in the Post-Graduate Medical College of New York. His investigations in neurology placed him in prominence in his profession. He was made professor of neurology in the post-graduate school in 1882, and in 1884 became consulting-neurologist for St. Mark's Hospital. He published numerous treatises; among them, *Insanity, Its Classification, etc.*; *The Architecture of the Brain*; and *Insanity in Children*.

SPLEEN. See **ANATOMY**, Vol. I, p. 907.

SPLINT. See *Fractures*, under **SURGERY**, Vol. XXII, pp. 681, 682.

SPLINT-BONE OR FIBULA. See **ANATOMY**, Vol. I, pp. 829, 830.

SPLÜGEN, a mountain of the Lepontine Alps, in the Grisons, Switzerland, whose summit, 9,600 feet high, bears the name of Tombenhorn. The pass of the Splügen, connecting the S.E. of Switzerland with the region of Italy round Lake Como, is at its highest point 6,946 feet above the sea, and in its present condition is the work of the Austrian government, which, in 1834, completed the building of galleries of solid masonry on the Italian side for the protection of travelers from avalanches.

SPOFFORD, AINSWORTH RAND, librarian of the United States Congress; born in Gilmanton, New Hampshire, Sept. 1825. He was a bookseller and publisher in Cincinnati; became editor there of the *Daily Commercial* in 1859; assistant librarian of Congress in 1861; was appointed librarian in 1865; published his *Library of Choice Literature* in 1881, and was editor of the *American Almanac*, published annually for many



A. R. SPOFFORD.

years. To Mr. Spofford is due the important legal reform of 1870, through which copyrights are issued from the national capital instead of from the offices of district clerks. When he took charge of the library it contained about 70,000 volumes; the number in 1895 was over 700,000 volumes, besides about 250,000 pamphlets. He also published *Library of Historic Characters and Famous Events* (1894) and a *Manual of Parliamen-*

tary Rules (1884). He was succeeded by J. R. Young in 1897, and later by Herbert Putnam.

SPOFFORD, HARRIET E. (Prescott), an American authoress; born in Calais, Maine, April 3, 1835, the daughter of Joseph N. Prescott. She was a contributor to a number of periodicals; wrote *In a Cellar* for the *Atlantic Monthly* in 1859, and in the same year published *Sir Rohan's Ghost*; married, in 1865, Richard Spofford, cousin of the librarian of Congress; also published *New England Legends* (1871); *Art-Decoration Applied to Furniture* (1881); *The Servant-Girl Question* (1884); *Ballads About Authors* (1888); *A Scarlet Poppy* (1894); *The Amber Gods*; *The Marquis of Carabas*, etc.

SPOKANE, a city of eastern Washington and capital of Spokane County, on the Spokane River, 30 miles from the beautiful Cœur d'Alène Lake, and in sight of the Cœur d'Alène Mountains. The city is also an equally important railway center of the Northern Pacific system, 449 miles from Portland, and 1,512 miles W. of St. Paul, and is also on the lines of the Great Northern, the Spokane Falls and Northern, and the Oregon Railway and Navigation Company. It is the center of an area of cultivable lands of unsurpassed richness, and the supply-point for the rich mining districts of Cœur d'Alène and Salmon River. The city was laid out and incorporated early in the eighties. In 1890 its population was 19,922; in 1900 it was 36,848. On Aug. 5, 1889, the entire business portion of the city was destroyed by fire, entailing a loss of \$8,000,000, but the space then burned over has since been rebuilt in manner both substantial and artistic, and a very pronounced impetus given to the progress and completion of improvements generally. There is an admirable distribution of the water-power obtained from the Spokane River, the principal industry being the manufacture of flour, and the output of two thousand barrels a day is mostly shipped to China and Japan. The financial system of the city has attained to large proportions, and is now represented by seven national, one state and two savings banks, with a cash capital of \$1,100,000, deposits approximating \$4,000,000 and an abundant surplus. The improvements completed and in progress during the past year have cost more than \$10,000,000, and those proposed for the immediate future will represent a total investment of many additional millions. The city is the seat of an Episcopal bishopric and of a Jesuit college, while in the way of schools, churches, hotels, public halls, hospitals, societies, newspapers, mills, and manufacturing industries the city is well supplied, and the residence portions on the hillsides and along the river front are built up with houses architecturally after the most attractive designs, of the best material, and provided with every improvement.

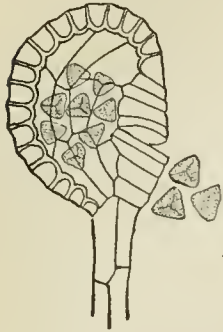
SPONGE-FISHERIES. See **SPONGES**, Vol. XXII, p. 428.

SPONTANEITY, BAIN'S THEORY OF. See under **PSYCHOLOGY**, Vol. XX, p. 43, Note 2.

SPONTANEOUS COMBUSTION. See **CHEMISTRY**, Vol. V, p. 481.

SPONTANEOUS GENERATION. See ABIOTIC GENESIS, Vol. I, pp. 49, 50.

SPORANGIUM, a general name given in botany to vessels containing spores. In the case of those plants which produce two kinds of spores (heterosporous plants), the two kinds of sporangia are distinguished as microsporangia and macrosporangia. The accompanying figure represents a sporangium taken from the lower surface of the leaf of *Aspidium*, an ordinary fern, showing the stalk upon which it is borne, the curious ring (annulus) which partly encircles it and the ruptured wall permit-



ting the escape of spores.

SPORE, a general name given in botany to cells usually given off by the parent plant, and able, directly or indirectly, to produce other plants like that from which they came. Among the *Algæ*, the spores usually have the power of swimming by means of cilia; in other plants the spores are usually scattered by the wind; while in the flowering plants one kind of spore (*pollen*) is often transported by insects. In the figure under SPORANGIUM, in these Supplements, fern-spores are represented as escaping from the sporecase. See also REPRODUCTION, Vol. XX, pp. 423 et seq.; and in these Supplements.

SPOROGENIUM, a name given in botany to the sporophyte of bryophytes (liverworts and mosses). The sporophyte of the higher groups is the leafy phase of the plant, and hence the more prominent one, but the sporogonium is leafless, the gametophyte bearing the leaves. The accompanying figure of *Polytrichum*, a common moss, shows the leafy gametophyte (G), from the summit of which arises the naked sporogonium (sporophyte), composed of the long stalk, or seta (S), and the capsule (C) containing the spores, and still invested by the loose membranous hood known as the calyptra.



SPOROPHYLL, a leaf modified to bear spores. In some cases the sporophyll can be recognized easily as a modified leaf, but in such cases as the stamen of a flower it has departed so much from the ordinary form of a foliage leaf as to be completely disguised.

SPOROPHYTE, the sexless phase of plants in which there is alternation of generations. It is always produced by the sexually formed spore borne by the gametophyte, and in turn produces asexually formed spores, which develop gametophytes again. In the figure under SPOROGENIUM, in these Supplements, these two phases are represented in a moss.

SPOROZOA. See PROTOZOA, Vol. XIX, pp. 852-856.

SPORTS. See ATHLETIC SPORTS, Vol. III, pp. 12-13; and ATHLETICS, in these Supplements.

SPOTTSYLVANIA COURTHOUSE, a small village of Virginia, 55 miles from Richmond, the scene of one of the most desperate battles of the Civil War. The engagement is classed as one of the battles of the Wilderness, which were fought during the interval from May 5th to June 1st, 1864. Grant had determined to cut Lee off from connection with Richmond, and in order to do so decided to march directly through the wooded Virginia district known as the Wilderness, and flank Lee, who was camped on the south bank of the Rapidan. Lee anticipated Grant's movement, and being more familiar with the district, relied upon that knowledge to enable him to attack Grant to advantage. Both armies advanced, and from May 4th to May 8th occurred the battles which, strictly speaking, were the Wilderness battles. The result of these engagements had been favorable to Grant, and he again took up his forward march toward Spottsylvania Courthouse. Lee again anticipated him, and when Grant arrived he found Lee intrenched. An attack was ordered, and at the end of the first day the two armies faced each other, Lee still behind his breastworks, and Grant preparing for a general assault. The Confederate left was attacked by the troops immediately under Hancock's command, and was driven back. Hancock was recalled to assist in a general assault on the Confederate center, which was taken, together with 4,000 men. This practically ended the fighting. Skirmishers from both sides maintained a constant fire during the next few days, and Grant moved around Lee's left,—a move which resulted in the battle of Cold Harbor. At the time of this campaign the Union effective men numbered 100,000, the Confederate about 60,000. During the several battles the Union losses were, in killed, 5,584; wounded, 28,364; and missing, 7,450. The Confederate losses were not reported.

SPRAGUE, a town and the capital of Lincoln County, eastern Washington, 42 miles S.W. of Spokane, on the Northern Pacific railroad. It is the center of an agricultural and stock-raising region, an important shipping-point for horses, cattle and farming products, and contains large railway repair-shops. Population 1900, 695.

SPRAGUE, WILLIAM BUEL, an American clergyman; born in Andover, Connecticut, Oct. 16, 1795. He graduated at Yale in 1815, and afterward studied in Princeton Theological Seminary. He was ordained a minister of the Congregational Church in 1819, and held pastorates in West Springfield, Massachusetts; Albany, New York; and Flushing, Long Island. He was an enthusiastic collector of autographs and historical pamphlets, and at the time of his death was in possession of over one hundred thousand autographs. He obtained possession of the papers of General Thomas Gage and presented them to Harvard Library, and published a number of works, including sermons, letters and essays. Among his publications are *Letters from Europe* (1828); *Letters to Young Men*

(1845); *Women of the Bible*; and *Timothy Dwight*, in Sparks's American Biography Series. He died in Flushing, Long Island, May 7, 1876.

SPRAINS. See SURGERY, Vol. XXII, p. 682.

SPRAYER. Agricultural sprayers are used for a variety of fruits and vegetables, to rid the plants of insects, etc. A common form is the knapsack-sprayer, which is a copper vessel, holding about five gallons, fitted with straps for attaching to the back. It has an inside force-pump, worked by a handle with one hand, while the other hand holds the tube, which contains a nozzle for dividing the spray. A cart-sprayer is made on the same plan, but with a double-discharge hose. It is particularly suitable for potatoes. A sprayer used in France for freeing grape-vines from pests is mounted on the back of a horse. There are two cylinders for containing the fluid, and from these extends a cross-pipe, bearing three spraying-nozzles on each end. With this sprayer six rows of vines can be sprayed at one trip.

SPREE, a river See BERLIN, Vol. III, p. 593

SPRENGEL, HERMAN JOHANN PHILIP, a German chemist; born in Schillerslage, Germany, in 1834. He studied at Göttingen, Heidelberg and Oxford; settled in England, and in his researches at the chemical laboratories of the Royal College and elsewhere made discoveries of much value. His work was especially in the invention of explosives, and methods of applying them. He brought about great reforms in the use of explosives in water. His methods were put to effective use in the blowing up of Flood Rock, in New York harbor. Explosives invented by Sprengel include hellhoffite, oxonite and rackarock. He published a number of scientific articles and treatises. Among his publications are *Researches on the Vacuum* (1865); *The Water Air-Pump* (1873); *A New Class of Explosives* (1873); and the *Hell-Gate Explosion* (1885).

SPRENGEL'S AIR-PUMP. See MERCURIAL AIR-PUMP, Vol. XVI, p. 31.

SPRENGER, ALOYS, an Austrian Orientalist; born in Nassereut, Tyrol, Sept. 3, 1813. He studied at Innsbruck and Vienna, and in 1836 went to London to assist in Munster's publication, *The Military Sciences of the Mohammedan Nations*. He went to India in 1843, and in 1845 received the appointment of president of Delhi College; remained in India until 1857, when he returned to Europe and was appointed professor of Oriental languages at Bern. He published several works, the most important of which are *The Life and Teachings of Mohammed* (1865) and *Dictionary of Mussulman Scientific Terms* (1854). He died in Heidelberg, Germany, Dec. 19, 1893.

SPRING, GARDINER, an American clergyman; born in Newburyport, Massachusetts, Feb. 24, 1785. After his graduation at Yale he spent two years teaching in Bermuda. He returned to the United States in 1808 and was admitted to the bar of Massachusetts, turning his attention to theology, he studied at Andover, was ordained a minister of the Presbyterian Church, and devoted the

remainder of his life to pastoral work in New York City, in the Brick Presbyterian Church. He published several of his sermons and addresses. Among them are *Fragments from the Study of Pastor* (1838); *Discourses to Seamen* (1847); and *Personal Reminiscences* (1866). He died in New York City, Aug. 18, 1873.

SPRING, LEVERETT WILSON, an American author and educator; born in Grafton, Vermont, Jan. 5, 1840. He was graduated at Williams College in 1863, and after a term of study at Hartford Theological Seminary was ordained a minister of the Congregational Church; was pastor of churches at Fitchburg, Massachusetts, and Lawrence, Kansas, 1868-81. He became professor of English literature at the University of Kansas in 1881, and in 1886 Morris professor of rhetoric at Williams College. He published *Kansas*, in the American Commonwealth Series (1885), and *Mark Hopkins, Teacher* (1885).

SPRINGBOK. See ANTELOPE, Vol. II, p. 101.

SPRING CITY, a borough of Chester County, southeastern Pennsylvania, 31 miles N.N.W. of Philadelphia, on the Schuylkill River and canal, and on the Pennsylvania railroad. It is the center of a region rich in agricultural and mineral products, and has manufactures of terra-cotta, foundry facings, wood-pulp, stoves, glass, fire-brick, tile, paper and lumber. Population 1890, 1,797; 1900, 2,566.

SPRINGFIELD, a city and the capital of the state of Illinois and of Sangamon County, 185 miles by rail S.W. of Chicago, at the meeting-point of the Baltimore and Ohio Southwestern, the Chicago and Alton, the Chicago, Peoria and St. Louis, the St. Louis, Chicago and St. Paul and the Wabash railroads. Besides the various state, Federal and county buildings, the city has numerous churches, representing the leading denominations. It has good public schools, including a high school. Among its denominational institutions, are Concorca College (Lutheran), the Bettie Stuart Institute, several convents, a number of parochial schools, charitable institutions, including hospitals and the Home of the Friendless. The public library of the city contains over 25,000 volumes, and the newspapers comprise four dailies and a number of weeklies, semimonthlies and monthlies. The city, in 1895, had six banks with a combined capital of \$1,150,000, besides loan and trust companies and building and loan associations, and, according to the returns of 1890, there were, in Springfield, 374 manufacturing establishments, employing a capital, in the aggregate, of over \$3,500,000, and paying to 3,200 persons nearly \$2,000,000 in wages, and for materials almost \$4,000,000, from which products were turned out valued at \$6,500,000. The leading industries include the mining of coal, rolling-mills and foundries, a watch factory, flour, woolen, paper and planing mills, printing and publishing. Springfield has an extensive system of well-paved streets, traversed by electric street-railways and lighted by electricity. There are

water-works, and good sewerage system. Population 1890, 24,963; 1900, 34,159. See also SPRINGFIELD, Vol. XXII, pp. 432, 433.

SPRINGFIELD, a city of southern central Massachusetts, the capital of Hampden County, on the left bank of the Connecticut River, by rail 99 miles W. by S. of Boston, on the Boston and Albany railroad, and 25 miles N. of Hartford, on the New York, New Haven and Hartford railroad, and is also the southern terminus of the Connecticut and Passumpsic division of the Boston and Maine railroad, and the northern terminus of a branch of the New York, New Haven and Hartford railroad, the three roads entering a union depot, built at a cost of \$700,000. It has ten national banks with a net capital of \$3,500,000; and three savings banks with deposits of nearly twenty millions. In 1890, \$10,524,457 were invested in 681 manufacturing industries, paying \$5,391,005 annually to employees, and producing finished products valued at \$16,191,456 from materials costing \$7,583,487. The city is well equipped with electric railways and lighted by gas and electricity, has an excellent water system, and is stretching out over an elevated plain to the east. The older streets are broad, shaded avenues, and the city has a large and beautiful park. The public buildings include a cathedral and numerous other churches, a brownstone post-office and city hall and a granite courthouse. Springfield is noted for the great variety of its manufactures. Among its larger factories is the United States Armory (since 1794), employing about four hundred men, chiefly in the manufacture of rifles and carbines; the others embrace foundries, car-works, and manufactories of cottons and woollens, paper, machinery, furniture, trunks, buttons, needles, spectacles, locks, pistols, skates, picture-frames, organs and jewelry. The town was settled in 1635. Population 1890, 44,179; 1900, 62,059. See also SPRINGFIELD, Vol. XXII, p. 433.

SPRINGFIELD, a city and the capital of Greene County, southwestern Missouri, on the Kansas City, Fort Scott and Memphis and the St. Louis and San Francisco railroads. In 1894 the city had seven banks, with a net capital of \$725,000 and deposits aggregating \$1,890,000. Besides a government building valued at \$150,000, churches of nine denominations, excellent educational facilities and a Roman Catholic college, there is also located here a Congregational college (Drury), chartered in 1873, with an endowment of \$210,000 and occupying, in 1894, property valued at \$115,800, with 265 students and 12 instructors, having both classical and scientific courses. Many of the streets are well paved, and all are equipped with electric or gas lighting. See also SPRINGFIELD, Vol. XXII, p. 433. Pop. 1900, 23,267.

SPRINGFIELD, a city and the capital of Clarke County, western Ohio, on the Cleveland, Cincinnati, Chicago and St. Louis, the Ohio Southwestern and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. The city is marked by modern improvements, such as gas and electric lights, street-railways, water-works

and sewers, and derives good water-power from the Mad River. The public buildings of recent construction include a new city hall, a new United States government building and a public library. Springfield has nearly fifty churches, excellent public schools of all grades, a business college, daily and weekly newspapers, and is the seat of Springfield Seminary and of Wittenberg College (Lutheran), a co-educational institution chartered in 1845, which, in 1895, had 21 instructors, 450 students and a library of 12,000 volumes. The city, in 1893, had an assessment valuation of over \$17,000,000, 5 national banks with a combined capital of \$1,300,000, and, according to the census returns for 1890, had 372 manufacturing establishments, employing a combined capital of \$14,500,000, paying to nearly 7,000 persons over \$3,000,000 in wages, and turning out products valued at \$10,700,000, made from materials which cost \$4,700,000. Of the total value of output, agricultural implements represented over \$5,000,000. Other products include steam-heaters, sewing-machines, water-wheels, flour, wind-mills, galvanized iron, carriages, spring beds, linseed-oil, lime, brick and whisky. Population 1890, 31,895; 1900, 38,253. See also SPRINGFIELD, Vol. XXII, p. 433.

SPRINGFIELD, a town and the capital of Robertson County, northwestern Tennessee, on the Louisville and Nashville railroad, 29 miles N. N. W. of Nashville. It is the center of an agricultural, stock-raising and tobacco district. Whisky is extensively distilled, and there are grist and saw mills and a carriage factory. It has two banks and three weekly newspapers. Population 1890, 1,372; 1900, 1,732.

SPRINGHILL, a village and town of Cumberland County, northwestern Nova Scotia, on the Meccan River, and on the Intercolonial railway, about nine miles S. of Amherst. The discovery and working of coal in the vicinity raised the place from a mere hamlet, known as Meccan in the census of 1881, to a prosperous town of 4,813 in 1891. It manufactures woolen goods, leather, etc., and has one newspaper.

SPRINGS. See GEOLOGY, Vol. X, pp. 269-271.

SPRING VALLEY, a city of Bureau County, northern central Illinois, 104 miles S. W. of Chicago, on the Illinois River, and on the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific and the Chicago and North-Western railroads. It is extensively and almost exclusively engaged in the mining of coal, in which the region abounds is mainly inhabited by Italian, Polish-American miners, and has been the scene of several racial or labor disturbances. Population 1890, 3,837; 1900, 6,214.

SPRING VALLEY, a village of Fillmore County, southeastern Minnesota, 30 miles E. of Austin and 80 miles W. of La Crosse, Wisconsin, on the Chicago, Milwaukee and St. Paul and the Winona and Western railroads. It is the center of a rich farming region, and has manufactures of pumps. Population 1890, 1,381; 1900, 1,770.

SPRINGVILLE, a village of Erie County,

western New York, on the Buffalo, Rochester and Pittsburg railroads, 30 miles S. of Buffalo. It is in the center of an important dairying district, and its cheese factory produces 2,000,000 pounds of cheese annually. It has good water-power, and manufactures woolen goods and leather. It has natural gas for fuel, electric lights, two banks and two weekly newspapers. Population 1890, 1,883; 1900, 1,992.

SPRINGVILLE, a town of Utah County, central Utah, on the Rio Grande Western and Union Pacific railroads, near the eastern shore of Utah Lake, 5 miles S. of Provo City. It has excellent water-power, is in the center of a good agricultural and stock-raising district, and manufactures woolen goods. It has an academy, a Mormon and a Presbyterian church, a state bank and a weekly newspaper. Population 1880, 2,312; 1890, 2,849; 1900, 3,422.

SPRUCE. See FIR, Vol. IX, pp. 222-224.

SPULLER, SERAPHIN EUGÈNE, a French journalist and politician; born in Seurre, France, Dec. 8, 1835. He became a member of the Paris bar in 1862, but soon abandoned law for politics. He became editor of *Europe*, published at Frankfort, and was one of the founders of *Revue Politique* in 1868. He was closely associated with Gambetta, and was made editor of *La République Française*. He was elected to the Chamber of Deputies in 1876; in 1881 became Under-Secretary in the Foreign Office; retired with Gambetta in 1883; Minister of Public Instruction in 1887; Minister of Foreign Affairs in 1889-90; and was elected a Senator in 1892. He wrote *A Short History of the Second Empire* (1870); *Michelet, His Life and Works* (1876); *Ignace de Loyola and the Society of Jesus* (1876); *Popular Conferences* (1879); and other works. Died in Sombernon, near Dijon, July 23, 1896.

SPURGE, a tree. See GUTTA-PERCHA, Vol. XI, p. 339.

SPURGEON, CHARLES HADDON, an English Baptist preacher, born at Kelvedon, Essex, June 19, 1834; was the son of a Congregational minister. He went to school at Colchester and Maidstone, and became usher in a school at Newmarket. At 16 Spurgeon adopted Baptist views, became very active in religious work, and began preaching and exhorting in and near Cambridge; a little later became pastor of the chapel at



REV. C. H. SPURGEON.

Waterbeach. In 1853 Mr. Spurgeon accepted the pastorate of the New Park Street Chapel, Southwark, London. The chapel was soon found to be too small, and it was enlarged, services meanwhile being carried on at Exeter Hall and Surrey Gardens Music Hall. The first enlargement, however, proved insufficient and its size was again increased, and finally it became necessary to build the Metropolitan Tabernacle, which was

opened in 1861—a structure with double galleries and capable of seating six thousand persons. Mr. Spurgeon's sermons began to be published in 1885, and at the end of 1891 the full series had reached 2,188, or 37 annual volumes, while enough sermons remained to carry on the series for 12 years. A book fund which was established in his own house, and superintended by his wife, in ten years supplied indigent ministers with over 80,000 volumes. Mr. Spurgeon founded a "pastor's college" for training evangelists, an orphanage, a colportage society and almshouses in connection with his church, and kept them under his own administration. Besides sermons, he published a devout commentary on the Psalms, entitled *The Treasury of David*, a series of expositions very useful to preachers (7 vols., completed in 1887), and one on St. Matthew's Gospel, called *The Gospel of the Kingdom* (1893); narratives of the work of both the New Park Street and the Tabernacle congregations, and the epigrammatic, racy, and deeply evangelical books for popular use, *John Ploughman's Talk*; *John Ploughman's Pictures*; *The Cheque-Book of the Bank of Faith* (1889); and *Salt-Cellars* (1890). Nothing in recent English is more like Bunyan in idiomatic force, simple vigor of diction and evangelical piety than Spurgeon's books. He went to Mentone, in the Riviera, to recruit, and died there, Jan. 31, 1892.

SPURGEWORTS, a name sometimes given to the plants belonging to the great family *Euphorbiaceæ*, which is characterized by its milky juice, monoëcious or diëcious flowers, and three-celled ovary. The family contains more than three thousand species, most largely displayed in the tropics. Among the well-known forms are *Ricinus* (whose seeds yield castor-oil); *Manihot* (whose roots yield cassava-flour, tapioca, etc.); *Siphonia* (whose latex is caoutchouc); *Aleurites* (producing shellac), etc. The largest and most peculiarly modified genus is *Euphorbia*.

SPURREY, a local name for *Spergula arvensis*, a common weed of grain-fields in the United States, and cultivated in Europe as a forage plant for sheep. It belongs to the *Carophyllaceæ*, or pink family, and is a low plant with whorls of filiform leaves and a terminal cluster of white flowers. The sandspurrey is *Spergularia*, a closely allied genus of the sea-coasts and saline soils.

SPYRIDACEÆ, a suborder of florideous algæ, having filiform, monosiphonous fronds, consisting of filaments from which proceed shorter branches. The secondary branches bear the antheridia, and have tripartite tetraspores at their nodes. The branches have subterminal cystocarps. The genus *Spiridia* numbers but few species and these are nearly all tropical in their distribution. It is worthy of note, however, that two have been found as far north as Massachusetts, in the vicinity of Cape Cod.

SPY WEDNESDAY, a name formerly applied to the Wednesday which immediately precedes Easter. The term is in allusion to the measures taken by Judas Iscariot on that day for the betrayal of the Saviour.

SQUALLS. See METEOROLOGY, Vol. XVI, p.

132.

SQUARES, METHOD OF LEAST. See LE-
GENDRE, ADRIAN MARIE, Vol. XIV, p. 414.

SQUASH. See GOURD, Vol. XI, p. 4.

SQUASH-BUG (*Anasa tristis*), a well-known hemipterous insect, which is very destructive to the leaves of the squash and allied plants.

SQUETEAGUE, fishes of the genus *Cynoscion*, common on the Atlantic coast of the United States. *C. regalis* is found abundantly south of Cape Cod, while on the southern coast *C. maculatus* is the common spotted squeteague. They are often called weak-fishes because the mouth is easily torn when hooked. The squeteagues are great favorites as game-fishes, and are excellent as food.

SQUID, the common name for certain of those cephalopodous mollusks which have ten arms (*Decapoda*) and two gills (*Dibranchia*). The name is especially applied to the slender, elongated calamaries (*Teuthidae*), and to the *Loliginidae*. These constitute an important part of the food of many fishes, and in some countries they are eaten by man. The best-known squid of the United States is *Loligo pealii*. No sharp line can be drawn between the popular names squid and cuttle-fish, since they do not correspond to scientific divisions. See also SEA SERPENT, Vol. XXI, p. 609.

SQUIER, EPHRAIM GEORGE, an American explorer and writer; born in Bethlehem, New York, June 17, 1821. In his youth he worked on a farm in summer and taught school in winter. In 1848 he was appointed *chargé d'affaires* to the republics of Central America. He spent 1863 and 1864 in Peru as United States commissioner, examining the remains of the Inca architecture, of which he took hundreds of photographs. He was commissioned, by the government of Honduras, consul-general at New York in 1868, and there began to prepare an exhaustive work on archæology but the completion of the work was for several years interrupted by a mental disorder, from which he, however, subsequently recovered so far as to be able to revise the portions already written, and to superintend their publication under the title *Peru: Incidents and Explorations in the Land of the Incas* (1877). Previously he had published a number of reports, among them *Aboriginal Monuments of the State of New York* (1849); and *The States of Central America* (1857). A recurrence of his mental disorder incapacitated him for all labor, and he died in Brooklyn, New York, April 17, 1888.

SQUILLA. See CRUSTACEA, Vol. VI, p. 658.

SQUINTING. See OPHTHALMOLOGY, Vol. XVII, pp. 785, 786.

SQUIRE, WATSON C., an American public man; born in Cape Vincent, New York, in 1838. He graduated at Middletown, Connecticut, in 1859; was principal of the Moravia Institute; enlisted in 1861; raised a company of sharpshooters; was in the battles of Chickamauga, Chattanooga, Nashville and Resaca; was brevetted colonel; made judge advocate of the district of Tennes-

see. From 1865 to 1879 was in business in New York City. In the latter year he removed to Washington territory and was appointed governor of that territory in 1884; distinguished himself by his course as executive during the anti-Chinese riots, and contributed largely to the development of the territory and in bringing about statehood; was elected to the United States Senate from the state of Washington in 1889, and re-elected for six years in 1891.



WATSON C. SQUIRE.

SRINAGAR, a city. See KASHMIR, Vol. XIV, p. 11.

STABAT MATER. See HYMNS, Vol. XII, p. 583.

STACHYS, a genus of plants of the family *Labiata*, or mints, whose species are commonly called hedge-nettles. They are hairy or bristly plants, with flowers crowded in approximate whorls and forming a terminal raceme or spike. *S. lanata*, from Europe, and *S. coccinea*, from Mexico, are cultivated for ornament.

STADIA MEASUREMENT, the measuring of lines, in civil and topographical engineering, by means of the stadia. The stadia consists of the introduction of a pair of fine horizontal spider-web or delicate platinum wires, or even lines ruled upon the glass, in addition to the regulation wires which are embraced within the diaphragm of an ordinary surveyor's instrument, in connection with a stadia-rod,—i. e., a staff which is regularly graduated. The wires or lines may be inserted within any surveyor's transit or theodolite. The simplest form of stadia is to so arrange the wires that one hundred feet of distance exactly correspond to one foot marked off on the rod by the horizontal wires within the glass; that is to say, when the operator looks through his telescope, the horizontal wires stretched across near the top and bottom of his object-glass will, when covering the space of a foot upon the graduated staff held vertically by his assistant, indicate that the staff is just one hundred feet distant.

Another form of stadia more generally used is through the trigonometrical principle of similar triangles, or, otherwise, upon the geometrical law that the lengths of two vertical lines which subtend an angle must be proportionate to their relative distances from the apex of the angle. Upon very level ground, or over water-distances, stadia-work can be done with considerable precision, but it has never been a favorite method over rough ground, where accuracy is desirable, either triangulation or careful chaining being preferable.

The principle is said to have been invented about 1840 by an Italian engineer named Porro. It has been used in topographical work in Switzerland, and is quite largely in use in the United

States Geodetic and Coast Survey. The instrument there used is called the *telemeter* instead of stadia.

STADIUM. See ATHENS, Vol. III, p. 7.

STAFF AND STAFF SCHOOLS, BRITISH. See ARMY, Vol. II, pp. 577, 585.

STAFFA, a celebrated islet on the west coast of Scotland, about seven miles off the west coast of Mull. The most remarkable feature of the island is Fingal's or the Great Cave, the entrance to which is formed by columnar ranges on each side, supporting a lofty arch. The entrance is 33 feet wide and 60 feet high, and the length of the cave is 212 feet. The floor of this marvelous chamber is the sea, which throws up flashing and many-colored lights against the pendant columns, whitened with calcareous stalactites, which form the roof, and against the pillared wall of the cave.

STAFFORD, a town of Tolland County, northern central Connecticut, about 20 miles N. of Willimantic, on the Central Vermont railroad. It manufactures woolen goods, and has a good local trade. Population 1890, 4,535; 1900, 4,297.

STAG. See DEER, Vol. VII, p. 23.

STAG-BEETLE OR HORN-BUG. See COLEOPTERA, Vol. VI, p. 131.

STAGGERS, the name of a disease confined chiefly to horses and sheep, and taking name from the vertigo or dizziness that is a characteristic symptom. In the horse, the malady may have its origin in the brain or in the stomach. Of brain disorders there are two,—one a form of epilepsy called "blind staggers," which is incurable; the other, arising from cerebral inflammation, called "mad staggers," and it may be controlled by bleeding, blisters and cathartics. Gastritis causes what are called "grass-staggers," for which the treatment aims at reducing the inflammation of the stomach. The staggers that afflict sheep are attributable to a parasite, the larvæ of the *Æstrus ovis*, which attacks the nostrils. The removal of the parasite effects a cure.

STAGHOUND. See DOG, Vol. VII, p. 329.

STAGNELIUS, ERIK JOHAN. See SWEDEN, Vol. XXII, p. 757.

STAINED GLASS. See *Painting*, under GLASS, Vol. X, pp. 667-673.

STAINER, SIR JOHN, a British musician; born in London, June 6, 1840. He early manifested his musical ability, and in 1856 became organist at St. Michael's College and, in 1859 of Magdalen College, Oxford. From 1850 to 1872 he was organist of University Church, Oxford, and from 1872 to 1888 of St. Paul's Cathedral, London. He composed a large number of hymns and services, was knighted in 1888, and appointed professor of music in Oxford. Among his cantatas are *The Daughter of Jairus* (1878) and *St. Mary Magdalene* (1883). He also published a *Dictionary of Musical Terms* and a work on the *Music of the Bible*.

STALACTITES. See CAVE, Vol. V, p. 266.

STAMBOUL. See CONSTANTINOPLE, Vol. VI, p. 303.

STAMBULOFF, STEFAN, a Bulgarian states-

man; born in Tirnova, Bulgaria, in 1855. He received part of his education in Russia, at Odessa, and there was imbued with the spirit of independence which characterized his life. He was one of the revolutionists of 1875; served in the Russian army during the Russo-Turkish war; was elected to the Sobranje, or Chamber of Deputies, and upon the election of Alexander I as Prince of Bulgaria became the leader of the Liberals. He became president of the Sobranje in 1884 and upon the abdication of Alexander in 1886, the head of the regency. He was virtually a dictator, and brought about the election of Prince Ferdinand of Saxe-Coburg to the vacant throne in 1887. From that time until May, 1894, he ruled the country with a cruelty and severity that, while it kept peace in Bulgaria, made countless enemies for the government. Various plots against Stambuloff's life were discovered and the plotters summarily shot. At length the opposition to Stambuloff became so strong that his government was forced to resign, May 29, 1894. Prince Ferdinand turned against his former premier, and Stambuloff was disgraced, imprisoned, and fined. He was refused permission to leave the country, and was assassinated in Sofia, July 18, 1895, at the instigation of the government. He was an excessive patriot, and in his endeavors to have Bulgaria recognized as a free state put in force the measures which cost him his life.

STAMEN. See BOTANY, Vol. IV, pp. 135-136.

STAMFORD, a city of Fairfield County, southwestern Connecticut, on Long Island Sound, 33 miles by rail from New York, on the New York, New Haven and Hartford railroad. It has a handsome town hall, and the hills and shore around are embellished with the summer residences of well-to-do New Yorkers. Steamboats run daily to New York. There are iron and bronze foundries, and manufactories of hats, drugs, sashes and blinds and Yale locks. In addition to an excellent system of public schools, the city contains a number of private seminaries, one of which, King's School, for boys, has an attendance of fifty pupils, with six instructors, and occupies property valued at \$35,000. There are six banks, electric-light and railway plants, an excellent water-supply and paid police and fire departments. Population 1890, 15,700; 1900, 15,997.

STAMP ACTS. See UNITED STATES, Vol. XXIII, pp. 736, 737.

STAMPING AND CREASING PRESS. See PRESSES, in these Supplements.

STAMP-MILL. See GOLD, Vol. X, p. 747; and MINING, Vol. XVI, p. 463.

STAMPS. See POST-OFFICE, Vol. XIX, pp. 585-588.

STANBERRY, a city of Gentry County, northwestern Missouri, on the Omaha and St. Louis railway, 50 miles N.E. of St. Joseph and 110 miles S.E. of Omaha. It is the center of a large agricultural region, and has two banks and six newspapers. Population 1890, 2,035; 1900, 2,654.

STANCHIO, an island. See COS, Vol. VI, p. 444.

STANDARDS OF VALUE. See MONEY, Vol. XVI, pp. 735-738.

STANDARD TIME. In the meridian conference held at Washington in 1884, it was determined to establish a general system of reckoning-time, with the Greenwich meridian as a basis. Local time made each town have a different time from its neighbor, in accordance with the movement of the sun. Standard time makes all towns within a certain district have the same time, without reference to the exact movement of the sun. This was adopted for general convenience, both in private matters and public. According to this arrangement, the United States is divided into four sections, and the time used in each is known as Eastern, Central, Mountain, and Pacific. Eastern time is maintained in the district which includes all territory between the Atlantic coast and an irregular line drawn from Detroit to Charleston, South Carolina. Central time has for its limits the last-mentioned line and a similar irregular line drawn from Bismarck, North Dakota, to the mouth of the Rio Grande. Mountain time is restricted by the last-named line and the western borders of Idaho, Utah, and Arizona, and Pacific time is the standard in the remainder of the country. The time in each district differs one hour from the adjoining districts. Thus at twelve noon, in New York City (Eastern time), it is eleven a. m. in Chicago (Central time), ten a. m. at Denver (Mountain time), and nine a. m. at San Francisco (Pacific time). The standard of time in the United States is supplied by the Naval Observatory at Washington. Every day the exact hour of twelve o'clock, noon, is determined by astronomical observation, the chronometer of the observatory corrected, and at the precise hour the correct time is communicated to the government departments by electricity. The Western Union Telegraph Company is permitted to have its instruments in the room, and is enabled to telegraph the time automatically to all parts of the United States, reaching San Francisco in one fifth of a second. To accomplish this the company is obliged to take all business off the wires three minutes before noon each day, and to establish unbroken connection between Washington and every point on their lines. Not merely is the time telegraphed to all parts of the country, but by means of an electrical device such clocks as are connected to the Western Union wire are regulated at the same time. The device, which is attached to each clock, consists of an electromagnet operating a clamp. When the circuit is closed to give the noon signal, the electromagnet is actuated, and the hands of the clock are forced exactly to the point twelve by the clamp. The noon signal at Washington, it must be remembered, regulates the clocks in Chicago for eleven a. m., in Omaha for ten a. m., and for San Francisco for nine a. m. The Western Union Company charges for each clock \$15 a year for the service, and derives an income of over a million dollars from this source. Seven thousand clocks in New York City, and

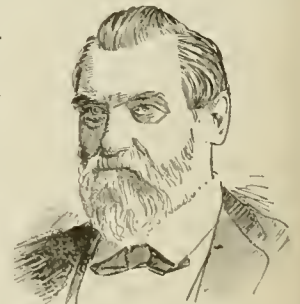
probably seventy thousand in the United States, are thus regulated. In the seaport towns the noontime balls are dropped in the same manner, in order that mariners may correct their chronometers by them. At first this was the principal object of the service.

STANDISH, MILES, an American soldier; born in Lancashire, England, about 1584. He entered the British army in the Netherlands, and rose to the rank of captain. Later he accompanied the Pilgrims to Cape Cod, on board the *Mayflower*. On September 21st, after the founding of Plymouth, Standish, with ten armed followers, and three savages as guides, explored the land, anchoring off Thompson's Island, and entered that portion of the country now known as Quincy. In 1625 he went to England as agent for the colony, and returned in the following year with supplies. Besides being military head of the colony, he was its counselor, and for a long time its treasurer. He was the hero of many exploits, and his ability as a captain kept the Indians awed. The *Courtship of Miles Standish*, by Longfellow, is based upon an incident in the Standish's life. He died in Duxbury, Massachusetts, Oct. 3, 1656.

STANFORD, a town and the capital of Lincoln County, central Kentucky, 38 miles S.W. of Lexington and 104 miles S.E. of Louisville, on the Louisville and Nashville railroad. It is the center of an agricultural district, and contains woolen, flour and grist mills, and two banks with an aggregate capitalization of \$400,000. It also contains a college for women. The population in 1890 was 1,385; in 1900, it was 1,651.

STANFORD, CHARLES VILLIERS, a British music-composer; born in Dublin, Ireland, Sept. 30, 1852. He was educated in Queen's and Trinity colleges, Cambridge, and in 1873 he was elected organist of Trinity College. In 1882 he was appointed professor of composition and orchestral playing in the Royal College of Music, and in 1888 professor of music in Cambridge. Among his compositions are *The Veiled Prophet of Khorassan*, a grand opera (1881); *Savonarola*, an opera (1884); *Three Holy Children*, an oratorio (1885); *Carmen Saculare*, a song (1887); *Irish*, a symphony (1887); and numbers of quartets, sonatas, odes and songs.

STANFORD, LELAND, an American public man and philanthropist; born in Watervliet, New York, March 9, 1824. He was admitted to the bar of New York in 1849; went to California overland and engaged in gold-mining in 1852, and in 1856 settled in business in San Francisco. He was one of the organizers of the Central Pacific Railroad Company; secured the requisite Congressional legislation; was made president of the company and superintended the construction of the line. He entered politics as a



LELAND STANFORD.

Republican in 1860, was elected governor of California in 1861, and from 1884 until his death was a United States Senator. Out of a fortune estimated at more than \$50,000,000, he gave property valued at \$20,000,000 to found, in memory of his son, a university at Palo Alto, to be known as the Leland Stanford Junior University (q.v., in these Supplements). He died in Palo Alto, June 21, 1893.

STANHOPE, PHILIP HENRY, EARL, a British historian and statesman; born in Walmer, England, Jan. 31, 1805. He was graduated from Oxford in 1827 and was elected to the House of Commons in 1830. He was largely instrumental in securing the passage of the Copyright Act in 1842; was Under-Secretary for Foreign Affairs in 1834-35, and secretary of the Indian Board of Control in 1845-46. He was a Conservative in politics and an intimate of Robert Peel. He succeeded to the earldom in 1855, previous to which time he was known as Viscount Mahon. He was much interested in antiquities, and was one of the founders of the National Portrait Gallery. Among his numerous historical writings are *A History of England from the Peace of Utrecht to the Peace of Versailles* (1836-54); *Life of Louis, Prince of Condé* (1845); and edited *The Memoirs of Sir Robert Peel* (1857). He died in Bournemouth, Dec. 22, 1875.

STANISLOW, a town of Galicia, Austria. Population 1890, 22,391. See STANISLAU, Vol. XXII, p. 450.

STANLEY, DAVID SLOANE, an American soldier; born in Cedar Valley, Ohio, June 1, 1828. After his graduation at West Point in 1852 he entered the regular army and saw severe service on the frontier. He was in the Missouri department of the Union army at the beginning of the Civil War, and in reward for meritorious actions was appointed brigadier-general in 1861. In 1863 he was given command of the Army of the Cumberland, and was promoted major-general. He remained in the army after the war, as a colonel, and after frontier service was made brigadier-general and given command of the Department of Texas and New Mexico. He was placed on the retired list, June 1, 1892.

STANLEY, SIR HENRY MORTON, African explorer; born in Denbigh, Wales, in 1841. Various accounts are current of his early life. The most probable of them is that his name was John Rowlands until he took the name of his patron, a wealthy merchant at New Orleans. That he was an adopted son of the New Orleans Stanley there is nothing to show. When the lad was three years of age, his father died, and his mother moved into a free-rent



HENRY M. STANLEY.

cottage, of which the bishop of St. Asaph's was patron, and he was educated in the cathedral school.

At 15 years of age he arrived at New Orleans as a

cabin-boy, and there was taken into the service of Mr. Stanley. The connection could not have been long, for when the Civil War began he had had roving adventures among Indians and in California. He enlisted in the Southern army, was captured, entered the United States navy, and left it at the close of the war as an ensign. He now found an engagement with the New York *Herald*, which paper sent him to report upon the Cretan revolution of 1866, and he then traveled extensively in the Levant.

In the next year he joined General Napier's expedition against Abyssinia, and in April, 1868, became distinguished as a news-correspondent by getting his account of the battle of Magdala printed in London in advance of official dispatches. The same year he was engaged in reporting the revolution in Spain against Queen Isabella, and it was here, in October, 1869, that Bennett's laconic dispatch reached him, ordering him to "find Livingstone." Not until a year after did he reach Zanzibar, having in the mean time described the opening of the Suez canal and made his way overland from the Crimea to Bombay, whence he sailed to Zanzibar. On the 21st of March, 1871, his rear column started for Ujiji, on Lake Tanganyika. His force comprised 200 men and was 234 days on the road, having passed the summer 400 miles east of Ujiji, partly on account of Stanley's sickness and partly on account of native hostilities. Livingstone was found at Ujiji, and together the two men made an exploration of the great lake. (See Vol. XIV, p. 722.) In February, 1872, Stanley started to return to England, where he was received with royal honors and the plaudits of the geographical societies.

He undertook a second African exploration, under a joint arrangement between the New York *Herald* and the London *Daily Telegraph*. At Zanzibar he learned of Livingstone's death, but still went on to explore the region of the great equatorial lakes. Early in 1875 he reached Victoria Nyanza, having been ninety days on the march and having lost a third of his men. On this expedition he explored and charted the Victoria Lake and the Albert Nyanza, proving the latter to be a tributary of the Nile. His expedition ended in completing one of Livingstone's projected enterprises, by passing from Ujiji to Lualaba River, and by following its course he proved it to be a tributary of the Congo, down which he passed to the Atlantic.

Stanley now circumnavigated South Africa, and, dismissing his force at Zanzibar, reached London in February, 1878. The result of this expedition was the founding of the Congo Free State, undertaken by the African International Association under the patronage of Leopold II of Belgium. Stanley spent four years on the Congo River, establishing stations upon its upper reaches above the rapids. In 1885 the state was established by agreement of the great European powers, but Stanley declined to accept the office of President.

Stanley's most famous expedition is known as that for the relief of Emin Pasha (q.v., in these Supplements). Heralded as a great enterprise in the interests of humanity, there is every reason to believe that beneath it were political agencies bent on extir-

pating German influence in the equatorial region, and on the annexation of new territory to the empire of Great Britain. It is known from Stanley's account of this expedition that he carried with him the Khedive's revocation of Emin's authority so far as it was derived from Egypt; that before leaving Zanzibar for the Congo River he negotiated with its Sultan for the cession of a vast region on the eastern shore of the continent of Africa to the New Imperial British East Africa Company. It appears further, that Emin did not desire relief, and could not be tempted to abandon his province by Stanley's offer of service, under either the Belgian or British flag.

In 1890 a vast territory within the southern end of which Emin had exercised a personal jurisdiction became British territory, and is now known as British East Africa, having a conjectural area of over five hundred thousand square miles. Such was the fruit of this famous relief expedition, of the nature of which Stanley could scarcely have been advised. He left Zanzibar early in 1887 with seven hundred men, went by way of the Cape of Good Hope to Boma, near the mouth of the Congo river, and on April 30 reached Leopoldville, where he was carried by steamer to the Aruwimi river. He had already made an agreement with Tippu Tib, the great Arab slave-trader of this region, that from him he should receive supplies at Yambuya, near the lowest rapid of the Aruwimi. Here he left his rear-guard and for 160 days was lost in the trackless forest. About the middle of December he reached Albert Nyanza, where for more than four months he awaited the arrival of Emin Pasha. He returned thence to find his rear-guard at Yambuya disorganized and reduced to destitution by fever, desertion, and the faithlessness of Tippu Tib. Its commander, Major Bartelot, had been murdered, and much contentious and angry writing has been published over the misfortunes of the rear-guard.

On Jan. 18, 1889, Stanley and his forces were camped on the banks of the Albert Nyanza, where time was spent in arranging for the transportation of the reluctant Emin and his caravan to the coast. On Dec. 4 the expedition reached Bagamoyo, whence Stanley went to Cairo to write out the notes for his book *In Darkest Africa* (1890). In May, 1890, he was in London, and that summer was made D. C. L. by Oxford; and in the same year married Dorothy Tennant, a gentlewoman of artistic fame. After a lecturing tour in the United States and Australia, he was in 1892 naturalized in England; and was the Unionist candidate for North Lambeth in the elections of 1892, but was defeated. In 1895 that constituency returned him.

Besides *In Darkest Africa*, already named, Stanley published *How I Found Livingstone* (1872); *My Kalulu* (a novel, 1873); *Coomassie and Magdala* (1874); *Through the Dark Continent* (1878; Epitome, 1885); *Congo and the Founding of Its Free State* (1885); *Slavery and the Slave Trade in Africa* (1893); *My Dark Companions and Their Strange Stories* (1893); *My Early Travels in America and Asia* (1895); and *Through South Africa* (1898).

STANLEY OF PRESTON, BARON. See DERBY, FREDERICK A. STANLEY, EARL OF, *ante*, p. 1031.

STANLEY POOL, an inland lake. See ZAIRE, Vol. XXIV, p. 765.

STANNARD, HENRIETTA ELIZA VAUGHAN, pseudonym JOHN STRANGE WINTER, an English novelist; the daughter of Rev. Henry Vaughan Palmer; born in York, England, Jan. 13, 1856. Her father was for a time an artillery officer, and she gained a knowledge of military life which enabled her to produce genuine pictures of camp incidents. She was married in 1884 to Arthur Stannard, a civil engineer. In 1893 she was elected a Fellow of the Royal Society of Literature. Her literary career began in 1872 with the writing of sketches, collected in 1881 under the title *Cavalry Life*. Her best-known story, and the one which established her reputation, is *Boots's Baby* (1886). She founded and edited *Winter's Weekly Magazine* in 1891. She also wrote *Mignon's Secret* (1886); *A Siege Baby* (1887); *Beautiful Jim* (1888); *Boots's Children* (1888); and *Heart and Sword* (1898). Several of her works were published over the pseudonym "Violet Whyte."

STANNARY COURTS. See CORNWALL, Vol. VI, p. 426.

STANNIC COMPOUNDS. See TIN, Vol. XXIII, pp. 401, 402.

STANOVVOY RANGE. See SIBERIA, Vol. XXII, p. 4.

STANSTEAD, a district and the capital of Stanstead County, southern Quebec, containing the villages of Stanstead Plain and Rock Island, on the Boston and Maine railroad, and just across the United States boundary line from North Derby, Vermont. The surrounding region is a rich agricultural and farming country, and at Stanstead Plain there is a Wesleyan College, besides several manufactures, including a woolen-mill. Population of the district in 1891, 3,684.

STANTON, a city and the capital of Montcalm County, in the western central part of the southern peninsula of Michigan, 62 miles N.N.W. of Lansing and 15 N.E. of Greenville, on the Detroit, Lansing and Northern railroad. It is the center of an agricultural region, and has a foundry, machine-shops, and flour and planing mills. Population 1890, 1,352; 1900, 1,234.

STANTON, a village and the capital of Stanton County, northeastern Nebraska, 40 miles N. of Columbus, on the Fremont, Elkhorn and Missouri Valley railroad. It is the center of a fertile agricultural region, producing corn, oats, wheat, hay, sheep and cattle. Population 1900, 1,052.

STANTON, ELIZABETH CADY, an American reform advocate; born in Johnstown, New York, Nov. 12, 1815, the daughter of Daniel Cady, and was married in 1840 to Henry Brewster Stanton (q.v.). With Lucretia Mott she held the first woman's suffrage convention at her home in Seneca Falls, New York, in 1848.



ELIZABETH CADY STANTON.

From that time on she was active in the cause of woman's rights, canvassing several states, and influencing legislation in its behalf. She was president of the National Woman's Suffrage Association, and of the International Council of Women in 1888. With Susan B. Anthony and Matilda J. Gage she published *The History of Woman's Suffrage* (1886). She also wrote *Eighty Years and More* (1898).

STANTON, HENRY BREWSTER, an American journalist, husband of Elizabeth Cady Stanton; born in Griswold, Connecticut, June 29, 1805. He joined the staff of the Rochester *Monroe Telegraph*; became interested in politics and then in the anti-slavery movement; addressed audiences in various parts of the country in advocacy of the cause, and went with his wife to London, in 1840, as a delegate to the Antislavery Society meeting. Upon his return to the United States he engaged for a time in politics, and finally returned to journalism as editor of the New York *Sun*. He was a constant contributor to abolitionist papers, and published, in bound form, *Sketches of Reforms and Reformers in Great Britain and Ireland* (1849) and *Random Recollections* (1886). He died in New York City, Jan. 14, 1887.

STANTON, THEODORE, an American journalist, son of Henry B. and Elizabeth Cady Stanton; born in Seneca Falls, New York, Feb. 10, 1851. He graduated at Cornell in 1876; became German correspondent for the New York *Tribune* in 1880; settled in Paris; was United States Columbian Exposition resident commissioner in France in 1893. He published *The Woman Question in Europe* (1884) and edited a *Life of Thiers* by Le Gaff (1879).

STANWIX, JOHN, a British general; born about 1690, in England. He entered the British service in 1706, and by 1745 had been promoted to lieutenant-colonel. In 1756, as colonel, he was ordered to America, and in 1757 was made brigadier-general and placed in command of the Southern colonial district. He built Fort Stanwix, in New York, and rebuilt Fort Duquesne, in Pennsylvania. In 1759 he was promoted major-general, and in 1760 ordered back to England. There he was made lieutenant-general, lieutenant-governor of the Isle of Wight and elected a member of Parliament. He was drowned in the Irish Channel in December, 1765.

STAR-APPLE FAMILY, a name applied to the family SAPOTACEÆ; q.v., in these Supplements.

STARCH. See GLUCOSE, Vol. X, p. 695; and in these Supplements.

STARFISH. See ECHINODERMATA, Vol. VII, pp. 632-635.

STAR-GAZERS, a popular name for fishes of the family *Uranoscopidae*, which are characterized by eyes on the top of the head. There are several species on American coasts.

STARK, JOHN, an American Revolutionary general; born in Londonderry, New Hampshire, Aug. 28, 1728. He grew up in the wilds of New Hampshire, was captured by the Indians, and adopted into the St. Francis tribe. He took part, as captain, in the French-English war in 1758-59, raised recruits at the beginning of the Revolution, and took part in the battle of Bunker Hill. He saw service in Can-

ada, at Trenton and Princeton, and distinguished himself at Bennington. Previous to the last-named battle he had been censured by the Continental Congress, but for his services there was made a brigadier-general. He continued to take an active part in the patriot service, and held the command of the northern department. He died in Manchester, New Hampshire, May 8, 1822. His saying, at Bennington, that "the enemy must be beaten, or Molly Stark will be a widow," is proverbial.

STARKVILLE, a village and the capital of Oktibbeha County, eastern Mississippi, on the Mobile and Ohio and Illinois Central railroads, 22 miles W. of Columbus. It is in a cotton and stock raising district. It contains six churches, a seminary for girls, and has two weekly newspapers. The State Agricultural and Mechanical College is two miles distant. Population 1890, 1,725; 1900, 1,986.

STAR-OF-BETHLEHEM, the popular name of *Ornithogalum umbellatum*, a liliaceous plant of Europe, in common cultivation in old gardens. Its leaves are long and grass-like, and its flowers are bright white within and green outside.

STAR OF INDIA, ORDER OF THE. See KNIGHTHOOD, Vol. XIV, p. 124.

STARS. See ASTRONOMY, Vol. II, pp. 816-820; and in these Supplements.

STARVATION. See DIETETICS, Vol. VII, p. 208.

STATE. See ARTICLES OF CONFEDERATION, and CONSTITUTION OF THE UNITED STATES, in these Supplements.

STATE, THE UNITED STATES DEPARTMENT OF. The United States Department of State is similar in many respects to the Foreign Office of some of the European nations. The head of the department, under the President, is the Secretary of State. The statement of the duties of this official is also a description of department duties. He has the direction of all correspondence with diplomatic representatives of the United States in foreign countries, of all matters of business with representatives of foreign powers in the United States, and of all matters relating to the foreign affairs of the United States. He also acts for the President in relations with the governors of the several states of the Union. The great seal of the United States is in his care, and all executive proclamations, government commissions and extradition papers must be countersigned and have the seal affixed by him. Passports and exequaturs to foreign consuls are granted by him. The publication of all Congressional acts comes within his domain. Treaties with foreign powers and laws of the United States are placed in his custody. And finally, he is required to report annually to Congress information received from the United States consular offices. The Secretary of State is head of the President's Cabinet. It is not to be supposed that the Secretary personally superintends and transacts the duties just enumerated. He has a full force of assistants and clerks. The highest of these are the first, second and third assistant secretaries. The first assistant becomes the Acting Secretary of State in the absence of the Secretary. The three assistants are

given the immediate direction of diplomatic correspondence and the preparation of papers upon any departmental business. The chief clerk of the department is in charge of the clerical work. The employees, under his direction, are divided into six bureaus, which are the Diplomatic, Consular, Indexes and Archives, Accounts, Rolls and Library, and Statistics. A solicitor, assigned by the Department of Justice, is the legal adviser of the Secretary and assistants.

The Department of State, as now constituted, was organized July 27, 1789. Under the Continental Congress, and until Jan. 10, 1781, all diplomatic affairs were in charge of a committee. At the last-named date the office of Secretary of Foreign Affairs was established. From 1781 to 1783, Robert R. Livingston held the position, and John Jay from 1784 to 1789. Below are given the names of those who have held the office of Secretary of State since the formation of the department. The date of the appointment of each is also given. The Secretary of State and the assistant secretaries are appointed by the President. All minor officials are appointed by the Secretary or are governed by civil service rules: Thomas Jefferson, 1789; Edmund Randolph, 1794; Timothy Pickering, 1795; John Marshall, 1800; James Madison, 1801; Robert Smith, 1809; James Monroe, 1811; John Quincy Adams, 1817; Henry Clay, 1825; Martin Van Buren, 1829; Edward Livingston, 1831; Louis McLane, 1833; John Forsyth, 1834; Daniel Webster, 1841; Hugh S. Legaré, 1843; Abel P. Upshur, 1843; John C. Calhoun, 1844; James Buchanan, 1845; John M. Clayton, 1849; Daniel Webster, 1850; Edward Everett, 1852; William L. Marcy, 1853; Lewis Cass, 1857; Jeremiah S. Black, 1860; William H. Seward, 1861; Elihu B. Washburn, 1869; Hamilton Fish, 1869; William M. Evarts, 1877; James G. Blaine, 1881; F. T. Frelinghuysen, 1881; Thomas F. Bayard, 1885; James G. Blaine, 1889; John W. Foster, 1892; Walter Q. Gresham, 1893; Richard Olney, 1895; John Sherman, 1897; William R. Day, 1898; John Hay, 1898.

STATEN ISLAND. See TIERRA DEL FUEGO, Vol. XXIII, p. 383.

STATEN ISLAND, the largest island in New York harbor, forming Richmond Co.; 13 miles long, 8 wide; area 58½ square miles. It is separated from New Jersey on the north by the Kill von Kull, on the east by New York harbor, bay and the Narrows; on the southeast by Raritan Bay and the Lower Bay, and on the west by Arthur Kill, or Staten Island Sound, across which is a drawbridge of the Baltimore and Ohio railway, which has its terminus on the island at Erastina. It has steam-ferry connection with New York City from St. George on the northern extremity of the island, and with Perth Amboy, New Jersey, by ferry from Tottenville, a quaint old fishing-village. The island is hilly, but contains much excellent farming-land. From Grimes Hill in the interior, 370 feet high, fine views of the harbor, bay and city of New York are obtained. The interior is sequestered, with only wagon-roads, the capital, Richmond, being approached from the Oakwood station of the island railway by this means. This railroad, operated by the Staten Island Rapid Tran-

sit Company, reaches all the shore villages and towns of importance, its central station being at St. George, whence it connects with the Baltimore and Ohio at Erastina. On the north shore is Sailor's Snug Harbor, an asylum for aged and infirm sailors, which supports one thousand beneficiaries, has stately buildings, and a park of 175 acres, in which is a monument of the founder, Captain Richard Randall, by St. Gaudens. Prohibition Park is an exclusive community, in which are the homes of many of New York's best-known and wealthiest citizens. This village has a fine auditorium for summer lectures and conventions. Clifton, a mile or two south of St. George, is the headquarters of the quarantine officer. A mile southeast of Clifton is Fort Wadsworth, with its water batteries commanding the Narrows and the approaches to New York. Between St. George and Tomkinsville is a United States lighthouse. At Stapleton is a United States marine hospital. The towns have many churches, public and private schools, libraries, newspapers, manufacturing establishments and other industries. Population 1880, 38,991; 1890, 51,693.

STATE'S EVIDENCE, a phrase synonymous with the expression king's or queen's evidence in England. It is popularly and technically used to describe the evidence of an accomplice, usually given under and after an arrangement made by the state's attorney that the accomplice so testifying shall not himself be punished for the crime which he confesses in so testifying. The evidence of an accomplice requires corroboration, and is justly and properly looked upon with suspicion by jurors. The practice of calling state's evidence, while often too frequent, is at times absolutely necessary, in order to secure the conviction of the principal criminal. There is generally a tacit understanding between the prisoner so testifying, or his attorney, on the one side, and the state's attorney, or other prosecuting officers, on the other, that if full disclosure is made for the public benefit the accomplice shall either be leniently dealt with or discharged from punishment. The practice of modern jurists is to instruct the jury to carefully scrutinize the testimony of an accomplice, and to find other corroboration before relying upon it. Such instructions are in the nature of advice, rather than mandatory, and the rule that an accomplice must be corroborated is one of expediency and practice, rather than a hard and fast rule of the law.

STATES GENERAL. See FRANCE, Vol. IX, pp. 566, 567, 597, 598.

STATESVILLE, a city and the capital of Iredell County, west-central North Carolina, on the Southern railroad, 47 miles N. of Charlotte. It is in the center of a farming, stock-raising, tobacco and cotton district; it manufactures leather, and there are corundum-mines in the vicinity. It has a United States government building, seven churches, several schools, an academy for boys, a state bank and three newspapers. Population 1900, 3,141.

STATICS. See MECHANICS, Vol. XV, pp. 702-704.

STATIONS OF THE CROSS, a series of images or pictures to be seen in the majority of Roman

Catholic churches and representing scenes in the passion of Christ, or journey to the cross. There are fourteen of these stations, which are arranged around the church, the first being placed on one side of the high altar, the last on the other.

STAUNTON, a village of Macoupin County, southwest central Illinois, on the Chicago, Peoria and St. Louis and Wabash railroads, 14 miles S.S.W. of Litchfield. It is in a farming, stock-raising, and coal-mining region; has a private bank and one newspaper. Population 1890, 2,209; 1900, 2,786.

STAUNTON, a city and the capital of Augusta County, in western Virginia, on the Baltimore and Ohio and the Chesapeake and Ohio railroads, about 30 miles N. of Lynchburg. It is in a farming region, has agricultural-implement works, tannic-acid works, flouring-mills, and iron-works. Its educational institutions include a military academy, four seminaries for girls and two business colleges, and in it are the Western Lunatic Asylum, and the Virginia Institution for the Deaf, Dumb, and Blind. The city has two national and one savings bank, and two daily and six weekly newspapers. Population 1890, 6,975; 1900, 7,289.

STAUNTON RIVER, a stream of Virginia. It rises in the Alleghanies, in Montgomery County, flows eastward through Roanoke County and through a pass in the Blue Ridge. It then flows southeastward, forming the boundary line between the counties of Franklin, Pittsylvania, and Halifax on the right, and of Bedford, Campbell, and Charlotte on the left, and unites with the Dan to form the Roanoke river. Its length is about two hundred miles, and in the first twenty miles of its course it has been estimated to make a descent of one thousand feet.

STAUPITZ, JOHANN VON. See LUTHER, Vol. XV, pp. 71, 72 et seq

STEAD, WILLIAM THOMAS, a British writer and publisher; born in Embleton, England, July 5, 1849. In 1871 he entered journalism as editor of the *Northern Echo*; became assistant editor of the *Pall Mall Gazette* in 1880; in 1883 editor-in-chief, and remained in that office until 1889, when he resigned in order to found the *Review of Reviews* in 1890. He also edited *Borderland*, founded by him in 1893, a monthly devoted to the study of psychical phenomena. He took an active interest in social reforms, especially those relating to the condition of women. He wrote *The Maiden Tribute of Modern Babylon* (1885); *Truth about Russia* (1888); *If Christ Came to Chicago* (1893) which, written at the time of the Columbian Exposition, created a sensation; *The Labor War in the United States* (1894); *Her Majesty the Queen* (1897); *Satan's Invisible World* (exposing the misgovernment of New York, 1897); and *The United States of Europe* (1899).

STEAM. See STEAM-ENGINE, Vol. XXII, 483-90.

STEAM-BOILER INSURANCE. See ACCIDENT AND CASUALTY INSURANCE, in these Supplements.

STEAM-ENGINES. See STEAM-ENGINES, Vol. XXII, pp. 473-526; and MARINE ENGINES, and LOCOMOTIVES, in these Supplements.

STEAM-HAMMER. See HAMMER, Vol. XI, pp. 425-26.

STEAMSHIPS. Ten record-breaking steamships have been brought into service on the Atlantic since 1881. The competition between the passenger lines of the North Atlantic has developed the finest steamships in the world. In the year mentioned three prominent vessels appeared,—the *Servia*, of the Cunard line; the *Alaska*, of the Guion line; and the *City of Rome*, of the Inman, and later of the Anchor line. The *Servia* was distinguished as being the first Atlantic liner constructed almost wholly of steel; the *City of Rome* was noteworthy as being the largest vessel of her type built up to that time, being exceeded only by that often-quoted nautical failure, the *Great Eastern*. The *Alaska* was the fastest of the three, and held the record both ways during 1882. Her best daily distance for one day was 430 knots, made in October, 1883. Soon after, the *Aurania* made the record 440 knots, and the *America* raised it to 447. This was not materially improved until May, 1888, when the *Etruria* jumped the figures to 503. The *Paris* increased this later to 515, and the *Lucania* eclipsed all predecessors with 560 knots in a run of 24 hours. In 1884, the Guion line produced another record-breaker for the westward passage, with the *Oregon*, and the Cunard line proceeded to meet the competition by building the *Umbria* and *Etruria*, twin vessels of practically the same speed, which began by chopping nearly six hours from the record in crossing the Atlantic, and kept on breaking it for five years, when the time was cut very close to six days. Then the Inman line came to the front with the *City of Paris*, later rechristened the *Paris*, and in 1889 broke the records, crossing both ways, the best time of that year being a little over 5 days and 19 hours. In 1891 the *Teutonic*, of the White Star line, cut the records both ways, but the *Paris* regained her supremacy in 1892 by clipping the westward passage to 5 days, 14 hours and 24 minutes. In 1893 the Cunard line placed the *Campania* and *Lucania* in service, and these twin ships began cutting the record with a regularity that culminated, in 1895, at 5 days, 7 hours and 23 minutes.

The highest records made in crossing the Atlantic each year from 1882 to 1896 follow.

YEAR.	TIME.			STEAMSHIP.	LINE.	DIRECTION.
	Days.	Hours.	Minutes.			
1882	7	6	43	Alaska ----	Guion ----	Westward.
1882	6	22	0	Alaska ----	Guion ----	Eastward.
1884	6	9	42	Oregon ----	Guion ----	Westward.
1884	6	14	8	America ----	National ----	Eastward.
1884	6	11	9	Oregon ----	Guion ----	Eastward.
1885	6	5	31	Etruria ----	Cunard ----	Westward.
1887	6	4	42	Umbria ----	Cunard ----	Westward.
1887	6	4	36	Etruria ----	Cunard ----	Eastward.
1888	6	1	55	Etruria ----	Cunard ----	Westward.
1889	5	19	18	Paris ----	Inman ----	Westward.
1889	5	22	50	Paris ----	Inman ----	Eastward.
1891	5	16	31	Teutonic ----	White Star--	Westward.
1891	5	21	3	Teutonic ----	White Star--	Eastward.
1892	5	14	24	Paris ----	Inman ----	Westward.
1893	5	12	7	Campania --	Cunard ----	Eastward.
1894	5	9	6	Campania --	Cunard ----	Westward.
1894	5	8	38	Lucania ----	Cunard ----	Eastward.
1894	5	7	23	Lucania ----	Cunard ----	Westward.

A description of the chief points of the *Campania* and *Lucania* follows: They were built as nearly alike as possible, the length over all being 622 feet, beam $65\frac{1}{4}$ feet and depth from shade-deck $59\frac{1}{2}$ feet. The engines indicate a little more than 30,000 horse-power, and are 47 feet high. Each set of engines has five cylinders, arranged for triple expansion of the steam. The high-pressure cylinders are 37 inches in diameter, and the low-pressure 98 inches, the stroke of all the cylinders being 69 inches. All are connected with the one crank-shaft, which is made in three interchangeable parts. The whole crank-shaft, with the thrust-shaft, weighs 110 tons. There are 14 boilers, which are supplied with heat from 102 furnaces. The main boilers work at 165 pounds' pressure, and they are the largest ever built for that pressure. Each of them contains a mile and a quarter of tubing, and some of the plates are 20 by 7 feet $1\frac{1}{2}$ inches. The boilers occupy two large water-tight compartments, separated by a large fuel compartment. There are two funnels, each 20 by 13 feet diameter, the form being oval, to reduce wind-pressure. They rise to a height of 130 feet above the keel. A $4\frac{1}{2}$ -foot plate forms the central-line girder of the vessel, and its width is increased to $7\frac{1}{2}$ feet under the machinery. Five lines of girders, with their intercostals, form the flooring of the ship. There are two bottoms, as in all first-class steamships, each being water-tight, and affording space between for water-ballast, which may be pumped in to the amount of 1,600 tons, to preserve the stability lost by coal-consumption. There are 18 transverse water-tight bulkheads, no two being more than 65 feet apart, thus forming 19 water-tight compartments. The twin propellers have each three eight-ton blades of manganese bronze. Great care has been taken to provide appliances which will make it impossible for these enormous blades to race—that is, run at a dangerously high speed when out of water. In addition to governors on the shafts and engines, there is an emergency governor-gear provided for stopping the engines automatically should an abnormal rate of speed be developed. There are seven levels, or decks, and the upper one affords a promenade a quarter of a mile in length. The electric lights number 1,350, being supplied by four engines and dynamos, any one of which will run all the lights. Fifty miles of wire are used in this service. Other figures might be given as to material used which would seem equally enormous.

Another pair of twin steamships, the *St. Louis* and *St. Paul*, appeared on the American line in 1895. While they are smaller and less speedy than the two just described, yet they are the equals of any of the previous liners, and possess many minor improvements, made possible by being built at a later date. These two, with the *New York* and *Paris*, are subsidized by the United States government for use, in case of war, as merchant cruisers. The *St. Louis* and *St. Paul* are 554 feet over all, being ten feet longer than the *Paris* and *New York*, and 68 feet less than the *Campania* and *Lucania*. The engines develop 19,000 horse-power, and are built for quadruple expansion. Steam is used at the very high pressure of 200 pounds. There are six cylinders for each engine,

and the arrangement is such that a single piston serves the two high-pressure cylinders and another the two low-pressure cylinders. The steam enters the two high-pressure cylinders simultaneously, and after partial expansion, passes to the first intermediate and second intermediate cylinders, after which it is again divided and goes simultaneously to the two large low-pressure cylinders. In June, 1896, the *St. Paul* crossed from Southampton to Sandy Hook in 6 days, 5 hours and 32 minutes.

Of recent years, the Hamburg-American and the North German Lloyd lines have shown great enterprise in building fast steamers for the better class Atlantic passenger trade. Of the former line, the *Deutschland* is a splendid example of the new fleet, and in the summer of 1900 she broke the record. Of the latter line, the *Kaiser Wilhelm der Grosse* is the most notable success and a formidable competitor for the trade of the old established lines.

Steamships for interior waterways have never kept pace with the ocean liners in speed or equipment, although the boats plying on Long Island Sound and the Hudson River are both speedy and costly. The best of them can all do better than twenty knots an hour, and the fittings and furnishings of the Fall River line of boats have earned for them a world-wide fame. See also SHIP-BUILDING, Vol. XXI, pp. 823-825.

C. H. COCHRANE.

STEAM SHOVELS AND DREDGES. Within a half-dozen years there has been a marked advance in machinery for digging and dredging. The crane type of steam-shovel familiarly observed in railroad cuttings has been materially improved. For extremely heavy work the Bucyrus Steam Shovel and Dredge Company has built an interesting machine, the boom of which is of heavy steel girders, and carries independent thrusting-engines, for giving great scooping-power to the shovel. These engines exert an outward pressure of sixty thousand pounds on the shovel when digging, which is sufficient to dislodge large boulders, and to do efficient work in glacial drift, hard-pan, clay, etc. The hoisting and other operations are performed by a different engine. Seven of these machines are in use on the Chicago drainage-canal, doing a class of work that previously was usually accomplished by blasting. They are also coming into use for excavating iron ore from its natural bed without blasting.

Dredges for river-work, which have to be used in soft mud and sand, are built on the suction principle, to pump up the accumulations which impede navigation. Revolving cutters are usually mounted at the mouth of the suction-pipe to break up any material which otherwise might choke up the passageway. For heavier work, as digging canals in swampy ground, a long steel truss-frame is used, bearing a line of continuous conveyors for carrying up the material. Such machines have been found very useful in filling railroad trestles. The dipper type of dredge is used for removing hard material from river bottoms, also for drainage-ditches and irrigating-canals in soft soil. For canal-excavation, special machines have been made, which will do the entire

work at one operation, exclusive of any blasting required. A series of very stout shovels or buckets is mounted on an endless chain arrangement run on a girder frame. The whole is managed by hoisting devices, so that the buckets work along in a regular manner, carrying up the material and depositing it in conveyors, which drop it high up on the banks on either side. All the machinery is mounted on a truss-bridge bearing a railroad track, upon which it is run back and forth until the required depth within its reach is completed, when the bridge is moved forward, and the work proceeds. By mounting the bridge on tracks running parallel on the sides of the canal, the shifts are carried along with very little labor or loss of time. Machines with belt-conveyors for dredging river bottoms and delivering the material on shore are built in numerous patterns. Some have a conveyor which swings radially one hundred and twenty feet, for delivering the material well up on the bank. Others deliver to the shore or to a scow by gravity, through an extensible sheet-iron trough of large dimensions. Where the material is quite soft, a discharge-pipe is sometimes used, into the upper end of which the material is dropped by the digging-buckets of the conveyor, so that it may run out through the pipe by gravity.

C. H. COCHRANE.

STEARIC ACID. See STEARINE, Vol. XXII, p. 527.

STEARNS, WILLIAM AUGUSTUS, an American educator and clergyman; born in Bedford, Massachusetts, March 17, 1805. After graduation at Harvard in 1827, he studied at Andover Theological Seminary, and in 1831 was ordained a minister of the Congregational Church. He was pastor at Cambridgeport, Massachusetts, until 1854, when he became president of Amherst College, an office he retained until his death. He was the author of a number of volumes of sermons and of *Infant Church Membership* (1844); and *Life of Rev. Samuel H. Stearns* (1846). He died in Amherst, Massachusetts, June 8, 1876.

STEATITE OR SOAPSTONE. See MINERALOGY, Vol. XVI, p. 414.

STEBBINS, EMMA, an American sculptress; born in New York City, Sept. 1, 1815. In the first part of her career she worked in oil-painting and water-colors. She turned to sculpture in 1857, and that year studied in Rome. Among her better known works are a fountain, *The Angel of the Waters* (1862); *Horace Mann*, a statue (1860); and a bust of John W. Stebbins. As the intimate friend of Charlotte Cushman, she published, in 1878, *Memoirs of Charlotte Cushman*. She died in New York City, Oct. 25, 1882.

STEDMAN, EDMUND CLARENCE, an American poet; born in Hartford, Connecticut, Oct. 8, 1833. He studied at Yale, but did not finish the course. The degree of A.M. was conferred on him in 1871. He entered journalism in 1852, as editor of the *Norwich Tribune* and later of the *Winsted Herald*. After two years, he went to New York City, and there attempted to earn a living by contributing to periodicals. He was forced to return to journalism

as a writer for the *New York Tribune*. During the Civil War he served as field-correspondent for the *New York World*. He engaged in banking in New York City in 1864. His largest work is *A Library of American Literature* (11 vols., 1883-90), edited with Ellen M. Hutchinson. He published *The Nature and Elements of Poetry* (1892). Among his volumes of poems are *Hawthorne, and Other Poems* (1877); *Lyrics and Idyls* (1879); *Poetical Works* (1884).



E. C. STEDMAN.

His *Poets of America* appeared in 1885, and in 1887 he published the thirteenth edition of *Victorian Poets*, since revised and extended by a supplementary chapter, added in 1891. By these and other works Mr. Stedman has earned a high place for himself in American literature as an accomplished writer of verse and discerning critic. His literary judgments show catholicity of taste and trained skill in the art of criticism. As a complimentary work to his literary exposition of the *Victorian Poets*, he published in 1896 an excellent *Victorian Anthology*, and in 1900 an *American Anthology*.

STEEL. See IRON, Vol. XIII, pp. 332-358.

STEEL-CONSTRUCTION IN BUILDING. See IRON AND STEEL, in these Supplements.

STEELTON, a borough of Dauphin County, southeastern central Pennsylvania, three miles E. of Harrisburg, on the Susquehanna River and the Pennsylvania canal, and on the Pennsylvania and the Philadelphia and Reading railroads. It is connected with Harrisburg by electric railway, and is engaged in the manufacture of Bessemer steel, containing the immense plant of the Pennsylvania Steel Company. Population 1900, 12,086.

STEEVENS, GEORGE WARRINGTON, journalist, war-correspondent, and author, was born Dec. 10, 1869, and educated at the City of London School and at Balliol College, Oxford. Taking early to journalism, for which he had a natural instinct and marked gifts as a writer, he for a time was on the staff of the *Pall Mall Gazette*. In 1896 he passed to the staff of the *London Daily Mail*, for which newspaper he visited on journalistic missions the United States, Germany, Egypt, and France, and served as correspondent during the Turco-Grecian war. He was also with the Soudan expedition in 1898, and in 1899-1900 acted as correspondent in the war in the Transvaal. In Jan. (?9th), 1900, he died of fever in Ladysmith, Natal. His published works embrace *Naval Policy and Monologues of the Dead* (1896), *The Land of the Dollar*, and *With the Conquering Turk* (1897), *Egypt in 1898*, *With Kitchener to Khartum*, *In India in 1899*, and *The Tragedy of Dreyfus* (1899). Since the death of Mr. Steevens, a volume of the thoughtful papers of this "alert and intrepid observer" have appeared, edited by two friends. The volume is entitled *Things Seen: Impressions of Men, Cities, and Books*.

STEINITZ, WILLIAM, a Bohemian chess-player;

born in Prague, Bohemia, May 14, 1836. He early gave evidence of his ability as a chess-player, and became so proficient that in 1866 he won the title of champion of the world. He won in every single-handed match, and gained either first or second place in every tournament from 1862 until 1894 when he was defeated by Emanuel Lasker, and thus lost the championship. He settled in the United States in 1883, and established there the *International Chess Magazine*. He died in New York, Aug. 13, 1900.

STEINWAY, WILLIAM, an American manufacturer, was born in Seesen, 24 miles S. of Wolfenbüttel, March 5, 1836. His father, HENRY ENGELHARD (1797-1871), was a manufacturer of musical instruments there, but, wearied with the tyrannies of the trade guilds, removed his family in 1850 to New York. The elder Steinway, with his sons, worked for a time as journeymen in piano-manufacturing establishments, until in 1853 he founded the house of Steinway and Sons. In their pianos they made constant improvements, in the action, the resonance, and the frame, until they were recognized as the most durable and pure-toned of instruments. The house grew wealthy and established famed concert-halls in London and New York. William rose, after his father's death, to be the head of the house. He was one of the committee to break up the Tweed Ring in 1871; a member of the Democratic national convention of 1888; a Presidential elector in 1892, and president of the New York Rapid Transit Commission. He died Nov. 30, 1896, in New York.

STELLARTON, formerly ALBION MINES, a town of Pictou County, northeastern central Nova Scotia, 39 miles N.E. of Truro and 3 miles S.W. of New Glasgow, on the Intercolonial railroad. It is the center of a region producing coal, iron and some petroleum, and its chief interests are in the mining industry. Its manufactures are unimportant. Population 1891, 2,410.

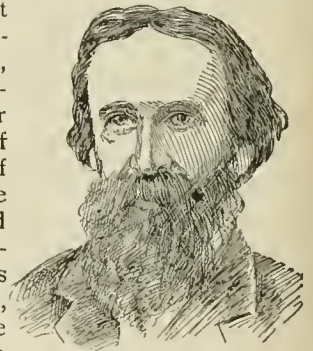
STENOGRAPHY. See SHORT-HAND, Vol. XXI, pp. 836, 842.

STENTOR, a genus of ciliated unicellular animals (*Protozoa*). They are conical in form, hence the common name of trumpet-animalcule. They attach to foreign objects by the apex of the cone, while around the end corresponding to the base of the cone are circles of cilia and a circular groove leading into a funnel-shaped mouth. Many species are known; the large blue-stentor (*S. caeruleus*) is common in the United States.

STEPHEN, SIR JAMES FITZJAMES, an English jurist; born in London, March 3, 1829; educated at Trinity College, Cambridge, and called to the bar in 1854. His persistent studies and wide researches caused him to become distinguished as a consultative jurist, and an opportunity was afforded him of displaying his legal attainments in the defense of the Rev. Roland Williams on his trial for heresy, and in the prosecution of Governor Eyre of Jamaica. A most industrious student, he published, in 1863, *A General View of the Criminal Law*, and later issued a collection of his numerous magazine articles under the title *Essays by a Barrister*. In 1869 he was appointed the successor of Sir Henry Maine (q.v., in these Supplements), as legal member of the

council of the Governor-General of India. In this vast empire he labored incessantly for three years at the work of codifying the entire mass of penal laws, and produced an Indian penal code, the merits of which were transcendent. He also drafted and procured the passage of the Indian Evidence Act, and labored incessantly in the cause of reform. Returning to England in 1872, he was appointed professor of common law at the Inns of Court (1875), was nominated K.C.S.I. (1877), and (1879) appointed a judge of the High Court of Justice. Meanwhile he had worked diligently on codifying the English laws of evidence, under the direction of Lord Coleridge (q.v., in these Supplements), the then Attorney-General, and had made a masterly attempt to reduce the multifarious English criminal laws to the simplicity of a code. His books include *Liberty, Equality, Fraternity; A Reply to John Stuart Mill's Liberty* (1873); *The Supreme Court of Judicature Acts* (1875); *A Digest of the Law of Evidence* (1876); *A Digest of the Criminal Law* (1870); a masterly and erudite *History of the Criminal Law of England* (3 vols., 1883); *Letters on the Liberty Bill* (1863); *A Story of Nuncomar; and the Impeachment of Sir Elijah Impey* (1885). As a criminal judge he was noted for the severity of his sentences, at times attempting to put in practice his rhadamanthine views in dealing with habitual criminals. He presided as the trial judge at the trial of Mrs. Maybrick for the alleged murder of her husband by poisoning, and shortly afterward began to exhibit signs of failing mentality. He retired from the bench in response to popular opinion, and died in London, March 12, 1894.

STEPHEN, LESLIE, an English littérateur and critic, was born at Kensington, London, Nov. 28, 1832, and was educated at Eton, King's College, London, and Trinity College, Cambridge, where he graduated in 1854, and was for a time tutor and fellow of his college. The son of Sir James Stephen (see Vol. XXII, p. 534), and brother of the distinguished jurist, Sir James Fitzjames Stephen (q.v., in these Supplements), he shared their abilities. On leaving Cambridge, he devoted himself to literary pursuits, and was for twelve years editor of the *Cornhill Magazine*, which was founded by his father-in-law, Thackeray, the novelist. In 1882 he resigned this post to undertake the important editorship of the *Dictionary of National Biography*, which, after issuing 26 volumes, he was obliged to relinquish to his successor, Mr. Sidney Lee. In 1883 he became lecturer in English literature at Cambridge, but resigned the post within a year, to devote himself exclusively to literary work. His writings include a work undertaken while president of the Alpine Club, entitled *The Playground of Europe* (1871); three volumes of delightful literary criticism, entitled *Hours in a Library* (1874-79); and



LESLIE STEPHEN.

three monographs in the English Men of Letters Series on *Johnson* (1878), *Pope* (1880), and *Swift* (1882). He also wrote *Essays on Freethinking and Plain Speaking* (1873); a *History of English Thought in the Eighteenth Century* (1876); *The Science of Ethics* (1882); *Life of Henry Fawcett*, the political economist (1885); and *Studies of a Biographer* (2 vols., 1898). He also edited, with a biographical survey, *Fielding's Works* (10 vols., 1882). To the literature of ethical and religious thought Leslie Stephen made important, if perhaps too materialistic, contributions. His ethical creed is somewhat pessimistic, at least as shown in *The Science of Ethics*, where he admits that "progress cannot be assumed to be indefinite; that science rather points to a time when the social organism will fall into old age and decay, and to the ultimate extinction of life upon the planet." But as a scientific moral analyst and candid searcher after truth he well repays close attention.

STEPHEN BÁTHORI. See POLAND, Vol. XIX, p. 293.

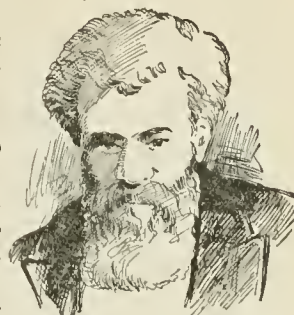
STEPHENS, ANN SOPHIA, an American authoress; born in Derby, Connecticut, in 1813. In 1831 she married Edward Stephens, and with him went to Portland, Maine. From 1835 to 1837 she published and edited the *Portland Magazine*; in 1837 went to New York City and there contributed to *Peterson's Magazine* and other periodicals. She established the *Illustrated New Monthly* and *The Ladies' World*. Among her writings at that time was *The Polish Boy*, a poem, a favorite of declaimers. Her first novel was published in 1854, *Fashion and Famine*. Among her short stories are *Mary Derwent* and *A Story of Western Life*; and among her novels, *The Old Homestead* (1855); *Bellehood and Bondage* (1873); and *Phemie's Experience* (1874). She died in Newport, Rhode Island, Aug. 20, 1886.

STEPHENS, GEORGE, a British archæologist; born in Liverpool, England, Dec. 13, 1813. He studied in University College, London, and early settled in Stockholm, Sweden. He made a study of Norwegian antiquities, and in 1851 was appointed professor of English in the University of Copenhagen, where he was enabled to continue his studies. This position he held until 1893. He was the author of several archæological reports, of which the best known is *Old Northern Runic Monuments of Scandinavia and England* (1866-84).

STEPHENVILLE, a town and the capital of Erath County, northern central Texas, 200 miles N.W. of Austin, about 95 miles S.W. of Dallas, near the Bosque River, on the Fort Worth and Rio Grande railroad. It is the trade and shipping center for an extensive grain and stock raising section. Population 1900, 1,902.

STEPNIAK, SERGIUS MICHAEL DRAGOMANOFF, said to be a *nom-de-guerre* of Sergius Kartscheffsky, a Russian revolutionist and exile; born at Hajatsch, in the Ukraine, in 1841, of a Cossack family belonging to the lesser nobility. In 1859-63 he was a student at Kiev, where he became politically offensive to the government for his publications in advocacy of greater liberty. He became an instructor

of history in the University of Kiev in 1865, but was removed from his chair in 1873. In 1876 he gave offense to the minister of justice and fled to Geneva; but in 1885 took refuge in London, where he was killed through falling under a moving railroad train, Dec. 23, 1895. Besides contributions to reviews and newspapers, he was associated with an edition of the folk-songs of the Little Russians; and he published *The Turks, Within and Without; Underground Russia* (a study of Nihilism; 1883); *Russia Under the Czars* (1885); *The Career of a Nihilist* (a novel, 1889); *King Stork and King Log; A Study of Modern Russia* (2 vols., 1896); and other works on historical and ethnological subjects.



SERGIUS M. D. STEPNIK.

STERCULIACEÆ, a family of plants, mostly tropical, and closely related to the mallows. The best-known genus is *Theobroma*, the cocoa tree, whose seeds are used for chocolate, under the name cocoa-beans, and yield cocoa-butter and oil of theobroma.

STEREOCHEMISTRY, that branch of chemistry which treats of the arrangement of the atoms in space and the geometrical forms which groups of atoms may assume. It was founded by Le Bel and Vanit Hoff in 1874. The former was led to consider the subject by Pasteur's assumption, in 1860, that the molecules of substances optically active in solution are asymmetric, and the latter by Wislizenus's statement, in 1873, that there are two lactic acids with the same structural formula, and that their difference must be due to a different arrangement of the atoms in space.

If the carbon atom is assumed to be at the center of a tetrahedron, and the four solid angles occupied by four different radicles, two space-isomers, one bearing to the other the relation of an object to its image in a mirror (enantiomorphous forms), will exist, one turning the plane of polarized light to the right, the other to the left. Such a carbon atom is called an asymmetric carbon atom, and it has been found that all optically active substances contain at least one asymmetric atom, not necessarily carbon, as one case is known where the activity is due to asymmetric nitrogen. As the number of asymmetric atoms may exceed one, the number of space-isomers may be greater than two. The best example of this is afforded by the sugars. The same conception enables us to explain other cases of isomerism, where the difference is not in the action on polarized light, such as maleic and fumaric acids. As in these two carbon atoms are doubly bound, two tetrahedra are supposed to have an edge in common, and the possibility of space-isomerism becomes apparent. An extension of the principles of carbon stereochemistry in a modified form to the nitrogen atom has been of great service. The stereochemistry of inorganic compounds has lately been developed by Werner, and, though still in its

infancy, already shows the great amount of valuable work that may be done in this field.

STEREOCHROMY. See *SILICA*, Vol. XXII, p. 54.

STEREOM. the tissues of a plant which serve for mechanical support.

STEREOTYPING AND ELECTROTYPING. See *TYPOGRAPHY*, Vol. XXIII, pp. 702, 703.

STERILITY. See *MEDICAL JURISDICTION*, Vol. XV, p. 778; and *HYBRIDISM*, Vol. XII, pp. 422-426.

STERILIZATION OF BACTERIA, the process of removing or destroying bacteria and other germs, in order to prevent multiplication. It is usually accomplished by heat or chemicals. A sterilized vessel or instrument is one that has been treated to remove or destroy any adhering germs that might thrive in the substance the vessel or instrument is to come in contact with. A sterilized liquid is one freed from living germs. See also *SURGERY, AMERICAN*, in these Supplements.

STERLET. See *STURGEON*, Vol. XXII, pp. 611, 612.

STERLING, a city of Whiteside County, northern Illinois, beautifully situated on Rock River, about 30 miles E. of Clinton, Iowa, and 110 miles W. of Chicago, on the Chicago, Burlington and Quincy and the Chicago and North-Western railroads. It has an abundant water-power, and is an important manufacturing center, the industries including foundries and machine-shops, manufactures of undertakers' supplies, school furniture, gas-engines and paper. The city has churches, schools, a hospital, two national banks with combined capital of \$175,000, two daily and four weekly newspapers. Population 1890, 5,824; 1900, 6,309.

STERLING, a city and the capital of Rice County, central Kansas, 18 miles N.W. of Hutchinson, on the Arkansas River, and on the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads. It is surrounded by a farming and stock-raising section, and has flour-mills, wagon-shops, a sugar and syrup factory and salt-works. Population 1890, 1,641; 1900, 2,002.

STERLING, ANTOINETTE. See *McKINLAY, Mrs. JOHN*, in these Supplements.

STERNBERG, GEORGE MILLER, an American surgeon and bacteriologist; born in Hartwick, New York, June 8, 1838. In 1861, after his graduation at the New York College of Physicians and Surgeons, he received the appointment of assistant surgeon in the Union army. He served throughout the Civil War, and after its close continued in the service. In 1875 he was promoted surgeon, in 1891 deputy surgeon-general, and in 1893 surgeon-general with the rank of brigadier-general. He represented the United States at a number of sanitary conventions and special commissions; made a special study of bacteriology, and published *Bacteria* (1884); *Malaria and Malarial Diseases* (1884); and *A Manual of Bacteriology* (1892).

STERNE, SIMON, an American lawyer and writer; born in Philadelphia, Pennsylvania, June 23, 1839. In 1860 he graduated at the University of Pennsylvania Law School and settled in New York City. He took an active interest in municipal re-

form; was a member of the committee of seventy in 1870; on the state commission for investigating the government of cities in 1876; and in 1885 United States commissioner to Europe to investigate the regulation of railroads there. He was a constant contributor to economical magazines and the author of *Our Representative Government*, and *Personal Representation* (1871); *Suffrage in Cities* (1878); *Hindrances to Prosperity* (1879); and *Constitutional History and Political Development of the United States* (1882). He also contributed articles on *Railways*, *Legislation*, etc., to Lalor's *Cyclopædia of Political Science and United States History*.

STERNHOLD, THOMAS. See *HYMNS*, Vol. XII, p. 589.

STERNUM OR BREAST-BONE. See *ANATOMY*, Vol. I, p. 822.

STERRETT, JOHN ROBERT SITLINGTON, an American Greek scholar; born in Rockbridge Baths, Virginia, March 4, 1851. He graduated at the University of Virginia, and afterward studied in Germany, at Berlin, Leipsic, Munich, and at Athens, Greece. He took part in several archæological expeditions in Palestine and Syria; returned to the United States, and was, in 1886-88, professor of Greek in Miami University; in 1888-92 in the University of Texas; and after 1892 at Amherst College. He published, in addition to contributions to philological journals, *Preliminary Report of an Archæological Journey in Asia Minor in 1884* (1885); *The Wolfe Expedition to Asia Minor* (1888); and *An Epigraphical Journey in Asia Minor* (1888).

STETHOSCOPE. See *AUSCULTATION*, Vol. III, p. 100.

STEBEN, FRIEDRICH WILLIAM AUGUST HEINRICH FERDINAND, BARON VON, a Prussian general; born in Magdeburg, Prussia, Nov. 15, 1730. He entered the Prussian service in 1747; served throughout the Seven Years' War; in 1754 was promoted adjutant-general, and in 1762 aid to Frederick the Great. He retired from military life in 1764 and was appointed to offices which yielded him a handsome income. In 1777 he decided to give up these honors and cast his fortunes with the American colonists. He received a commission as major-general, and was appointed inspector-general of the American army. He reorganized and disciplined the forces in such a manner as to call forth the thanks of Congress. He saw active service in New Jersey and the Carolinas; checked Arnold's invasion of Connecticut, and was present at Cornwallis's surrender at Yorktown. In return for his services, Congress granted him land in New York, Virginia and Pennsylvania, and tardily a pension of two thousand five hundred dollars. He remained in America, settled upon his land in New York and died there, at Steubenville, Nov. 28, 1794.

STEBENVILLE, a city and the capital of Jefferson County, Ohio, on the Pennsylvania, the Pittsburg, Cincinnati, Chicago and St. Louis and the Wheeling and Lake Erie railroads. The city has numerous churches, public and parochial schools, Steubenville Female Seminary, public libraries, national and private banks, daily and weekly newspapers. The assessed property valuation in 1893 was

over five million five hundred thousand dollars. The principal streets of the city are paved, and there are good sewerage and water systems. The principal industries are blast-furnaces, rolling-mills, machine and railway shops, and manufactories of white lead, paper, glass, woolens, etc. There are bituminous coal-mines near by, and natural gas is plentiful. Population 1890, 13,394; 1900, 14,349.

STEVENS, an American family of mechanical engineers. JOHN, the father, was born in New York City about 1748. He was graduated from Columbia College in 1768; was treasurer of New Jersey in 1776-79, and was active in aiding the Revolution. After peace was declared he retired to private life and devoted himself to invention. He secured the passage, by Congress, of a patent law in 1790, and became interested in steam-navigation. To him was offered the monopoly of Hudson River navigation, afterward secured by Fulton and Livingston. He did not take advantage of the opportunity, but in 1804 built a screw-propeller, and thereby first applied steam to screw-propulsion. He built the *Phoenix*, a side-wheeler, with which he navigated the Delaware, and in 1811 began a system of steam-ferries between New York and Hoboken. In 1812 he proposed the building of a passenger and freight railroad to connect the Great Lakes with the sea-coast. The practicability of the scheme was denied at the time. He obtained charters for the construction of railroads between New York and Philadelphia, and Philadelphia and Lancaster, in 1823; these were the first railroad charters granted in America. He did not take advantage of these privileges, but to demonstrate the feasibility of the plan, built a circular road near Hoboken, on which he placed the first locomotive run in America. He died in Hoboken, New Jersey, March 6, 1838.—

ROBERT LIVINGSTON, son of the preceding, born in Hoboken, New Jersey, Oct. 18, 1787. Like his father, a mechanical genius, he early became associated with him. He went with the steamer *Phoenix* by sea to Philadelphia, said to have been the first sea-voyage of a steam-propelled vessel. He improved the engines used in vessels so that the speed attainable reached 15 miles an hour instead of 7, the speed of Fulton's vessels. He remodeled and perfected the working-beam engine so that there has been but little change in the construction since his time. He introduced the T-rail for railroad purposes, and in the last years of his life successfully experimented with percussion shells and armored vessels. His process of constructing shells was purchased by the government, and he was awarded a contract for the construction of an iron-clad. This vessel, however, he did not complete, owing to the rapid changes in iron-construction and in the manufacture of cannon. He died in Hoboken, April 20, 1856.—His brother EDWIN AUGUSTUS, born in Hoboken, New Jersey, July 28, 1795; engaged in railroad-construction; built, with his brother Robert, the Camden and Amboy railroad, and himself invented many devices and improvements, among them the air-tight fireroom for forced draft in vessels. He invented a monitor, the *Naugatuck*, which engaged in the first day's fight with the

Virginia. He planned a vessel which the government refused to accept, and which he bequeathed to the state of New Jersey, with \$1,000,000 to aid in its completion. The act for which he is remembered is the founding of the Stevens Institute of Technology (q.v., in these Supplements). He died in Paris, France, Aug. 8, 1868.

STEVENS, ABEL, an American author and Methodist Episcopal clergyman; born in Philadelphia, Pennsylvania, Jan. 19, 1815. He entered the ministry of the Methodist Church in 1834, and served in Boston for three years, after which he went to Europe for a year. Upon his return, and until 1854, he was engaged in journalistic work in Boston and New York. In 1856 he became the editor of the New York *Christian Advocate and Journal*. After 1860, he divided his time between pastoral and editorial work. He wrote *History of the Methodist Episcopal Church in the United States* (1864-67); *Madame de Staël, a Study of Her Life and Times* (1881); *Character Sketches* (1882); and other works. Died in San José, Cal., Sept. 12, 1897.

STEVENS, ALFRED, a Belgian artist; born in Brussels, May 11, 1828. He studied under Navez in Belgium, and Roqueplan at Paris. He became famous for his genre-painting. Among his works are *The Visit; A Morning in the Country; The Japanese Woman; and Springtime of Life*. He was an officer of the Legion of Honor, and divided his work between Belgium and France, but maintaining his studio in Paris.

STEVENS, ALFRED GEORGE, a British sculptor; born in Blandford, Dorsetshire, England, about 1817. His father was a house-decorator, and while helping his father his talent attracted the attention of certain gentlemen, who, in 1833, sent him to Italy. There he remained for nine years, part of the time assisting Thorwaldsen, the sculptor. During this period he devoted the most of his time to painting. In 1845-48 he was teacher of architectural drawing in the School of Design, London. He devoted the remainder of his life to decorative-modeling. The one work for which alone he will be remembered is his Wellington Monument, in St. Paul's Cathedral, London. He died in London, May 1, 1875.

STEVENS, BENJAMIN FRANKLIN, an American bibliographer; born in Barnet, Vermont, Feb. 19, 1833. In 1860 he became a partner of his brother Henry (q.v.) in book publishing and selling in London. He was made the European agent for many American libraries, and for a time was United States dispatch agent. He published a reprint of the Yorktown campaign papers in the Clinton-Cornwallis affair, under the title *The Campaign in Virginia* (1888), and in 1889 began work on the reproduction of papers in Europe relating to the early history of America, under the title *Facsimiles of Manuscripts Relating to America from 1763 to 1783 in the Archives of England, France, Holland, and Spain*. This work, when completed, will consist of 25 volumes.

STEVENS, HENRY, an American bibliographer, brother of the preceding; born in Barnet, Vermont, Aug. 24, 1819. He was graduated from Yale in

1843. He went to London in 1845 to examine the archives in a search for historical data relative to America. He settled there and became the official agent for the British Museum in the importation of American books. He also was made the purchasing agent for several American libraries, and to his zeal as a book-collector Lenox Library owes some of its rarest volumes. He was an active editor and publisher. Among his publications are *Catalogue of American Books in the British Museum* (1857); *Historical and Geographical Notes on the Earliest Discoveries in America* (1869); *Bibles in the Caxton Exhibition* (1878); and *Recollections of James Lenox* (1886). He died in South Hampstead, England, Feb. 28, 1886.

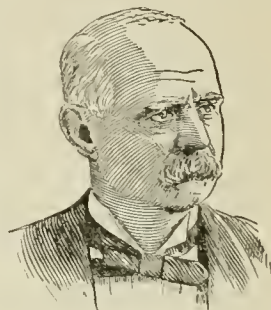
STEVENS, ISAAC INGALLS, an American soldier; born in Andover, Massachusetts, March 28, 1818. He was graduated from West Point in 1839, and took an active part in the Mexican War, attaining the rank of major. He remained in the service until 1853, being stationed the greater part of the time in Washington, District of Columbia, in the Coast Survey Bureau. In 1853 he received the appointment of governor of Washington territory. During his term of office he conducted a Pacific railroad survey from St. Paul to Puget Sound, made treaties with the Blackfeet and other Indians, and suppressed by severe measures an Indian revolt. He resigned in 1857 to become Congressional delegate. He was chairman of the Breckinridge campaign committee in 1860. He again entered the army of the United States, as colonel, at the beginning of the Civil War; was made a brigadier-general in 1861 and a major-general in 1862. He saw service in the Carolinas, and under Pope in Virginia. He was killed while leading a charge at the battle of Chantilly, Sept. 1, 1862. He was the author of *Campaigns of the Rio Grande and Mexico* (1851) and *Report of Explorations for a Route for the Pacific Railroad* (1860).

STEVENS, JOHN LEAVITT, an American journalist and diplomat; born in Mount Vernon, Maine, Aug. 1, 1820. He became a minister of the Universalist church in 1844, and remained in the ministry until 1854, when sickness compelled him to give up preaching. He entered journalism as an associate of James G. Blaine on the *Kennebec Journal*. There he remained, in the latter portion of the period as editor-in-chief, until 1870, when he received the appointment of United States minister to Paraguay and Uruguay, where he remained until 1873. In 1877 he was sent as Minister to Sweden, where he stayed until 1883. In 1889 he received the appointment as United States minister to Hawaii. After the revolution in 1893 at Honolulu, and the resultant provisional government, he proclaimed a United States protectorate over the islands. This act led to diplomatic controversies, in which Minister Stevens's protectorate was denied by the United States government, and which led to his recall in May, 1893. He died in Augusta, Maine, Feb. 8, 1895.

STEVENS INSTITUTE OF TECHNOLOGY, an educational institution for men, founded in 1870 by the trustees of the will of Edwin A. Stevens, who, on his death, bequeathed it, in addition to land in

Hoboken, \$650,000. The school is devoted to mechanical-engineering and its allied studies. Practical instruction is given in all kinds of machine and electrical work. There were, in 1893, 250 students, and 18 in the faculty.

STEVENSON, ADLAI EWING, an American statesman; born in Christian County, Kentucky, Oct. 23, 1835. In 1852 the family removed to Bloomington, Illinois. Admitted to the bar in 1858, Mr. Stevenson was a master in chancery of Woodford County, and state's attorney from 1864 to 1868. He formed a law partnership with James S. Ewing at Bloomington in 1868. He was a presidential elector in 1864. In 1878 he was



ADLAI E. STEVENSON.

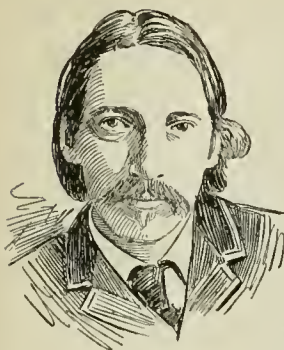
elected to Congress as a Democrat, carrying every county in the district. He was a delegate to the Democratic national convention of 1884, and by Cleveland was appointed First Assistant Postmaster-General. In 1892 he was elected Vice-President of the United States, and in 1897 appointed commissioner on international bimetalism. In the summer of 1900 Mr. Stevenson was nominated at the Kansas City convention as Democratic candidate for Vice-President, and on August 8th at Indianapolis he accepted the nomination. He continues to be a bimetalist, as well as an anti-expansionist. Imperialism, he takes to mean, the establishment by the American Republic of the colonial methods of European monarchies. As he has said of it: "It means the right to hold alien people as subjects and enthrones force as the controlling agency in government." Anti-imperialism and the Democratic platform were, however, defeated at the November elections.

STEVENSON, MRS. CHARLES A., better known as KATE CLAXTON, an American actress; born in New York City in 1848; the daughter of Colonel Spencer W. Cone. She was married first to Isidor Lyon, from whom she was divorced, and afterward married Charles A. Stevenson, an actor. Her first appearance was in Chicago; but she attracted no large amount of attention until her appearance in New York City in 1873 as Mathilde in *Led Astray*, and in *The Two Orphans*, etc. The part with which her name is identified is Louise in the last-named play.

STEVENSON, DAVID WATSON, a British sculptor; born in Rotha, Scotland, in 1842.

STEVENSON, ROBERT LOUIS BALFOUR, a Scottish novelist and writer; born Nov. 30, 1850, in Edinburgh. He belonged to the family of famous lighthouse-engineers (see Vol. XXII, p. 545), and his father, Thomas, intended him for the same profession. The boy always suffered from ill-health, which he beguiled with wanderings over the fields and with sketching. Nevertheless, he had a university course in his native city, getting, as he thought, a little discipline. For a time he frequented his father's engineering works and shops. In 1871

he began to study law, but his health being poor, he was sent to Mentone, in the Riviera, and while there he wrote, for *Macmillan's Magazine*, *Ordered South* (1872). It was his second publication, his first having been published by his lifelong friend, Sidney Colvin, in *The Portfolio*. He now passed his time practically in search of health and literary subjects, going from London to Paris, Edinburgh, Barbizon, La Monastier, and Burford Bridge, whither he went in order to be near George



R. L. STEVENSON.

Meredith. He says of himself, "Nobody ever took such pains to learn a trade as I did." The migratory impulse never left him, nor his love of life in the open air. He frequented the resorts of California and the Adirondacks, finally settling in Samoa. He had lived in Bournemouth, Hyères, Davos, Kingussie and Pitlochrie. His experience at all these places contributed themes and materials for his books. His style is marked by a masterly, lucid utterance and command of simple, idiomatic, rhythmic English. His graphic power stamps him as a genius. It is even more captivating than his artistic weaving of plots. One of his most famous stories is *Treasure Island* (1883), full of exuberant fancy and adventure. At the same time, none of his works excels in real merit his *Kidnapped* (1886); *The Master of Ballantrae* (1889), and *Catriona* (1893), connected stories of an historical character dealing with Jacobite Scotland and Scotch character. An unusual psychological study of double-consciousness is his *Strange Case of Dr. Jekyll and Mr. Hyde* (1886), several times dramatized.

In 1879 Stevenson went to California, where he married a widow, whose son, Lloyd Osbourne, became his collaborator, companion, and literary executor. In 1887 he moved to Samoa, the climate and scenes of which captivated him, and he bought an estate overlooking Upolu, in the island of Apia. He called his place Vailima, and it was upon the mountain side there that he died, Dec. 3, 1894, and was buried.

The most notable of his books are *Northern Lights*, which comprises biographical studies of his engineering forbears; *A Memoir of Fleeming Jenkin* (1877); and *Father Damien* (1890). His *Footnote to History* (1892) is his narrative of Samoan political conditions.

Other works are *The Pentland Rising* (1866); *An Inland Voyage* (1878); *Edinburgh; Picturesque Notes* (1879); *Travels with a Donkey in the Cévennes* (1879); *Virginibus Puerisque* (1881); *Familiar Studies of Men and Books* (1882); *New Arabian Nights* (1882); *The Silverado Squatters* (1883), dealing with events in California; *The Dynamiter* (with his wife, 1885); *Prince Otto* (1885), said to concern the history of Milan and Natalie in Serbia; *The Merry Men, and Other Tales* (1887), in which the wild waves of a cross serve as an avenger of crime; *Underwoods*

(1887), a book of verses; *The Black Arrow* (1888), in its serial form called *The Outlaws of Tunstall Forest*; *The Wrong Box* (1889), a ghastly tale, in which Osbourne shared; *Ballads* (1890); *Across the Plains* (1892), dealing with the author's trip from New York to San Francisco in an emigrant train; some plays, written in conjunction with W. E. Henley; *Admiral Guinea* (1893); *Island Nights Entertainment* (1893), concerned with the folk-lore of Polynesia; and *Ebb Tide* (1894). Two volumes came out posthumously, entitled *St. Ives* and *The Lord Justice Clerk*. An *édition de luxe*, of which he saw the first volume, was in process of publication at the time of his death. His Vailima letters had serial publication not long after his decease. The initial numbers of the trilingual magazine, *Cosmopolis*, contain his last (and unfinished) work, *Weir of Hermiston*, edited by Sidney Colvin.

D. O. KELLOGG.

STEVENS POINT, a city and the capital of Portage County, northern central Wisconsin, 100 miles N. of Madison and 85 miles W. of Green Bay, on the Wisconsin River, and on the Green Bay, Winona and St. Paul and the Wisconsin Central railroads. It is at the southern edge of the great pine forests of northern Wisconsin, and is the center of a region having large lumber and agricultural interests. The industries of the city are saw, planing and shingle mills, flour and feed mills, sash and door factories, foundries and machine-shops, and car-shops of the Wisconsin Central railroad. Population 1890, 7,896; 1900, 9,524.

STEWART, ALEXANDER TURNEY, an American merchant; born in Lisburn, Ireland, Oct. 12, 1803. Removing to New York in 1823, he engaged in school-teaching until 1825, when he went into mercantile business, and in 1867 his was recognized to be the largest dry-goods establishment in the United States. He was nominated Secretary of the Treasury by President Grant in 1869, but could not take office, the law prohibiting the holding of that office by any one engaged in merchandise-importation. He was a man of great benevolence, contributing to the Chicago sufferers of 1871, French sufferers of 1870, and numerous charitable societies in New York. His wealth, at the time of his death, was estimated at forty million dollars. He died in New York City, April 10, 1876.

STEWART, BALFOUR, a British physicist; born in Edinburgh, Scotland, Nov. 1, 1828; studied at St. Andrews and Edinburgh University; appointed director of Kew Observatory in 1859, and professor of physics at Owens College, Manchester, in 1870. He is regarded as one of the originators of the theory of spectrum analysis. He contributed the article on METEOROLOGY to this ENCYCLOPÆDIA. Among his numerous publications are *Radiant Heat* (1858); *Conservation of Energy* (1873); and *The Unseen Universe; or, Physical Speculations on a Future State* (1875), written in conjunction with Prof. P. G. Tait. He died near Drogheda, Ireland, Dec. 10, 1887.

STEWART, CHARLES, an American naval officer; born in Philadelphia, Pennsylvania, July 28, 1778. He began his sea-life as cabin-boy on a packet in 1791, and was soon a commander. He

enlisted in the United States navy in 1798, with the rank of lieutenant, and took part in the fights with French privateers in 1800; was on the *Constellation* in 1802, in the war with the Barbary States, and when peace was concluded was among those officers who received the thanks of Congress. As captain he served in the war of 1812, and in command of the *Constitution* captured a number of British vessels. For his fighting qualities he was nicknamed "Old Ironsides." He continued in the service for 71 years, attaining the rank of rear-admiral. He died in Bordentown, New Jersey, Nov. 6, 1869.

STEWART, WILLIAM MORRIS, an American lawyer and public man; born in Lyons, New York,



WILLIAM M. STEWART.

Aug. 9, 1827; attended Yale College; attracted by the gold discoveries in California, he found his way thither and immediately engaged in mining. In 1852 he commenced the study of law and was appointed district attorney; in 1854 was appointed attorney-general of California; in 1860 removed to Nevada, where he was largely engaged in early mining litigation and in the development of the Comstock lode; was chosen a member of the Territorial Council in 1861; in 1863 was elected a member of the constitutional convention; was elected United States Senator in 1864 and again in 1869; in 1875 he resumed the practice of law in Nevada. He was thus engaged when elected to the United States Senate, as a Republican, in 1887. He was re-elected in 1893.

STEYN, MARTINUS T., ex-president of the late Orange Free State (now the British Orange River Colony), was born at Winburg, O. F. S., Oct. 2, 1857. He was educated at Bloemfontein, in Holland, and at London. He practiced law in the Free State, and in 1896 was elected to the Presidency of his native republic. After the Jameson Raid, the Orange Free State and the Transvaal formed a defensive alliance, and at Steyn's invitation and that of President Kruger, a conference was called at Bloemfontein in May 1899, at which Sir Alfred Milner, British High Commissioner was present. The conference had reference to points at issue between the Transvaal and Britain. Negotiations came to an end when President Kruger's ultimatum to Britain was issued, in Oct. 1899, and when war broke out the Free State threw in its lot with the Transvaal. On Lord Roberts' occupation of Bloemfontein, the independence of the state was abolished and Britain declared it a colony of the Crown.

STILLÉ, ALFRED, an American physician; born in Philadelphia, Pennsylvania, Oct. 30, 1813. After his graduation at the University of Pennsylvania in 1832, and the medical department in 1836, he spent two years in foreign study. He was appointed professor of the theory and practice of medicine in the Pennsylvania Medical College, and in 1864 was ap-

pointed to the same chair in the University of Pennsylvania department of medicine, a place he retained until 1884. He published several medical works; among them are *Medical Instruction in the United States* (1845); *The Unity of Medicine* (1856); and *Therapeutics and Materia Medica* (1860). He died Sept. 22, 1900, aged 87.

STILLÉ, CHARLES JANEWAY, an American historian; born in Philadelphia, Pennsylvania, Sept. 23, 1819. He was admitted to the Pennsylvania bar after graduation at Yale in 1839; served as a member of the Sanitary Commission executive committee during the Civil War; and received the appointment of professor of history in the University of Pennsylvania in 1866. In 1868 he was appointed provost at that institution, a position he retained until 1880. He published *How a Free People Conduct a Long War* (1862); *History of the United States Sanitary Commission* (1866); *Studies in Mediæval History* (1881). He died Aug. 11, 1899.

STILLINGIA, a genus of plants of the family *Euphorbiaceæ*, or spurges, with alternate leaves, and a terminal spike which is naked and staminate above and pistillate below. The species of economic importance is *S. sebifera*, the tallow tree of China, whose seeds yield a useful tallow or wax. See also OILS, Vol. XVII, p. 744.

STILLMAN, WILLIAM JAMES, an American writer; born in Schenectady, New York, June 1, 1828. After his graduation at Union College in 1848, he devoted himself to painting, and studied in Europe in 1849. An intimate friend of Kossuth, the Hungarian patriot, he undertook a delicate task for him in 1852, in connection with the crown jewels of Hungary. From 1852 to 1855 he was in Paris, studying. In 1855 he established *Crayon*, an art journal; in 1861-65 was consul of the United States in Rome; consul in Crete in 1865-69; and after that time correspondent of the *London Times* in Greece and Rome, and art critic of the *New York Evening Post*. He was a constant contributor to standard magazines, and published a number of volumes, among which are *Acropolis of Athens* (1870); *On the Track of Ulysses* (1887); and the *Cretan Insurrection* (1874).

STILLS. See DISTILLATION, Vol. VII, pp. 260-267.

STILLWATER, a city in southeastern Minnesota, and the capital of Washington County, situated on the St. Croix River, 20 miles N.E. of St. Paul, on the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul and Omaha and the St. Paul and Duluth railways; and has regular boat communications, with Mississippi River points by way of the St. Croix. The city is surrounded by a rich agricultural country, and is extensively engaged in the manufacture of lumber and lumber products. The city contains two national banks, with a combined capital of \$500,000, two savings banks, a fine courthouse, the state penitentiary, ten churches, a high-school and other school edifices, several handsome public buildings, including The Mannerchor and Grand Opera House. The list of manufactures includes lumber, feed, flour and cement mills, threshing-machinery works, dry docks, foundry and machine-shops, gas

and electric-light works. Horse-cars were early in operation throughout the city. However, on some routes, they have been rejected in favor of trolley-cars. Population 1890, 11,260; 1900, 12,318. See STILLWATER, Vol. XXII, p. 551.

STILO, LUCIUS ÆLIUS PRÆCONINUS, a Roman grammarian. He was a teacher of Varro and an adherent of Quintus Mettulus Numidicus, who was exiled in 100 B. C. Among his writings are *De Proloquiis*, and commentaries on the Twelve Tables and the Songs of Sallii. He was given the name *Stilo* on account of his writings, and, his father having been a præco, the name *Præconinus* was applied to him. See VARRO, Vol. XXIV, pp. 92, 93.

STIMPSON, WILLIAM, an American zoölogist; born in Roxbury, Massachusetts, Feb. 14, 1832. He studied under Louis Agassiz, and was with the great naturalist on many expeditions for the investigation of marine fauna. From 1852 to 1855 he was naturalist to the North Pacific expedition, and devoted the succeeding nine years to the arrangement of the collections of that trip. He was appointed curator of the Chicago Academy of Sciences, and made a valuable collection of zoölogical specimens, which was destroyed in the Chicago fire of 1871. During the remainder of his active life he worked in connection with the United States Coast Survey in deep-sea dredgings. He published numerous scientific treatises, among them *Crustacea and Echinodermata of the Pacific Shores of North America* (1857), and *Resarches upon the Hydrobina and Allied Forms* (1865). He died in Ilchester Mills, Maryland, May 26, 1872.

STIMSON, FREDERIC JESUP, an American writer; born in Dedham, Massachusetts, July 20, 1855. After his graduation at Harvard in 1876 he studied law, and was admitted to the Massachusetts bar in 1878. From 1884 to 1885 he held the office of assistant attorney-general of Massachusetts. Under the pseudonym, "J. S. of Dale," he published a number of novels, among them *Guerndule* (1882); *The Crime of Henry Vane* (1884); *The Residuary Legatee* (1888), and *King Noonett* (1896). He also published *Stimson's Law Glossary* (1881); *American Statute Law* (1886); *Labor in its Relations to Law* (1895); and *Uniform State Legislation* (1895).

STIMULANTS. See DIETETICS, Vol. VII, pp. 205, et seq.; and DRUNKENNESS, Vol. VII, pp. 482, et seq.

STING-RAY. See RAY, Vol. XX, p. 299.

STINKHORN FUNGI, a group of fungi (*Phal-laceæ*) with fetid odor, which grow as saprophytes from soil rich in decaying matter. The nauseous odor attracts carrion-loving insects to a slimy excretion upon the surface, and by this means the spores are distributed.

STINKSTONE. See GEOLOGY, Vol. X, p. 232.

STINKWOOD, the wood of certain tropical species of *Lauraceæ*, or laurels, notably of the African *Ocotea bullata*. The wood, though beautiful and durable, exhales an exceedingly disagreeable odor.

STIPPLE-ENGRAVING, a branch of engraving so closely allied to line-engraving as to sometimes be classed with it. Stipple-engraving consists of producing shade effects in engravings by means of

dots instead of lines. Generally, there must be some stipple-work in every engraving.

STJERNHJELM, GEORG. See SWEDEN, Vol. XXII, p. 754.

STOAT. See ERMINE, Vol. VIII, p. 526.

STOCK, LIVE, IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

STOCKBRIDGE, a town of Berkshire County, western Massachusetts, on the Berkshire division of the New York, New Haven and Hartford railroad, 17 miles N. of Pittsfield. Its picturesque scenery and magnificent air have attracted many wealthy New Yorkers to build summer homes among its hills, originally the residence of the Stockbridge Indians. The town has a public library, and a national bank with a capital of \$200,000. Population 1890, 2,132; 1900, 2,081.

STOCK-DOVE. See DOVE, Vol. VII, p. 379.

STOCKFISH. See LING, Vol. XIV, p. 668.

STOCKMAR, CHRISTIAN FRIEDRICH, a German diplomat; born in Coburg, Aug. 22, 1787. He studied medicine, and was appointed physician to Prince Leopold of Coburg, and in time became the Prince's most influential adviser. He rendered valuable assistance in the negotiations which made Leopold King of Belgium. In 1834 he entered the service of Prince Albert of Coburg, and continued with the Prince after the latter's marriage with Queen Victoria of England. He was Coburg's representative in the Diet of 1848, and advocated the King of Prussia's right to be German Emperor. He died in Coburg, July 9, 1863.

STOCKS AND STOCK CERTIFICATES. See STOCK EXCHANGE, Vol. XXII, pp. 556, 557.

STOCKTON, a city and a capital of San Joaquin County, California; is well laid out, having public squares and paved streets traversed by electric railroads, and lighted by electricity. Besides an excellent school-system, conducted at an annual expense of over \$67,000, there are in Stockton a number of private schools, a normal institute and a business college. There are five banks, with a net capital and surplus of over two million dollars. The population 1890, 14,424; 1900, 17,506.

STOCKTON, a town and the capital of Rooks County, northern Kansas, on the south fork of the Solomon River, 40 miles N. of Hays City, on the Missouri Pacific railway. Its population in 1890 was 880; in 1900 it was 1,030.

STOCKTON, a town and the capital of Cedar County, southwestern Missouri, 3 miles W. of the Sac River and about 50 miles N.W. of Springfield. It is the center of a region producing some copper, lead and zinc, and had a population in 1890 of 508 and in 1900 of 555.

STOCKTON, FRANCIS RICHARD, an American novelist; born in Philadelphia, Pennsylvania, April 5, 1834. After his school-life in Philadelphia Central High School, he spent several years as a draftsman, but about 1866 abandoned that profession for journalism. He was on the staff, successively, of the Philadelphia *Post*, New York *Hearth and Home*, *Scribner's Monthly* and *St. Nicholas*. His stories for children were contributed to the *Riverside Magazine*, and were afterward pub-

lished in bound form as *The Ting-a-Ling Stories* (1870). In 1879 were published the *Rudder Grange*



F. R. STOCKTON.

Pomona's Travels (1894); *The Adventures of Captain Horn* (1895); *Mrs. Clipp's Yacht* (1896); and *The Girl at Cobhurst* (1898).

STOCKTON, RICHARD, a signer of the Declaration of Independence; born near Princeton, New Jersey, Oct. 1, 1730. Previous to his admission to the bar of New Jersey in 1754, he had graduated at Princeton. He spent the years 1766 and 1767 in England and Scotland, and while there received many honors, including the freedom of the city of Edinburgh. He was appointed a justice of the New Jersey supreme court in 1774; was an ardent patriot during the Revolution; a member of the Continental Congress; and was elected chief justice of New Jersey, an office he declined. He was captured by the British, and harshly treated while in prison. His statue is in the capitol at Washington. He died in Princeton, New Jersey, Feb. 28, 1781.—His son, ROBERT FIELD, an American naval officer; born in Princeton, New Jersey, Aug. 20, 1795. He entered the United States naval service in 1811 as midshipman; took part on land in the defense of Baltimore during the War of 1812, and for his conduct was appointed a lieutenant; took part in the war with Algiers, and in command of a frigate first established the legality of the seizure of slave-traders. In 1826-38 he engaged in private business in New Jersey, where he obtained a charter for and built the Delaware and Raritan canal. In 1838 he returned to the navy, and in 1845 was sent to California to take command of the Pacific squadron, and there took possession of the present state of California and organized a provisional government. Army troops of the Mexicans were routed by the forces of Stockton and Frémont at Los Angeles, San Diego and La Mesa. Stockton negotiated a treaty, transferring California to the United States from Mexico. He returned to the East in 1847, and in 1850 retired permanently from the navy. In 1851-53 he occupied a seat in the United States Senate. He died in Princeton, New Jersey, Oct. 7, 1866.

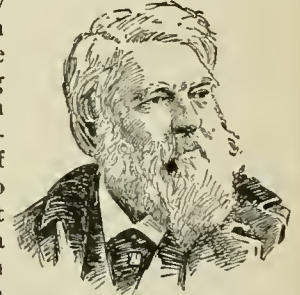
STOCK-YARDS. For economical system in, see ABATTOIRS, in these Supplements.

STODDARD, CHARLES AUGUSTUS, an American clergyman and editor; born in Boston, Massachusetts, May 28, 1833. After graduation from Williams College he spent several years in study at New Church College, Edinburgh, and afterward at Union Theological Seminary. He was ordained a

minister of the Presbyterian Church, and in 1859-83 officiated at Washington Heights Church, New York City. He was chosen editor of the *New York Observer* in 1883; published numerous pamphlets and sermons and *Across Russia* (1891); *Spanish Cities* (1892); *Beyond the Rockies* (1894); and *Cruising among the Caribbees* (1895).

STODDARD, CHARLES WARREN, an American traveler and writer; born in Rochester, New York, Aug. 7, 1843. He was taken by his parents to California in 1855, and from there went to the Hawaiian Islands in 1864. He took up journalism, and in the interest of the *San Francisco Chronicle* traveled in Asia, Africa, Europe and the South Sea Islands. In 1885-86 he occupied the chair of English literature at Notre Dame University, Indiana, and later lectured on the same subject at the Catholic University of America at Washington, District of Columbia. Among his publications are *Poems* (1867); *South-Sea Idyls* (1873); *Mashallah: A Flight into Egypt* (1881); *The Lepers of Molokai* (1885); and *A Cruise under the Crescent* (1898).

STODDARD, RICHARD HENRY, an American poet; born in Hingham, Massachusetts, July 2, 1825; attended schools in New York, and then worked in an iron foundry for some years, meanwhile reading widely, especially in poetry. In 1849 he produced a small volume of poems, *Footprints*, only to suppress it afterward; but 1852 saw the birth of a sturdier collection. From 1853 to 1870 he served in the New York custom-house; in 1870-73 was clerk to General McClellan, and for a year city librarian, and he did much reviewing and writing for the booksellers. In 1860-70 he was on the literary staff of the *New York World*, and in 1880 was appointed literary editor of the *New York Mail and Express*. His poems include *Songs in Summer* (1857); *The King's Bell* (1862); *The Book of the East* (1867); and *Lion's Cub* (1891). He edited Griswold's *Poets and Poetry of America* (1872); *The Loves and Heroines of the Poets* (1861); and *Female Poets of America* (1874).



R. H. STODDARD.

STODDARD, WILLIAM OSBORN, an American author; born in Homer, New York, Sept. 24, 1835. After graduation at Rochester University in 1858, he entered journalism, and worked upon *The Daily Ledger* of Chicago and the *Champaign Central Illinois Gazette*. He became interested in politics, and was active in behalf of Abraham Lincoln. After Lincoln's election to the Presidency in 1861, Stoddard was appointed his private secretary, an office he retained until 1864, when he resigned to become United States marshal for Arkansas. His stories are mostly for boys, and include *Saltillo Boys* (1882); *The Red Beauty* (1887); *On the Old Frontier* (1893); *The Captain's Boat* (1894); *Chumley's Post* (1895); and *The Partners* (1895). He is also the author of *Table-Talk of Abraham Lincoln* (1894).

STOKERS, MECHANICAL. There are but a few suc-

cessful mechanical stokers in use. Many manufacturing concerns still fire their furnaces by hand, and the practice is universal on steamships. The Roney mechanical stoker is one of those most used for supplying the coal to steam-boilers. It is a sort of stairway, which forms the fire-grate of the furnace. The coal is let into a hopper at the head of the stairway, and is gradually worked downward while it burns until at the foot of the stairway; the remainder is shaken off into the ash-pit. This stairway has an incline of about thirty degrees, and the steps are formed of grate-bars, each of which is separately hinged and connected to a rocker-bar. This bar is connected with a crank that gives a periodical shake to the whole set of bars, about seven to ten times a minute. The fire is thus constantly stirred, and the quantity of coal entering is made adjustable both by the rapidity of the shakes and the amount of throw given the grate-bars. These bars are made separate, so that any one deformed by the heat can be removed without disturbing the others, and the two lower ones, which give out the fastest, can be removed without even stopping to cool down the furnace.

The Jones under-feed mechanical stoker is also in successful use. With this the coal is fed from the hopper into a horizontal cylinder called a steam-ram. This ram has a piston or pusher that works the coal on to the furnace-grate with a stroke that may be regulated as desired. Any size or quality of coal may be used. The mechanism is combined with a blast arrangement from tuyere-pipes, which aids the combustion. The whole arrangement is extremely simple, and does not interfere with hand-firing, if that be desired.

C. H. COCHRANE.

STOKES, SIR GEORGE GABRIEL, a British physicist; born in Skreen, County Sligo, Ireland, Aug. 13, 1819. He graduated at Cambridge University in 1841; in 1849 was appointed to the Lucasian mathematical professorship in Pembroke College, Cambridge. He had many honors conferred on him, including the presidency of the Royal Society in 1885; was knighted in 1889, and in 1887-92 represented the university in Parliament. His discovery of the change in the refrangibility of light attracted the attention of the scientific world. He was a constant contributor to scientific periodicals, and published *Natural Theology* (1891).

STOKES, WHITLEY, a British lawyer; born in Dublin, Ireland, Feb. 28, 1830. He studied at Trinity College, Dublin, and after a short time spent in law practice was sent to India, where he was acting administrator-general at Madras, 1863-64; secretary to the government of India in the legislative department, and president of the Indian Law Commission in 1882. He was otherwise prominent in governmental affairs. He published *Liens of Legal Practitioners* (1860); *Hindu Law Books* (1865); *The Anglo-Indian Codes* (1887-88); *Three Irish Glossaries* (1862); *Middle Breton Hours* (1876); and *Three Middle Irish Homilies* (1877).

STOMACH. See DIGESTIVE ORGANS, Vol. VII, pp. 224, 225; and DISEASES OF, see Vol. XXII, pp. 574-576.

STOMAPODA OR STOMOPODA. See CRUSTACEA, Vol. VI, p. 658.

STOMATA. See BOTANY, Vol. IV, pp. 89, 90.

STOMIATIDÆ. See ICHTHYOLOGY, Vol. XII, p. 693.

STONE. See BUILDING, Vol. IV, pp. 469-472; and BUILDING-STONES, in these Supplements.

STONE, a measure of weight in use throughout the northwest and central countries of Europe, but varying much in different places. The English imperial standard stone is a weight of 14 pounds avoirdupois, but there are stones of other weights for particular commodities; thus, the stone of butcher's meat or fish is 8 pounds, of cheese 16 pounds, of hemp 32 pounds, of glass 5 pounds, etc.

STONE, CHARLES POMEROV, an American soldier; born in Greenfield, Massachusetts, Sept. 30, 1824. He was graduated from West Point in 1845, and entered the army service. For his bravery during the Mexican War he was advanced to the rank of captain; was stationed as chief of ordnance in California in 1851-57; resigned his commission, and became a member of an exploring party in the Sonora Valley, Mexico. He re-entered the army in 1861, and served as inspector-general of the militia of the District of Columbia; was afterward assigned to a brigade; was responsible for the Federal losses at Ball's Bluff on the Potomac, Oct. 21, 1861, and for two years was imprisoned. Upon his release in 1863 he was assigned to the Department of the Gulf as chief of staff to Gen. N. P. Banks. At the close of the war he returned to private life until 1870, when he was appointed chief of staff to the Khedive of Egypt. This office he retained until 1883. As engineer-in-chief of the erection of the statue *Liberty Enlightening the World*, in 1886, he was in charge of the dedication of that work. He died in New York City, Jan. 24, 1887.

STONE, CHARLES W., an American public man; born in Groton, Massachusetts, June 29, 1843. He graduated at Williams College in 1863; was admitted to the bar in 1867; appointed county superintendent of schools of Warren County, Pennsylvania, in 1865; a member of the Pennsylvania house of representatives in 1870 and 1871; a member of the Pennsylvania senate in 1877 and 1878; lieutenant-governor of that state from 1879 to 1883; appointed secretary of the commonwealth in 1887; elected to Congress as a Republican in 1890, and re-elected in 1892 and 1894.

STONE, LUCY, an American reform advocate; born in West Brookfield, Massachusetts, Aug. 13, 1818. She graduated at Oberlin College in 1847, and immediately began her work in the advocacy of woman's suffrage, which ended with her death. She was also an earnest anti-slavery lecturer, and in the interest of one or the other cause canvassed the Middle and Eastern states until



LUCY STONE.

1855. She was in that year married to Henry B. Blackwell, but by previous agreement retained her maiden name. She was one of the organizers of the Woman's Suffrage Association in 1869. In 1870 she began work on the *Woman's Journal*, of Boston, a periodical of which she became the ruling spirit. In 1867 the agitation of woman's rights again called her to the lecture platform, and until 1882 she traveled in almost every state in the Union, lecturing and organizing local societies. She continued her labors until her death, in Dorchester, Massachusetts, Oct. 18, 1893.

STONE, MARCUS, a British artist; born in London, July 4, 1840. He received little or no instruction; was for a time an illustrator of magazines and books. His first exhibited work was in 1858, *Rest*. In 1863 he painted *From Waterloo to Paris*, an incident in Napoleon's life. Among his later paintings are *A Gambler's Wife* (1885); *The First Love-Letter* (1889); *Two's Company, Three's None* (1892); and *A Honeymoon* (1893).

STONE, MELVILLE E., an American journalist, born Aug. 22, 1848, at Hudson, Illinois; educated in the public schools of Chicago; began newspaper work in 1871 as reporter on the old *Republican*; became city editor of the *Inter-Ocean*, and managing editor of the consolidated *Post and Mail*. He founded the Chicago *Daily News*, the original one-cent paper of the city, and retiring from this in 1888, took part in organizing the Globe National Bank of Chicago, of which he is now president. In 1893 he became general manager of The Associated Press.

STONE, THOMAS, a signer of the Declaration of Independence; born in Pointon Manor, Charles County, Maryland, in 1743. He gained an education by hard work and sacrifice; studied law and began practice in Frederick, Maryland; was an ardent patriot and a member of the Continental Congress; was the representative of his colony in the committee of confederation. He served in the Maryland senate, and again in Congress until 1784, when he retired from private life. He died in Alexandria, Virginia, Oct. 5, 1787.

STONE CUTTING AND DRESSING. The dressing or leveling of the surfaces of blocks of stone is now performed largely by a compressed-air machine, introduced in 1894. A strongly made swinging arm carries a reciprocating piston on which the dressing-tools are mounted, and directed over the surface of the stone, doing the work about ten times as fast as it can be done by hand. The rough-pointing of stone is done with long-pointed tools, called picks, which even up the surface so that the projections do not vary more than half or three fourths of an inch. For fine-pointing, narrow steel rods are used, and the surface reduced to a better level; but if a perfect surface is desired, fine-pointing is omitted. The crandall is a tool usually composed of ten double-headed steel rods a quarter of an inch thick, clamped together so that it presents a row of teeth, which are used to produce a fine pointing. The operation is called crandalling, and a stone is said to be cross-crandalled when the tool has gone over the surface a second time at right angles. In

axing a surface a double-ended blunt ax is used, or for tooth-axing an ax with serrated face. Axing produces nearly parallel chisel-marks. Tooth-axing is done as a process preliminary to bush-hammering. The bush-hammer has a square head, covered with pyramidal points, and produces a finely dotted surface. Sandstone and marble are usually sawed, and rubbed with other stone to level the surface. The polishing of stone is done in a bed with a rotating disk covered with felt and charged with a powder.

C. H. COCHRANE.

STONE-FLY. See INSECTS, Vol. XIII, p. 152.

STONE-FRUITS. See *Drupe*, under BOTANY, Vol. IV, p. 151.

STONEHAM, a town of Middlesex County, northeastern Massachusetts, 9 miles N. of Boston, on the Boston and Maine railroad. It has several churches, high and district schools, national and savings banks, public library, and is chiefly noted for its manufactures of shoes and leather goods, in addition to which there are a box factory and machine-shop. The town in 1894 had an assessment valuation of over \$4,000,000. Population 1890, 6,155; 1900, 6,197.

STONEMAN, GEORGE, an American soldier; born Aug. 8, 1832, in Busti, New York, and graduated at West Point in 1846. He served in Oregon and California until 1857, going thence to Texas, where he was at the opening of the Civil War. He entered that contest as major of the First Cavalry, was promoted to be brigadier-general, Aug. 1, 1861, and commanded the cavalry division of the Army of the Potomac in the peninsular campaign. He was at Fredericksburg with the Third Army Corps, having been made a major-general in the month of November previous, and in 1863 and 1864 was conspicuous as a cavalry leader, especially in the campaigns against Atlanta, Georgia, and Asheville, North Carolina. He retired from the service in 1871, and in 1883 was elected governor of California, as a Democrat. He died in Buffalo, New York, Sept. 5, 1894.

STONE-PINE, SWISS. See PINE, Vol. XIX, pp. 104, 105.

STONE RIVER, BATTLE OF. See MURFREESBORO, in these Supplements.

STONEWORTS, same as CHARACEÆ. See VEGETABLE KINGDOM, Vol. XXIV, p. 126.

STONINGTON, a town, one of the capitals and a port of entry of New London County, southeastern Connecticut, 12 miles E. of New London and 50 miles S.W. of Providence, Rhode Island, on Long Island Sound, and on the New York, New Haven and Hartford railroad. It has a capacious harbor protected by a breakwater, and daily steamboat communication is kept up with New York City. The town includes the borough of Stonington and the villages of Mystic and Pawcatuck, and has manufactories of silk and cotton machinery, cotton and woolen goods, printing-presses, paper-cutters, spools, velvets, boilers, iron and brass goods. Stonington, in August, 1814, made a successful resistance to the bombardment of the place by a British fleet. Pop. town and borough, 1890, 7,184; 1900, 8,540.

STONYHURST COLLEGE, a Roman Catholic

institution for the education of young men, located in Lancashire, England, 4 miles S.W. of Clitheroe. The parent of this institution was St. Omer's Seminary, France, founded in 1592. There it flourished, but Bourbon oppression compelled its removal to Stonyhurst in 1794. Both academic and collegiate instruction are given. In 1895 there were about three hundred students in attendance, with thirty instructors, and a library of about forty thousand volumes.

STONY POINT, a town of Rockland County, southeastern New York, situated on a small rocky promontory on the right bank of the Hudson River, at the entrance of the Highlands, 42 miles N. of the city of New York, on the New Jersey and New York, the New York, Ontario and Western and the West Shore railroads. This and the opposite Verplanck's Point were fortified in the War of the Revolution, and were the scenes of several contests. The population of the town in 1900 was 4,161. See UNITED STATES, Vol. XXIII, p. 743.

STOP. See ORGAN, Vol. XVII, p. 828.

STOPPAGE, IN TRANSITU. See SALE, Vol. XXI, p. 208.

STORAGE BATTERIES. See ELECTRICITY, §§ 97 to 109, in these Supplements.

STORER, DAVID HUMPHREYS, an American physician; born in Portland, Maine, March 26, 1804. He graduated at Bowdoin in 1822; afterward studied medicine at Harvard, and began his practice in Boston. He was appointed professor of obstetrics and medical jurisprudence in Harvard Medical School in 1854, and later, dean of that school. He remained in that position until 1876; was always interested in zoölogical studies, and published *Ichthyology of Massachusetts* (1839); *Fishes of North America* (1846); also a *History of Massachusetts*. Died in Boston, Mass., Sept. 10, 1891.

STORER, FRANCIS HUMPHREYS, chemist, son of preceding; born in Boston, Mass., March 27, 1832; graduated at Harvard Lawrence Scientific School in 1855; studied in Germany and France for two years; from 1857 to 1865 was engaged in private work; in 1865 was appointed professor of general chemistry in the Massachusetts Institute of Technology, and in 1870 was appointed professor of agricultural chemistry in Harvard. He was the author of over one hundred papers. Among his publications are *Dictionary of the Solubilities of Chemical Substances* (1864); *Cyclopædia of Quantitative Analysis* (1873); and *Agriculture in some of its Relations with Chemistry* (1887).—Another son, **HORATIO ROBINSON**, surgeon; born in Boston, Massachusetts, Feb. 27, 1830. After his graduation at Harvard in 1850 he studied medicine, graduated from Harvard Medical School in 1853, and spent two years in Europe. He studied law to prepare himself for lecturing on medical jurisprudence, and in 1865 was appointed professor of that subject in the Berkshire Medical College. Failing health compelled his retirement from active practice in 1872. He was the author of *Criminal Abortion in America* (1860); *Nurses and Nursing*; etc.

STOREY, GEORGE ADOLPHUS, a British artist; born in London, Jan. 7, 1834. He studied under

Dulong, in Paris. He first exhibited in 1852. Among his works are *Royal Challenge* (1865); *Love in a Maze* (1873); *Scandal* (1873); *The Milliner's Bill* (1891); and *Waiting for Her Partner* (1893).

STORM, JOHN FREDERICK, a Norwegian philologist; born in Lom, Norway, Nov. 24, 1836. He studied at the University of Christiania and in 1873 was elected professor of Romanic and English philology there. He wrote numerous papers, and contributed the article on ROMANCE LANGUAGES, in this ENCYCLOPÆDIA. Among his publications are *Practical Course in English* (1862); *English Philology* (1879); and *French Dialogues: An Introduction to the Grammar and Idiom of Spoken French* (1887).

STORM LAKE, a city and the capital of Buena Vista County, northwestern Iowa, on Storm Lake, and 53 miles W. of Fort Dodge and 81 miles N.E. of Sioux City, on the Illinois Central railroad. It is the center of a large agricultural region, and has three banks, with an aggregate capital of \$150,000. Population 1900, 2,169.

STORMS. See METEOROLOGY, Vol. XVI, pp. 154-159.

STORRS, RICHARD SALTER, an American Congregational clergyman; born in Long Meadow, Massachusetts, Feb. 6, 1787. He graduated at Williams College in 1807; was ordained a minister of the Presbyterian Church in 1808, but afterward studied at Andover Theological Seminary and became a Congregational minister, and was placed in charge of the Braintree (Massachusetts) church, where he remained the rest of his life. He edited the *Boston Recorder* in 1817-25, and of the *Congregationalist* in 1850-56. He died in Braintree, Massachusetts, Aug. 11, 1873.—His son, **RICHARD SALTER**, also a Congregational clergyman; born in Braintree, Massachusetts, Aug. 21, 1821. After his graduation at Amherst in 1839, he studied law until 1842, when he took up the study of theology at Andover Seminary. He was ordained in 1845, and spent that year as pastor at Brookline, Massachusetts, whence he went to the Church of the Pilgrims, Brooklyn, New York. He lectured in



REV. DR. STORRS.

Union Theological Seminary and at Princeton; in 1887 was elected to the American Board of Foreign Missions; in 1848-61 was on the editorial board of *The Independent*. Among his numerous publications are *The Constitution of the Human Soul* (1856); *Early American Spirit and the Genesis* (1875); *Manliness in the Scholar* (1883); *The Divine Origin of Christianity Indicated by its Historical Effects*; and *The Broader Range and Outlook of Modern College Training*. Died at Brooklyn, N. Y., June 5, 1900.

STORY, EMMA HAYDEN, a soprano singer, widely known by her maiden name, Emma Eames, was born in Shanghai, China, in 1868, during a stay there of her parents, who were from Boston, Massachusetts. After musical instruction in Boston she

went to Paris in 1884, and studied under Madame Marchesi. She was a protégée of Gounod, and having made her début in 1888, appeared at the Grand Opera House in 1889, as Juliette in his opera *Roméo et Juliette*. Two years later she sang in New York under H. E. Abbey, taking the rôle of Marguerite in Gounod's *Faust*. In July, 1891, she married in London, Julian Story, an artist, and son of William Wetmore Story. Her husband had the exceptional honor of having his picture *Le Laboratoire de St. Lazare*, exhibited at the Paris Salon of 1896, purchased by the French government.

STORY, WILLIAM WETMORE, an American lawyer, sculptor and poet; born in Salem, Massachusetts, Feb. 12, 1819; son of Joseph Story, the jurist.



W. W. STORY.

After his graduation at Harvard in 1838 he studied law, was admitted to the bar of Massachusetts in 1840, and practiced his profession for five years. During this time he published *Treatise on the Law of Sales* (1844); and *Treatise on the Law of Contracts* (1847). After his father's death in 1845 he turned his attention to sculpture, in which he had done some amateur work. The Massachusetts bar commissioned him to execute a statue of his father, and to prepare himself for the work he went to Rome. He mastered the details of the art, and devoted the remainder of his life to it. Among his sculptures are statues of George Peabody, for the London Corporation; Edward Everett, in Boston; and busts of Josiah Quincy, James Russell Lowell, and others; also *Semiramis* and *Cleopatra*, in the Museum of Art, New York. He also published several works, including *Poems* (1856); *Roba di Roma* (1862); *Poems* (1885); *Conversations in a Studio* (1890); and *A Poet's Portfolio, Later Reading* (1894). Died in Vallombrosa, Italy, Oct. 7, 1895.

STOUGHTON, a town of Norfolk County, eastern Massachusetts, on the New York, New Haven and Hartford railroad. It contains manufactories of boots, shoes, rubber and woolen goods; has excellent educational facilities and a co-operative bank. Population 1890, 4,852; 1900, 5,442.

STOUGHTON, a city of Dane County, southern Wisconsin, on the Yohaha River, 14 miles S.S.E. of Madison, on the Chicago, Milwaukee and St. Paul railway. It is the center of a tobacco-raising region, and contains manufactories of cigars, wagons and harness, and flour and feed-mills. There are in the town two banks, with a combined capital of fifty-five thousand dollars. Population 1900, 3,431.

STOUGHTON, JOHN, a British clergyman; born in Norwich, England, Nov. 18, 1807. He studied at University College, London, and in 1832 was ordained a minister of the Congregational Church, and for 32 years was pastor at Kensington. In 1875 he was appointed professor of historical theology and homiletics in New College, St. John's Wood. He published many works, among them

Windsor in the Olden Time (1844); *Haunts and Homes of Martin Luther* (1875); *William Penn* (1882); *Religion in England from the Opening of the Long Parliament to the End of the Eighteenth Century* (1881); and *Religion in England from 1800 to 1850* (1884).

STOVES. A recent novelty in the way of a stove designed for cooking-purposes is one invented by Edward Atkinson, LL.D., the well-known lecturer and writer on dietetics, which is named the Aladdin oven, and received an award at the Columbian Exposition for "a cooking-apparatus which economizes heat and controls its operations to a degree not heretofore possible in cooking, thus greatly reducing the cost of fuel for domestic requirements." The principle on which this oven is constructed is that heat may be boxed up. In other words, the heat generated from the combustion of a small quantity of liquid or gaseous fuel can be held and accumulated within a case, box or oven, of which the outer walls are made of non-conducting material. If this principle is tenable, then all metallic ovens must be condemned, because there is no metal that is not a good conductor of heat. Suitable materials for constructing heat-chambers or ovens may either be wood, properly protected against ignition on the inside, wood-pulp, compounds of magnesia, fossil-meal, non-conducting clays, or a recent form of asbestos paper crimped to hold entrapped air. In the oven under consideration, the heat is put into an outer oven made of non-metallic and non-conducting material—here a form of stiff paper made from wood-pulp combined with other ingredients. Inside is a food-receptacle, nearly as large as the outer oven, made of sheet-metal. The heat, supplied from below either by a lamp with a circular wick, by gas burned in a Bunsen burner, or by natural gas, passes around the thin iron wall of the inner oven, through which it penetrates in even measure. This inner oven, provided with a ventilator for use in special cases, is closed, so that the products of combustion and the direct drying heat of the lamp cannot enter it. By means of movable shelves the interior may be divided into not more than four compartments. Under the control of this oven, the heat developed from the top of the chimney of a central duct lamp, with a round wick one and one half inches in diameter, during eight hours, by the combustion of one quart of oil, suffices to cook fifty to sixty pounds of food-material in three charges. The ratio is one pound of oil, or a fraction over one pint, to twenty or thirty pounds of food, according to its kind. As compared with the energy developed by coal, one pound of oil applied in an automatic oven will do the work of fifty to seventy pounds of coal consumed in the ordinary stove or range.

The tendency in recent forms of stoves, both for purposes of cooking and heating, is in the general direction of economizing fuel, with an attempt at the same time to add to the attractive character of the vehicle employed. For both these reasons there has been an increase in the output of gas, gasoline and oil-stoves, as opposed to those burning either wood or hard or soft coal. So-called electric stoves, in

which the heat is concentrated in suitable resistance-coils, are also coming into considerable use.

C. H. COCHRANE.

STOWE, CALVIN ELLIS, an American Hebraist and educator; born April 6, 1802, at Natick, Massachusetts; educated at Bowdoin College and Andover Theological Seminary. He passed his professional life teaching Biblical literature at Andover, except during the interval of 17 years, 1833 to 1850, at Lane Seminary, in Cincinnati, and some short terms of college work, where he met and married a daughter of Dr. Lyman Beecher. He published editions of *Jahn's History of the Jewish Commonwealth* and of *Lowth's Sacred Poetry of the Hebrews*; a report on education to the legislature of Ohio, and a volume entitled *Origin and History of the Books of the Bible*. His later years were spent in Hartford, Connecticut. He died Aug. 22, 1886.

STOWE, HARRIET ELIZABETH, author of *Uncle Tom's Cabin*, wife of preceding, and a sister of Henry



HARRIET BEECHER STOWE.

Ward Beecher; born June 14, 1812, at Litchfield, Conn.; married Professor Stowe in 1836, in Cincinnati, where she gained her most vivid insight into the conditions of slavery. Her first book was *The Mayflower, or Sketches of the Descendants of the Pilgrims* (1849). In 1850 her husband began a two-years' professorship at Bowdoin College, and while living at Brunswick, Maine, Mrs. Stowe began her world-renowned story in *The National Era*, an antislavery weekly paper published in Washington. In serial form it attracted attention, but when, in 1853, it appeared as *Uncle Tom's Cabin*, it obtained extraordinary popularity, and was regarded as an epoch-making book. The political contest over slavery in the United States was at this time in a bitter stage, and *Uncle Tom's Cabin* was hailed on the one side as a powerful support to the antislavery movement, and on the other as a seditious attack upon the domestic institutions of the slave states. The avowed object of the book was to show with temperance and fidelity to the humanity of the better class of slaveholders the injustice of the slave system.

Its incidents Mrs. Stowe did not claim to be the life-history of any person, but their actual occurrence to some persons she undertook to justify by *A Key to Uncle Tom's Cabin* (1853). The first book has been dramatized in twenty ways, translated into more than as many languages (it is said even into Chinese and Japanese), and its remarkable and continuous sales placed it long ago among the phenomenal things of the book trade.

In 1853, Mrs. Stowe visited Great Britain, where she was received with marked public attention. She commemorated this visit in *Sunny Memories of Foreign Lands* (1854).

Mrs. Stowe was destined again to make a tempo-

rary though unsavory sensation, this time over the history of Lord Byron. In 1868 the Countess Guiccioli gave to the world *My Recollections of Lord Byron*, in which she spoke somewhat scornfully of Lady Byron. Mrs. Stowe came to the rescue in the following year, with *The True Story of Lord Byron's Life*, in which she alleged that the poet had sustained incestuous relations with his sister, the discovery of which led to his wife's desertion of him. A storm of criticism followed, accompanied by exhaustive refutations of the scandal. Mrs. Stowe answered them all in *Lady Byron Vindicated*, re-affirming her first position.

Besides the foregoing books, Mrs. Stowe published a number of novels, of which *Dred, a Tale of the Great Dismal Swamp* (1856); and the New England tales, *The Minister's Wooing* (1859), *The Pearl of Orr's Island* (1862), *Oldtown Folks* (1869), and *Pogonoc People* (1878), are the best-known. To these there should be added, out of a long list, *Agnes of Sorrento* (1862); *Oldtown Fireside Stories* (1872); *Pink and White Tyranny* (1871), dealing with divorce; *My Wife, or Harry Henderson's History* (1872); *Palmetto Leaves* (1873), concerned with Florida scenes, where the authoress passed many winters in Duval County; and *Betty's Bright Idea* (1876).

Her last years were passed at Hartford, Connecticut, her memory gradually failing her, and there she died, July 1, 1896.

STRABO, WALAFRID. See WALAFRID STRABO; Vol. XXIV, p. 320.

STRACHEY, RICHARD, a British general; born at Sutton Court, Somersetshire, July 24, 1817. He entered the British Army in 1836; saw service in the Indian engineer corps; in 1857 was appointed under-secretary in the public works department of the Indian government, and also secretary of the central provinces. He was advanced until he attained the rank of lieutenant-general, in 1875, when he was retired from the army. While in India he devised the irrigation plans, organized the railways and founded the forest system. After retirement he was sent on several important missions for the government, and in 1889 became chairman of the East Indian Railroad Company. He represented the Indian government at the monetary conference in Brussels in 1892, and was appointed a member of the Indian currency committee. In recognition of his labors in the interests of geography he was in 1884 appointed a delegate to the meridian conference, held at Washington.

STRACHEY, WILLIAM, an American colonist and historian; born about 1585. He was a member of a party of colonists under Sir Thomas Gates, who were shipwrecked on the Bermudas in 1609. Strachey, with others of the party, reached Virginia the next year, and, having received the appointment of secretary of the colony, wrote *A True Repertory of the Wracke and Redemption of Sir Thomas Gates Upon and from the Islands of the Bermudas*. This was published in Purchas' *Pilgrims*. He also published *Lawes, Divine, Morall and Martiall* (1612) and *History of Travaile into Virginia Britannia*, printed in 1818.

STRADIVARI, ANTONIO. See VIOLIN, Vol. XXIV, p. 245.

STRAIGHT UNIVERSITY, a co-educational institution for the training of negroes. It was founded in 1869 by Seymour Straight, at New Orleans, Louisiana. Academic, normal and collegiate courses are given. Manual training is begun in the lower grades and continued until graduation. In 1893 there were 21 in the faculty, 595 students in attendance, and a library of about 3,000 volumes.

STRAIN. See STRENGTH OF MATERIALS, Vol. XXII, p. 595; and in these Supplements.

STRAKOSCH, CLARA LOUISE (KELLOGG), an American singer, born in Sumterville, South Carolina, July 12, 1842. She acquired her musical education in New York City, and in 1861 made her first public appearance as "Gilda" in *Rigoletto*. Her success was almost immediate, and after singing in her own country she went in 1867 to London, where she made her debut as "Marguerite," winning instant popularity. The following year she returned



CLARA L. STRAKOSCH.

to America, and afterward appeared in many European countries. Her voice was a pure soprano of a wide range, and was tuneful to the highest point of perfection. Among the operas with which her name is most identified are *Faust*, *Crispino*, *Travaita*, *Aida*, and *Carmen*. In 1887 Miss Kellogg became the wife of Mr. Paul Strakosch.

STRATEGY. See WAR, Vol. XXIV, pp. 349-353; and NAVAL, pp. 364, 365.

STRATFORD, a city and capital of Perth County, western Ontario; population 1891, 9,501.

STRATHCONA AND MOUNT ROYAL, LORD, DONALD ALEXANDER SMITH, G. C. M. G., High Commissioner for Canada in London, was born in Scotland in 1820. He entered at an early age the service, in Canada, of the Hudson Bay Company, and was the last resident governor of that fur-trading corporation. Was M. P. for Selkirk, Manitoba, in Dominion House of Commons, and afterwards represented Montreal West. Was created a K. C. M. G. in 1886 and a G. C. M. G. in 1896, and in the following year was elevated to the British peerage for his distinguished services and many philanthropies. In 1898 he gave a million dollars to the Royal Victoria College for Women, in connection with McGill Univ., Montreal. In Jan. 1900, he equipped at his own expense and presented for use to the British government a corps of over 500 mounted men (known as "Strathcona's Horse"), for service against the Boers in South Africa.

STRATHROY, a town of Middlesex District, western Ontario, on the Grand Trunk railroad. Population 1891, 3,316.

STRAUSS, JOHANN, the younger, an Austrian music composer; known as the "Waltz King"; born in Vienna, Oct. 25, 1825. Notwithstanding

the opposition of his father, Johann Strauss, the father of the waltz, he began his musical studies early in life, and in 1844 made his debut as a conductor; and the success of that occasion attended him throughout his career. He combined his own and his father's orchestras, after the latter's death, and toured the continent of Europe. But it was as a composer that he was regarded as a master. He composed his first waltz, *Erster Gedanke*, when but six years old.



JOHANN STRAUSS.

From that time until 1870 he composed over 400 waltzes. Then he retired from public life and devoted himself to composing operettas. Of his waltzes, the most popular is *An der Schönen Blauen Donau*. His operettas include *Indigo* (1871); *Der Karneval in Rom* (1873); *Der Lustige Krieg (The Merry War)*; *Jabuka* (1894); *Gypsy Baron*; and *Der Fliedermus (The Bat)*. Died in Vienna, June 3, 1899.

STREATOR, a city of Lasalle County, eastern Illinois, on the Vermilion River, about 100 miles S.W. of Chicago, on the Atchison, Topeka and Santa Fé, the Chicago and Alton, the Chicago, Burlington and Quincy and the Wabash railroads, and a terminal of the Indiana, Illinois and Iowa Railroad. Besides the 23 churches distributed among the different denominations, seventeen public schools and a high-school, the building valued at \$45,000, there are a number of private schools and two convents. The center of an agricultural and coal-mining district, there are manufactories of glass, foundries, machine shops and flour-mills, and also clay-working factories, a valuable clay being found in the neighborhood. There are three national banks, with an aggregate capital of \$250,000. The city is well equipped with electric lighting and street-railways and all the modern improvements. Population 1890, 11,414; 1900, 14,079.

STREET-RAILWAYS. See RAILROADS, RAILROADS, ELECTRIC, and TROLLEYS, in these Supplements.

STREET-SWEEPERS. The common form of machine in use for sweeping paved streets is a vehicle drawn by horses, and carrying a rotary broom mounted at an angle of about 45 degrees with the wheel-track. By means of gearing to the principal axle, the broom is made to rotate in the opposite direction to which the vehicle travels. Fenders are provided at the rear and top of the wheel to prevent the dust from being blown about. The brooms on two-horse machines have a length of eight or nine feet, and are about twenty-eight inches in diameter when new. The one-horse machines use a broom about six and a half feet in length. A good broom will sweep eight hundred miles before requiring renewal. A lever is placed near the driver's foot so that he can raise the broom over obstructions that would interfere with its work. The broom

may be set for either light or heavy sweeping. Smaller machines on the same principle are made for hand-sweeping, as in parks, about depots and public buildings. One man with a rotary sweeper can do as much work as six men with brooms. The hand-sweeping machines are usually provided with a sprinkling-device to keep down the dust. A hand-machine is also manufactured for sweeping out gutters. This broom is in the form of a Greek cross, and rotates on an upright axis. It is mounted in the center of a tricycle frame, and is so adjustable that it reaches beyond the wheels into the farthest corner of a gutter, and throws the dirt into a line about fifteen inches from the curb. One man can work this gutter-sweeper at the rate of about two and a half miles an hour. Another street-sweeping machine is styled the "picker-up," because it is used to gather up into a box the leavings of other sweepers. It operates on the well-known principle of the carpet-sweeper, and is pushed along the so-called wind-row of dirt by one-man power.

C. H. COCHRANE.

*STRENGTH OF MATERIALS; MODERN METHODS OF RESEARCH. The prosecution of experimental researches relating to strength of materials has recently come to constitute one of the most important and useful departments of experimental science in the technical departments of institutions of learning, and in governmental bureaus. All great technical schools, and the engineering departments of all governments, are now supplied with apparatus, and manned, in part, by specialists who have this object in view.

The laboratories of the Prussian government, in which Wohler and Spangenberg made their remarkable investigations of the effect of repeated stresses and strains, and that at Munich, in which Bauschinger conducted many and important researches, are illustrations of foreign practice; while the British dockyards and arsenals, and the schools of science at Kensington and elsewhere, furnish similar facilities for such work. In the United States, the government possesses at Watertown Arsenal, in Massachusetts, the largest and most delicate of testing-machines, with all required accessories, and has there, under the direction of its purchaser, the "United States Board appointed to test iron, steel and other metals," conducted most elaborate and valuable studies of the metals and their alloys.* Since that date (1875-78), and the disbandment of that board, the Ordnance Bureau of the army has continued similar work, with fruitful result. The larger technical schools of the United States, as well as, to a less extent, those of European countries, are supplied with apparatus of this kind, both for use in instruction and for research. Sibley College, Cornell University, possesses many testing-machines, ranging in power from 15,000 or 20,000 up to 100,000, to 200,000 and to 300,000 pounds, including the large "Emery testing

machine" of the Columbian Exposition at Chicago, 1893. The same institution, in its College of Civil Engineering, possesses another machine of 400,000 pounds capacity. The Massachusetts Institute of Technology, Columbia College, New York, and other institutions, also employ similar apparatus in experimental engineering, and other laboratories for regular use in investigation. The outcome of their work includes that of Lanza on strength of timber, that of Johnson on the timbers of the United States, of Smith and Beardslee on tool-steels and on irons, of Thurston on "maximum kalchoid alloys" and on the "exaltation of the elastic limit by strain," and on effects of time and of orthogonal stresses and strains. Mechanical laboratories, and laboratories of applied mechanics, in all countries and in all great engineering colleges, are now employed in such researches.

The apparatus now generally used in this work consists of various forms of testing-machines and measuring-instruments, such as have been described; and the power and delicacy and accuracy of these machines and apparatus have already become singularly great. Many testing-machines are now furnished with systems of autographic registry, based, in principle, upon that of Thurston's autographic machine of 1871, the first of the class, in which the diagram described is automatically produced in the course of the operation of testing, and of which diagram the co-ordinates are resistances and extensions or other distortions. Few of these apparatus, however, can be relied upon for fine measurements, especially within the elastic limit, but they often give valuable qualitative indications and afford useful suggestions. Of the later forms of testing-machines, the following may be taken as representative. It is somewhat singular that, as is the fact, these machines should be constructed in the United States, on the whole, in a better form than abroad, and at less cost, and they are undoubtedly more generally employed by manufacturers, and especially by railways; the latter having often extensive and complete laboratories for mechanical and scientific research. In this direction, the Pennsylvania Railroad Company first commenced the application of scientific methods, and founded the most complete laboratory for investigation; submitting all its materials to test, under contract, and investigating every important subject with a view to improvement both of methods and of materials.

The methods of research in this department are coming to be well established; although but one compendium of such methods is yet published.* This system of experimental work is perhaps most fully illustrated by the regular schedule of work of the Department of Experimental Engineering of Sibley College, Cornell University, as developed originally at the Stevens Institute of Technology from 1871 to 1885 by Thurston, and later at Cornell University by the same investigator, as

* Reports of the United States Board testing iron, steel and other metals; edited by R. H. Thurston, secretary and member of the board. Washington; 1878; 2 vols. 8vo.

* Copyright, 1897, by The Werner Company.

* *Text-Book of Experimental Engineering.* By R. C. Carpenter, New York; 1892; 1 vol., 8vo.

director of Sibley College, and aided by Carpenter, in charge of that department since 1890.*

These methods consist, in general, in the determination of the continuous values of the varying resistance, extension, elasticity and resilience of the material investigated, from the moment of application of stress, through all the changes produced by its gradual increase, up to, and especially at, the elastic limit, and then on to the point of final rupture. Frequently, the stress is relieved, and the strain reversed, so far as the elasticity of the piece permits, at intervals both before and after the original elastic limit is passed, in order to ascertain the magnitude and limits of the new limit and modulus of elasticity. Where practicable, autographic records are secured, and a continuous automatically-produced curve of relations of stress and strain—a "stress-strain diagram"—is thus obtained for study and quantitative investigation. Where such a diagram cannot be made of satisfactory completeness and accuracy, the investigator plots his series of observations, and thus produces a similar diagram. Such diagrams, first employed systematically for such purposes by Morin and Tresca, are now universally applied in this work. It is only by their use that a complete history of the deformation and rupture of the piece, and full revelation of its properties, can be secured. Many illustrations of the form and proportions of such diagrams are given in the body of the main article.

Standard forms and proportions of test-piece are obviously essential to work of this character, to insure intelligible results. The forms adopted in the system here followed are as shown in the

* Ibidem; also Thurston's *Materials of Engineering*; *Manual of Steam Engine and Boiler Trials*, etc.

accompanying figures.* The first and second of these forms are the accepted proportions for tests of rolled bars, square and round, as found in the market; the third is adopted for samples from plates and sheets, and the fourth is the standard in form and proportions of a test-piece specially prepared for scientific investigation. The fifth is an old, and now discarded shape of test-piece, formerly in use in all departments of government work. It is valueless for scientific work, as it gives no measure of the ductility or elasticity of the piece from which can be deduced correct values of its moduli.

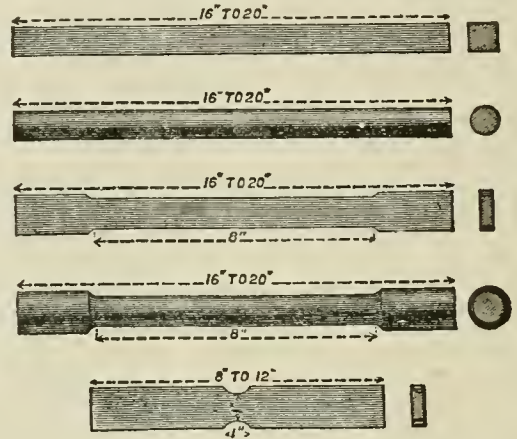


Fig. 1.—SHAPES FOR TEST-PIECES.

The most delicate form of testing-machine, and that usually regarded as best for fine scientific work, is that of Emery, already referred to in the main article. It may properly be here more fully

* Thurston's *Materials of Engineering*, Vol. 11, Fig. 79, p. 389. *Carpenter's Experimental Engineering*, pp. 117, 118.

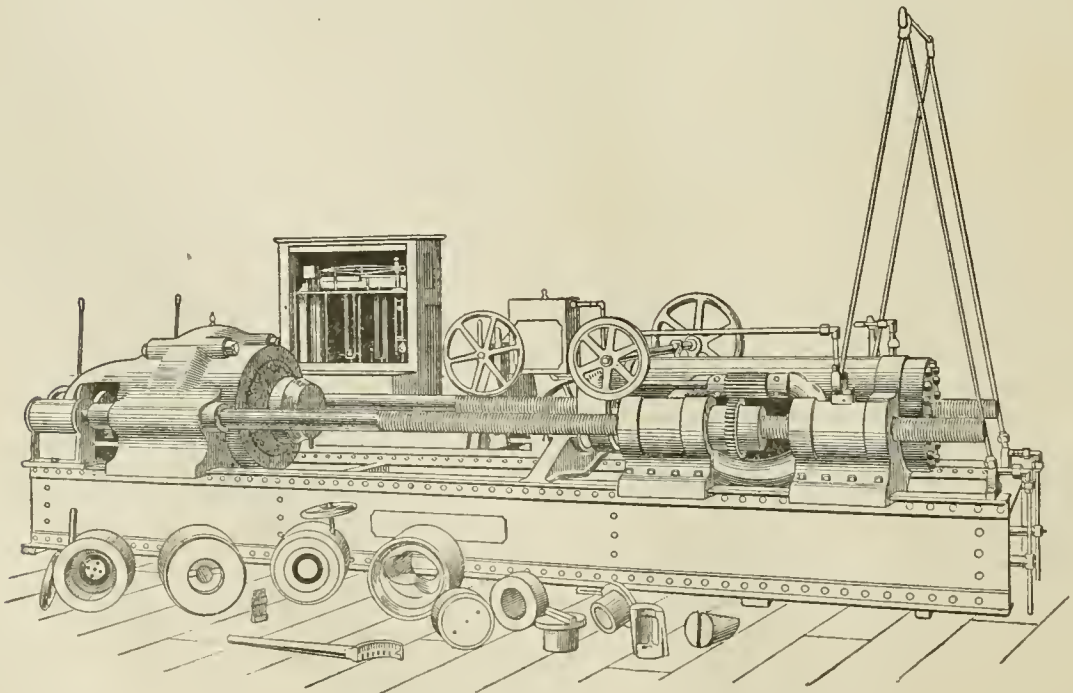


Fig. 2.—260,000-POUND TESTING-MACHINE.—A. H. EMERY.

described. The illustration (Fig. 2) exhibits the general form of the machine employed by the United States government at the Watertown arsenal, and still more perfectly the later construction exhibited at the Columbian Exposition, as above referred to, and now forming a part of the equipment of the mechanical laboratory of Cornell University. The marvelous sensitiveness and accuracy of this machine are indicated by the fact that the makers, Messrs. Sellers and Company of Philadelphia, load to its maximum a 500,000-pound machine, used by them in standardizing, and then find that the addition of 200 grains causes sensible movement of the 20,000 pounds weight of intermediate indicating mechanism, and shows on the needle, which is thus moved 0.02 inch. In the proof of the United States arsenal (Watertown) machine, a bar of iron five inches in diameter was broken by a load of 722,800 pounds, and then a horse-hair 0.007 inch in diameter was broken

holder is secured to it. The draw-bar is enlarged in the middle, and against each of the shoulders thus formed is secured a thin annular steel plate (73) these plates are for the purpose of carrying and centering the hydraulic support, which is made annular. The hydraulic support is maintained in fixed relation with the draw-bar laterally, while it is left free to move relatively to it in the direction of its axis through the small distance required. On each side of the hydraulic support, steel collars (71) are screwed and secured to the draw-bar; these collars are provided in the periphery with a series of ribs (Fig. 3) parallel with the axis of the draw-bar. The ends of these ribs on the two beams and the collars are accurately faced at right angles to the axis of the draw-bar. Movement of the draw-bar, in either direction, carries the hydraulic support against the ends of the ribs in one annular beam; brings the ends of the ribs on one of the collars on the bar against

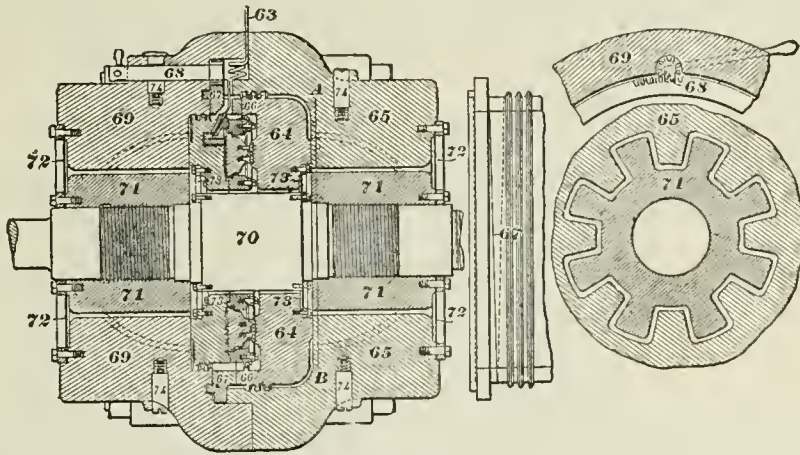


Fig. 3.—WEIGHING-HEAD.

under a load of 16 ounces, and after stretching 30 per cent. The machine is sufficiently well shown as a whole in the engraving. The details of the hydraulic cushion and weighing-head by which pressures are received and transmitted without friction, the fundamental element of the construction, are shown in the next figure.

The indicator-needle has a movement at its point of $1\frac{3}{4}$ " to 2", and this is not less than 300,000 times the movement of the piston in the weighing-head, and may, on large machines, be 6,000,000 times as much. The transfer of fluid is almost imperceptible.

The weighing-head (Fig. 3) consists of two circular or annular beams, 65 and 69, firmly secured together by bolts placed around their periphery and by the straining-screws which pass through both beams and clamp them by a shoulder and nut. A draw-bar (70) is secured in the axis of these beams by two thin annular steel plates (72); these plates hold the draw-bar securely in line with the axis of the machine, while permitting a free motion to a limited extent in the direction of the axis. The projecting end of the draw-bar is provided with a screw-thread by which the compression platform or the tension-

the opposite side of the hydraulic support, and produces pressure on the contained liquid which is transmitted through the pipe (63) to a small hydraulic chamber in the scale.

In order to prevent the shock of recoil from doing injury to the thin brass plates in the hydraulic support, the abutting piece (64) of the support which rests against the ribs in the annular beam (65) when strains of tension are applied is made larger in diameter than the hydraulic support proper, and is divided with a spiral or screw-face (66) which engages with a corresponding screw-face formed on a rotatable ring (67) fitting in the other annular beam (69). After the initial load has been applied, this ring is rotated by the pinion-shaft (68) to bring the screw-faces in contact (see Fig. 1), and the abutting piece (64) is thus clamped firmly to the annular beam against which it rests. When the specimen breaks, its first blow is delivered through the draw-bar and ribbed collar to this abutting piece (64) which transmits it through the ring (67) to the rear annular beam (69) and as these beams (65 and 69) are rigidly united, the blow is absorbed by the total mass of these two beams.

The weighing-head is returned to its place on

the bed after movement due to recoil, by a set of spiral springs locked up in boxes secured to the bed. The annular beams constitute one built-up beam to resist the bending due to the pressure on the draw-bar midway between the straining-screws. The hydraulic support is thus inclosed in a rigid mass of cast-iron, and effectually protected against injury from violence or from being gummed up by oil from the straining-cylinder, and the frictionless movement of this support under all conditions of service is thus insured.

The machine employed in instruction and research in the institution above referred to, when work of a very heavy kind is to be done, and when, especially, autographic registry is desired, is shown in great detail in the accompanying illustration; (Fig. 4.) the reference numbers permitting the tracing of all its parts without difficulty.

The lower cross-head is secured to four screws, and stress is applied by nuts rotated on the screws, driven by toothed wheels and pinions inclosed in the base of the machine; these trains of

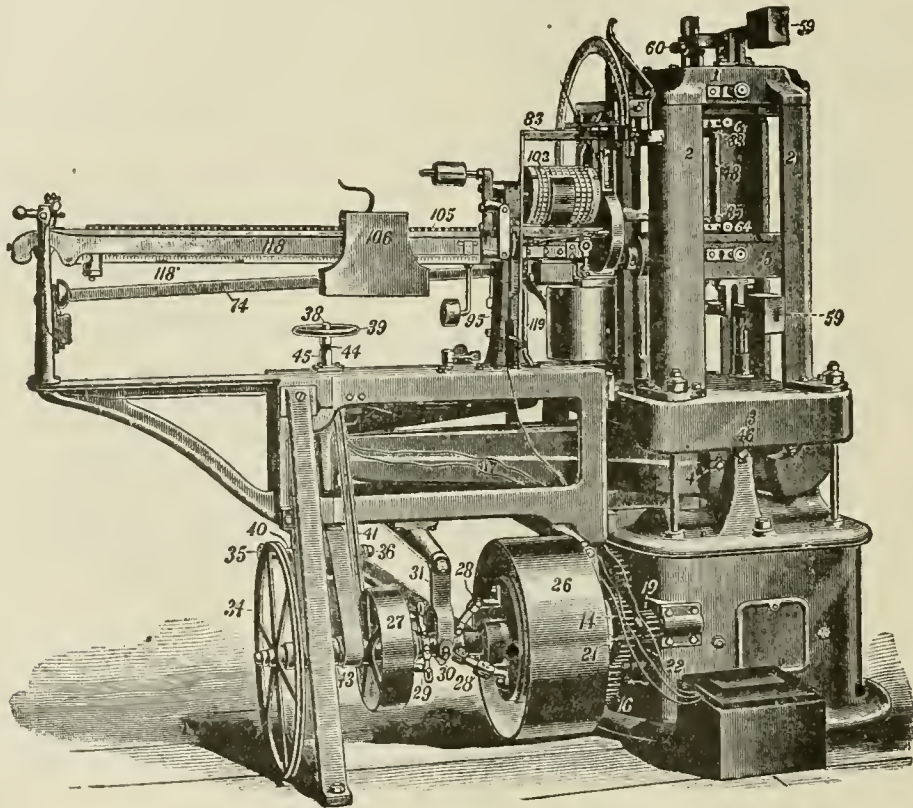


Fig. 4.—300,000-POUND MACHINE. (OLSEN.)

- | | | |
|---|--|--|
| 1. Entablature. | 39. Nut. | 79. Shaft for 78. |
| 2. Columns. | 40. Tilting-bearing. | 81. Pins for holding 79. |
| 3. Platform supporting columns. | 41. Band wheel. | 82, 83. Calipers. |
| 4. Pivots. | 42. Endless band. | 85. Arm of caliper. |
| 5. Lower moving head. | 43. Pulley turning with pulley 27. | 86. Clamps. |
| 14. Spur wheel. | 44. Helical spring. | 87, 88. Upright bars or rods. |
| 16. Idle wheel. | 45. Support for 44. | 95. Cord operating recording-cylinder. |
| 19. Pinion. | 46. Fulcrum of lever 117. | 96. Pulley. |
| 21. Spur wheel on sleeve 22. | 48. Specimen under test. | 97. Lever. |
| 22. Sleeve on driving-shaft. | 64. Collars or clamps for caliper bearing. | 98. Fulcrum to 97. |
| 24. Rock shaft operating lever shifting 22. | 65. Set-screws in 64. | 99. Pulley or sheave. |
| 25. Hand lever operating 24. | 66. Detachable cap on clamps 64. | 100. Drum or winding barrel of 102. |
| 26, 27. Pulleys rotating driving-shaft. | 67. Tenons fitting 66. | 101. Link. |
| 28, 29. Friction clutches engaging 26 with driving-shaft. | 68. Guiding-plates. | 102. Recording-cylinder. |
| 30. Sleeve operating clutches. | 69. Screws to 68. | 103. Pencil. |
| 31. Forked lever controlling sleeve 30. | 70. Nuts to screws 69. | 104. Screw. |
| 32. Shaft. | 71. Washers to 69. | 105. Screws shifting 106. |
| 33. Hand lever operating 30. | 72. Guiding-block. | 106. Poise or weight. |
| 34. Grooved wheel on driving-shaft. | 73. Cam. | 111. Balancing pivot of beam. |
| 35. Small wheel turning 34. | 73'. Handle of cam. | 117. Force multiplying lever. |
| 36. Arbor to 35. | 73". Grooves in clamps 64. | 118. Weighing-beam. |
| 37. Chain. | 74. Lever moving 87. | 118'. Slide to small poise on 118. |
| 38. Adjusting-screw. | 75. Sliding-blocks. | 119. Link. |
| | 76. Supporting guide to 75. | 144. Endless band for moving poise. |
| | 77. Set-screws for 75. | 145. Guiding-pulleys. |
| | 78. Polygonal prism in 75. | 146. Grooved wheel. |

wheels and pinions are propelled by the driving-pulleys. Change of speed is accomplished by changing the back gears by a lever (25) on the front of the machine.

In addition, there are placed on the driving-shaft a large and small pulley, either of which may, by a friction-clutch, be alternately engaged with the driving-shaft. By means of these the shaft can be turned rapidly for the purpose of quickly moving the cross-head into position to receive the specimen, or with less speed and with greater force to apply stress to the specimens. Thus there are four adjustments of speed and force in applying motion to the cross-head. There are two others susceptible of fine graduation and instant control. A large grooved friction-wheel (34) upon the end of the driving-shaft, may at will be turned by a small wheel (35) upon a small shaft in constant motion, and can be pressed into constant engagement and released by the hand of the operator, by means of a nut (39) in a small hand-wheel controlling a screw (38) attached to the bearing of the small shaft, so that the operator can feel and observe the strain as he gradually applies it.

The mechanism used for weighing the strains consists of a table (3) supported on levers, with knife-edge fulcrums. Upon this table the entablature containing the upper cross-head (1) is supported by four columns (2).

The levers for supporting the table and upper cross-head are connected by an intermediate lever and links having knife-edge bearings throughout, to a graduated beam (118), upon which a poise (106) moves outwardly from the fulcrum, propelled by a screw (105), supported in a parallel position on the beam and turned by means of an endless cord that passes to the screw-propelling wheel in a vertical plane coincident with the balancing knife-edge. The engagement and disengagement of the screw-driving wheel with the screw are controlled by an electro-magnet having coils in circuit with electrodes, one of which is located on the outer end of the beam and the other above it; so that whenever the beam rises the circuit is closed, and the poise (106) on the beam moved farther from the fulcrum. Then, as further stress is applied, if the beam again rises, the poise is moved still farther from the fulcrum, increasing the stress.

The mechanism for measuring and recording consists of a pair of clamps or heads (64), secured by pointed set-screws (65) held on the specimen at definite initial distances, and calipers (82 and 83) resting upon these heads, which, by means of intervening mechanism, rotate a diagram-sheet-holding cylinder (102) exactly in proportion to the difference in the motion of the clamps on the specimens, and a pencil (103) resting against and marking the diagram-sheet, traveling in the direction of the axis of the cylinder in exact ratio with the motion of the poise upon the beam.

The pencil is moved by a connected nut engaged in the threads of a screw (104) turned on the screw which operates the poise (106) on the

beam (118), so that the line marked on the paper indicates by its ordinates the stress at each moment, and by the abscissæ the extent of elongation between the points of attachment of the clamps.

The apparatus for adjusting the clamps upon the specimen to be tested consists of a pair of saddles or sliding blocks (75), mounted upon a parallel-sided bar (76), and provided with seats to receive the lower sides of the clamps so as to gauge them as to distance when placing the specimen in them. In conjunction with each saddle there is a set of rotatable gauges (78), eccentric polygonal prisms, which, by being turned to the proper adjustment, support the specimen so that the head center lies in line with the central axis of the specimen.

The figure 5 represents the 100,000-pound machine employed for lighter work than the preceding, and illustrates the elegant design characteristic of the productions of makers in the United States. Its autographic registry is operated by electrical apparatus, and automatically produces stress-strain diagrams which give records of the varying resistances, elongations, resiliences and elasticities up to and beyond the elastic limit. The connections are usually broken only when approaching the breaking-point, and in some instances the final rupture may be safely exhibited.

Directions for use of these machines, as operated in the laboratories of experimental engineering, are the following:

DIRECTIONS.

See that all bearings are in place and everything free and clear.

Balance the beam at zero.

Adjust the position of the traveling-head to suit the length of specimen. Place the specimen in the head-slots, and secure with the wedges, keeping everything central and the wedges equally advanced. Oil the backs of the wedges. If the wedges come through the slot too far, place liners back of them to prevent injury to the mouth of the slot. Allowance must be made for the wedges pulling through somewhat when the pressure is applied.

Have specimens made long enough to extend through the whole width of the holders, top and bottom. If a shorter specimen is used, the wedges spread and break the holders.

There is a great range of speed for testing: use the slowest for compression (where the pressure runs up rapidly), and the quick for pulling out long, ductile material; and the quickest, for setting the head.

Oil all working-parts of the machine, especially the bearings of the vertical gear-shaft in the main box, and the steel anti-friction balls at the thrust-bearing.

The back-gear is only to be used in the fast gear, when setting the head to suit the length of specimen, and is then used in combination with the other quick gear to secure speed adjustment, but not for power.

Note that the friction-gear must only be used in combination with the slow back-gear, and the quick back-gear is only to be used for quick adjustment.

The nuts of each corner of the table, covering the gum recoil cushions, should be set up gently by hand, just so as to feel the table without weighing on the beam to any extent. When balancing the beam these nuts should be loosened.

Use open and cross belts on the pulleys, and see that the belts that pull the head down run on the pulley that has the friction-wheel attached. The pulley should run at about 150 to 200 revolutions.

The standard form of test-piece for general purposes, and as used in these machines, is shown, drawn to scale, in Fig. 6, p. 2805. The proportions are those proposed by a committee of the American Society of Mechanical Engineers.* They advise:

Specimens for scientific or standard tests are to be prepared with the greatest care and accuracy, and turned according to the following dimensions as nearly as possible. The tension test-pieces are to have different diameters according to the

Fig. 6 shows the form of the test-piece recommended for tension; the numbers above the figure give dimensions in millimeters, those below in inches. For *flat test-pieces* the shape as shown in Fig. 7 is recommended: such specimens are to be cut from larger pieces; the fillets are to be accurately milled, and the shoulders are to be made ample to receive and hold the full grip of the shackles or wedges.

The earliest of the autographic registering machines, that known as Thurston's Autographic

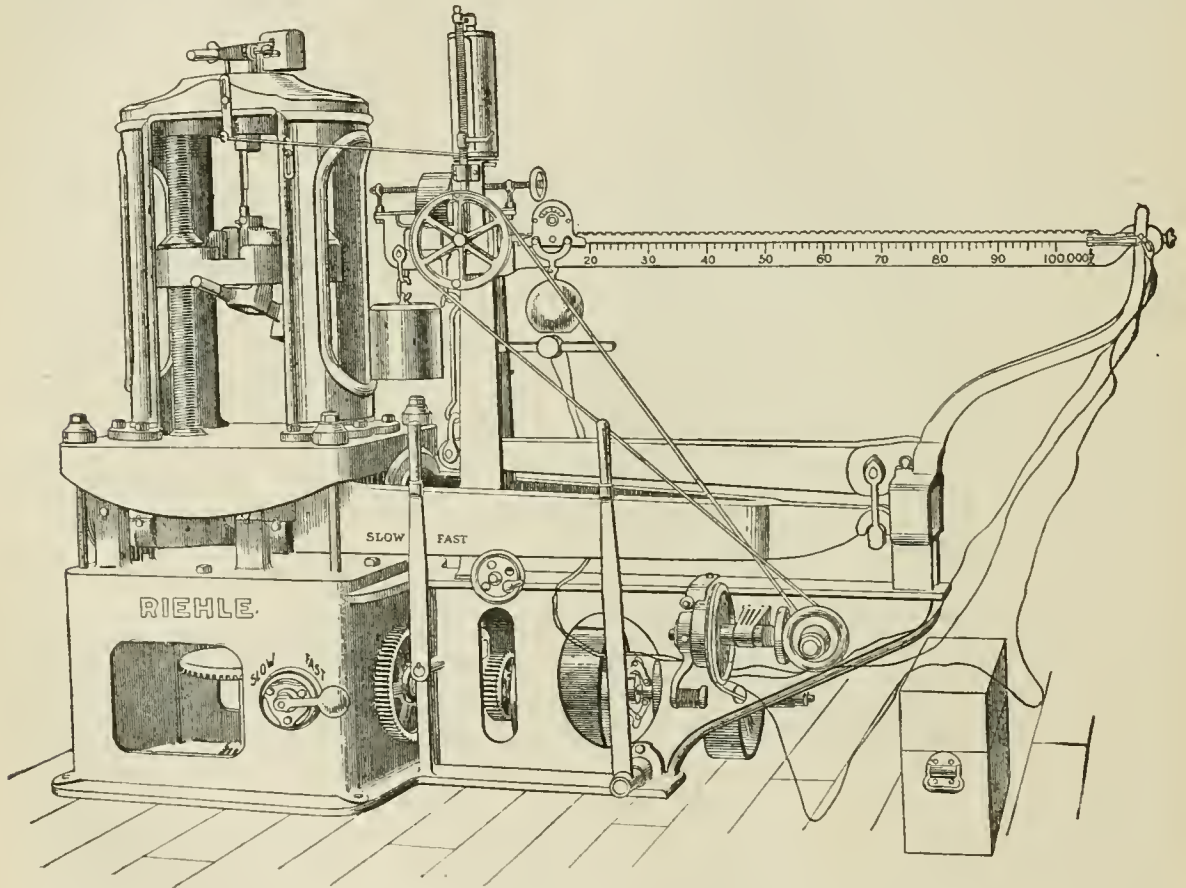


Fig 5.—100,000-POUND MACHINE.—RIEHLE.

original thickness of the material, and to be, when expressed in English measures, exactly 0.4, 0.6, 0.8, and 1.0 inch in diameter; but for all these different diameters the angle and length of the coned neck is to remain the same. This neck is a cone, not a fillet connecting the shoulders and body. The length of the gauged or measured part to be 8 inches, of the cylindrical part 8.8 inches. The length of the coned neck to be $2\frac{1}{2}$ times the diameter, increasing in diameter from the cylindrical part to $1\frac{1}{4}$ times the cylindrical part. The shoulders to have a length equal to the diameter, and to be connected with a round fillet to a head, which has a diameter equal to twice that of the cylinder, and a length at least $1\frac{1}{4}$ the diameter.

* *Transactions*, Vol. XI.

Torsion Machine, is shown in Fig. 8 on page 2805.*

In this machine the power is applied by a crank at one side, tending to rotate the specimen, the specimen being connected at the opposite end to a pendulum with a heavy weight.

The resistance offered by the pendulum is the measure of the force applied, since it is equal to the length of the lever-arm into the sine of the angle of inclination, multiplied by the constant weight. A pencil is carried in the axis of the pendulum produced, and at the same time is moved parallel to the axis of the test-piece by a guide curved in proportion to the sine of the angle of deviation of the pendulum, so that the

* *Carpenter's Manual of Experimental Engineering*, p. 95; *Thurston's Materials of Engineering*, Vol. 11, p. 381, q.v.

pencil moves in the direction of the axis of the specimen an amount proportional to the sine of this angle. A drum carrying a sheet of paper is moved at the same rate as the end of the specimen to which the power is applied. Now if the pencil be made to trace a line, it will move a

any form of automatic mechanism or plotted from the records derived from ordinary work. Such differences as may be apparent are usually due solely to variations in the reactive magnitudes of the vertical and horizontal scales. The characteristic qualities of various materials, as thus

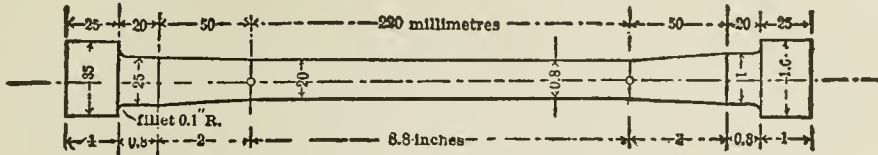


Fig. 6.—STANDARD TEST-PIECE IN TENSION.

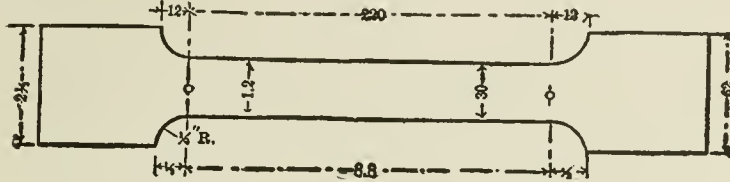


Fig. 7.—TEST-PIECE FOR FLAT SPECIMENS.

distance around the drum which is equal to the angle of torsion (a) expressed in degrees of π measure, and it will move a distance parallel to the axis of the test-piece proportional to the moment of external forces.

developed, are exhibited in the adjacent figure, in which only these characteristics, and not precise measurements, are intended to be shown.*

As drawn, the strain-diagram, $a a'$, is such as would be made by a soft metal like tin or lead; $b b'$ represents a harder, and $c c'$ a still harder and stronger metal, as zinc and rolled copper. If the smallest divisions measure the per cent of extension horizontally, and 10,000 pounds per square inch (703 kilogrammes per square centimeter) vertically, $d d'$, would fairly represent a hard iron, or a puddled or a "mild" steel; while $f f'$ and $g g'$ would be strain diagrams of hard, and of very hard tool steels, respectively.

The points marked e, e' , etc., are the so-called "elastic limits," at which the rate of distortion more or less suddenly changes, and the elevation becomes more nearly equal to the permanent change of form, and at these points the resistance to further change increases much more slowly than before. This change of rate of increase in resistance continues until a maximum is reached, and, passing that point, the piece either breaks, as at f' and g' , or yields more and more easily until distortion ceases, or until fracture takes place, and it becomes zero at the base line, as at X .

Such curves have been called by the author "strain-diagrams."

EQUATIONS OF CURVES OF RESISTANCE OR STRAIN-DIAGRAMS. These curves are, at the start, often nearly parabolic, and the strain-diagrams of cast iron, h, i, k , having their origin at o , are usually capable of being quite accurately expressed by an equation of the parabolic form, as

$$P = A \frac{e}{l} - B \frac{e^2}{l^2}$$

in which $\frac{e}{l}$ is the ratio of elongation to the length

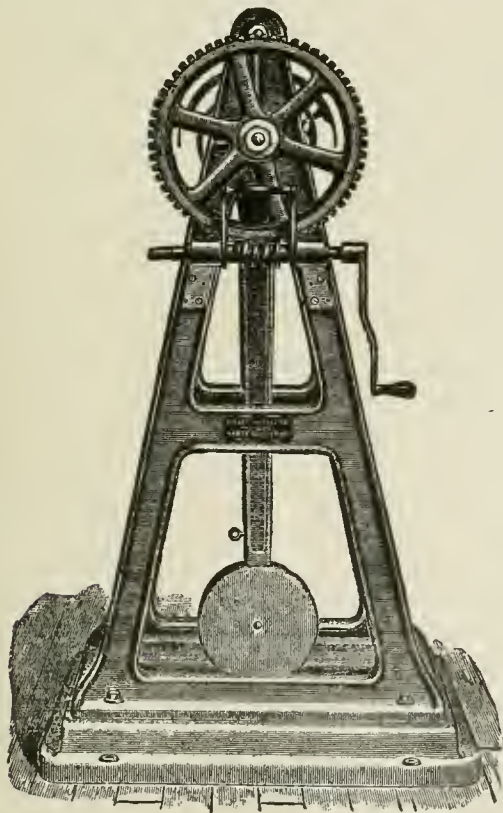


Fig. 8.—THURSTON'S AUTOMATIC TORSION TESTING-MACHINE.

The forms assumed by the stress-strain diagram (Fig. 9.) have been given in the preceding article, and are substantially the same, whether taken by

* Carpenter, p. 140; Thurston, p. 346. For more complete and full-sized diagrams produced autographically, see Thurston's Materials of Engineering, Vol. 11, p. 533, Fig. 98.

of the piece, and P the load per unit of area. The constants may be taken as:

MATERIAL.	A.		B.	
	BRITISH.	METRIC.	BRITISH.	METRIC.
Cast steel ---	14,000,000	984,000	3,000,000,000	211,000,000
Forged iron ---	28,000,000	1,758,000	125,000,000	8,800,000
Soft "steels" ---	28,000,000	1,758,000	125,000,000	8,800,000
Tool steels ---	30,000,000	2,109,000	1,000,000,000	70,300,000
Brass and bronze ----	12,000,000	844,000	50,000,000	3,500,000
Copper-----	10,000,000	703,000	100,000,000	7,000,000

The coefficient A is the modulus or coefficient of elasticity.

Such expressions as that above given, the constants being determined, for each case, by experiment, may be made to represent the method of variation of resistance with increasing distortion with every method of strain. The equations, therefore, the relation between ordinate and abscissa being algebraically expressed, may be made to form a means of integrating the area $\int y dx$, and determining its magnitude.

THE SERIES OF ELASTIC LIMITS. If, at any moment, the stress-producing distortion is relaxed, the piece recoils and continues this reversed distortion until, all load being taken off, the recoil ceases and the piece takes its "permanent set." This change is shown in the figure at $f'' f''$, the gradual reduction of load and coincident partial restoration of shape being represented by a succession of points forming the line of $f'' f''$, each of which points has a position which is determined by the elastic resistance of the piece as now altered by the strain to which it has been subjected. The distance $O f''$ measures the permanent set, and the distance $f'' f''$ measures the recoil.

The piece now has qualities which are quite different from those which distinguished it originally, and it may be regarded as a new specimen and as quite a different metal. Its strain-diagram now has its origin at f'' , and the piece being once more strained, its behavior will be represented by the curve $f'' f'' e^{vi} f'$, a curve which often bears little resemblance to the original diagram O, f, f' . The new diagram shows an elastic limit of e^v , and very much higher than the original limit e^{iv} . Had this experiment been performed at any other point along the line of $f f'$, the same result would have followed. It thus becomes evident that the strain-diagram is a curve of elastic limits, each point being at once representative of the resistance of the piece in a certain condition of distortion and of its elastic limit as then strained.

The ductile non-ferrous metals, and iron and steel, and the truly elastic substances, have this in common—that the effect of strain is to produce a change in the mode of resistance to stress, which results, in the latter, in the production of a new and elevated elastic limit, and in the former, in the introduction of such a limit where none was observable before.

It becomes necessary to distinguish these elas-

tic limits in describing the behavior of strained metals, and, as will be seen subsequently, the elastic limits here described are, under some conditions, altered by strain, and we thus have another form of elastic limit to be defined by a special term.

In this work the original elastic limit of the piece in its ordinary state, as at $e e' e''$, etc., will be called either the *Original* or the *Primitive Elastic Limit*, and the elastic limit corresponding to any point in the strain-diagram produced by gradual, unintermitted strain, will be called the *Normal Elastic Limit* for the given strain. It is seen that the diagram representing this kind of strain is a *Curve of Normal Elastic Limits*.*

Experimental investigations in the mechanical laboratory are directed, in commercial work, to the determination of the qualities of the materials of engineering and construction, and in compliance with specifications and contracts, which usually demand the measurement of the resistances of the material as tabulated below:

TESTS FOR CONTRACTS.

Required test denoted by x .

MATERIAL USED FOR	TENSION.	COMPRESSION.	TRANSVERSE.	TORSION.	IMPACT.	WELDING.	BENDING.	HARDENING.	FORGING.	ABRASION.	PUNCHING.
Railroad—											
Rails -----	x				x		x				
Car-axles -----	x				x		x				
Car-tires -----	x				x						
Shafting -----	x		x	x							
Building—											
Wrought-iron ---	x	x	x			x	x				
Low steel -----	x	x	x				x	x			
High steel -----	x	x	x				x	x			
Boiler—											
Wrought-iron ---											
Plates -----	x		x				x		x		x
Shape-iron -----	x					x	x		x		x
Rivet-rods -----	x						x		x		
Low steels -----	x						x	x	x		
Ship Materials—											
Plates -----	x						x				
Rivets -----	x						x		x		
Wire -----	x						x*				
Wire-ropes -----	x				x†						
Cast-iron -----	x	x					x				
Copper and soft metals -----	x	x					x				
Woods -----	x	x	x								
Stones -----		x	x								

The singular results of exposure to steady loads exceeding the primitive elastic limit of the material, and of their renewal in increasing magnitude, is seen in the diagram, Fig. 10, produced in work carried on by Thurston for the United States Board testing metals (1878). Numbers 596, 599 are brasses; 648-651, inclusive, common wrought-irons.

The co-ordinates are deflections and loads producing them. The full portions of the line are those traced by the observer, by carefully following the indications of the machine; the dotted

*Ibidem.

† Repeat in both directions—also by winding. † Longitudinal.

parts indicate those portions of the curves which lie between the points at which the special studies in minute detail were made for the purpose of this special investigation. In each case, the load is applied, in amount coincident with the momentary value of the elastic limit of the already strained piece. It is left until yield ceases; when a new load, equal to the newly produced elastic limit, is applied, with similar result. In every case the metal yields slowly, and to a limited extent, when the bar is found to possess a new and exalted limit of elasticity. Under a load equal to

become stiffer, and even, in some cases, apparently stronger for the rest under load. The two classes behave in opposite ways, and this peculiar difference makes the first class more, and the second less, safe in construction than would otherwise be the fact.*

The fact here exhibited has this result: that it is not safe to load the non-ferrous metals as heavily as the irons and steels, and the practical outcome of the researches of which these facts are one product is that an apparent factor of safety of *two* is actually a factor of safety of *one*,

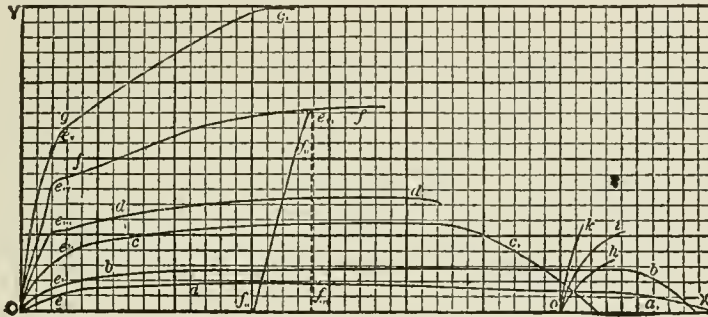


Fig. 9.—STRESS-STRAIN DIAGRAM.

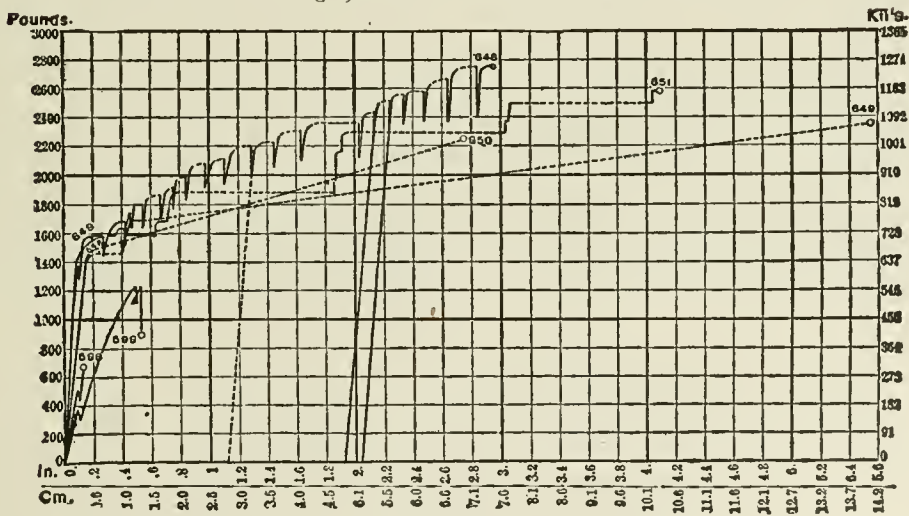


Fig. 10.—VARIATION OF ELASTIC LIMITS. (THURSTON.)

this temporary, elastic limit, a new yield occurs, to a limit higher than the preceding, and a new and still higher pair of elastic limits—the one temporary and the other apparently permanent—is produced. In the case of the irons and steels, it was found that this process goes on indefinitely, up to the breaking load of the bar; while, with the bronzes and brasses, a point is promptly reached at which steady yielding goes on until, finally, fracture takes place.

It was found that, in the case of the irons and the steels, the strain gave rise to an exaltation of the normal series of elastic limits; while with the non-ferrous metals, a depression occurs. If held strained, the latter class gradually loses power of resistance, and will, if heavily loaded, finally break; the former under the same conditions, accommodate themselves to the distortion and

and a double figure should be employed in designing, as below.†

MAXIMUM STRESSES FOR METALS.

MATERIAL USED.	FACTOR OF SAFETY.		MAXIMUM STRESS.			
			DEAD LOAD.		LIVE LOAD.	
	DEAD Load.	LIVE LOAD.	Lbs. per sq. inch.	Kgs. per sq. cm.	Lbs. per sq. in.	K per sq. cm.
Good iron (large)----	2	4	20,000	1,406	10,000	703
Copper, cast-----	4	8	5,000	352	2,500	176
Copper, forged-----	4	8	15,000	1,055	7,500	528
Copper, wire-----	4	8	16,000	1,125	8,000	563
Gun-bronze, cast----	4	8	10,000	703	5,000	352
Brass, yellow, cast---	4	8	5,000	352	2,500	176
Brass, yellow, rolled-	4	8	10,000	703	5,000	352
Brass, yellow, wire--	4	8	12,000	845	6,000	423
Lead, rolled-----	4	8	1,000	70	500	35

*Materials of Engineering, Vol. 11, p. 598.
†Ibidem, p. 562.

INCREASE OF DEFLECTION WITH TIME IN TRANSVERSE TESTS OF BARS OF METAL

RATE OF SET OF BARS, 1 INCH SQUARE 22 INCHES, BETWEEN SUPPORTS.

ROBERT H. THURSTON.

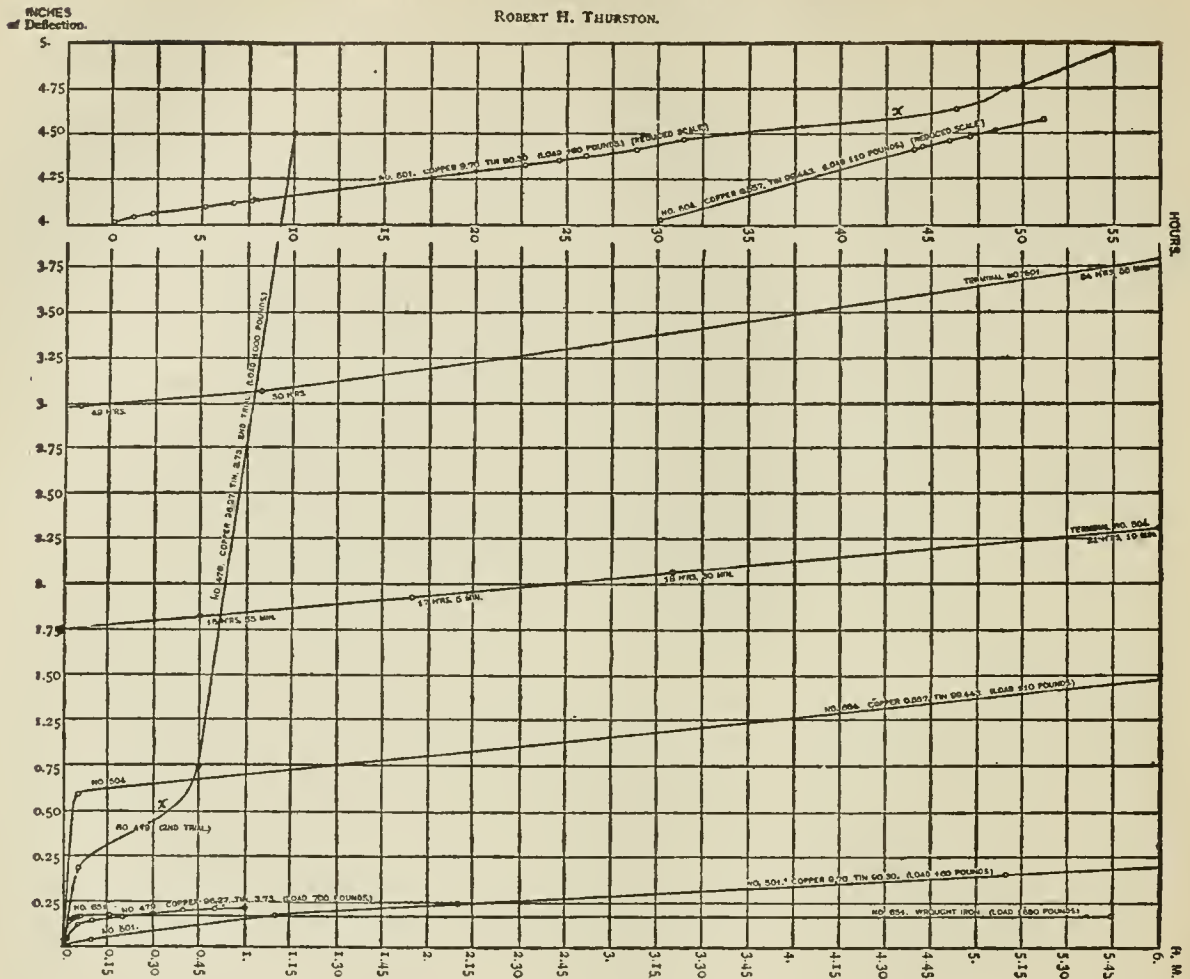


Fig. 11.

When the stresses are reversed, as in connecting and piston rods, the factor of safety should be doubled and the maximum stresses reduced at least one-half.

For the best irons, in small sections, these figures may be increased somewhat, and, in the steels, the primitive elastic limits may be approximated. As already seen, the non-ferrous metals should not be loaded, even with an absolutely "dead" load, to above one-half their primitive apparent limits of elasticity.

Simple stresses may, with time, produce what were, when the facts were discovered, considered surprising effects in destruction of materials; effects differing, both in degree and in kind, with different materials. Thus, in the figures 11 and 12, we have the effect shown of, first, holding a bar of metal at a constant deflection, observing its variation of resistance with time; secondly, of loading a bar with a constant weight and observing its change of deflection with time. The bars tested are of iron, of brass and of bronze, prepared, originally, for the United States Board testing metals in 1876-78.*

* Transactions American Society Civil Engineers, 1876.

It is seen that iron behaves—as does also steel—radically differently from the alloys; although all show a falling-off of elastic effort to regain their original form and line. On releasing the bar and repeating the experiment, it is seen that the iron has assumed a considerably higher elastic limit, and a vastly decreased rate of loss of resistance, when left thus strained. The other bars show this effect, but in much less degree. Under constant load, also, deflection steadily increases, in the case of the alloys, and rupture in the end takes place, though the load is far within the rupturing-loads of ordinary tests, and well down toward the primitive elastic limit. Under constant deflection Bar No 591 actually broke at a load of 911 pounds, after about two hours' stress and after falling off from a maximum of 1,233 pounds. No. 648 carried, as a maximum, 1,000 pounds; its second loading was 1,600 pounds. No. 655, tin, carried 100 pounds; No. 599 sustained 1,233; Nos. 561 and 612, respectively, 160 and 800 pounds. The latter finally broke under a load less, by 25 per cent, than the maximum previously sustained.

Referring to the second set, No. 651 was a bar

DECREASE OF RESISTANCE WITH TIME IN TRANSVERSE TESTS OF BARS OF METAL.

RATE OF SET OF BARS, 1 INCH SQUARE, 22 INCHES BETWEEN SUPPORTS.

ROBERT H. THURSTON.

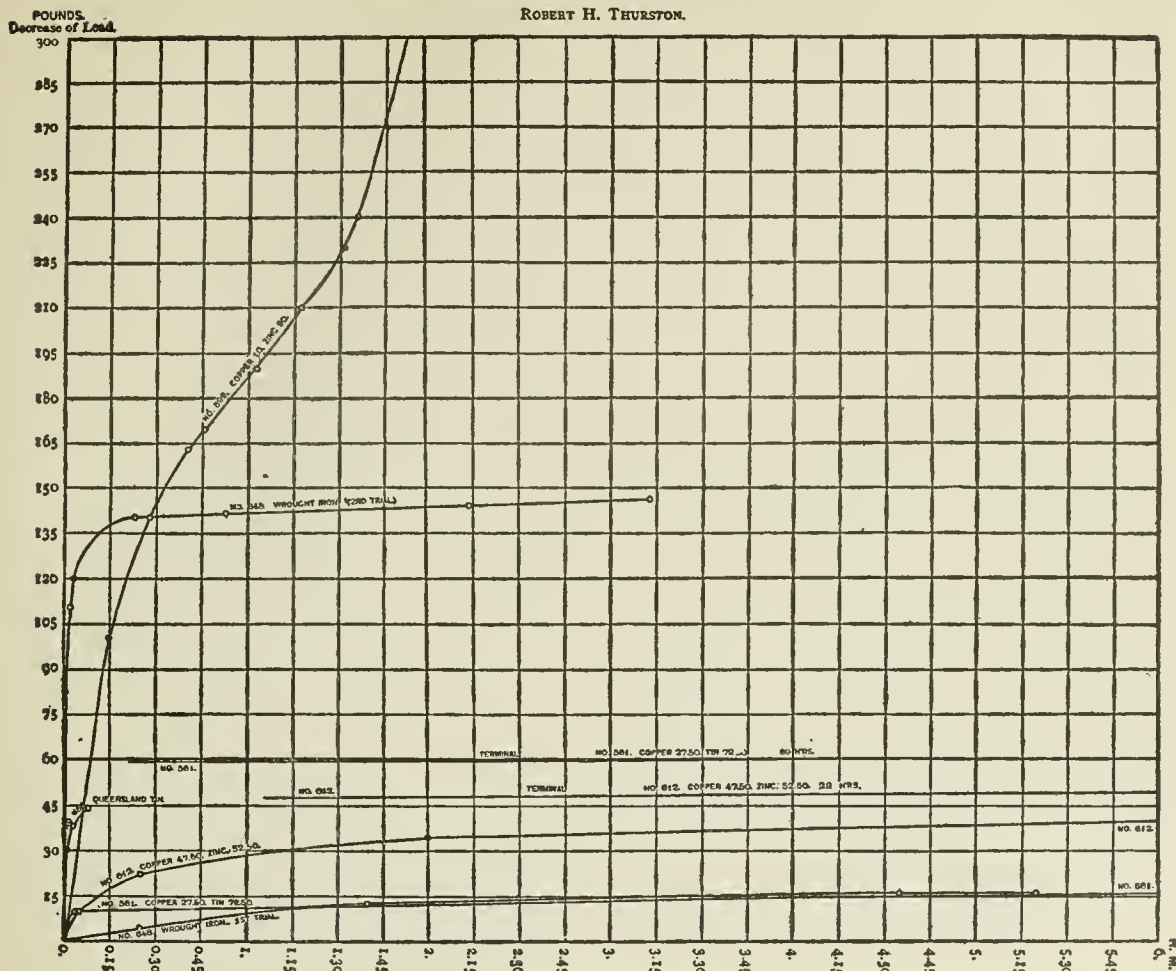


Fig. 12

from the same piece with No. 648. Its deflection rapidly increased for six minutes, became unobservable in the next ten minutes, and remained thus for 344 minutes. The set was then permanent under a load of 2,587 pounds. It broke when tested to rupture, later, at 2,589 pounds, deflecting 4.66 inches. No. 479 carried 700 pounds in its first trial, 1,000 in its second, and broke under the latter after 1¼ hours. No. 479 carried 700 pounds and 1,000 with similar results. No. 504 carried 110 pounds 21 hours. No. 501 sustained 160 pounds 2½ days and broke.* Thus certain classes of metals, as ordinary iron and steel, when subjected to strain and distortion by a force exceeding the resistance of the material within the elastic limit, take a set and are stiffened by that act, and exhibit an exaltation of the elastic limit. It was also shown that other classes, like tin and similarly viscous and ductile materials, exhibit flow and a depression of their limits of elasticity when similarly treated. It was further shown that the former class when

subjected to loads, even approaching their ultimate strength, took a certain set and remained apparently indefinitely without further distortion; while the second class, under very moderate loads, frequently exhibited a gradual yielding, a progressive distortion, until fracture took place, sometimes under stresses which were but a fraction of those which were found required to break such metals quickly, and when time was not allowed for flow to occur. It was noted that increase of rapidity of distortion and fracture produced increase of resistance in the latter, or "tin-class," and decrease of resisting power in the first, or "iron-class," and *vice versa*.

The study of the behavior of the iron and steels at and near the elastic limit was recognized at an early date as one of the most important, though difficult, of the directions of research to be undertaken by the engineer in this department. Wöhler's work in 1871 showed that repeated loading would invariably break the piece, though under stresses far within the limit of rupture under single stresses; though a bar thus stressed, if under a certain limit, fixed for each material and quality, would bear repeated loading indefinitely. Ac-

*Transactions of the American Society of Civil Engineers, CXXIII. Note on the Resistance of Materials as Affected by Flow, and by Rapidity of Distortion, Vol. V, p. 199; also Van Nostrand's Engineering Magazine, September, 1876; and Engineering (London), Dec. 29, 1876.

cepting Bauschinger's definition of the elastic limit as that point at which the strain ceases to retain a constant ratio to stress, it is found that this limit, once supposed constant, is a variable quantity and may be raised and depressed with alternation of load-stress and may be "exalted" by strain. Heavy loading in tension, for example, lowers the elastic limit in compression, and the reverse is also true. The limit of permanent elastic resistance and resilience is found considerably below the apparent limit of the metal as it comes from the mill, and fracture may occur under repeated reversed strains under loads below the latter and approximating the former of these limits. An apparent factor of safety of two is really a factor of safety of perhaps a trifle over one in such cases.*

By such apparatus and by such methods as have been described, it has been found that iron and steel, once overstrained, carry permanently a record of that fact, and of the maximum stress, in their exalted elastic limits. Every strain raises the elastic limit of the material, at the section strained, to a point which measures that load. A structure broken down by overload, at any point, carries this record in its several strained members, and in some cases it is possible to trace the cause of accident and the magnitude of the loads brought upon the structure thus destroyed. The following are figures representing such a case, where a bridge broke down under a passing train with resulting loss of life as well as of property. Samples taken from points near to and remote from the break gave, on test, figures substantially as below:*

TESTS OF BRIDGE IRON.

	ELASTIC LIMIT.	TENACITY.
Sample No. 1-----	16,500	46,000
Sample No. 2-----	18,000	48,000
Sample No. 3-----	30,000	48,000
Sample No. 4-----	22,500	50,000
Sample No. 5-----	25,000	52,000
Sample No. 6-----	27,500	52,000
Sample No. 7-----	28,000	52,000
Sample No. 8-----	30,000	52,000
Sample No. 9-----	32,000	53,000
Sample No. 10-----	34,000	53,000

The extension ranged from ten to fifteen per cent in the overstrained members, showing the higher final elastic limits. All were bridge-bolts, and the break occurred in the bottom of the thread, at the end of the bolt most strained, leaving a record of stresses in the body of the rod, constituting a statement of the extent of the overload, and of the cause of the disaster. The lowest figures for elastic limits were given by rods most remote from the point of overloading.

It is at once seen that the ordinary loads on the bridge had not exceeded about sixteen thousand pounds per square inch on the main rods; that the accident resulted from a load which,

while rupturing the bars most strained under their nuts and locating the point of first breaking, strained those, and others more or less remote, to the amounts read off in the table. It is probable that a similar investigation would sometimes reveal the location and cause of incipient rupture in cases of boiler explosion.*

The effects of orthogonal strains modifying the primitive elastic limits of materials are observed in other than the original directions of stress, and an exaltation of the primitive limit by tension produces similar effects in transverse and torsional directions, while every other form of stress affects the original limit in tension. This is beautifully shown by the illustrations in figure 13, p. 2811. In each case the piece was subjected to a strain beyond the primitive elastic limit, one by tension, one by transverse loading, one by torsion, one by compression. The effects were localized by at first turning down the test-piece for a single inch at its middle. Each was then turned down over a length of ten inches, and all were finally tested by tension and left, as shown, drawn down considerably but not broken. In every case the yielding occurred at a point not previously strained, and the earlier strain was located by the fact that the metal refused to yield at such strained points, and they were left larger in diameter than the rest of the body of the test-piece.

"Iron and steel rods broken by tension were found to have their transverse elastic limits abnormally elevated, and to have become very stiff and of comparatively slight ductility." Lateral compression, as by cold-rolling, produced "great increase of strength and stiffness, and an even more considerable exaltation of the normal elastic limit. Torsion similarly stiffened wires and rods longitudinally, and test-pieces longitudinally strained became stiffer against torsionally and transversely applied stress." It was concluded that "thus orthogonal strains mutually affect orthogonal resistances of metals, and the engineer is, by this fact, compelled to study these mutual influences in designing structures in which the stresses approach, or may exceed, separately or in combination, the normal primitive elastic limit of his material."

The principle thus revealed, and which is likely to prove of such importance to the engineer, may be enunciated thus:

If a metal be subjected to a stress of any given kind, or in any stated "sense," sufficient to produce permanent strain and set, then its ultimate resistance to that, or to any other kind of stress, will be sensibly increased, and in all directions, whatever the line of action of the deforming stress.*

A study of the characteristics of the various alloys of copper, tin and zinc, by a systematic process of exploration, has revealed the fact that there exists a series of these "kalchoids," or ter-

* *Transactions of the American Society of Civil Engineers*, Dec. 6, 1876.

* *Transactions of the American Society of Civil Engineers*, 1878; No. CLVIX.

* *Ibidem*.

* *Transactions of the American Society of Civil Engineers*, December, 1876; March, 1878; April, 1880; March, 1891. *Materials of Engineering*, Vol. II, p. 1.

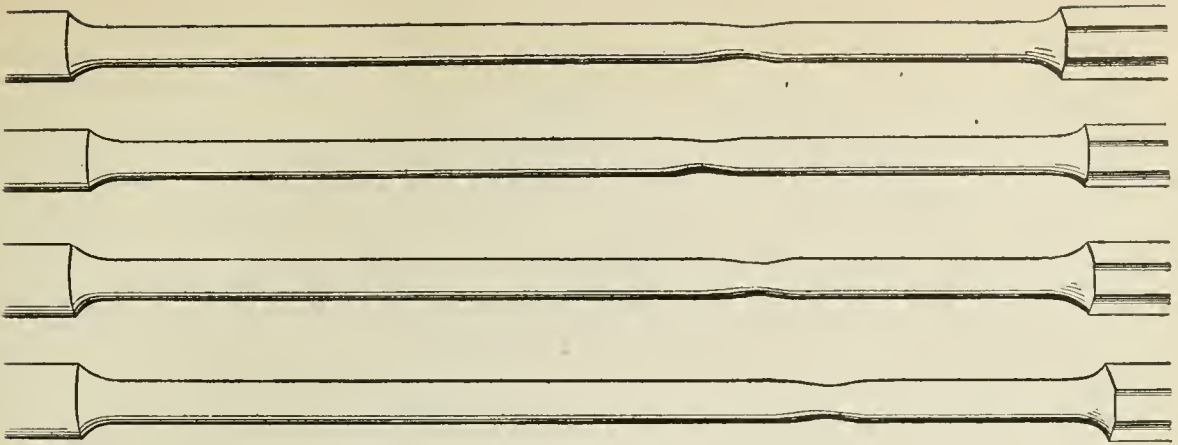


Fig. 13.—ORTHOGONAL STRAINS, EFFECTS OF.

nary alloys, which have maximum strength, and that gradation from maximum to minimum occurs in all directions; and further, that the same is true of the binary alloys of which these metals are the elements. Thus, in figure 14, an equilateral triangle is formed, and on this plane it is assumed that each apex, as indicated, represents one hundred per cent of one element of the three; that the distance from that apex to the opposite base measures, point by point, proportions in the alloy similar to the proportion of that perpendicular represented on the triangle by the distance of that point from the base. Thus, it will be found, on

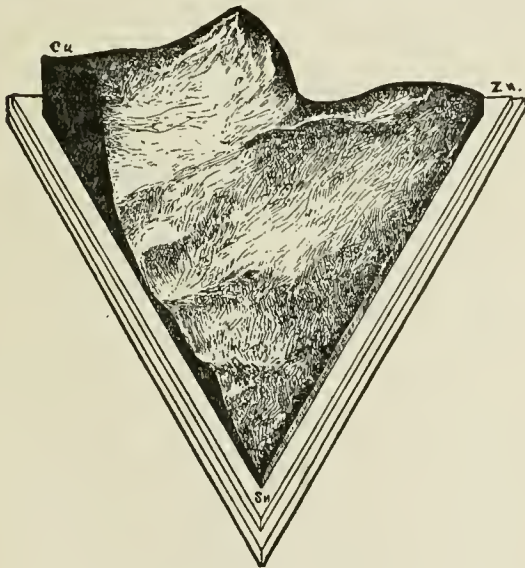


Fig. 14.—MODEL OF STRENGTH OF ALLOYS.

examination, that every point on the plane stands for a certain alloy, of which the proportions are indicated by the distance of that point from the three bases, respectively. All possible alloys of three elements may thus be represented, and no possible alloy can fail of finding its representative point.*

The peak seen in figure 14, which is made from

* *Transactions of the American Association for the Advancement of Science*, 1881; *Journal of the Franklin Institute*, 1883; *Trans. A. S. C. E.*, 1881. *Thurston's Materials of Engineering*, Vol. III; *The Alloys*.

the model thus constructed by raising a perpendicular to the triangular base proportional to the strength of the composition represented by the point at its foot, shows the location and the extraordinary strength of the "maximum metal." The highest points in the nearer edge represent gun and speculum metals, and the maximum kalchoid may be compared with those well-known compositions. The highest point in the farther edge, concealed by the peak, is Munz metal, the strongest of the brasses, which is, nevertheless, a much weaker alloy than the mixture, copper 57, zinc 42 and tin 1; the maximum, and the strongest of all bronzes. It is a close-grained alloy, of rich color, fine surface, and takes a good polish. It oxidizes with difficulty, and the surface then takes on a pleasant shade of statuary bronze-green. Testing it, it was found to have considerable hardness, but moderate ductility, though tough and ductile enough for most purposes; it would forge if handled skillfully and carefully, and not too long or too highly heated; had immense strength, and seemed unusually well adapted for general use as a working quality of bronze. In composition, however, it is seen to be a brass, with a small dose of tin. The alloy made as representing the alloy for purposes demanding toughness as well as strength, contains less tin than the above composition, Cu 55, Sn 0.5, Zn 44.5. It had a tenacity of 68,900 pounds per square inch (4,841 kilogrammes per square centimeter) of original section, and 92,136 pounds (6,477 kilogrammes) on fractured area, and elongated 47 to 51 per cent, with a reduction to from 0.69 to 0.73 per cent of its original diameter. No exaltation of the normal elastic limit was observed during tests made for the purpose of measuring it if noted. This alloy was wonderfully homogeneous, two tests by tension giving exactly the same figures, 68,900. The fractured surface was in color pinkish-yellow, and was dotted with minute crystals of alloy produced by cooling too slowly. The shavings produced by the turning-tool were curled closely, like those of good iron, and were tough and strong. This alloy and the "Tobin alloy," Cu 58.22, Sn 2.30, Zn 39.48, are good working-metals, the latter being capable of

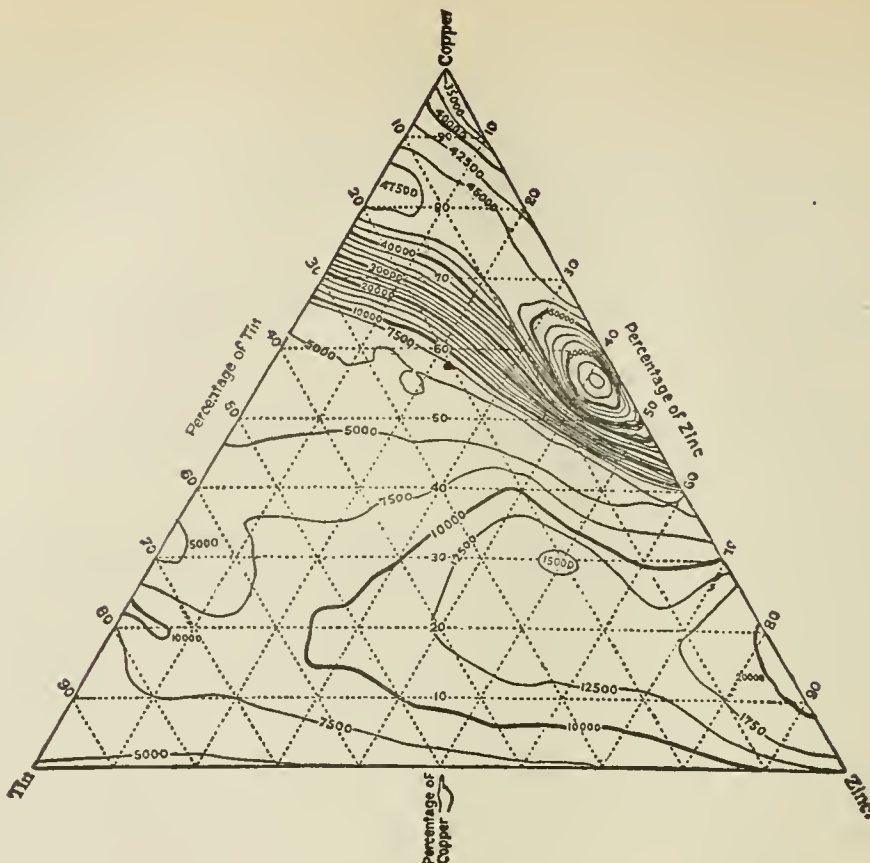


Fig. 15.—COPPER-TIN-ZINC ALLOYS.

great improvement by skillful working, either hot or cold, and thus of obtaining a tenacity of over 100,000 pounds per square inch (7,311 kilogrammes per square centimeter)

The model represented in figure 14 illustrates a system of representation of results of researches, like that just described, that may have many valuable applications. It is seen that the edges also give the variations of the studied characteristics of alloys of two metals; and any similar interdependent pair or triplet of values, or conditions, may be similarly represented. The same may be done by a "contour map," as shown in figure 15 above, in which we have that of the topography of the model in figure 14.* The contour lines are here lines of equal strength, and these may be laid down either from the original observations or from the model, as in this case.

Researches, such as have been described, constitute the work, in large part, of the engineering laboratories of all technical schools and of the public-works departments of cities and governments, and especially of the army and navy departments in their ordnance and engineering bureaus. Such work has developed marvelous qualities in the metals employed in construction, and particularly in ordnance. The United States testing department at the Watertown Arsenal, employing the Emery testing-machine here illus-

TEST-PIECE: 4988; 0.564" BY 3".

APPLIED LOADS.		ELONGATION PER INCH.	SUCCESSIVE ELONGATION PER INCH.	PERMANENT SET.	SUCCESSIVE PERMANENT SET.	REMARKS.
Total.	Per Square Inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	Initial 'e
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000067	.000067	-----	-----	
2,500	10,000	.000300	.000233	-----	-----	
5,000	20,000	.000633	.000333	-----	-----	
7,500	30,000	.000967	.000334	-----	-----	
10,000	40,000	.001333	.000366	0.	-----	
11,000	44,000	.001400	.000067	0.	-----	
11,250	45,000	.001467	.000067	-----	-----	
11,500	46,000	.001533	.000066	-----	-----	
11,750	47,000	.001567	.000034	-----	-----	
12,000	48,000	.001600	.000033	-----	-----	
12,250	49,000	.001633	.000033	-----	-----	
12,500	50,000	.001667	.000034	-----	-----	
12,750	51,000	.001667	0.	-----	-----	
13,000	52,000	.001700	.000033	-----	-----	
13,250	53,000	.001733	.000033	-----	-----	
13,500	54,000	.001767	.000034	-----	-----	
13,750	55,000	.001833	.000066	-----	-----	
14,000	56,000	.001900	.000067	-----	-----	
14,250	57,000	.001967	.000067	-----	-----	
14,500	58,000	.002000	.000033	-----	-----	
14,750	59,000	.002067	.000067	-----	-----	
15,000	60,000	.002233	.000166	-----	-----	Elas. limit.
15,250	61,000	.002400	.000167	-----	-----	
15,500	62,000	.002933	.000533	-----	-----	
15,750	63,000	.004067	.001134	-----	-----	
16,000	64,000	.005533	.001466	-----	-----	
24,650	98,600	.051833	-----	-----	-----	Ten. str'th

* Reports of United States Board testing Iron, steel, etc.; Washington, 1878-81. *The Strongest of the Bronzes*; R. H. Thurston. *Transactions of the American Society of Civil Engineers*, 1881, No. CCXLV.

Reduction in diameter at point of rupture114
 Reduction in area after rupture, per cent of original section 36.4
 Character of broken surface granular, 60 per cent; silky, 40 per cent
 Elongation of inch sections ".28", ".14", ".13

trated, as constructed for the use of the United States Board testing metals, and which was strangled by refusal of appropriations before it had fairly commenced its work, is doing much work of this kind. Its reports are issued annually by the Ordnance Bureau of the War Department. As an illustration of the method of work and of the extraordinary results attained, we give the record of a sample of gun-steel intended for the jacket of an 8-inch B. L. rifle:*

Such steels, as investigation plainly shows, have not endurance at all proportioned to their strength and high elastic limits. Thus, it is found that 35,000 to 40,000 pounds per square inch represents the limit of safe loading for repeated stresses, indefinitely carried, even though the elastic limits exceed 80,000 pounds. Here again, as has been seen elsewhere, an apparent factor of safety of one half is really a factor of about one for repeated loading.

R. H. THURSTON.

STREPSIPTERA. See *Heteromera*, under INSECTS, Vol. XIII, p. 149.

STREPTONURA. See MOLLUSCA, Vol. XVI, p. 645.

STRESSES. See STRENGTH OF MATERIALS, Vol. XXII, pp. 594, 595.

STRICTURE, a contraction of a tube, duct or orifice, as of any part of the alimentary canal or urinary passages. Stricture of the œsophagus may result from inflammation, the action of caustics, or the pressure of adjacent tumors. Or spasm of the muscular walls of the œsophagus may cause stricture. Stricture of the intestines may result from ulcerative diseases, or from a matting together of the bowel from tubercular or other forms of peritonitis. Stricture of the urethra is common in persons of advanced age, and may be caused at any time by traumatic injuries or inflammation of adjacent tissues. The muscular tissue surrounding the canal may spasmodically contract from reflex irritation or from the presence of calculi in the canal. Urethral stricture is also produced by the contraction of scars following an injury, or by long-continued inflammation of tissues following gonorrhœa. The symptoms of urethral stricture are more or less difficulty in passing urine, pain, and sometimes the retention of urine. When the stricture is complete, other means failing, a surgical operation only can bring relief. The causes of stricture are so numerous and the affection itself may be so complicated that no form of treatment can here be stated. The physician or surgeon only can be relied on.

STRIGES. See OWL, Vol. XVIII, pp. 88, 89.

STRIKE. See GEOLOGY, Vol. X, p. 298.

STRIKES AND LOCKOUTS. See UNITED STATES, in these Supplements.

STROBILATION. See HYDROZOA, Vol. XII, p. 553.

STROMBIDIUM. See PROTOZOA, Vol. XIX, p. 862.

STROMBOLI. See LIPARI ISLANDS, Vol. XIV, p. 683.

STRONG, AUGUSTUS HOPKINS, an American clergyman and educator; born in Rochester, New York, Aug. 3, 1836. After graduation at Yale he studied at Rochester Theological Seminary, where he graduated in 1859. He was ordained a minister of the Baptist Church in 1861; was stationed at Haverhill, Massachusetts, and Cleveland, Ohio; and was called from the last-named place in 1872 to the presidency of Rochester Theological Seminary. He also held the chair of Biblical theology, and was the author of *Systematic Theology* (1886); and *Philosophy and Religion* (1888).

STRONG, JAMES, an American classical scholar; born in New York City, Aug. 14, 1822. Delicate health compelled him to give up the study of medicine, and later, teaching. He took up his residence near Flushing, Long Island, where he became interested in several public enterprises, among them the Flushing railroad. Recuperated strength enabled him to engage in teaching again. In 1858-61 he was professor of Biblical literature in Troy University, and in 1868 until his death was professor of exegetical theology in Drew Seminary. In 1874 he traveled in Palestine and Egypt. He is best known on account of his publications, among which are *Harmony in Greek* (1854); and *Cyclopædia of Biblical, Theological and Ecclesiastical Literature* (1867-81, 10 vols.). He died in Round Lake, New York, Aug. 7, 1894.

STRONGYLIDÆ. See NEMATOIDEA, Vol. XVII, p. 325.

STROUDSBURG, a borough and the capital of Monroe County, eastern Pennsylvania, on Broadhead Creek, and on the New York, Susquehanna and Western and the Delaware, Lackawanna and Western railroads, 24 miles N. of Easton. The borough is situated in an attractive region devoted to agriculture, has excellent water-power, and contains an emery-wheel factory and manufactories of woolen goods. The Delaware Water Gap is 4 miles S. E. of Stroudsburg. Population 1890, 2,419; 1900, 3,450.

STRUMA. See SCROFULA, Vol. XXI, p. 554.

STRUTHIONIDÆ. See OSTRICH, Vol. XVIII, p. 62.

STRUTT, JOHN WILLIAM. See RAYLEIGH, BARON, in these Supplements.

STRUVE, OTTO WILHELM, a Russian astronomer; born in Dorpat, Russia, May 7, 1819. His father was Friedrich Georg Struve, director of the Pulkowa Observatory. He became his father's assistant, and after the death of the latter, succeeded to the directorship. He discovered a satellite of Uranus in 1847, and during his term of office over five hundred double stars. He wrote numerous astronomical papers, among which are *Observations of Biela's Comet in 1852*; *Measurements of Double Stars*; and *Determination of the Constant of Precession*.

STRYCHNINE. See POISONS, Vol. XIX, p. 279.

STRYCHNOS. See NUX VOMICA, Vol. XVII, p. 687

* Tests of Metals: 1894.

STUART, a town of Guthrie County, southwestern central Iowa, 100 miles E. of Omaha, Nebraska, and 41 miles W.S.W. of Des Moines, on the Chicago, Rock Island and Pacific railroad. It is situated in a fertile prairie region, and has large locomotive and machine shops. Population 1890, 2,052; 1900, 2,079.

STUART, ARABELLA. See STUART, Vol. XXII, p. 610.

STUART, JAMES EWELL BROWN, an American soldier; born in Patrick County, Virginia, Feb. 6, 1833. He graduated at West Point in 1854, and spent the next seven years in the cavalry service in Texas and Kansas. At the beginning of the Civil War he held a captaincy, which he resigned to take charge of a Confederate cavalry regiment in Virginia. He took part in the battles of Bull Run, Antietam and Fredericksburg, and conducted raids through the



GEN. J. E. B. STUART.

Shenandoah Valley and into Pennsylvania. He arrived too late to participate in the battle of Gettysburg, but covered the retreat. He was appointed a major-general and assigned to the command of the cavalry of Lee's army. In the battles of the Wilderness he rendered effective service. His last engagement was with Sheridan at Yellow Tavern, Virginia, in which he was defeated and mortally wounded. He died in Richmond, Virginia, June 12, 1864. His loss was a severe one to the Confederacy, as he ranked foremost among the cavalry generals of the Civil War.

STUART, MOSES, American clergyman and classical scholar; born in Wilton, Connecticut, March 26, 1780. He was educated at Yale, where he remained for some time as a tutor; began the study of law, but abandoned it for theology; was ordained as pastor of a Congregational church at New Haven in 1806, and from 1810 to 1848 was professor of sacred literature at Andover. He determined to publish a Hebrew grammar, but found himself confronted with the difficulty of no type, and also no compositor able to set the type when obtained. He was obliged to set the type himself. He afterward published a number of classical and miscellaneous works. Among them are *Grammar of the Hebrew Language* (1821); *Grammar of the New Testament Dialect* (1834); and *Hints on the Interpretation of Prophecy* (1842). He died Jan. 4, 1852, in Andover, Massachusetts.

STUART, RUTH McENERY, an American writer; born in Avoyelles Parish, Louisiana, May 21, 1849; the daughter of James McEnery. She received but little education, owing to the condition of Southern schools immediately after the Civil War; in 1879 married Alfred O. Stuart, a planter of Arkansas. Her first stories appeared in 1888, in the *New Princeton Review* and *Harper's Magazine*. In later years she contributed to *The*

Century Magazine. Her stories have been collected in bound form under the titles *A Golden Wedding, etc.* (1893); *Carlotta's Intended* (1893); *The Story of Babette* (1894); *Sonny* (1896); and *Gabolinks*, in collaboration with Albert Bigelow Paine (1896).

STUB, AMBROSIOUS. See DENMARK, Vol. VII, p. 91.

STUBBS, WILLIAM, an English bishop and historian; was born at Knaresborough, Yorkshire, June 21, 1825; educated at Ripon Grammar School, and at Christ Church, Oxford, where he graduated first-class in classics in 1848. Elected to a fellowship at Trinity College, he took orders and was appointed vicar of Navestock, Essex. From 1860 till 1866 he was a diocesan inspector of schools, when he succeeded Professor Goldwin Smith as regius professor of modern history at Oxford. In 1868 he became curator of the Bodleian Library; in 1875 rector of Cholderton, Wiltshire, and in 1879 canon residentiary of St. Paul's, London. In 1884 he was consecrated bishop of Chester, and five years later was translated to the see of Oxford. An industrious and exhaustive student of English ecclesiastical and constitutional history, Bishop Stubbs edited a number of early English chronicles and documents bearing on church councils and the national annals. His chief historical writings embrace a work of vast learning on the origin and development of the constitution of England to the accession of the House of Tudor (3 vols., 1870); *Select Charters and Other Illustrations of English Constitutional History* to the reign of Edward I (1870); *Lectures on the Study of Mediæval and Modern History* (1886); and a text-book, in the Epochs of Modern History Series, on *The Early Plantagenets* (1876). Besides these scholarly works, he published in 1858 *Registrum Sacrum Anglicanum*, tracing the course of episcopal succession in England, and edited in 1863 Mosheim's well-known *Institutes of Ecclesiastical History*, in three volumes. He also edited the following: *Roger de Hovedon's Chronicle* (4 vols., 1868-71); *Memorials of St. Dunstan* (1874); the *Historical Works of Gervase of Canterbury*, dealing with the reigns of Stephen, Henry II and Richard I (2 vols., 1879-80); *Chronicles of the Reigns of Edward I and Edward II* (2 vols., 1882-83); and of William of Malmesbury's *De Regum Gestis Anglorum* (2 vols., 1837-89), together with the three books of his *Historicæ Novellæ*.

STUCCO. See BUILDING, Vol. IV, pp. 504-507.

STUNDISTS, a Russian sect which has been organized since 1861, when the promulgation of the Bible was ordered by Alexander II. It is claimed by some authorities that this sect had its origin in 1817, in the Kherson district, among immigrants from Würtemberg. The formation of a powerful sect deemed worthy of persecution by the Russian orthodox priests did not take place until 1870. Since that time the numbers have constantly increased, until it is estimated there were about one million in 1895. The name

Stundists is derived from their custom of meeting to read lessons or hours,—*stunden*. There is no common confession of faith, and the Bible is their only guide. The rulers, known as elders, are chosen from among the old men of the congregation. Under them are the deacons, younger men upon whom devolve the active clerical duties of the congregation. There are no regular houses of worship, but meetings are held in dwellings and public halls. They believe in the right of free thought, submit to laws, and are an industrious and sober people. In recent years their objection to the too rigid enforcement of the agrarian laws has been the pretext of government persecution. Alarmed at their increase in numbers and power, the Greek Church in 1893 brought about the proclamation of laws which provide that the children of Stundists who are under 16 are to be placed under the charge of the village priests, who are to give them instruction in the orthodox teachings. All Stundist children must be baptized by orthodox priests. All passports issued to Stundists must bear the word Stundist, for the information of the police. Other similar conditions are imposed, which are intended to crush out this growing sect. See, RUSSIA, Vol. XXI, p. 82.

STURGEON BAY, a city and the capital of Door County, northeastern Wisconsin, on an inlet of Green Bay and a canal from that bay to Lake Michigan, 25 miles E. of Oconto. The bay, eight miles long by two wide, furnishes an excellent harbor for large vessels. The industries of the adjacent country are farming and lumbering. The city has large shipping interests, saw and planing mills, a furniture factory and machine-shop. It has a state and a private bank, and two weekly newspapers. Population 1880, 1,199; 1890, 2,195; 1900, 3,372.

STURGIS, a village of St. Joseph County, southern Michigan, on the Grand Rapids and Indiana and the Lake Shore and Michigan Southern railroads, 36 miles S. by E. of Kalamazoo. It has seven churches and many schools, waterworks and electric light, a fair-ground and a noted mile race-track. It is in a farming district, and has lumber industries, sash, door and blind factories, foundry and machine-shop, two banks, a monthly and three weekly newspapers. Population 1890, 2,489; 1900, 2,465.

STURGIS, RUSSELL, an American architect; born in Baltimore, Maryland, Oct. 16, 1836. He began the study of architecture in New York City and later in Europe; settled in New York City, and there engaged in his profession until 1878. After that time he devoted himself to study of the fine arts. While in practice he designed numerous public buildings, among them Laurence Hall at Yale College, Flower Hospital, New York City, and Durfee Hall, Yale College. He was a constant contributor to periodicals, and was an editor of *Webster's International* and *The Century* dictionaries.

STURM, JOHANNES VON. See EDUCATION, Vol. VII, p. 673.

STUYVESANT, PETER, the last director-general of the New Netherlands; born in Holland, in 1602. The Dutch West India Company appointed him director-general of the New Netherlands, where he arrived in 1647. He established a court of justice, and, in deference to the popular will, ordered a general election of 18 delegates, from whom he selected his advisory council. Toward the Indians he adopted a policy of conciliation, and endeavored to improve their condition. In 1650 he met the New England commissioners at Hartford, and with them arranged a line of partition between the Dutch and the English territories which had been hitherto in dispute. In 1655 he took possession of the Swedish settlement on the Delaware. In 1664 Charles II, King of England, granted to his brother, the Duke of York (afterward James II), all the territory from the Connecticut River to the Delaware, and four English warships appeared in New York Bay, demanding the surrender of the City of New Amsterdam. The municipal authorities, seeing no hope of successful defense, insisted on yielding to the English, and on Sept. 9, 1664, a treaty was signed in Stuyvesant's farmhouse, called the "Bowerie," by which the city was surrendered to the English, who called it New York. Stuyvesant lived 18 years longer on his farm. He was buried in the graveyard on the corner of Stuyvesant Street and Second Avenue, New York City. He died in New York City, in 1682. See NEW YORK, Vol. XVII, p. 455.

STYE OR HORDEOLUM. See OPHTHALMOLOGY, Vol. XVII, p. 786.

STYLE, OLD AND NEW. See CALENDAR, Vol. IV, p. 671.

STYLITES. See MONACHISM, Vol. XVI, p. 701.

STYRACACEÆ OR STYRACEÆ, a family of plants, also called storaxworts or storax family. It is a group of gamopetalous shrubs having alternate simple leaves, and generally white flowers in racemes with from four to eight petals somewhat united in the corolla. It has seven genera, found in all parts of the world, the more important species being tropical. The snow-drop tree (see ARBORICULTURE, Vol. II, p. 320) is one well-known species. From the *Styrax officinalis*, liquid amber is obtained. See STORAX, Vol. XXII, p. 577.

SUBCARBIDE THEORY OF STEEL. See IRON AND STEEL, in these Supplements.

SUB-CONSCIOUS STATES. See PSYCHOLOGY, Vol. XX, p. 47.

SUBERIC ACID C⁶H¹²(COOH)², a dibasic acid obtained by the action of nitric acid on cork as well as on some other substances in long needles, melting at 140° and distilling at 300°.

SUBERINE. See PHYSIOLOGY OF PLANTS, Vol. XIX, p. 44.

SUBLIMATION. See DISTILLATION, Vol. VII, p. 260.

SUBLIME PORTE, the name applied to the Ottoman or Turkish empire, and especially to the court or cabinet of ministers. This term is derived from the old custom of holding the jus-

tice courts in the High Gate of the palace, and from that extended first to the court and later to the whole government.

SUBMARINE BOATS. There are three classes of submarine boats—those arranged for propulsion by hand-power, those using steam-engines, and those which use electricity as a motive power. During the Civil War the Confederates built one of the first class, which was designed for the destruction of the vessels of a blockading squadron. She was manned by eight men, who were able to row her at a speed of a little more than three miles an hour. She was christened the *David*, and sank with the wreck of the first vessel she attacked. In 1886 one Nordenfeldt built a submarine boat at Stockholm, which was propelled by steam, and proved manageable. Later boats have usually employed electric power stored in accumulators,—a form which is now considered the most satisfactory means of propulsion for such craft. These boats are built almost solely for torpedo warfare, to be used in attacking an enemy's vessels unawares. They are all very slow of movement when entirely submerged, the difference between the speed on the surface and that below being about as three to one. The French easily lead in these constructions, having built several notable crafts. In 1888, Gustave Zédé, of the Mediterranean Engineer Corps, with the assistance of Engineer Romazzotti and Captain Krebbs, designed the *Gymnote*, which attained considerable notoriety. Her dimensions were, length, 59 feet; diameter, 6 feet. The shell is cigar-shaped, being formed of steel plates $2\frac{1}{2}$ by 3 feet in size, firmly riveted together. Six tons of storage-battery accumulators are used to furnish a current for the electric motor. This latter was specially designed by Captain Krebbs, and develops 55 horse-power and weighs 4,400 pounds. The propeller is four-bladed, and has a diameter of 4 feet 10 inches. Two upright rudders are arranged aft, in front of the propeller, for steering, while somewhat similar horizontal blades are provided to assist immersion by being set at a slight angle, when the force of the screw will cause them to act on the water as inclined planes. There is an outlook or conning-tower for the steersman and several manholes in the upper surface. Water-chambers are provided, into which water may be pumped to bring the craft to a submersion of eight yards, the raising being accomplished by pumping out the water again. The submerged speed is given at five knots an hour. The lighting is accomplished by means of incandescent lamps, furnished with a current from the accumulators. The ventilation is provided for by means of tanks of compressed air. This boat is wholly experimental, being constructed to afford greater knowledge as to the management and feasibility of such craft. The French government subsequently built two smaller submarine boats, each christened *Le Goubet*. No. 1 is 8 meters long $1\frac{3}{4}$ meters in diameter. She is built of bronze plate, and weighs ten tons. Glass windows are provided to admit light. There are accommodations for three persons, who are pro-

vided with air from tanks containing air compressed to eighty atmospheres. In other particulars the boat resembles the *Gymnote*. No. 2 is the same size as No. 1, but affords more space for the occupants. The construction is such that it may be taken into three parts for transportation. Oars, operated by one man, are used for propulsion, but accumulators are also provided. On the inner side of the shell are bolts, designed to be loosened to free torpedoes. A false metal keel is provided, which may be loosened and dropped by the turn of a handle, thus enabling the craft to rise. In its normal position one small conning-tower is just above the surface, presenting a mark so small as to be very difficult of observation from an opposing vessel. Another boat, named the *Zédé*, has been built for the French government, and was successfully maneuvered at a depth of sixty feet. It is normally steered, just below the surface, by means of a periscope.

The Baker submarine boat, tried by George C. Baker on Lake Michigan in May, 1892, attracted widespread attention. Her proportions are different from the French boats, the dimensions being, length, 40 feet; beam, 8 feet; and height, 13 feet. An oak-planking six inches thick forms the shell. She carries a steam-engine, an electric motor and storage-battery cells, the plan being to use the steam-engine when navigating the surface, and also to drive the motor as a dynamo, when an opportunity of rest is taken to charge the cells of the battery. This arrangement proved satisfactory, rendering the boat free from the nuisance of being helpless when at a distance from a point where the accumulators can be charged. The smokestack of the engine may be withdrawn through a valve when the vessel is to be submerged. The dynamo is then reversed for use as a motor, and the charged batteries supply the current. The motor-dynamo is fifty horse-power, and the battery contains 232 cells. Twin propellers are used, each being two feet in diameter, and having four blades. They are so adjustable that the pilot can use them for steering the boat in any direction, up or down, to starboard or larboard. One wheel alters the angle of these propellers, and another wheel is used for the rudder. The conning-tower has plate-glass sides, and also serves as a manhole. The surface speed of this boat is about nine miles an hour.

Another American submarine boat, the *Nautilus*, was tested in New York harbor a few years since. Her chief novelty consisted in the submersion apparatus, which comprised several large telescopic cylinders set in the sides for increasing or decreasing the interior air-space, and thus raising or sinking the craft. The United States navy has lately contracted for a large submarine boat for use in torpedo warfare, to be constructed at a cost of \$150,000. Her displacement will be 138 tons; length, 80 feet; diameter, 11 feet. She will be designed to make 14 knots awash, and to have six hours' endurance under water.

The *Peral*, named after the designer, and built for the Spanish navy in 1888, is of 86 tons displace-

ment, with a length of 72 feet and a diameter of $9\frac{1}{2}$ feet. Four propeller-screws are provided, two serving to drive the vessel forward by means of electric motors, to which they are independently attached, and the other two being set horizontally, and rotated only when it is desired to increase or reduce the submersion. Water-compartments are also used to assist in raising or lowering the vessel should any accident happen to the propellers. The buoyancy apparatus is rendered automatic by a device for regulating the immersion-screws. A curved tube of elliptical cross-section is extended into the water, and is so arranged that a variation of pressure caused by difference of depth in the water deforms the tube and operates an electrical switch, setting the immersion-screws to work until the pressure is brought back to the normal point at which the apparatus was set. A pendulum device, swinging between electric contacts serves to secure a balance of the craft as between stem and stern, by adjustment of the driving-screws. The electric motor is supplied with a current from a battery carrying 613 Julien cells.

The Waddington torpedo-boat, built in England in 1888, is of the submarine type, 37 feet long and 6 feet in diameter. The eight horsepower electric motor, with 45 large accumulator-cells, is sufficient to take her on a voyage of 150 miles, at a slow speed, before it becomes necessary to recharge the batteries. There are no less than four devices for elevating and submerging the vessel, any one of which will accomplish the object should the others, by accident, be out of order. First, there are side-planes, which carry the vessel down or up with the aid of the propeller-screw. Then there are twin vertical propellers, mounted in large tubes passing vertically through the boat's hull. Next, water-tanks are provided, so that pumping in or out will depress or elevate the craft. Lastly, there is a heavy weight hung to the bottom, which may be detached by turning a screw from the inside, thus allowing the vessel to rise. Two pairs of rudders are used, one set serving for lateral guidance, and the other set being operated automatically to maintain the verticality of the vessel. Three torpedoes are carried, one for use as a mine, and the others of the automobile type.

A steel submarine boat was built a few years ago, at Foce, Italy, for examining wrecks, searching for pearl-oysters, etc. Her shape resembles that of the Baker boat, being 28 feet long, 7 feet beam and $11\frac{1}{2}$ feet high. She is designed to descend to a depth of 300 feet and to carry divers, who crawl out of compartments in the bottom. The motive power used is electricity.

C. H. COCHRANE.

SUBPŒNA. See WRIT, Vol. XXIV, p. 696.

SUBROGATION. See NOVATION, Vol. XVII, p. 604.

SUBSTITUTIONS, THEORY OF. See ALGEBRA, Vol. I, p. 553.

SUCCESSION, a legal term used to describe

the transmission of a dignity, such as a peerage, or an estate real or personal. See PEERAGE, Vol. XVIII, pp. 458-468; PRIMOGENITURE, Vol. XIX, pp. 733-737; REMAINDER, Vol. XX, pp. 372, 373; SUCCESSION DUTY, Vol. XXII, pp. 616, 617; WILL, Vol. XXIV, pp. 570-574; and EXEMPTION LAWS, in these Supplements.

SUCCINIC ACID ($C^2H^4(COOH)^2$), a dibasic acid occurring in amber, bituminous coal, the juices of unripe fruits of many plants, and the secretions of some animals. It is formed in the fermentation of sugar, asparagin, flesh, etc., by the action of nitric acid on many organic substances, and in a variety of other ways. It occurs in small quantity in bread. It forms crystals very soluble in water, less soluble in alcohol, and but little soluble in ether. It is used in a number of organic syntheses, and to a limited extent in medicine.

SUCCORY. See CHICORY, Vol. V, p. 614.

SUCKER, a name commonly applied to fishes of the family *Catostomidae*. The name refers to their habit of sucking up mud, from which they obtain a large part of their food. The mouth is well adapted for this purpose. The family consists of about sixty species, of which two are Asiatic and the rest North American. All waters east of the Rocky Mountains contain species of suckers. The buffalo-fishes (*Ictiobus*), the red-horse (*Moxostana*) and the suckers proper (*Catostomus*) are well known in the Mississippi Valley. The name is also given to the *Discocephala* or *Echeneididae*, fishes with a dorsal sucking-disk on the head, by means of which they attach to larger fishes and other objects. The *Remora* is an example.

SUCRE, ANTONIO JOSÉ DE, a Bolivian general (1793-1830). See BOLIVIA, Vol. IV, p. 17.

SUCTORIA. See PROTOZOA, Vol. XIX, p. 865.

SUDAN. See SOUDAN, Vol. XXII, pp. 277-279; and AFRICA, in these Supplements.

SUDERMANN, HERMANN, a Prussian novelist and dramatist; born Sept. 30, 1857, at Matziken, near the Russian frontier. Though his youth was passed in narrow circumstances he gained a gymnasium and university education, and then settled in Berlin as a journalist. His paper was a small weekly, on which he did most of the work, among other things writing short stories for its pages. He broke off connection with the paper, because his views were too radical, and resolved to live by literature, which, after a hard pinch, he was able to do comfortably. His first novel was *Im Zwielicht* (*In the Twilight*), which was followed by *Frau Sorge* (English version *Dame Care*), by a number of short stories, and by his most successful novel *Der Katzensteg* (*The Cat's Way*). These publications, he says, preceded 1889. His greatest success came through his plays, of which *Die Ehre* (*Honor*, 1890) was the first. His *Die Heimath* (1893), translated into Italian and into English, has been made famous by Sarah Bernhardt in France, and by Duse in Great Britain and America, where it bears the title of its principal rôle, *Magda*. The plot moves on the strain of relations between an old-fashioned father and his daughter touched with the new order of things. Suder-

mann's more recent plays are *Die Schmetterlings-schlacht* (*The Battle of the Butterflies*, 1891), and *Das Glück im Winkel* (*Happiness in a Corner*, 1896).

SUDETENGEbirGE, one of the most important mountain ranges of Germany, dividing Prussian Silesia and Lausitz from Bohemia and Moravia, and connecting the Carpathians with the mountains of Franconia. The range is rich in minerals, especially in the metals, iron, lead, copper, zinc, tin, cobalt, with some silver and gold. Schneekoppe (Snowpeak), in the Riesengebirge, 5,265 feet high, is the highest peak.

SUEVI. See GERMANY, Vol. X, p. 474.

SUEZ, GULF OF. See RED SEA, Vol. XX, p. 316.

SUEZ CANAL. During 1897, 2,986 vessels, of 11,123,403 tons, passed through the canal. Of these, 1,905, of 7,389,237 tons, were British. Of other nationalities, Germany had 325 vessels, of 1,194,106 tons; France, 202, of 807,995 tons; Holland, 206, of 532,272 tons; Austria-Hungary, 78, of 265,231 tons; Italy, 71, of 198,161 tons; Russia, 44, of 218,514 tons; Spain, 48, of 199,695 tons; Japan, 36, of 165,425 tons; Norway, 48, of 117,794 tons; and the United States, only 3, of 6,627 tons. The number of passengers who passed through in 1897 was 191,224. The total receipts were \$14,566,110; the net profits were \$7,863,106; and the amount distributed among the shareholders was \$8,182,760. See also CANAL, Vol. IV, pp. 789-92; AFRICA, in these Supplements.

SUFFIELD, a town in Hartford Co., Conn., 15 miles N. of Hartford, on a branch of the New York, New Haven and Hartford railroad; has 6 churches, the Connecticut Literary Institute (Baptist), a bank, paper-mill, and cigar factories. Pop. 1900, 3,521.

SUFFOCATION. See MEDICAL JURISPRUDENCE, Vol. XV, p. 781.

SUFFOLK, a town and the capital of Nansemond County, southeastern Virginia, on the Nansemond River, and on the Norfolk and Western and other railroads, 18 miles W.S.W. of Norfolk, having steamboat connection with Baltimore by the Nansemond River. It is in a farming region, and is engaged in lumbering and oyster-packing, and in the manufacture of iron, lime and woolen goods. It has a bank, one bi-weekly and two weekly newspapers. Population 1880, 1,963; 1890, 3,354; 1900, 3,827.

SUFFRAGE. See ELECTION LAWS, in these Supplements; BALLOT, Vol. III, p. 288; and ELECTIONS, Vol. VIII, p. 2.

SUFFRAGE, WOMEN. See WOMEN, in these Supplements.

SUFIS or SOOFEES. See SUNNITES, Vol. XXII, p. 662.

SUGAR. See CHEMISTRY, in these Supplements.

SUGAR-BERRY. See HACK-BERRY, Vol. XI, p. 360.

SUGAR CROP IN THE UNITED STATES. See AGRICULTURE, and BEET SUGAR, in these Supplements.

SUGAR-MAKING MACHINERY. The mechanisms used in the manufacture of sugar have undergone important changes within the past 15 years. The triple-effect method of evapora-

tion has come into general use, with the result that sugar-mills are fewer, but much more extensive and complete, than formerly. The cane as brought into the mill is loaded upon a carrier, which is an endless traveling-conveyer, formed of wooden slats carried on chains. This carrier feeds the cane to a cutter, if one be used, otherwise it feeds the cane-mill direct. Cane-cutters break the cane into pieces of six inches or less in length, by means of iron rolls bearing steel corrugations on the surface, which are so contorted that the cane cannot get through in long pieces. About sixty per cent of the juice is expressed in this cutting of the cane. The cane-mill has three large, slightly roughened rolls, set about half an inch apart, between which the cane is passed once or twice until the remainder of the juice is thoroughly expressed. The rolls are roughened, in order to prevent their slipping over instead of gripping and crushing the cane. These mills are made much larger and heavier than formerly, the upper or king roller being made 36 and sometimes 38 inches in diameter. The lower rollers are known respectively as the cane-roller and the bagasse roller.

The juice from the cutter and the mill falls into a tank below, in a dirty and impure condition, but is pumped up through strainers to an elevated tank, from which it is allowed to flow into the defecators. Here lime is used to settle the impurities, and steam introduced to coagulate the albumen, while the purified juice is drawn off from below, minus the scum and settlings. The juice is next conveyed to the triple-effect vacuum-pans, to evaporate the water, which constitutes about seven eighths of its bulk at this stage. This apparatus consists of three great cylindrical tanks, each surmounted with a pipe of large diameter for conveying the steam to the next pan, or in the case of the last tank, to the condenser. The tanks are called vacuum-pans, because they take the place of open pans formerly used, and because they are closed on top, and a vacuum maintained in the pans and tubes to which the juice is admitted. The greater the vacuum maintained, the less is the temperature required to boil the juice. It is found best to maintain only a slight vacuum in the first pan, a better one in the second, and a still better vacuum in the last pan. Steam is introduced about the tubes, which are placed upright in the lower parts of the pans, and furnishes the heat for the boiling, and as the second and third pans use increased vacuums, less heat is required for the boiling, hence the steam is carried over from the first pan, and though somewhat cooled, is hot enough for the purpose. This system of evaporation has been tried with two pans, also with four or more, and the use of three pans has finally been decided upon as producing the best effect. Hence the name *triple effect*, which is given to the whole evaporating apparatus. Another type has been manufactured in France, in which the pans are horizontal, and the steam is run through tubes, while the liquor surrounds them. It is a cheaper construction than that

described above, and also less effective. In the most recently constructed triple effects the arrangement of the tubes in the pans is changed, so as to pass only a small stream of liquor through a considerable length of steam-heated tube, and as far as possible to cause this liquor to form a thin film over the inner surface of the tube.

From the third vacuum-pan the liquor, which is now a thick syrup, goes to a condenser, where the best possible vacuum is maintained. The syrup is then clarified by boiling and skimming, and passes to an individual vacuum-pan, where the final evaporation takes place. When almost dry, and on the point of crystallization, it is discharged from a large valve at the bottom, being then a pasty mass. This valve is designated the "strike-valve," and the operation a "strike." The paste run into cooling-cars and allowed to crystallize. It next goes to a mixer having rotating paddles, where it is thoroughly stirred and passed on to the centrifugal machines, which are large whirling baskets, in which the last vestige of molasses is got rid of by centrifugal force, while the baskets retain the sugar. The centrifugal machines have upright cylinders, within which the porous baskets are rotated at a speed of about one thousand turns per minute for three or four minutes, when all the moisture is removed. The machines are commonly set several in a row and connected by gearing.

The first mechanism used in the refining of sugar is a cistern, in which the sugar is dissolved in hot water. From the cistern it is pumped up to the blow-up pans, where it undergoes a process of purification by settling and skimming. A series of five or six long upright filters of animal charcoal and bone-black are next used to whiten the product. Centrifugal machines are again used to throw out the moisture, after which the sugar emerges in a finished condition.

For the manufacture of loaf-sugar, molds are used, and, after cooling, a gang of small saws serves to cut up the mass into lumps of proper size for the table. In making beet sugar the mechanisms for the first part of the process are necessarily different from those used for cane sugar. A slicing-machine is first used, then a diffusing apparatus, that stirs the slices in water to separate the saccharine matter from the pulp. After defecation and saturation with carbonic-acid gas, the beet-juice may be filtered and evaporated in a triple-effect apparatus, the same as cane-juice.

Machines for the manufacture of maple-sugar are in a crude state, boiling in a long pan or series of open pans being the customary method. As it is usually made on a small scale, there is little inducement to introduce improved machinery for its manufacture.

C. H. COCHRANE.

SUGAR OF LEAD. See LEAD, Vol. XIV, p. 378.

SUGDEN, EDWARD B., chancellor. See ST. LEONARDS, Vol. XXI, p. 182.

SUGGESTION, HYPNOTIC. See MAGNETISM, Vol. XV, pp. 279-281.

SUHM, PETER FREDERICK, a Danish historian; born in Copenhagen, Oct. 18, 1728. He early began the study of philology, at the University of Copenhagen; removed to Norway in 1751, where he remained for 15 years, examining the archives and records. His *History of Denmark* (1782-1828) is recognized as one of the authoritative works of its kind in Denmark, and is the basis of many later works. He collected a library of over one hundred thousand volumes, which was given to the Royal Library. Among his works are *Origin of Northern Nations* (1770); *Odin; or, The Mythology of Northern Paganism* (1771); and *Critical History of Denmark in the Time of the Pagans* (1781). He died in Copenhagen, Sept. 7, 1798.

SUIDÆ. See SWINE, Vol. XXII, pp. 772, 773.
SULAIMAN OR **SULIMAN** MOUNTAINS. See INDIA, Vol. XII, p. 732.

SULAIMAN SHAH. See PERSIA, Vol. XVIII, p. 639.

SULEYMAN, the name of two Ottoman sultans. See TURKEY, Vol. XXIII, pp. 643-646.

SULIDÆ, a family of birds. See GANNET, Vol. X, p. 70.

SULINA, a river. See DANUBE, Vol. VI, pp. 819, 820.

SULIOTES. See BOZZARIS, Vol. IV, p. 186.

SULKIES. See TROTting AND PACING, in these Supplements.

SULLIVAN, a city and the capital of Moultrie County, southeastern central Illinois, 25 miles S.E. of Decatur and 14 miles N.W. of Mattoon, on the Chicago and Eastern Illinois, the Peoria, Decatur and Eastern and the Wabash railroads. It is the center of an agricultural and stock-raising district, and has flour and woolen mills. Population 1890, 1,468; 1900, 2,399.

SULLIVAN, a town and the capital of Sullivan County, west-southwestern Indiana, 26 miles S. of Terre Haute and 32 miles N.N.E. of Vincennes, on the Evansville and Terre Haute and the Indiana and Illinois Southern railroads. It is in a region rich in coal and agricultural products, and has an electric-light plant, an academy, and manufactures of lumber, flour and tiles. Population 1890, 2,222; 1900, 3,118.

SULLIVAN, SIR ARTHUR SEYMOUR, an English composer; was born in London, May 13, 1842.

His father was professor at Kneller Hall, the training-school for British military bands. He received his first systematic instruction in music at the Chapel Royal, St. James's, and was still a chorister, when, at the age of 14, he gained the Mendelssohn scholarship. After two years' study under Mr. (afterward Sir Sterndale) Bennett, and Mr. (afterward Sir John) Goss, he studied at Leipsic for three years, at the Conserva-



SIR ARTHUR SULLIVAN.

torium. On his return to England in 1861, he produced his music to Shakespeare's *Tempest*, which was performed at the Crystal Palace. He also wrote the incidental music for other plays of Shakespeare, including *The Merry Wives of Windsor*; *The Merchant of Venice*; *Macbeth*; and *Henry VIII*. His next works were the cantatas *Kenilworth*, produced at the Birmingham Festival in 1864, and *Marmion*, produced at the London Philharmonic in 1867. These were followed by a number of works before he wrote the light operas that gave him world-wide reputation, as *The Sorcerer*; *H.M.S. Pinafore*; *The Pirates of Penzance*; *Patience*; *Iolanthe*; *Princess Ida*; *The Mikado*; *Ruddigore*; and *The Gondoliers*. These were written, for the most part, to librettos furnished by W. S. Gilbert (q. v., in these Supplements). In his song-writing, which is extensive, his popularity has been greater, perhaps, than that of any other English composer. He was also musical editor of *Church Hymns*, for which he composed several of the best-known tunes, and has been an extensive composer of oratorios and sacred musical dramas. The best of these are *The Light of the World* (1873); *The Prodigal Son* (1868); *The Martyr of Antioch* (1880); *The Golden Legend* (1886); *In Memoriam* (1866); *On Shore and Sea* (1871); and the festival *Te Deum*, to commemorate the recovery of the Prince of Wales in 1872. He was knighted at Windsor in 1883, and was awarded the Legion of Honor of France in 1878, when acting as British commissioner for music at the Paris Exhibition. From 1876 till 1881 Sir Arthur Sullivan was principal of the National Training School (now the Royal College) of Music. He died Nov. 22, 1900.

SULLIVAN, BARRY, an English actor; born in Birmingham, England, in 1824. His first appearance was in Cork, in 1840. He met with success from the first, and made tours in Great Britain and America; visited the latter country twice, in 1857-60 and 1875-76. In 1861-66 he made a successful trip in Australia, where he played 1,000 nights in Melbourne. His greatest successes were in Shakespearean characters, his first great hit being as Hamlet, in London, in 1851. Died in Brighton, England, May 3, 1891.

SULLIVAN, JOHN, an American soldier; born in Berwick, Maine, Feb. 17, 1740. He was a lawyer in Durham, New Hampshire, at the beginning of the Revolution; represented New Hampshire in the Continental Congress in 1774; was made a brigadier-general in 1775; was prominent in the siege of Boston; commanded the northern district; was created a major-general and given command at Long Island. He took part in the battles of Trenton, Princeton, Brandywine and Germantown. In 1779 he led an expedition against the Iroquois, and successfully defeated them and laid waste their settlements. He resigned his commission in 1780 and resumed his work in Congress. His services in securing the adoption of the constitution were of inestimable value. He was United States judge for the New Hampshire district (1789-95). He died in Durham, New

Hampshire, Jan. 23, 1795.—His brother, JAMES, a jurist and statesman, born in Berwick, Maine, April 22, 1744. He was admitted to the bar, and engaged in practice at Biddeford, Maine, from which he was sent to the Massachusetts provincial assembly; was a Massachusetts representative in the Continental Congress (1784-85). In 1776-82 he was judge of the superior court; was a commissioner in the settlement of the Massachusetts-New York boundary dispute in 1784; attorney-general of Massachusetts (1790-1807); and governor of the state (1807-08). He was the author of several works of value; among them, *Observations on the Government of the United States* (1791); *History of the District of Maine* (1795); *History of Land Titles in Massachusetts* (1801); and *History of the Penobscot Indians*. He died in Boston, Massachusetts, Dec. 10, 1808.

SULLIVAN, WILLIAM KIRBY, an Irish chemist and scholar. The date of his birth is not recorded, but his birthplace was in County Cork, Ireland. He studied in Cork and later in Germany; was chosen president of Cork College, succeeding Dr. Kane. Previous to his appointment to that office he had been assistant in the Museum of Irish Industry, professor of chemistry in Queen's College, Cork, and professor of chemistry in the Irish Catholic University. He was a leader in the organization of scientific societies in Ireland; edited the *Atlantis*, and was a constant contributor to current literature. He contributed the articles on CELTIC LITERATURE; FENIANS; IRELAND; and PATRICK, SAINT, to this ENCYCLOPÆDIA. Among his publications is *Lectures on the Manuscript Materials of Irish History*. He died in 1890.

SULLIVAN'S ISLAND, a long, narrow island six miles below Charleston, South Carolina, between the harbor and ocean, the site of Fort Moultrie, one of its defenses, and of the summer residences of the wealthy inhabitants. It is a fashionable resort for bathing, and is connected with Charleston by ferryboats. When Fort Moultrie was evacuated by Major Anderson, Dec. 26, 1860, several batteries were erected on the shore of this island, bearing upon the channel and Fort Sumter.

SULLY, JAMES, a British psychologist; born in Bridgewater, Somersetshire, England, in 1842; was educated in the Independent College, Taunton, the Regent's Park College (one of the affiliated colleges of the University of London), and the University of Göttingen. He began work in literature in 1871, as a contributor to the *Saturday*, *Fortnightly* and *Westminster* reviews. His writings are mainly occupied with the modern science of psychology, as developed, more especially in Germany, by help of the physiology of the brain and nervous system. He was appointed to the Grote professorship of the philosophy of mind and logic in University College, London, in 1892. His principal works are *Illusions* (1883); *The Outlines of Psychology* (1884); *The Teachers' Handbook of Psychology* (1886); and *The Human Mind*. He wrote the articles on

ÆSTHETICS; DREAM; and EVOLUTION, in this ENCYCLOPÆDIA.

SULLY, THOMAS, an American portrait-painter; born in Horncastle, England, June 8, 1783. He came to the United States with his parents in 1792. At the age of 16 he went to his brother, a miniature-painter in Richmond, Virginia. Sully studied at home under Gilbert Stuart, and abroad under Benjamin West. In 1810 he settled permanently in Philadelphia, Pennsylvania, where he executed numerous portraits in oil. In 1837 he visited England to paint Queen Victoria in her coronation robes. His *Washington Crossing the Delaware* is a much-admired work. Among his portraits are one of Lafayette, Thomas Jefferson, Fanny Kemble, James Madison and John Marshall. Of his historical paintings in addition to the one mentioned, the most celebrated are *Capture of Major André* and *Miranda*. He died in Philadelphia, Pennsylvania, Nov. 5, 1872.

SULLY-PRUDHOMME, RENÉ FRANÇOIS ARMAND, a French poet; born in Paris, March 16, 1839; educated at the Lycée Bonaparte. He afterward became a lawyer's assistant, and published his first volume of poems in 1865, under the title *Stances et Poèmes*. It attracted considerable attention, and the poem *Le Vase Brisé* was pronounced a masterpiece of its kind. Among his other works are *Les Épreuves* (1866); *Les Destins* (1872); *Le Bonheur* (1888); and *Réflexions sur l'Art des Vers* (1892). In 1881 he became a member of the Academy, and was made an officer of the Legion of Honor in 1888.

SULPHOCYANIDES OR THIOCYANATES. See PRUSSIC ACID, Vol. XX, p. 25.

SULPHUR COMPOUNDS. See SULPHUR, Vol. XXII, pp. 634-636.

SULPHUREA, a compound which, when combined with three times its weight of chlorate of potassium, forms an explosive more powerful and much cleaner than gunpowder. It is obtained principally from the waste products of gas-manufacture. It is a sulpho-carbonyl diamide, symbol CSN^2H^4 . It is obtained by heating dry ammoniac sulphocyanate slowly to 170° , keeping at that temperature for several hours, cooling to 100° , dissolving in an equal weight of water at 80° , filtering and allowing the filtrate to crystallize. It forms small prisms, soluble in water and alcohol, insoluble in ether, and fuses at 149° .

SULPHURETTED HYDROGEN. See SULPHUR, Vol. XXII, p. 635.

SULPHURIC ACID AND SULPHATES. See SULPHUR, Vol. XXII, p. 636; and CHEMISTRY, in these Supplements.

SULPHURIC ETHER. See ETHER, Vol. VIII, p. 568.

SULPHUR SPRINGS, a city and the capital of Hopkins County, northeastern Texas, 80 miles E. N. E. of Dallas, on the Sherman, Shreveport and Southern and St. Louis Southwestern railroads. It is situated in a region abounding in mineral springs, and producing cotton, lumber and coal; contains furniture factories, flour, saw and

planing mills, foundry and machine-shop, wagon-shop, oil-mill and cotton-compress, and is the seat of Central College (Methodist Episcopal South). Population 1900, 3,635.

SULPICIA. See TIBULLUS, ALBIUS, Vol. XXIII, p. 349.

SULPICIAN, an order of Roman Catholic priests whose special duty is the caring for the theological seminaries of the church. The order was founded in 1642 by Abbé J. J. Olier, in Paris, at the Seminary of St. Sulpice, hence the name. During the life of the founder the parent chapter stood alone, but after his death it sent out missionaries to France and Canada, who founded chapters in these countries. This was in the seventeenth century. In 1790 the first members of the order visited the United States and founded at Baltimore St. Mary's Seminary. In 1894 the members of the order had charge of St. Charles College, Baltimore; Brighton Seminary, Boston; and St. Mary's Seminary, above mentioned. The theological students in the Catholic University of America at Washington are also in charge of the Sulpicians.

SULTAN. See TURKEY, Vol. XXIII, p. 654.

SULU ISLANDS, a group of islands in the Indian Ocean, lying between the Philippines and Borneo, which are understood to have passed from Spain to the possession of the United States by the treaty signed by the Peace Commissioners Dec. 10, 1898. The population of the islands, of which there are over 150 in number, is mostly of Malays, who are addicted to piracy and the slave trade. In Aug. 1899, a treaty was concluded with the Sultan of Sulu, in which the monarch's rights to his island possessions were guaranteed, while he acknowledged the supremacy of the United States, and undertook to conform to certain regulations prescribed as a condition of being allowed to retain lordship over the archipelago, but subject to American sovereignty. See PHILIPPINES, Vol. XVIII, p. 752.

SUMAC FAMILY, the family *Anacardiaceæ*, otherwise known as the cashew family. See LEATHER, Vol. XIV, p. 382; and ANACARDIACEÆ, in these Supplements.

SUMAROKOFF, ALEKSANDR PETROVICH. See DRAMA, Vol. VII, p. 444.

SUMIR OR SUMER, a district. See BABYLONIA, Vol. III, p. 185. For language, see URAL-ALTAIC, Vol. XXIV, p. 3.

SUMMERS, HENRY E., professor of zoölogy and entomology Iowa State Coll. of Agriculture and Mechanic Arts, also professor of human physiology and vertebrate anatomy univ. of Illinois, born in 1863 and graduated at Cornell.

SUMMERSIDE, a town and port of entry in Prince County, southern Prince Edward Island, 40 miles N. W. of Charlottetown, on Bedeque Bay, and on the Prince Edward Island railroad. It has an excellent harbor, steamers running daily during the summer to Nova Scotia and New Brunswick. Besides doing a large shipping business in eggs, potatoes, sheep, horses and oysters, ship-building is carried on, and there are grist,

saw and planing mills and a cabinet factory. Population 1891, 2,882.

SUMMERVILLE, a town of Berkeley County, southeastern South Carolina, on the South Carolina and Georgia railroad, 22 miles N.W. of Charleston. It has brickyards and saw-mills, is in the pine region, and is a favorite winter resort for invalids. It has several hotels and one weekly newspaper. Population 1890, 2,219; 1900, 2,420.

SUMMERVILLE, a village and the capital of Nicholas County, south-central West Virginia, about 45 miles E. of Charleston, its nearest railroad point being Camden-on-Gauley, Chesapeake and Ohio railroad. It is in a stock and lumbering district, coal being also found in the vicinity. The village has one newspaper and an estimated population of 250, that of the district being 1,274.

SUMNER, EDWIN VOSE, an American soldier; born in Boston, Massachusetts, Jan. 30, 1797. He was appointed a second lieutenant in the United States army in 1819; saw service in the Black Hawk war and on the frontier until 1838, when he was ordered to Carlisle, Pennsylvania, to take charge of the cavalry school there. As major he served through the Mexican War, in 1851-53 governed New Mexico, and from 1855 to 1861 was again on frontier duty. He was promoted brigadier-general, and in 1861 assigned to the command of the Department of the Pacific, and in 1862 transferred to the Army of the Potomac, where he saw severe service at Fair Oaks, Antietam and Fredericksburg. He was assigned to the command of the Department of the Missouri, and died on the eve of his departure to his new command, March 21, 1863, in Syracuse, New York.

SUMNER, WILLIAM GRAHAM, an American political economist; born in Paterson, New Jersey, Oct. 30, 1840. After graduation at Yale in 1863, he studied in Germany at Göttingen, and in England at Oxford. He was ordained a minister of the Protestant Episcopal Church, and until 1872 was assistant rector of Calvary Church, New York City; was called to the chair of political economy and social science in Yale, and has been a constant contributor to standard periodicals, and published a number of volumes, highly esteemed by economists. Among his works are *History of American Currency* (1874); *What Social Classes Owe to Each Other* (1883); *Essays in Political and Social Science* (1885); *Robert Morris* (1892); and *The Financier and Finances of the American Revolution* (1891).

SUMTER, a city and the capital of Sumter County, east-central South Carolina, on the Charleston, Sumter and Northern and Atlantic Coast railroads, about 45 miles E. of Columbia. It is an educational center, has a good local trade, is in the center of a farming, tobacco and truck raising region, ships cotton, and has planing-mills, sash and blind and cotton factories. The city has all modern improvements, academies for girls, two banks, an evening, a biweekly and three

weekly newspapers. Population 1880, 2,011; 1890, 3,865.

SUMTER, FORT, was built in 1845-55, in the form of a truncated pentagonal pyramid 50 ft. high on an artificial island, at the entrance of Charleston harbor, South Carolina, 2½ miles from Forts Moultrie and Pinckney, on each side. On the secession of South Carolina, December, 1860, Major Anderson, in command of the defenses of the harbor, was called upon to surrender them to the state authorities. Instead of doing this, he abandoned the other forts and occupied Fort Sumter, mounting 52 guns with a garrison of 70 men. This was considered an act of war by the Confederates and their troops, who, under command of General Beauregard, took possession of Forts Pinckney and Moultrie and erected additional batteries. While the surrender of the fort was under consideration, a vessel was sent from New York for its relief. On its appearance off the harbor it was compelled to put to sea and the attack on the fort was opened, April 12, 1861, and it surrendered on the following day. This event aroused the North and began the war which terminated in 1865. During the siege of Charleston in 1863, this fort was battered by the heaviest artillery until its walls were completely crushed and shattered. The flag-staff was shot away fifty times, and thousands of tons of iron projectiles were mingled with the *débris* of the fort, but the garrison still held out amid its ruins, and held it for three years against assault and bombardments, until the operations of General Sherman compelled its evacuation, and the United States flag was again raised, April 14, 1865, an event shortly subsequent to the evacuation of Richmond and the surrender of Lee at Appomattox.

SUMTER, THOMAS, an American revolutionary general; born in 1734, in Virginia. He entered the British service in colonial times; took part in the Braddock expedition in 1755, and in Indian wars. At the beginning of the Revolution in 1776, he was assigned to a command in South Carolina, with the rank of lieutenant-colonel; waged warfare against the Indians until 1780, when the capture of Charleston by the British gave the latter a foothold in the state. From that time until the close of the war Sumter was engaged in a guerrilla warfare, which proved very harassing to the British and aided the operations of the more northern American army under Greene. Sumter at one time captured Cornwallis's supply-train, but was overtaken and deprived of the prize by Tarleton, the British cavalry leader. Later, at Blackstock Hill, he defeated Tarleton, with a heavy loss to the latter. He took an active part in politics after the Revolution; was elected to Congress from South Carolina (1789-93 and 1797-1801); United States Senator (1801-09); and United States minister to Brazil (1809-11). He died in South Mount, South Carolina, June 1, 1832, and was at the time of his death the only surviving Revolutionary general.

SUN, RECENT DISCOVERIES IN THE. See ASTRONOMY, in these Supplements.

SUNBURY, a borough and the capital of Northumberland County, east-central Pennsylvania, on the Susquehanna River (at the junction of its northern and western branches), and the Northern Central, Pennsylvania and Philadelphia and Reading railroads, 54 miles N. of Harrisburg. It is in the center of a lumbering region, and is an important point for shipping coal; has flour, saw and planing mills, furniture, sash and door, coffin and organ factories, and nail, hat, and carpet works. It has two banks, two evening and two weekly newspapers. Population 1890, 5,930; 1900, 9,810.

SUNDANCE, a town and the capital of Creek County, northeastern Wyoming, about 40 miles W. of Deadwood, its nearest railroad point being Moorcraft, on the Chicago, Burlington and Quincy railroad. It is in the center of a mining and grazing region, has three weekly newspapers, and a population of 515.

SUNDAY SCHOOLS. The instruction of children in religion has been a custom since religions came into existence. The ancient tribes gave their children instruction in the family through the patriarch. Later, the Bible records that instruction in religious teachings was given both old and young. It was realized by all nations that the preservation of their religion must be accomplished by systematic training of the young. The religious leaders of mediæval times neglected this training. Luther and his fellow-reformers began again this instruction, and organized a movement which resulted in a general awakening. But such schools as were established by Luther in Germany, Knox in Scotland, and Richard Baxter in England, were irregular in their purposes and results. Oftentimes the entire schools were made up of adults, and where instruction of children was attempted, it was found necessary to teach the rudiments of reading, etc., before they could comprehend the religious teaching. While these isolated attempts were of great benefit in awakening the desire for knowledge, yet, because of their irregular methods, those children were not reached to whom the instruction would have done the most good. Such was the condition of affairs when, in 1780, Robert Raikes (q.v., Vol. XX, p. 222) conceived the idea of regularly organized schools to be held on Sundays in the poorer districts in Gloucester, England. The children were, for the most part, employed in neighboring factories during the week, and on Sunday spent their time at play in the dirt and filth of the streets. Raikes secured the services of four teachers, whom he paid to give lessons during the whole of the day. The children were invited to attend, the only requirement being that each child should go with clean hands and face. The influence of these schools was so great that Raikes established similar ones in other neighborhoods, and the idea was taken up in adjoining cities. The large expense of hiring teachers soon brought about the voluntary teacher plan in vogue in all Sunday schools of to-day. A letter of Raikes's, published in 1784 in the *Gentleman's Magazine*, in which he described the movement, attracted widespread attention, and brought about the beginning of the present world-wide Sunday school organizations.

Rev. Rowland Hill established the first Sunday school in London, in 1784. By 1789 there were about three hundred thousand scholars in Great Britain. In the United States the first organized movement was in 1786, by the Philadelphia Society for the Support of Sunday Schools. Schools were also started in other states—at Boston in 1791, at Asbury, Virginia, in 1786, in New York in 1793, etc. In 1816 the New York Sunday School Union was formed, and in 1824 the American Sunday School Union. Each denomination has a Sunday school organization of its own, and the work was so extensive that in 1893 there were, in the United States, 123,173 Sunday schools, with 1,305,939 teachers and 9,718,432 scholars. An English Sunday School Union was established in 1803. In 1833 was formed the Sunday School Association, an organization maintained in connection with the Unitarian Church. These unions supply the subordinate schools with literature and necessary stationery, and give a uniformity to lessons and methods. In 1893 there was, in the whole world, a total of 224,562 schools, 2,239,728 teachers, and 20,268,933 scholars.

These were apportioned as follows:

	SCHOOLS.	TEACHERS.	SCHOLARS.
Europe-----	72,191	765,329	8,618,501
Asia -----	6,442	15,112	241,555
Africa -----	4,246	8,455	161,394
North America -----	134,653	1,388,708	10,542,705
South America -----	350	3,000	150,000
Australasia and ocean is- lands -----	6,680	59,124	654,778

SUNDERBANS, a district of India. See GANGES, Vol. X, p. 68.

SUNDEW. See *Drosera*, under INSECTIVOROUS PLANTS, Vol. XIII, p. 134.

SUN-DOG OR MOCK-SUNS. See HALO, Vol. XI, p. 399.

SUNGARIA. See DZUNGARIA, Vol. VII, p. 587.

SUNN HEMP. See HEMP, Vol. XI, p. 647.

SUNSHINE-RECORDER, an instrument for making a photographic record of the duration and time of sunshine at the place where it is exposed. That in use by the United States Weather Bureau has a cylinder which is mounted at right angles to the path of the sun. Plates bearing graduated scales are fixed to the east and west sides of the cylinder. A photographic paper being placed within the cylinder, a hole made in each of the plates permits the printing of streaks whenever the sun shines through. The plates bear 31 graduations, and are shifted one notch lower each day, so that a record for the whole month is preserved on one sheet of paper. An inferior form of sunshine-recorder is made with a spherical lens, whose focus is so placed as to scorch a track on a curved strip of paper.

SUN-SPOTS. See SUN, Vol. XXI, pp. 646-650.

SUN-WORSHIP. In the earliest forms of religious worship the sun held a prominent position, especially among the tribes who were not nomadic, and whose religions were upon a higher scale than those of the wandering tribes. The worship of fire in all its forms naturally led to a religion of which

the sun was the central figure. The old Aryan tribes, the ancient Persians, the Brahmins of India, and the Pueblo Indians of North America, especially Mexico, all held to the belief that the sun and its companion, the moon, were the great rulers of the earth. In Egypt, sun-worship was carried to a great extent into the mythology of the nation. In Mexico the Spanish conquerors found a people whose largest temples were dedicated to the sun, and whose every acts were guided by the priests of the sun. See also MYTHOLOGY, Vol. XVII, pp. 157, 158; EGYPT, Vol. VII, pp. 715, 716; and MEXICO, Vol. XVI, pp. 211, 212.

SUPEREROGATION, WORKS OF, a class of good deeds, the performance of which is not prescribed, and according to the Roman Catholic faith not absolutely necessary to the eternal salvation of the individual. A difference is made by Roman Catholic theologians between works prescribed and works counseled. Under the latter are classed the works of supererogation. It is held, in connection with the doctrine of purgatory, that supererogative works lessen the time of the soul in purgatory, and if of sufficient number and value, may relieve the soul of that duration. Another phase of this doctrine is, that the possession of credit for works of supererogation may enable the individual to apply his good deeds for the salvation of an erring brother.

SUPERIOR, a city, port of entry and the capital of Douglas County, northwestern Wisconsin, on Lake Superior, at the mouth of Nemadji River, and opposite Duluth, Minnesota, from which it is distant seven miles. It is on the Great Northern, Northern Pacific, Chicago, St. Paul, Minneapolis and Omaha, St. Paul and Duluth, Duluth and Winnipeg, and the Duluth, South Shore and Atlantic railroads. It has three naturally land-locked harbors, connected with each other, with a length of about 13 miles and width of from 1 to 3 miles. The city is well laid out, the sewerage system being calculated for a population five times its present number of inhabitants. It has 36 church organizations and has many educational facilities. Its flouring-mills have a capacity of 23,000 barrels daily; its coal-docks are famed, and have a combined capacity of 6,000,000 tons; it has a bank of coking-ovens, an iron-ore dock, and shipyards where the whaleback steamers are built. There are saw and planing mills, iron-works and brickyards. It ships enormous quantities of coal, wheat, lumber, etc. It has a morning and two weekly newspapers. Population 1890, 11,983; 1900, 31,091.

SUPERIOR, LAKE. See ST. LAWRENCE, Vol. XXI, pp. 177, 178.

SUPERIOR IRON ORES, LAKE. See IRON AND STEEL, in these Supplements.

SUPHIS. See EGYPT, Vol. VII, p. 733.

SUPPURATION OR PUS. See PATHOLOGY, Vol. XVIII, p. 400. In repair, see SURGERY, Vol. XXII, p. 683.

SUPREMACY ACT. See ENGLAND, Vol. VIII, p. 375.

SUPREME COURT OF THE UNITED STATES, THE, created by the provisions of the constitution of 1787, which provided, in article III, section 1, that "the judicial power of the United

States shall be vested in one supreme court." The final court of appeal in America is regulated as to its times of session and its rules of procedure by the Judiciary Act of 1789. Its justices hold office during good behavior, by the express terms of the constitution.

Washington appointed John Jay as the first chief justice, and the court began its sessions in 1790. For a dozen years it had little business. Its first important decision on the constitution arose in the case of *Chisholm v. Georgia*. In 1792, Alexander Chisholm of South Carolina, brought suit against the state of Georgia for the payment of a private claim. His counsel argued that the supreme court had jurisdiction in such cases. The court so decided, found judgment for the plaintiff, and issued a writ of enquiry, which was inoperative, as the Georgia legislature passed an act making the execution of such a writ punishable by death. John Marshall, chief justice from 1801 to 1835, first made the court a great power in the government. The influence of his decisions in strengthening and nationalizing the government cannot be overestimated. The court continued to be composed of Federalists long after the Federalists lost control of Congress and the executive. At first it consisted of the chief justice and five associate justices. A sixth was added in 1807, two more in 1837, and a ninth in 1863. From 1836 to 1864, under Chief Justice Taney, the court was Democratic, and more inclined to the support of state rights. In the important Dred Scott case it gave a decision favorable to slavery. During the war the supreme court was made Republican. During the conflict between Congress and President Johnson, Congress, to prevent him from appointing any judges, enacted laws which reduced the number of associate justices to seven. In 1870 an eighth was added, by reason of which the court reversed its decision in the Legal Tender cases. The court has been, throughout its history, the most powerful tribunal of this century.

The court is composed of a chief justice and eight associate justices, appointed by the President of the United States, subject to the approval of the United States Senate. The associate judges have precedence according to the dates of their commissions, or when the commissions of two or more of them bear the same date, according to their ages. In each case of a vacancy in the office of chief justice, or of his inability to perform the duties and powers of his office, those duties shall devolve upon the associate justice who is first in precedence until such disability is removed, or another chief justice is appointed and duly qualified.

The salary of the chief justice is \$10,500 per annum, and of each associate justice \$10,000.

The chief justices, besides their duties in annual sessions of the supreme court in Washington, have assigned to them each his own judicial circuit, these circuits having in addition, their own circuit judges.

The following is a complete list of the justices of the United States supreme court, the names of the chief justices being printed in italics:

NAME.	SERVICE.	
	Term.	Years.
John Jay, New York	1789-1795	6
John Rutledge, South Carolina	1789-1791	2
William Cushing, Massachusetts	1789-1810	21
James Wilson, Pennsylvania	1789-1798	9
John Blair, Virginia	1789-1796	7
Robert H. Harrison, Maryland	1789-1790	1
James Iredell, North Carolina	1790-1799	9
Thomas Johnson, Maryland	1791-1793	2
William Paterson, New Jersey	1793-1806	13
John Rutledge, South Carolina	1795-1795	--
Samuel Chase, Maryland	1796-1811	15
Oliver Ellsworth, Connecticut	1796-1800	5
Bushrod Washington, Virginia	1798-1829	31
Alfred Moore, North Carolina	1799-1804	5
John Marshall, Virginia	1801-1835	34
William Johnson, South Carolina	1804-1834	30
Brockholst Livingston, New York	1806-1823	17
Thomas Todd, Kentucky	1807-1826	19
Joseph Story, Massachusetts	1811-1845	34
Gabriel Duval, Maryland	1811-1836	25
Smith Thompson, New York	1823-1843	20
Robert Trimble, Kentucky	1826-1828	2
John McLean, Ohio	1829-1861	32
Henry Baldwin, Pennsylvania	1830-1844	16
James M. Wayne, Georgia	1835-1867	32
Roger B. Taney, Maryland	1836-1864	28
Philip P. Barbour, Virginia	1836-1841	5
John Catron, Tennessee	1837-1865	28
John McKinley, Alabama	1837-1852	15
Peter V. Daniel, Virginia	1841-1860	19
Samuel Nelson, New York	1845-1872	27
Levi Woodbury, New Hampshire	1845-1851	6
Robert C. Grier, Pennsylvania	1846-1870	23
Benjamin R. Curtis, Massachusetts	1851-1857	6
John A. Campbell, Alabama	1853-1861	8
Nathan Clifford, Maine	1858-1881	23
Noah H. Swayne, Ohio	1861-1881	20
Samuel F. Miller, Iowa	1862-1890	28
David Davis, Illinois	1862-1877	15
Stephen J. Field, California	1863	--
Salmon P. Chase, Ohio	1864-1873	9
William Strong, Pennsylvania	1870-1880	10
Joseph P. Bradley, New Jersey	1870-1892	22
Ward Hunt, New York	1872-1882	10
Morrison R. Waite, Ohio	1874-1888	14
John M. Harlan, Kentucky	1877	--
William B. Woods, Georgia	1880-1887	7
Stanley Matthews, Ohio	1881-1889	8
Horace Gray, Massachusetts	1881	--
Samuel Blatchford, New York	1882-1893	11
Lucius Q. C. Lamar, Mississippi	1888-1893	5
Melville W. Fuller, Illinois	1888	--
David J. Brewer, Kansas	1889	--
Henry B. Brown, Michigan	1890	--
George Shiras, Pennsylvania	1892	--
Howell Jackson, Tennessee	1893-1895	2
Edward D. White, Louisiana	1893	--
Rufus W. Peckham, New York	1896	--

SUR OR SOOR. See TYRE, Vol. XXIII, pp. 710, 711.

SURFACER, a form of planer for surfacing wood, usually on both sides at a single operation. The names *surface-planer* and *surface-planing machine* are also applied. They have large knives, like those of a plane, and cutter-heads with bits for breaking the chips. In one form, made by the H. B. Smith Machine Company, the feeding-in rolls have a weighted equalizing-bar for giving a parallel lift to the upper rolls, which are adjustable. Another Smith machine manufactured for wet or rough lumber has a bed that is raised and lowered by

power, and will finish stock nine inches in thickness. The Rogers surfacer takes the lumber between slotted cylinders which run in yoke-boxes. The lower cylinder is made adjustable, and the bed is raised and lowered by corner-screws.

SURF-BIRD (*Aphrica virgata*), a bird related to the oyster-catchers, found on the Pacific coast of the United States. It was so named because it seeks its prey near the surf.

SURF-DUCK. See SCOTER, Vol. XXI, p. 470.

SURGEONS' TOOLS. The multiplicity of instruments used in modern surgery renders it impracticable to refer to more than a few of the most important here. Junker's chloroform-inhaler, somewhat recently introduced in America, is a superior form, having a cone-shaped shield for the mouth and nose, and a respiratory valve so arranged as to be under the control of the anæsthetizer. The soft rubber margins adapt the shield to the contour of the face, and a rubber inlet-tube is provided for admitting air when necessary. The mouthpiece has a tubular connection with a chloroform-bottle, which is made of leather to prevent danger of breakage, and being graduated in ounces and drams, a glance shows at any time the amount inhaled by the patient. A double bulb, such as are used with the best atomizers, serves to supply the chloroform through the tube to the mouth-shield. This apparatus wastes no chloroform, admits of dilution with air, and avoids all danger of an oversupply of anæsthetic.

A jointed instrument-rack, introduced from Germany, may be folded up in a case for transportation, and when laid out for use assumes an oblong shape, presenting notched supports for the instruments, so that they may not touch each other, the table, a cloth, or the like. It is made shallow, so that it may be set in a tray containing an antiseptic solution when desired.

Surgical needles are made in all shapes from straight to full curve. For using them a great variety of needle-holders have been devised. These usually are of nipper-like form, though some of them have scissor-handles. The Truax needle-holders are made with concave faces, so as to bite the needle in two places, avoiding the danger of breaking curved needles. Hagedorn's needle-holder has a spring and ratchet arrangement for maintaining the grip on the needle. The Goz needle-holder has a bobbin in the handle, from which the thread is supplied.

Wire-twisters are usually made with a small S-piece at the tip for catching the wire. Wire-cutting scissors are made with straight and bent handles, the latter for cutting at a right angle.

Drainage-tubes are mostly made of soft perforated rubber, and are introduced with a forceps or carrier. Schapp's hard-rubber drainage-tube is made spiral, so that it is firm yet elastic, and admits drainage at any point.

Antiseptic trays are made of porcelain and glass, and antiseptic ligatures, silk and catgut, are furnished in bottles, mounted on reels, covered by the solution. Ligatures are also put up in double-box form, securing perfectly antiseptic qualities.

Operating-tables are made of any material that is easily kept clean of impurities, marble tops being preferred for hospital use.

Among amputating and general operating instruments, forceps and scissors are conspicuous by their great variety of form. Artery-forceps are usually made on the principle of a pair of spring-tweezers, or with scissor-handles, the gripping end being toothed or serrated. Bone-holding forceps are made on the nipper principle, as are also gouging forceps.

Knives for the large cuts in amputation are made long and narrow, while cartilage-knives, finger-knives and scalpels have short blades. Retractors, for holding back soft parts during an operation, are of various hooked forms, sometimes flat, but often with two to six sharp prongs. Chisels and gouges are usually made of one solid piece of metal, with flat or curved blades. Bone-spoons, or scoops, for removing marrow, are made in the form of rings or cups set at a slight angle on a handle. Saws are made similar to common hand-saws, but of neater patterns. Truax manufactures a patent folding aseptic saw, which has a frame readily taken apart for packing in a case. Subcutaneous saws are made with narrow blades, guarded by a tube, and with handles like pistol-stocks.

Numerous small instruments are mounted in pocket-cases, so that they fold up into a handle, like the blades of a common pocket-knife. Among these are many forms of bistouries, scalpels, tenotomes, gum-lances, finger-saws, etc.

The Allen surgical pump is a mechanism of varied use. Within a short cylinder is introduced one coil of a rubber tube. An interior roller and central crank are so arranged that the coil of the tube may be compressed by turning the crank. A fluid or liquid in the tube may be forced either way, according to the direction in which the crank is turned, so that the apparatus becomes a force-pump or a vacuum-pump at pleasure. It makes an effective stomach-pump, and may be used, also, as a universal syringe, a tamponing or plugging-instrument for arresting hemorrhage, a breast-pump, a cupping-pump, a douche or a saliva-evacuator. A special instrument is manufactured for the transfusion of blood, the rubber tube being passed through a basin of warm water to maintain the temperature. For this purpose, the pump has the advantage that the blood may be transfused at the same rate of speed that it flows in the veins, and being absolutely free from contact with the air, there is no danger of coagulation. This pump is also useful, in connection with aspirating-trocars, for draining the fluid in operations for dropsy, or the like.

Fracture-apparatus include splints of innumerable forms, fracture-boxes for holding the limbs, and permitting dressing of a wound by letting down a side, sliding-rests, suspension-appliances, extension-apparatus, etc.

Special instruments in great variety are made for the treatment of the ear, the eye, the nose, hare-lip, mouth and throat, urethra and bladder, and for gynecological and obstetrical operations, as also rectal and veterinary surgery.

C. H. COCHRANE.

*SURGERY, AMERICAN. The wonderful revolution and progress made in surgery during the past ten years is due largely to the comparative perfection of the so-called germ theory; and a paper on surgery is not complete without some mention of these little pests in the cause of disease and the infection of wounds.

Bacteria or micro-organisms or microbes, as they are called, belong to the very lowest order of the vegetable kingdom. They get their name from *βακτηρίον*, a rod, which some of them resemble as to shape. While the great majority are at times capable of motion, many forms possess no movement whatever.

The principal forms of bacteria are the micrococcus, globular in form (*κόκκος*, a berry), bacillus, staff shape (*bacillus*, a little rod), and the spirillum or spiral shape.

The micrococci are sometimes seen in the stage of division when developing rapidly, and are seen to arrange themselves in pairs and are called diplococci; when arranged in rows, streptococci (*στροπεπτός*, a chain); when bunched together in masses like grapes, staphylococci (*σταφυλή*, a bunch of grapes).

These forms multiply by fission, the change being more readily seen in the cocci than in the bacilli, though some bacilli and a few spirillæ undergo germination, spore formation taking place within the cell before it is destroyed. Bacteria are found everywhere, even in healthy living tissues. They grow best in alkaline or neutral media. Under favorable circumstances one bacillus becomes sixteen millions in 24 hours. It is chiefly in dead organic matter that they multiply most prolifically, thus causing decomposition. These are called saprophytic or saprogenic. Others grow in the living body, producing disease, and are known as pathogenic. Pyogenic are those that produce pus.

During the process of decomposition very powerful poisons, called ptomaines, are developed (*πτῶμα*, a dead body). It is the action of these micro-organisms with the chemical substances they produce, being diffused throughout the body, that causes the condition known as septic intoxication and septic infection.

The temperature best suited for the growth of most bacteria is from 86° F. to 104° F. The putrefactive organisms prefer a temperature of about 75° F., or about the same as our homes, while the pathogenic flourish at a temperature of 95 F. to 104° F. Freezing seems to kill few of these organisms, though they are not reproduced at this temperature, simply lying dormant until a more favorable temperature is found.

Heat is more effective, and especially moist heat, a much greater temperature being required if the heat is dry. Bacilli containing spores must be subjected to a heat of 284° F. for three hours before they are rendered inert and incapable of further reproduction. Boiling water destroys all kinds of organisms and spores in a few minutes. In an Arnold steam sterilizer any of the cocci will be destroyed in five minutes. Certain drugs also destroy bacteria; among the most powerful is corrosive sub-

limate, a solution of 1:1000, according to Koch, destroys the most powerful organisms in ten minutes. Carbolic acid also in a solution of 1:30 kills all mature organisms and prevents the formation of spores.

We do not usually find bacteria in healthy tissue, but occasionally they are discovered in some organ and are apparently doing no harm. They are found in all kinds of true inflammation.

The bacteria that are of most interest to the surgeon are those that produce pus, and are known as pus microbes. They consist of several varieties, but the one most often found is the staphylococcus pyogenes aureus. It is a very hardy organism, and boiling or steaming for several minutes is required for its destruction. It prospers at the ordinary house temperature, flourishing at the temperature of the body. It gets its name aureus from the orange color it takes on in certain artificial cultures.

It is found in dirty dish-water, in the soil and air. Its most frequent habitat is the superficial layer of the skin, especially of the moist parts, as the axilla, and under the finger-nails. The mucous membrane of the alimentary canal also forms good soil for its production.

Other less frequent forms of the pyogenic cocci are the staphylococcus pyogenes albus and the staphylococcus pyogenes citreus.

Another important variety of pus cocci is the streptococcus pyogenes, which is found in the secretions of normal nostrils, vaginæ and urethræ, and also in the saliva. The bacillus pyocyaneus is an organism found in blue or green pus.

The pus-producing cocci are found in all acute abscesses. For the different kinds, the reader is referred to some work on bacteriology. Whether these bacteria produce pus or not depends upon their number in the tissue and also upon the state of the tissue—an injury lowering its vitality. The entrance of a foreign body or a mechanical irritation cannot produce pus unless there are also present bacteria.

Some of the bacteria of surgical diseases are the streptococcus, erysipelatis, the gonococcus, the tetanus bacillus, the tubercal bacillus, the bacillus of malignant œdema and the bacillus anthrax.

INFLAMMATION. If the vessels of a frog's foot be observed under a microscope, the web having been first irritated, the capillaries and veins are seen to dilate, and during the active beat of the heart the blood flows so rapidly as to make it impossible to see the individual blood corpuscles. During the diastole the current slows, and we recognize the row of red blood corpuscles moving rapidly along, in which is an occasional white blood corpuscle. After a little, the vessels continuing to dilate, the current slows and the vessels are filled with red corpuscles; the white are seen to roll along more slowly and to stick to the walls of the vessel, and some by their amoeboid movement to go through the vessel-wall and to be on the outside. This latter is spoken of as emigration of the white blood corpuscles, or diapedesis. The fluid of the blood also escapes into the tissues; and these elements, with some connective tissue-cells, make up the beginning of inflammation. These products, blood corpuscles and serum, appear

as a yellowish, greenish-white substance, which resembles the so-called buffy coat of the blood. If the source of irritation is removed and there are no germs present, or are destroyed, these products are absorbed and the tissue is as it was before.

REPAIR. When a wound is made into any tissue, the healing takes place by so-called first or second intention. If the wound is kept perfectly aseptic, that is, if no bacteria have been allowed to gain access to it, we see very little change during the process of repair, provided the edges have been kept approximated.

If the wound is large and the edges are not approximated, there will be seen a number of leucocytes at the end of 24 hours. As the process of repair continues, the number of the cellular elements increases. As the cells increase, the fibers of the old tissue become less perceptible, and many of them and some of the other elements which have undergone retrograde change, disappear, and the cells are soon reinforced by a new granular substance and the so-called granulation or embryonic tissue is formed—which is healing by second intention. The cavity of the wound is gradually obliterated, partly by the growth of the granulations, and also by cicatricial contraction. On the margins is seen a bluish border, which is the proliferation of the epithelial cells, forming new integument.

ULCERATION. An ulcer is a loss of substance on the surface of the body, and really represents a part of an abscess-wall, the opening of the abscess being almost as large as the abscess itself. Ulcers are caused by some inflammation or injury which destroys the protective surface, and lays bare the tissues beneath. Over its surface are often seen small elevations, called granulations; these appear to be composed of projecting masses of blood-vessels with newly formed tissue around them. An ulcer is the very lowest type of chronic inflammation.

The great progress made in surgery during the past ten years is due, to a very large extent, to our knowledge of wound-infection, or, in other words, to our acquaintance with bacteria. When a surgeon is now called to see a wound, his first effort, after checking hemorrhage, is to make it absolutely clean—that is, free from bacteria—which is spoken of as "surgical cleanliness." Not only must he make the wound clean, but he, with all his assistants, his instruments, and everything touched, must be absolutely free from germs.

When an operation is done for a disease, this cleanliness is carried out to a nicety. The wonderful success in abdominal and brain surgery is due almost absolutely to this cause.

The preparation for an operation, as of the abdomen, is as follows: The surgeon and his assistants wear muslin trousers and blouse, which, with all towels to be used, have been subjected to superheated steam; the nurses should wear dresses of some wash goods. The hands are washed for about twenty minutes with hot water, nail-brush and soap; they are then plunged into a solution of permanganate of potash, until every part of the hands and forearms is stained a deep mahogany red, then into a saturated solution of oxalic acid; the acid is

washed off with sterilized water. The instruments are boiled in a one-per-cent solution of carbonate of soda for ten minutes, and rinsed in a 1 : 20 solution of carbolic acid. For sponges, small mops of sterilized gauze are used. Silk or silk-worm gut is sterilized by steam, or a 1 : 20 solution of carbolic acid. Sterilized bichloride or iodoform gauze is used for dressing, which is put on in very many thicknesses, and over-topped by sterilized absorbent cotton in sheets.

The patient's abdomen is scrubbed with a brush and soap, shaved of all hair, and a towel wet with a solution of bichloride of mercury, 1 : 3000, is bound over. At the time of the operation the abdomen is again washed and saturated with alcohol or ether.

INJURIES. Shock is the result on the general system or the primary constitutional effect of a wound. Its manifestations are through the nervous system; therefore the nervous are more susceptible and the phlegmatic less so. During shock the blood leaves the surface for the large internal vessels, causing the pulse to become small, weak and rapid, the respiration shallow and irregular, the surface pale and cold; the treatment is that of symptoms. The body is rubbed vigorously and heat applied. Some heart tonic, as strychnia, is used hypodermically, and atropia for the failing respiration. If there has been loss of blood, intra-venous or intra-cellular injection of normal salt solution acts promptly and effectively.

FRACTURES. The chief factor in the treatment of fractures is the different methods of extension and the keeping of the fragments of bone in correct apposition after the fracture has been reduced. The extension is accomplished by one of the numerous extension devices, as Buck's, which is a weight attached to the limb and made to act over a pulley. The advance in the treatment of fractures is chiefly in compound fractures, where antiseptics come into play. Now, a limb is thoroughly cleansed and disinfected, the fracture reduced, and, after dressing the wound as an ordinary flesh-wound, the limb and dressings are incased in a plaster cast.

Wounds of joints are penetrating and non-penetrating. Formerly, in penetrating wounds of the joints, if amputation were not immediately done, suppuration followed in forty-eight to seventy-two hours, and the loss of the limb or the death of the patient was the result. The wound is cleansed, dressed antiseptically, and the limb immobilized by some splint. The fate of an individual with a joint-wound may be said to be in the hands of the physician who sees him first.

Dr. Gebney has described a method of treating sprains with strips of adhesive plaster, run in two directions or more, to relieve the affected parts. This seems to be superseding the older method of plaster-of-Paris casts.

VENEREAL DISEASES. In the importance attached to the venereal diseases, gonorrhœa seems to be fast usurping the place of syphilis. Since the separation of the great venereal diseases, the greatest advance has been made in the discovery of the gonococcus by Neisser, which is now known to be the cause of all true gonorrhœa. It has always been

thought that gonorrhœa was a disease of the urethra, but the gonococcus has been found, not only in the deep structures of the urethra, but also in the valves of the heart, causing very serious valvular trouble. A man who has had gonorrhœa as seldom entirely recovers as a person with syphilis. The so-called strain in the male who has been once infected, developed after prolonged sexual intercourse, or a debauch, is nothing more or less than the germ having been hidden in some crypt of the mucous membrane of the urethra, being liberated by the above causes, only to do over again what it had originally done.

The enormous amount of abdominal surgery being done all over the country, for pelvic pus in the female, is in the large majority of cases due to the gonococcus, and in a great many instances the female is infected after the male had thought himself well.

The mucous membrane of the vagina and uterus are first affected, in the female, and afterward the Fallopian tubes and ovaries, causing abscesses of these organs, in the pus of which is found the gonococcus.

The treatment in the male consists of antiseptics internally, and injected into the urethra. In the female the treatment should be most vigorous, as soon as the infection is discovered. The vagina is scrubbed in all its folds, with a 1 : 1000 solution of bichloride of mercury. The uterus if infected is dilated and curetted, washed out with a solution of mercury and painted with tincture of iodine. It is then packed with iodoform gauze, which is changed daily until the patient has recovered.

If the tubes and ovaries are affected, and do not yield to the above treatment, and pus is formed, an operation for the removal of the pus must be done immediately. This is done by opening through the vagina or rectum, or these organs have to be removed entirely, sometimes including the womb itself, to effect a cure of the gonorrhœa.

The germ of syphilis has not yet been discovered, though a great deal of work has been done in that direction. Lustgarten has described an S-shaped bacillus that is found in syphilitic ulcers, but it has not been cultivated. The drugs used in the treatment of syphilis remain about the same, viz.: iodide of potash and mercury. In the vast majority of cases syphilis is contracted during the sexual act, but instances are very numerous where the person is infected during the act of kissing, from drinking-cups, and babies from nursing a syphilitic nurse, and from many other modes of contact. This is termed syphilis of innocents.

TUMORS. Certain enlargements of a part or organ, new growths, with no tendency to a spontaneous cure, but which do have a tendency to enlarge during the patient's lifetime, except in a few instances, are surgically known as tumors.

They originate from the tissue of the part on which they are situated, and very nearly resemble these parts or organs in their component tissue elements. Some are congenital, but the most are developed after birth, usually from some source of irritation, as a constant chemical or mechanical

agency which produces an undue vascularity of the part—the hot stem of a clay pipe, epithelioma of the lip; a rough, jagged tooth, carcinoma of the tongue; a lacerated cervix, cancer of the uterus.

There has been an effort to find the cause of cancer to be of bacteriological origin, but nothing definite has been proved.

Usually, tumors are divided into two classes—benign and malignant. A benign tumor is generally made up of tissues very nearly resembling those from which it originated. Its growth is usually slow and painless. A malignant tumor is usually composed of tissue widely different from that upon which it originated. Its growth is rapid and painful. Of the benign class, fibromata or myomata of the uterus probably cause more trouble, and are now occupying a great deal of attention from abdominal surgeons.

For a complete classification of tumors, the reader is referred to some work on surgery, as Dennis's *System of Surgery*.

At present the treatment of tumors resolves itself into the very early removal of all the tumor, and if it is malignant, of all the surrounding tissue that is infected; though, if a benign tumor is giving no discomfort from its locality, or is not dangerous to life, its removal is not so imperative. But now, when surgery is absolutely painless and comparatively free from danger, when we consider the disposition to grow it is best to remove a large majority of these tumors.

The removal of a malignant growth is absolutely demanded at the earliest possible moment, before the adjacent lymphatics have become involved. If the lymphatics are already enlarged, as is frequently the case in cancer of the breast, those of the axilla being affected, the operation is not complete until all these are removed.

OPERATIVE SURGERY. As much care is taken in the diagnosis of surgical cases and the time to operate, what to do and what not to do, as in the operation itself. No matter how skillfully the operation may be done, as the amputation of the hand if part of the hand might have been saved, the surgery is bad. If the abdomen should be opened for the removal of an ovarian tumor and the patient is found pregnant, the surgeon would feel that he had not been careful in his surgery and would accordingly blame himself.

In the whole range of surgical operations, from the most trivial to those of extreme gravity, there is more or less danger; even the giving of an anæsthetic is not without danger, and the careful surgeon examines well all the organs that might influence the result of the operation. An anæsthetic should never be administered without a careful examination of the kidneys and the heart. In the selection of an anæsthetic, ether is used when there may be some defect in the heart, forbidding the use of chloroform. Chloroform is considered safer when there is any disease of the kidneys or lungs. Ether is used almost altogether by surgeons of the North and chloroform by those of the South, each claiming the advantages of the two great anæsthetics. At present the mortality in the exhibition

of chloroform is greater than that of ether; when deaths occur from chloroform, it is plain that the person administering it does not understand his business. The probability is that in the near future there will be professional anæsthetists.

As a local anæsthetic in minor cases, cocaine is very largely used, though this is not altogether without danger, as death has been known to follow its hypodermic use.

The greatest danger in operating after hemorrhage is infection by some of the germs previously mentioned, or by a germ of one of the infectious diseases—as diphtheria or puerperal fever; so that a surgeon attending one of these diseases bathes himself thoroughly and changes all of his clothes before going to his operating-room.

Hemorrhage occupies a very important place, especially in some fields of operation, as in the abdominal cavity, where there is a great deal of inflammatory tissue; but with the improved surgical technique and the careful tying of all vessels, and packing oozing surfaces with iodoform gauze, the mortality from this cause is becoming very much less. Some loss of blood attends every operation, but the care of the surgeon is always to have as little hemorrhage as possible. The larger the amount of blood lost the greater is the probability of shock, and the less rapid the recovery of the patient.

Dr. Halstead, of Johns Hopkins Hospital, has given us a preparation of catgut, called *gut-wool*, for stopping hemorrhage from bone by packing it into a bone-cavity.

Shock follows every operation to a more or less degree. The treatment is first preventive, consisting in large doses of strychnia, attention to the diet, and hygiene. The mind of the patient should be kept free from anxiety. The surgeon himself should see that everything is in readiness, and that every instrument likely to be used in the operation is sterilized. During the operation every small detail is looked after, as if the whole success depended upon that one item. The shortest time possible to do an operation well is also very important. The shorter the time the patient is under the anæsthetic and exposed upon the operating-table, the more likely is the surgeon to meet with success. Every possible detail is studied. Dr. Kelly, of Baltimore, has, by an improved method, removed the uterus in 3.36 minutes.

BRAIN. "Abandon all hope, ye who enter here," has been said of surgery of the brain until within the last ten years. Though there were occasional recoveries after injury, it was considered rather an accident. The perfection of the localization of the brain-centers, so that now we may speak of the parts of the brain as distinct in function as the abdominal organs, has placed brain-surgery almost on a level with that of any other part of the body. This, with antiseptic details of the strictest kind—the brain seeming to be a pabulum upon which most bacteria flourish—makes success possible in injuries and diseases of the brain where operation was thought formerly to mean death. While the general anatomy and functions of the brain have been known for a long while, and localization of function for over

twenty years, still it has not been more than ten years since cerebral surgery, founded upon these facts, has made its most rapid progress.

The position of the chief fissures and convolutions of the brain, and its various cortical centers, have of late assumed the greatest importance and have been laid out on the exterior of the skull with almost absolute precision.

The chief fissures are the fissure of Bichat, the fissure of Orlando, the fissure of Sylvius, and the two parietal fissures. The location of these, with the various centers, can be mapped out from the points named by Bocca, as described in any recent text-book on surgery.

TECHNIQUE. The technique of operations upon the cerebrum is as follows: The head is entirely shaved, as this frequently discloses a scar otherwise invisible. It is then well scrubbed, and washed with ether. The fissures may then be marked out with an antiseptic pencil. The operator and assistant should be doubly careful of asepsis.

After the skull has been trephined by one of the methods (*viz.*, by trephine or chisel), if any doubt remains as to the diagnosis the dura is opened, taking care not to wound any of the vessels; if a vessel is wounded it is tied immediately by passing a ligature beneath it, or, if it is small, by pressure with sponge or gauze.

On opening the dura, if the brain bulges into the opening it denotes a pathological addition to the intracranial pressure, due to a tumor, an abscess or internal hydrocephalus. If any brain-tissue is found abnormal, it should be thoroughly removed, avoiding in the cutting the special centers.

While the brain is exposed the different centers may be tried with electricity. The dura is then sutured with catgut. The bone may or may not be replaced. The scalp is sutured in place, and dressed antiseptically. If necessary, a drainage-tube may be used.

The limit of surgical procedure is constantly growing larger. The finger or a knife-handle can be introduced beneath the dura, and, pressing the brain away from the skull, an inch or more can be seen beyond the opening. The brain can be punctured almost with impunity, especially if a blunt instrument is used, taking care, of course, not to puncture large vessels.

Pressure of the brain, due to hemorrhage, a tumor, depressed fracture or products of inflammation, is treated according to the amount of pressure and gravity of the symptoms. If from hemorrhage, the clot is immediately evacuated and the vessel tied. If from depressed bone, it is elevated by trephining. If an abscess has formed or serum collected, the surgeon would not hesitate to operate.

Fracture of the skull, *per se*, is of comparatively small moment; but the concurrent injury to the brain or its membranes causes the all-absorbing symptoms.

Great care is needed in the diagnosis, especially when the inner table is fractured with very little or no external evidence. There are two sources of danger from fractures: the immediate is injury to the brain and septic inflammation; the later is epilepsy,

insanity and continuous headache. The treatment depends upon the character of the fracture. If it is of the vault, without depression, and moderate cerebral symptoms and they are growing less, the case is treated expectantly; but if any serious symptoms arise, trephining is done without delay. A punctured wound entering the brain is always trephined.

Fractures of the base may come from an extension of a vault fracture or indirect violence through the spinal column. Or they may be caused by puncture through the orbit, the nose or the mouth. Umbrellas, canes and small splinters penetrate the orbit and nose, while pistol-balls are often fired into the mouth in attempt at suicide. The prognosis of fracture of the base has always been considered most unfavorable. The sources of infection are especially many; the ear, mouth, nose and orbit are all more or less inaccessible, and likely to be overlooked. The necessity of thorough disinfection of these cavities when communicating with the brain has been recognized, and consequently the mortality of fractures of the base has become very much less.

The treatment consists in making as aseptic as possible whatever cavity the fracture is through, and draining. To accomplish this it may be necessary to trephine through the cavity. In gunshot wounds of the skull the same rule of thoroughly cleansing and making aseptic has made the surgeon absolutely bold in his procedures. The entire tract of the ball must be disinfected. The removal of the ball has always been one of the greatest difficulties. A very light aluminum probe is used, so that if allowed to enter by its own weight it will not produce a false passage. If the ball is more accessible from the opposite side of the head, a counter-opening is made at the point at which the probe would emerge if carried on through the head. Dr. Gardner has devised an instrument to locate a ball, called the telephonic probe. Formerly, balls in the brain, unless very superficial, were allowed to remain.

To cerebral localization belongs the success in operation for abscess of the brain. The abscess is located and trephining done. As over fifty per cent of cerebral abscess is caused by suppurative disease of the ear, a great many can be prevented by opening the mastoid cells before suppuration has reached the brain. Tumors are located and operated upon very much the same as abscesses; though a tumor is sometimes too large to be removed.

Trephining for epilepsy of the traumatic variety has been done successfully, and when the lesion is over well-known centers, and the convulsion is limited to muscles corresponding to these motor-centers, success will probably crown the effort. The operation should always be done as soon after the injury as possible. Trephining has also been done for Jacksonian epilepsy and for inveterate headache successfully.

Trephining for arrested development deserves some mention, and is done with good results in some cases.

ABDOMINAL. The immense amount of abdominal surgery being done shows with what fearlessness

this cavity is entered now for every conceivable injury and disease. Here again the most rigid cleanliness is demanded. In every wound penetrating any of the viscera, laparotomy is done, the wound found and sutured. In the case of gunshot wounds, the ball having passed through several coils of intestines, each puncture is carefully looked for, and when found is closed; and, provided the patient is seen soon enough, and shock is not too great, the surgeon has every cause to hope for the recovery of his patient.

In diseases of the gall, bladder and duct, the intestines and the stomach, the advance has been very great.

In cicatricial stenosis of the pylorus, the operation of pyloroplasty, or creating a new pylorus—devised by Heineke, and later by Mikulicz—is being done with great success, and in malignant disease of the pylorus, gastro-enterostomy, establishing an opening between the intestine and the stomach, at a distance from the diseased portion, prolonging the life of the patient.

Pylorotomy, or excision of the pylorus for malignant disease, has for its object the same as the former, except that the diseased portion is removed.

In intestinal obstruction, the use of decalcified bone-plates of Sen and the catgut rings of Abbe, in the anastomosis of the parts of the intestine above and below the obstruction, has added many successes to intestinal surgery.

The Murphy button is also being largely used for anastomosis. The button is in two parts, which fit together with a spring fastening; each part is sewed into a slit made in the upper and the lower part of the intestine, and then sprung into place. It is supposed to come away in the stool as soon as it has cut through the intestine. The gall-bladder is also anastomosed with the intestine in the same way, in biliary obstruction.

In pelvic surgery the tendency of the times is to operate only when the organs are so diseased as to preclude the possibility of a cure by any other means.

Pyosalpinx, ovarian abscess, or any abscess of the pelvis, is removed either by laparotomy or through the vagina. A large number of surgeons claim that the abscess, with the uterus, should be removed *per vaginam*, thereby leaving no source of infection which is liable to give future trouble. The principal causes of pelvic pus are gonorrhœa and septic infection from the uterus after a miscarriage. If the abscess is large and can be evacuated through the vagina, this is done, the patient usually making a good recovery. In the so-called celiotomy the per cent. of mortality should not be more than three.

There are those who say that every fibroid tumor of the uterus should be removed, and others who say that none should be operated upon. A safe rule is, that when a fibroid is growing rapidly, is so situated as to cause severe pain and make the life of the individual unbearable, hysterectomy should be performed.

The old operation of the clamp, by which the pedicle was clamped outside the abdominal wound,

is being superseded by one of total extirpation, by which only the vaginal portion of the cervix is left, as described by Baer. In cancerous disease the whole cervix also is removed. The former is still adhered to by Dr. Joseph Price, of Philadelphia.

In the operations upon the pelvis, rapidity and excellence have been greatly facilitated by the Trendelenburg position, or elevation of the hips above the shoulders, allowing the intestines to gravitate toward the thorax.

APPENDICITIS. Inflammation of the vermiform appendix and its surgical treatment is being observed with interest by all the world. Its etiology is predisposing and exciting. The appendix in our prehistoric ancestors was probably once useful, but now, belonging to that class of useless tissue having a very low vitality and a very slight power of resistance, it is pre-eminently susceptible to inflammation. The exciting causes are mechanical and bacterial, though the latter is nearly always associated with the former. The appendix is so constructed that if the ilium or the caput coli is distended with gas or fecal matter, it is so dragged upon as to cause interference with its circulation, when it is only a step to a catarrhal condition and the usual appendiceal abscess. The bacterium most often found is the "bacterium coli commune." It is nearly always found in the intestinal tract, but seems to do no harm until the mucous membrane is damaged. It has been shown by experiment that a condition of constriction favors the penetration of these bacteria.

Another class of cases is that in which some fecal concretions or foreign bodies get into the appendix. This was once thought to be the only cause of appendicitis, but it is now proven beyond a doubt that not more than four per cent. is due to this cause. The mucous membrane becomes very vascular and thickened, and as the opening into the intestine is very small, the secretions collect and become muco-purulent, and in time ulcers form. If penetration does not take place, a *localized* peritonitis sets in, and even after perforation the pus is frequently walled off by the loops of intestine; but sometimes the peritoneal infection becomes general in a few days. The pain is usually all over the abdomen at first, but after a few hours is localized in the right iliac fossa; a little later there is a point that is a little more tender than any other; this is called McBurney's point, and is situated nearly midway between the anterior superior spine and the umbilicus, which indicates the base of the appendix.

Vomiting, moderate fever, pulse 90 to 110, with rigidity of the rectus muscle, are some of the symptoms. As long as the disease confines itself to the appendix there is usually little swelling of the abdomen, but again the swelling increases very rapidly within a few days. Fluctuation is usually absent.

The mortality of appendicitis, with its attending surrounding inflammations, is about one out of seven or eight cases. If general peritonitis sets in, the operation must not be delayed a minute or death will quickly intervene. When seen in its incipency a saline cathartic should be administered, also a

warm-water enema; hot fomentations should be applied externally. After the bowels have freely moved, an opiate is given. Cathartics are contra-indicated afterward, until the acute symptoms have subsided. The food is absolutely nothing but liquid. If the inflammation does not yield to the above, surgical means must be resorted to. The abdomen is opened over the site of the appendix in the direction of the muscle-fibers, the appendix found, ligated with antiseptic silk or catgut, and removed. If an abscess has formed, it is opened, thoroughly irrigated and drained; the wound is dressed antiseptically. In recurrent appendicitis the interval is recommended as the time to operate in all cases by most surgeons, but certainly a large number of patients recover and never have any recurrence; though if the recurrence is very frequent, operation must be done.

KIDNEYS. Probably the greatest triumph of surgical skill during the past ten years is the catheterization of the ureters by Dr. Kelly, of Baltimore. Through a urethral speculum a light is thrown into the bladder and the orifice of the ureter found, a long, flexible catheter is introduced, and the other ureter is likewise catheterized. The urine of each is caught and tested, thereby diagnosing beyond a doubt the diseased kidney. The pelvis of the kidney is irrigated by allowing a small quantity of fluid to enter through the catheter, thus ultimately curing a pyonephrosis that would have continued to the end.

In all these operations and manipulations the strictest regard is had to antiseptic detail, and to this is due nearly all the vast progress made in surgery during the last decade.

J. THOMAS KELLEY, JR.

SURICATA. See **MAMMALIA**, Vol. XV, p. 437.

SURINAM OR DUTCH GUIANA. See **GUIANA**, Vol. XI, pp. 251-253.

SURNAME. See **GENEALOGY**, Vol. X, p. 144; and **NAMES**, Vol. XVII, p. 169.

SURPLICE. See **VESTMENTS**, Vol. XXIV, p. 195.

***SURVEY, THE UNITED STATES GEOLOGICAL**, is the immediate successor of three pre-existing governmental institutions which had as their principal object the making of topographic and geologic surveys in the United States. One of these, designated the Geographical Surveys West of the One-Hundredth Meridian, was established in 1869 under the War Department, Lieutenant (afterward Captain) Geo. M. Wheeler, Corps of Engineers, being in charge. The other organizations were under the control of the Department of the Interior, and were designated the Geographical and Geological Survey of the Territories, under Dr. F. V. Hayden, authorized by law in 1867, and the Geographical and Geological Survey of the Rocky Mountain Region, placed by Congress in 1870 under the charge of Major J. W. Powell. The government had also done more or less geographic and geologic work through other agencies, notably by the geological exploration of the fortieth parallel, under the direction of the War Department and the immediate charge of Clarence King; but these surveys had all completed their work and were not in

existence at the time the United States Geological Survey was established.

In 1878, under instructions from Congress, the National Academy of Sciences instituted an inquiry as to the best and most economical method of surveying and mapping the Territories of the United States, and submitted a report in November of the same year, recommending that all government survey operations be grouped under two heads: (1) Surveys of mensuration; and (2) Surveys of geology and economic resources of the soil. With this report before it, Congress proceeded to consider the question of the organization of government surveys, and the result was the enactment of legislation abolishing the Wheeler, Hayden and Powell surveys, and establishing in their stead the United States Geological Survey. This action was in conformity with the recommendation of the National Academy, though beyond this the recommendations made in the report of that body were not adopted.

The act establishing the United States Geological Survey became a law March 3, 1879.

The act provides, among other things: "That the director and members of the Geological Survey shall have no personal or private interests in the lands or mineral wealth of the region under survey, and shall execute no surveys or examinations for private parties or corporations. . . . And all collections of rocks, minerals, fossils, objects of natural history, archæology and ethnology, . . . when no longer needed for investigations in progress, shall be deposited in the National Museum."

The results of the work of the Wheeler, Hayden and Powell surveys, the existence of which terminated with the passage of this act, are recorded in publications as follows: By the Wheeler survey, 7 concurrent volumes of reports and a supplementary volume, together with a number of geologic and topographic maps; by the Hayden survey, 12 quarto monographs, 12 annual reports, 6 volumes of bulletins, so-called, and 12 other bulletins and reports on entomologic and other subjects; and by the Powell survey, 9 quarto reports, besides a number of contributions to ethnologic science.

The United States Geological Survey is a bureau of the Department of the Interior, and under the immediate charge of a director, who is nominated by the President and confirmed by the Senate. The members of the permanent corps are appointed by the Secretary of the Interior upon the recommendation of the director; and appointments are based upon merit alone, the fitness of applicants being determined by competitive examination conducted under the civil-service rules. The first director was Clarence King, who resigned in 1881 and was succeeded by Major J. W. Powell, who held the office until 1894, when he in turn resigned and was succeeded by Charles D. Walcott.

A plan of operations is submitted by the director to the Secretary of the Interior at the beginning of each fiscal year, and, if approved by him, becomes the order for the year's work; and the director also makes an annual report of operations.

The Survey is now organized into branches and divisions as follows:

BRANCH.	DIVISION.	
Geologic-----	Geology.	
	Palæontology.	
	Chemistry.	
	Hydrography.	
	Mineral Resources.	
Topographic -	Triangulation.	
	Topography.	
	Illustrations.	
Publication --	Editorial -----	Textual publications.
		Geologic maps.
		Topographic maps.
	Engraving and Printing.	
Administrative	Documents, Correspondence and Records.	
	The Library.	
	Disbursements and Accounts.	

In 1882 Congress extended the operations of the Survey over the entire United States, abandoning the use of the phrase "national domain."

The primal object of the Survey in preparing a topographic map is to provide a basis for a geologic map. But owing to a demand throughout the country for topographic maps, the character of the work done in the topographic branch of the Survey has been materially improved since the work was begun.

The methods employed are the same in all areas with respect to the two essential divisions of work, viz., the establishment geodetically of points of primary control, and the location of contours, streams, culture, etc. Procedures and methods within these two divisions differ in detail, but geodetically located points of control are in all cases obtained, and the contours, streams, and all features shown on the maps, are located and platted in horizontal and vertical position. To avoid duplication, the Geological Survey uses the points established by the coast and geodetic survey, the lake survey, and the Mississippi River commission, whenever they are available.

The first contoured topographic maps of the United States made for geologic purposes were on the scale of 1 : 250,000 (four miles to the inch), with contour intervals of 200 to 250 feet; but the necessities of science and the demands of the public called for a more detailed map, and the scale of 1 : 125,000 (2 miles to the inch) was adopted. This was again enlarged in certain regions to 1 : 62,500 (1 mile to the inch). The topographic maps of the Geological Survey are now being made, in the rougher mountain region and thinly populated areas, on the 1 : 125,000 scale; with contour intervals of from 10 to 100 feet, and in the more valuable and thickly populated areas, on the 1 : 62,500 scale, with contour intervals of from 5 to 100 feet. Special maps for the detailed representation of areas of unusual mining or scientific interest are occasionally made on still larger scales.

The standard atlas sheet is about 20x16 inches in size. Sheets made on the two-mile scale embrace an area of between 900 and 1,000 square miles, while those on the one-mile scale embrace about 225 square miles.

In an act passed in June, 1896, Congress made provision for determining levels above the base-level in each area under topographic survey, and for

the marking of these levels on the ground by means of iron or stone posts or permanent bench-marks. Under this provision, lines of spirit-levels are now run throughout the areas under survey, and monuments, sometimes of iron and sometimes of stone, according to circumstances, each capped with a brass plate bearing a record of the elevation and an appropriate legend, are established, two such monuments in each township or equivalent area in the region of country west of the 95th meridian, and at least one in each such area in the region east of said meridian. Permanent records are thus left on the ground, in the form of monuments, to show the position of triangulation points, township corners and points in villages and cities, and their true elevation above sea-level; and the topographic surveys are thus connected with the public-land surveys.

The geologic work is readily classified as (1) special investigations and (2) areal mapping. As a result of the special investigations conducted by it, at the close of 1895 the Survey had published 25 monographs and 129 bulletins. Numerous collections of rocks, minerals and fossils have been accumulated in the laboratories and storerooms of the Survey and in the National Museum, and upon these collections are based the correlations which are constantly being made in the course of the areal mapping, and frequently in the solution of problems arising in the study of economic questions.

Under the authority conferred by Congress in 1882, a large corps of geologists undertook the planning of a system of mapping that would serve for all the phases of geology to be met within the United States, and the assembling of the scattered results of the work that had been done by the earlier surveys. The problems to be considered had to be solved before the areal mapping could be carried forward intelligently and with due regard for scientific accuracy. This work was pursued for ten years before the first folio of the final geologic map was published. Most of the larger questions affecting the classification and nomenclature of the sedimentary and volcanic rocks were satisfactorily answered. Great progress was made in the study of the altered (metamorphic) rocks and of the complex of crystalline rocks grouped under the term "Archean." A satisfactory solution of the lower Mesozoic (Juratrias) series is yet to be reached; and there is a great field in the pre-Paleozoic sedimentary and crystalline formations, in which further study will bring out important data for classification and geologic mapping; but the areas affected are relatively small within the United States, and the areal geologic mapping can go on without seriously suffering on this account. The representing of the geology on the maps is by means of a color scheme that has thus far met the demands made upon it.

The areal geologic map in its final form is intended to place before the geologist, mining engineer, student, and all persons interested, a representation of the topography and geology of the area included within the atlas sheet. The areal geologic map represents all that the geologist preparing it knows of the areal distribution of the rocks occurring within its limits, so far as the scale upon which

it is made will permit of representation of the data. Taken in connection with the topographic base, it presents the geologic distribution of the various rocks in a form for the use of geologists and students, but it does not appeal so directly to persons interested in the mineral resources of the region as seems desirable. To meet this demand a second map is prepared, upon which the rocks carrying minerals of economic value are clearly indicated by distinct colors, the import of which is shown by the colored legend on the margin. Thus, the distribution of the coal and iron-bearing rocks of the Appalachians in Tennessee and other states, and of the gold-bearing rocks of California and elsewhere, is clearly presented. These maps refer only to the areal distribution of the rocks. What is known of the underground geology is graphically illustrated on a structure-section sheet and a sheet of columnar sections. With the four sheets before him, the geologist, mining engineer, land-owner, or other inquirer has in view in graphic form a summary of all that the geologist who prepared it can tell him of the area. Accompanying the maps are explanatory texts for the elucidation of their features. Maps, sections and text together constitute a folio of the geologic atlas of the United States. The first folio was issued in 1894.

A typical illustration of the economic side of the geologic work of the Survey is to be found in the investigation of the iron-ore deposits of the Lake Superior region (see IRON AND STEEL, in these Supplements), the results of which include the determination of (1) the geologic position and geographic distribution of the iron-bearing formations, and (2) the laws which control the occurrence of the ore-deposits within the formations.

By the aid of the areal and structural maps which have been and will be prepared, the mining engineer may avoid unnecessary expenditure of money in exploration, and be guided in the development of the mineral resources of the region.

Subsidiary to the geologic work of the Survey is the work in palæontology and in chemistry. Researches in these branches are conducted for the purpose of aiding the geologist in the solution of problems that arise from time to time in the course of areal mapping and of special geologic investigations.

The geologic investigation of the mineral resources was given an impetus by the inauguration of surveys of the Leadville district of Colorado and the Eureka and Virginia districts of Nevada. Surveys and reports then followed upon the quick-silver deposits and the gold-belt of California, the copper district of Lake Superior, the iron-ore districts of Wisconsin and Michigan, the phosphate deposits of Florida and the coal-fields of the Appalachians.

Ten volumes of the *Mineral Resources of the United States* were issued as a distinct publication of the Survey, but since 1894 the statistical data have been published as parts of the annual reports of the director.

The Survey is making a systematic examination of the water-resources of the United States, espe-

cially as these have to do with the question of supplies for irrigation, water-power, and domestic use. The investigation consists of three distinct yet closely related branches of work. The first comprises the measurement of the streams and determination of the surface supplies in lakes and rivers. It includes the examination of reservoir-sites, especially upon the public lands, and the feasibility of using these for increasing the water-supply. The second class of investigations is the examination of underground currents and artesian wells. It is mainly geologic in character, as distinguished from the engineering surveys first mentioned. The third class of works consists in the preparation of short popular reports giving the results of the measurement of the streams and describing the methods of utilizing the water-resources, particularly for irrigation.

In the course of "the classification of public lands and the examination of the geological structure, mineral resources and products of the national domain" by the Survey, the fact has been brought out clearly that over vast areas of fertile land the only "mineral" resource is water. Owing to arid or semi-arid climatic conditions the question of water-supply is a vital one for a very considerable portion of the United States. Water is the foundation of land-values, and the determination of the possibility of obtaining a sufficient quantity for agricultural purposes, including stock-raising, either from surface streams, from underground sources, or by storage, has an importance as great as, if not greater than, that of the study of the occurrence of precious metals.

With the gradual expansion of the surveys of this organization, phases of the question of water-power and the possibilities of its development are of especial importance in the East. The problem of securing potable waters for municipal and domestic supply has also been brought forward from regions where surface sources are contaminated, and the probabilities of obtaining a pure supply from deep-seated rocks can be determined only by thorough knowledge of the geology of a given region.

The history of the irrigation branch of the Survey dates from the year 1888, when the director was called upon by Congress to consider the irrigation subject, a resolution being passed requiring him to make an examination of that portion of the arid region of the United States where agriculture is carried on by means of irrigation, as to the natural advantages for the storage of water for irrigation purposes, etc. This was followed in October of the same year by an act providing for investigating the extent to which the arid region could be redeemed by irrigation, the segregation of the irrigable lands in such arid region, and the selection of sites for reservoirs and other hydraulic works; and providing further, that all the lands thus designated or selected for sites for reservoirs and other hydraulic works, and all the lands made susceptible of irrigation by such reservoirs, etc., should be thereafter reserved from sale as the property of the United States, and should not be subject to entry, settlement or occupation. Work was begun and actively prosecuted under the

terms of this act, and was continued under a similar act passed the following year; but in August, 1890, the law of October, 1888, was in part repealed and the appropriations withdrawn. That portion of the law which affected the withdrawal of public lands from entry, occupation and settlement was repealed, but the remaining provisions were unaffected by the act of repeal, and there is still on the statute-books authority for making an examination of the arid region, for ascertaining the capacity of the streams, and for the selection of sites for reservoirs, etc. While the law was in force the Survey selected and mapped a large number of reservoir-sites, which have been noted on the records of the General Land Office, and are now reserved from entry or settlement.

Measurement of the streams of the arid region, which was begun under the acts above mentioned, was not abandoned when the other branch of hydrographic work was discontinued, but was continued in a small way, without specific appropriations, until August, 1894, when Congress made appropriation for its further prosecution, and also provided for an extension of the field of operations of the hydrographer, in the following act: For gauging the streams and determining the water-supply of the United States, including the investigation of underground currents and artesian wells in arid and semi-arid sections.

The work was expanded under the larger opportunities offered by increasingly liberal appropriations, and now constitutes an important branch of the Survey's work. While the greater part of the river-work is within the Rocky Mountain region and to the westward, on streams flowing into the Pacific, and in the region of the Great Plains, the streams of the Atlantic seaboard have received considerable attention since 1894, as has also the general hydrography of the streams of New England. The geologic field-work, having to do with the investigation of underground waters, including artesian conditions, has been expanded to cover typical localities in various regions.

WILLIAM F. MORSELL.

SURVIVAL OF THE FITTEST. See *ACCLIMATIZATION*, Vol. I, p. 87; and *VARIATION*, Vol. XXIV, p. 80.

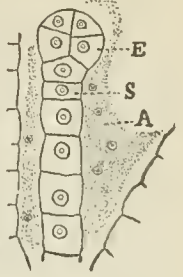
SURVIVORSHIP. As a legal incident of joint-tenancy, see *JOINT*, Vol. XIII, p. 731. As regards life-insurance, see *INSURANCE*, Vol. XIII, p. 169; and see *Presumption of Survivorship*, under *MEDICAL JURISPRUDENCE*, Vol. XV, p. 779; see also *EXEMPTION LAWS*, in these Supplements.

SUSANVILLE, a town and the capital of Lassen County, northeastern California, 110 miles N.E. of Marysville and about 25 miles W.N.W., on the Nevada, California and Oregon railroad, on Susan River. It is situated upon a slope of the Sierra Nevada, at an altitude of 4,180 feet, in a grain and fruit raising district, and has saw and planing mills. Population 1900, 4,511.

SUSO OR SEUSE, HEINRICH. See *GERMANY*, Vol. X, p. 526.

SUSPENSION BRIDGES. See *BRIDGES*, Vol. IV, pp. 301-305.

SUSPENSOR, a peculiar structure which appears in seed-plants in connection with the development of the embryo. It is usually a chain of cells, often called the pro-embryo; is the first structure produced by the segmenting egg-cells, and usually its terminal cell gives rise to the embryo. The accompanying figure represents a developing embryo in the seed of *Capsella*, the common shepherd's purse. The suspensor (*S*) is the chain of six cells, at the end of which a group of cells (*E*) is the beginning of the embryo, all imbedded in the food material, or endosperm (*A*).



SUSQUEHANNA, a borough of Susquehanna county, northeastern Pennsylvania, on the Susquehanna River, and on the New York, Lake Erie and Western railroad, 22 miles S.E. of Binghamton, New York, and 38 miles N. of Carbondale. It contains railroad machine-shops, locomotive and car works, steam-heater factory, and chemical works. Population 1890, 3,872; 1900, 3,813.

SUSQUEHANNA RIVER, a stream formed in Northumberland county, eastern central Pennsylvania, by the union of its eastern and western branches, the first and larger of the two rising in Otsego Lake, southeastern New York, the other rising in Cambria county, southwestern central Pennsylvania. The main stream flows through a fertile, picturesque region, and falls into the head of Chesapeake Bay at Port Deposit, Maryland, after a course of 150 miles, nowhere navigable except during the spring freshets, when great rafts of logs are floated down. The branches, which afford great water-power, have a length respectively of 200 miles for the western and 250 miles for the eastern branch.

SUSU, a fish. See *INDIA*, Vol. XII, p. 743.

SUTLEJ. See *PUNJAB*, Vol. XX, p. 107.

SUTRA. See *SANSKRIT*, Vol. XXI, pp. 274, 275, 276-80.

SUTRO, ADOLPH HEINRICH JOSEPH, an American mining engineer; born in Aix-la-Chapelle, Germany, April 29, 1830. He removed with his mother to New York in 1850, and immediately started for the California gold-fields, where a technical knowledge received in his native land was of great service to him. In 1860 he visited the famous "Comstock" mine in Nevada, and devised a tunnel which would drain and ventilate all the mines of that region. The next nine years were spent in organizing a company of sufficient capital for the undertaking, and in securing the necessary legislation. Work on the tunnel was begun in October, 1869, and finished in the latter part of 1871. Sutro realized a fortune from the venture, and settled in San Francisco, where he spent millions in benefactions, among them the copy of Bartholdi's statue of *Liberty Enlightening the World*, erected at the entrance to the harbor. In 1893, he was elected mayor of the city, and did much in introducing municipal reforms. His property, the Cliff House, with the large park and public baths, are well known. For a description of the "Sutro tunnel," see *NEVADA*, Vol. XVII, p. 368. Died in San Francisco, Aug. 8, 1898.

SUTTER, JOHN AUGUSTUS (1803-1880). See **SACRAMENTO**, Vol. XXI, p. 132.

SUTTON, a town of Worcester County, southern Massachusetts, nine miles S. of Worcester, on the New York, New Haven and Hartford railroad, and containing the villages of Sutton, West and South Sutton, Mauchaug, Wilkinsonville, Pleasant Valley, Woodbury and Marbleville. The region is devoted to agriculture, while the villages have manufactories of cotton goods. Population 1890, 3,180; 1900, 3,328.

SWAIM, DAVID GASKILL, an American soldier; born in Salem, Ohio, Dec. 22, 1834; educated in his native State, and admitted to the bar in 1859. Two years later he entered the army as First Lieutenant of the Sixty-fifth Ohio Volunteers, and soon after taking the field was promoted to be Adjutant of the regiment and Acting Adjutant General of his brigade. For his services at the battle of Shiloh he was made Captain and Assistant Adjutant General of Volunteers. He served through the entire period of the war of the rebellion, and was retained on staff duty after the close of the war. In 1867 Gen. Swaim was commissioned in the permanent military department, and was assigned to duty as Judge Advocate in the Fourth Military District, at Vicksburg, Miss. He was appointed Major and Judge Advocate in the United States Army in 1869, with headquarters at the Military Department of the Missouri. This position he occupied for ten years, until President Hayes, in Dec., 1879, appointed him Judge Advocate General of the army, with the rank of brigadier-general. Serious charges were brought against him in 1884, the inquiry covering more than a year, and resulting in his suspension for the remainder of his term of active service. His efforts at reinstatement culminated in the action of President Cleveland in reinstating him as Judge Advocate General, and immediately retiring with the rank of brigadier-general. Died in Washington, D. C., Aug. 16, 1897.

SWAMPSCOTT, a town of Essex County, northern Massachusetts, on Massachusetts Bay, 2 miles N. E. from Lynn and 13 N. E. from Boston, on the Boston and Maine railroad. An excellent beach and good accommodations at the villages of Swampscott, Beach Bluff, Phillips Beach and Mountain Park have given it a reputation as a summer resort. It has a good school system, five churches and a public library. Population 1900, 4,548.

SWANTON, a town of Franklin County, northern Vermont, on the Missisquoi River, nine miles N. of St. Albans, on the Central Vermont and St. Johns and Lake Champlain railroads. It has a national bank with a capital of \$50,000, white and variegated marble quarries, and some manufacturing. Pop. town and village, 1900, 3,745.

SWAYNE, NOAH HAYNES, an American jurist; born Dec. 7, 1804, in Culpeper County, Virginia. He was educated at Waterford, in that State, and upon his admission to the bar went to Ohio and established himself at Coshocton, where he began the practice of his profession. He served as prosecuting attorney of the county, also as a member of

the state legislature; and, upon his appointment as district attorney for the state in 1831, removed to Columbus, the capital. He resigned this office in 1841; and subsequently served on the Ohio fund commission and in the Ohio-Michigan boundary dispute. He appeared as counsel in many of the leading causes heard and determined by the supreme court of the state, and became prominent by reason of his association with the defense of escaped slaves. He was identified with the Republican party from its inception, and in 1862 was appointed one of the justices of the supreme court of the United States by President Lincoln. This position he retained until 1881. He died in New York City, June 8, 1884.

SWAZILAND. See **AFRICA**, in these Supplements.

SWEAT. See **NUTRITION**, Vol. XVII, p. 685.

SWEATING-SYSTEM is a term now employed for the most part to subcontracting for the output of piece-goods. About 1849 the name and the thing were brought to public notice by Charles Kingsley in *Alton Locke* and other writings, but in a way to indicate that the phrase was already familiar among sufferers from it. Exactly what was meant by the term is not clear. There is good authority for the use of the word *sweat* in the sense of arduous labor, such as would cause one to sweat; in slang use, it means to fleece or cozen; the process of paring down coins and remilling them, in order to make a light-weight coin do full-weight service, is known as "sweating." For a long time the term, as applied to industries, was used without definite force, and in a sense covering all these meanings. Thus, a recent standard dictionary defines the verb as signifying "to extort money or labor from; exact hard labor from at insufficient wages, or extortionate interest, or in unsanitary conditions." Plenty of this sort of sweating has been done in industrial history, but it disappears under the advance of incorporations, trades unions, factory inspections and legislation. Sweating is an incident of unorganized industrial conditions. With the progress of organization this type of labor becomes more definitely connected with subcontractors for piece-work.

The history of the sweating-system indicates that it is a survival of old conditions, and is passing away. In the encroachments of order upon disorder, or, as the scientists would say, of the known upon the unknown, there is a margin of work not yet reduced to system. Before the days of power-machines it was customary for the dealer or trader to give out his work by the piece, to be done at home. Thus, in the infancy of the power-loom, the dealer in fabrics gave out yarn to be woven at home into cloth, which was paid for by the yard. The chain-maker supplied the iron rods that the blacksmith took to his forge and turned into links. Domestic piece-work was the common method of manufacturing production in the first half of the nineteenth century. At that time the factory system was in its infancy; labor unions were conspiracies forbidden by law; wages were what the dealer chose to give, for there was no effective competition that did not rest on the depreciation of wages; days of labor were from 12 to 15

hours; women and children were competitors of husbands and fathers in mills and mines; and when Earl Grey's poor-law commission made its report in 1834, over \$30,000,000 was annually spent in England for poor-relief, a great proportion of which went to eke out insufficient wages—that is, to bring them up by means of parish-rates to the level of a very frugal existence.

What is called the factory system and its concomitants of trades-unions and humane legislation made great inroads upon this chaos of painful, personal struggles for bread. Labor collected into aggregates as capital built mills; factory-owners employed their own operatives, and no middlemen or contractors stood between them and their employees; superintendence became of a more intelligent gradé; labor, already collected into centers, organized itself to maintain wages; the corporate establishments created by law passed under legislative control, by means of which conspiracy laws were repealed, the duration of a laboring-day was shortened, the toil of women and children was regulated, and the competition that exploits and kills was arrested in the industrial world. There still remains a certain portion of the population not yet comprised in this great industrial order. They still seek piece-work on the best terms that personal ignorance and hunger can make with disorganized production.

In 1888 a select committee of the British House of Lords began an inquiry into the sweating-system of the United Kingdom. By this was meant the system in which middlemen stood between the piece-maker and the vendor of a finished commodity. The industries examined were tailoring, shirt-making, cloak-sewing, shoe-making, furriery, upholstery, chain and nail making, cutlery, and dock-labor. All these occupations can be carried on by piece-work. If the products can be made at home there is no need of factory plants, and house-rent becomes shop-rent also. This is a source of profit worth considering. It will now be seen that the appearance of the middleman upon the scene is a primary step toward system, that potent agent in economics. He is usually a man of small means and some enterprise. He goes to the dealer and is furnished with material. Often the material is delivered to him in the earlier stages of manufacture; cloaks, mantles, shirts, shoes and other garments are cut out; iron for nails and chains is intrusted to him in rods and bars; knives are forged. He contracts to return the material in finished products, at a fixed scale of prices. At the London docks a stevedore took contracts to load and unload vessels and find his own labor, but after the report of the Labor Commission in 1890 and the great dock strikes, this system was abandoned in Great Britain.

The middleman or contractor is called the "sweater." If he be of superior grade he will find rooms in the establishment of the dealer, or even in apartments he has hired for workrooms. Usually he works with his employees in his own living-rooms; he may take them as tenants. At best his profits are small, and yet his most skillful people can make a fair subsistence. The competition is close, and as the work is such as women and children can per-

form, their presence here, as elsewhere in the industrial world, tends to the depression of the family breadwinner's wages. The evils attendant upon this system are over-crowded tenements, bad sanitary conditions, long hours of labor, inadequate pay.

In the United States the sweating-system is to be found in most serious form among cigar-makers, cloak-makers and shop-tailors. The toilers are usually foreigners, especially the poorer class of Jews, who know nothing of the comforts of life and little of cleanliness. The system has given rise to strikes, out of which have come some temporary ameliorations. Perhaps one of the best of their results is the beginning of labor unions among these poor toilers. Their disorganization and personal isolation have threatened them with a grinding to pieces between the upper and nether millstones of trade and competition. On sanitary grounds, legislation has interfered in some states, forbidding the use of dwelling-tenements for workshops, the over-crowding of workrooms, the employment of children, etc. But even the law cannot be enforced when its execution will cut off the necessary subsistence of an impoverished family. Some benefit has accrued from compelling dealers to mark their goods made in tenements with tags telling their mode of manufacture. The conclusion we must reach concerning the sweating-system is two-fold: first, that it exists among the very wretched and ignorant, who must be trained and brought into the higher industrial order of society; secondly, that the subcontractor represents a stage in the evolution of a better order, when his sweating-function will be extirpated from industry.

D. O. KELLOGG.

SWEDISH LANGUAGE. See SCANDINAVIAN LANGUAGES, Vol. XXI, pp. 370-373.

SWEDISH LITERATURE. See SWEDEN, Vol. XXII, pp. 753-755.

SWEDISH MOVEMENT—CURE. See LING, PETER HENRIK, in these Supplements.

SWEET, HENRY, a British philologist; born in 1845. He was graduated in 1873, at Balliol College, Oxford; afterward studied in Germany, and early became known for his knowledge of early-English; he edited numerous works, and himself published books of value. His editing was done mainly for the Early-English Text Society. Among such publications are *King Alfred's West-Saxon Version of Gregory's Pastoral Care* (1872); *Old English Reading Primers* (1877); and *Old English Texts, Charters, etc.* (1885). Among his own writings are *A History of English Sounds* (1874); *An Anglo-Saxon Reader in Prose and Verse* (1876); *First Middle-English Primer* (1884); and *Icelandic Primer* (1886). He contributed the article on JACOB L. C. GRIMM to this ENCYCLOPÆDIA.

SWEET-BAY. See LAUREL, Vol. XIV, p. 348.

SWEETBREAD, the pancreas of an animal, as of a calf or sheep, when used for food. The term is also applied to the thymus gland, which is called the throat-sweetbread in distinction from the first form, commonly known as belly-sweetbread. See *Pancreas*, under DIGESTIVE ORGANS, Vol. VII, p. 232;

and *Thymus Gland*, under MAMMALIA, Vol. XV, p. 365.

SWEET-BRIER. See EGLANTINE, Vol. VII, p. 698.

SWEET-FLAG. See FLAG, Vol. IX, p. 280.

SWEET-GALE. See GALEWORTS, in these Supplements.

SWEET-GUM. See LIQUIDAMBER, Vol. XIV, p. 687.

SWEET-POTATO. See POTATO, SWEET, Vol. XIX, pp. 597, 598.

SWEET SPRINGS, a city of Saline County, western Missouri, on the Blackwater River, about 75 miles N.W. of Jefferson City and 30 miles S.E. of Lexington, on the Missouri Pacific railroad. It has two banks, with an aggregate capital of \$125,000, several medicinal springs, and is in a stock-raising and agricultural district. Population 1900, 1,080.

SWEETWATER, a town of Monroe County, southeastern Tennessee, about 35 miles S.W. from Knoxville, on the Southern railroad. It is in a stock-raising and grain-producing district, and has some iron-working establishments. Near here is Hiwassee College (Methodist Episcopal), founded in 1849, and having an average attendance of 75, employing five instructors. The population of Sweetwater in 1900 was 1,716.

SWEET WATER, a town and capital of Nolan County, west central Texas, 200 miles N.W. from Austin and 28 miles N.E. from Colorado City, on the Texas and Pacific railroad. It is the center of a large grazing district, and has a flour-mill and plaster-of-Paris factory. The population in 1900 was 670.

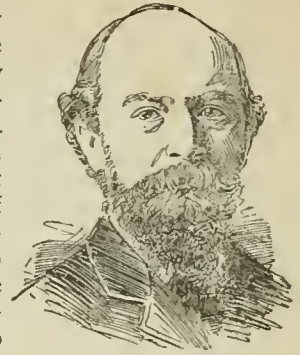
SWEDENBORGIAN. See Vol. XXII, pp. 759, 760; and NEW JERUSALEM CHURCH, in these Supplements.

SWEYN OR SVEND. See ETHELRED, Vol. VIII, pp. 567, 568.

SWIFT, LEWIS, an American astronomer; born in Clarkson, Monroe County, New York, Feb. 29, 1820. He began his professional career as a lecturer on magnetic and electrical phenomena, illustrating his subjects by experiments and exhibitions. Between the years 1862 and 1869 he made a number of important astronomical discoveries, and in 1872 located at Rochester, where the Warner Observatory was erected, and there for years pursued his investigations. His discoveries include the comet of 1862 and similar bodies at intervals from that year to the present time. The value of his researches was recognized by the Vienna Academy of Sciences, the Academy of Sciences of France, by private individuals, and in other forms, including his election to membership of the Royal Astronomical Society of Great Britain. He invented microscopic and astronomical appliances, and wrote many scientific articles. In 1894 he took charge of the Lowe Observatory at Mount Echo, California.

SWINBURNE, ALGERNON CHARLES, an English poet, the son of an admiral and the grandson of Earl Ashburnham; born April 5, 1837, in London, and educated at Eton and Balliol College, Oxford. He left Oxford without taking a degree, and went to Italy in company with Walter Savage Landor.

His memory for verse was extraordinary, and, like Pope, "he lisped in numbers, for the numbers came." His antecedents were those of hereditary aristocracy, and he became notable for his uncourtly and revolutionary opinions, but for which a large consensus of opinion would have made him poet laureate on the death of Lord Tennyson. His *Poems and Ballads* (1866) were published in the United States as *Laus Veneris*, but they followed two plays entitled *The Queen Mother* and *Rosamond*



ALGERNON C. SWINBURNE.

(1861). Perhaps nothing in erotic literature exceeds in vehemence and baldness his *Laus Veneris*. In its passion, by its very excess, strives to purge itself and reach a supreme and pure exaltation. By intensity he would transfigure passion, a road on which but few readers follow him appreciatively. His *Atalanta in Calydon* (1864) is an extraordinary drama, conceived in a highly classical spirit, and, while in no sense imitative, seems as if the genius of a Sophocles had inspired it. *Erechtheus* (1876) is another classical drama, but does not reach the purity of form and the vigor of *Atalanta*.

Swinburne essayed to write a Scottish trilogy, with *Mary, Queen of Scots*, for the subject. The work was begun in 1865, but was not completed till 1881. The three parts are *Chastelard*, *Bothwell* and *Mary Stuart*. He wrote the article on *MARY STUART* (see Vol. XV, pp. 594-607), as well as that on *BEAUMONT AND FLETCHER* (see Vol. III, pp. 469-474), in this *ENCYCLOPÆDIA*. For his other contributions to this work, see the *INDEX*.

In style Swinburne is a master of melodious alliteration. Nobody has found more music in the phonetics of the language than he. His command of metre is extraordinary. Indeed, his sense is often incumbered with the wealth of his rhythmic and metaphorical fluency. Among his hitherto unmentioned and later metrical works are *A Song of Italy* (1867); *Sienna* (1868); *Ode on the Proclamation of the French Republic* (1870); *Songs before Sunrise* (1871), in glorification of skepticism and republicanism; a second series of *Poems and Ballads* (1878); *Songs of the Springtides* (1880); *The Heptalogia* (1880), mystifying imitations of contemporary poets, in which he included himself, to bewilder the critics; *Disgust* (1871), a travesty on Tennyson; *Tristram of Lyonesse* (1882); *A Century of Roundels* (1883); *A Midsummer's Holiday* (1884); *Marino Faliero* (1885), and *Loerine* (1887), both being metrical tragedies; *Select Poems* (1887); a third series of *Poems and Ballads* (1889); *The Sisters* (1892), a tragedy; and *Astrophel* (1894), another poem.

Among his prose works there must be mentioned *A Criticism of Rossetti* (1866); *William Blake* (1867), a critical essay; *Essays and Studies* (1875); *A Study of Shakespeare* (1879); *Prose Miscellanies* (1886); *The*

Life of Victor Hugo (1886); *A Study of Ben Jonson* (1896); and *Studies in Prose and Poetry* (1894).

D. O. KELLOGG.

SWING, DAVID, an American clergyman; born in Cincinnati, Ohio, Aug. 23, 1830; graduated at Miami University, Oxford, Ohio, in 1852; professor of languages there from 1853 to 1866, and pastor of the Fourth Presbyterian Church of Chicago from 1866 to 1874, when charges of heterodoxy were made against him. After a celebrated trial he was acquitted, but soon resigned from the presidency, and from 1878 held independent services at



DAVID SWING.

Central Music Hall, preaching to crowded houses until his death. He was always an advocate of municipal reform, and prominent in national and local movements. His published works include *Sermons* (1874); *Truths for To-Day* (1876); *Club Essays* (1881); *Sermons* (1884); and *Old Pictures of Life* (1894). Died in Chicago, Oct. 3, 1894.

SWINTON, WILLIAM, an American historian; born in Haddingtonshire, Scotland, April 23, 1833. He removed with his mother to Montreal, Canada, in 1843; studied at Amherst College, Massachusetts, and at Knox College, Toronto; was instructor in language in Edgeworth Seminary, North Carolina, and in Mount Washington Institute, New York. While teaching he published a series of articles in *Putnam's Magazine*, which were afterward reprinted as *Rambles Among Words* (1859). During the Civil War he served as field-correspondent of the *New York Times* and witnessed many of the more important engagements, but incurred the displeasure of a number of the Union generals, who prevented him from visiting the front at some critical moments. He published, in book form, *Campaigns of the Army of the Potomac* (1866); *The Twelve Decisive Battles of the War* (1867); and *The History of the New York Seventh Regiment During the Rebellion* (1870). He was appointed to the chair of English in the University of California in 1869, remaining until 1874, when he returned to New York to engage in literary work, preparing a series of text-books, among them *Word Analysis* and *Masterpieces of English Literature* (1880). He died in New York City, Oct. 24, 1892.—His brother, JOHN SWINTON, a journalist; born in Salton, Scotland, Dec. 12, 1830. He removed with the family to Canada in 1843, and later to the United States; studied at Williston Seminary, Massachusetts, and in 1856 entered journalism to assist in the Free-State cause in Kansas. He was with the *New York Times* and *Sun* until 1883, when he began the publication of *John Swinton's Paper*, but returned to the staff of the *Sun* in 1889. He published several volumes, among them *New Issue: The Chinese-American Question* (1870); *A Eulogy on Henry J. Raymond* (1870); *John Swinton's Travels* (1880); and *John Brown*, an oration (1881).

SWISS MERCENARIES. See ARMY, Vol. II, p. 616.

SWITCH MECHANISMS. The interlocking system for switches was introduced into railway service in order that a number of switches might be operated from one set of signals. The first to be used in this country were placed at the Spuyten Duyvil Junction, in New York City, on the New York Central and Hudson River Railroad, in 1874. The Pennsylvania Railroad introduced them at East Newark in 1875, and since then their introduction has been general. The Saxby and Farmer system, which originated in London, England, is almost universally used, increasing safety and adding to the facility with which traffic is handled at busy points. Under this system the derailing-switch is usually placed about three hundred feet from the crossing, and is provided with a detector-bar and locking-rod, and operated by a rack-and-pinion movement, whose function it is to first withdraw a lock-pin from the lock-rod of the switch and simultaneously raise the detector-bar above the level of the rails, and then move the switch to the opposite position and force the lock-bolt into a second hole in the lock-rod, and at the same time restore the detector-bar to its normal position below the level of the rails. The detector-bar lies parallel to the rail, is about forty feet long, and is best made with a slight inclination toward the rail to obviate any tendency to sag away from the rail. If a switch is incompletely set the raised detector-bar will show the fact. It also serves to prevent the moving of the switch while the train is above, and the car-wheels keep it depressed. The Johnson lock-and-signal movement, which is based upon the Saxby and Farmer arrangement described, employs but one lever to operate the switch-lock, detector-bar and two junction-signals, where older methods required three levers. Besides economizing mechanism and space in the signal-tower, this device has the advantage that the minutest breakage, loss of a pin, etc., stops the whole operation, leaving the switch at safety position until the loss or break is repaired. This is effected by making the detector-bar and locking-plunger a part of the connection which operates the signals. Another convenience of the Johnson arrangement is, that the connections of the detector-bar are so made that the lever can be reversed and the signals thrown back to the danger position while a train stands upon the detector-bar, the switches remaining locked until the train moves off from the bar. Where two switches are worked together, as at cross-over roads, an equalizing-lever is commonly introduced to exert an equal pressure upon both switches, making it impossible for one switch to check the complete action of the other. Switch-stands are usually made with a target and lamp on top, which indicate the position to which the switch is set. They also bear the lever and locking devices.

Switches are now preferably locked by pipe-connections, rather than wire, which latter is too apt to stretch, causing annoyance. Facing point-locks are usually made duplex, that is, so arranged that in case of any breakage of the connections the plunger of the lock cannot be thrown into the wrong posi-

tion of the switch. The best usage also involves the fixing of iron plates under switch-points to keep the track accurately to gauge, the fixing of cranks and pipe-compensators in beds of concrete, and the providing of derailing switches to prevent cars coming from side-tracks to main track before the switch is set for the side-track.

The replacing-switch is common in street-railway service, where jumping of the track is an every-day occurrence. It consists of a metal casting, carried in a car, and laid upon the rail at the desired point. Its form is such that it leads the flange of the car-wheel back to its place upon the track. It is also called car-replacer and "jumper."

C. H. COCHRANE.

SWITZERLAND. For the general article, see SWITZERLAND, Vol. XXII, pp. 776-800.

The general census of Switzerland was taken Dec. 1, 1888. The area was 15,975 square miles; the total population, 2,917,754. The total population in June, 1897, was estimated at 3,082,989. The following table shows the area and population by cantons:

CANTONS.	AREA, SQ. MILES.	POP. JUNE, 1897.	POP. PER SQ. MILE, 1888.
Zürich (Zurich).....	666	392,945	506.3
Bern (Berne).....	2,657	548,061	201.9
Luzern (Lucerne).....	579	136,956	233.6
Uri.....	415	17,249	41.5
Schwyz.....	351	50,728	143.0
Obwalden (Unterwaldenle-Haut)	183	14,734	82.2
Nidwalden (Unterwaldenle-Bas)	112	13,139	111.9
Glarus (Glaris).....	267	33,379	126.7
Zug (Zoug).....	92	23,242	250.3
Freiburg (Fribourg).....	644	123,618	185.0
Solothurn (Soleure).....	302	91,261	283.5
Basel-Stadt (Bâle-V.).....	14	96,391	5,267.8
Basel-Land (Bâle-C.).....	163	64,911	380.0
Schaffhausen (Schaffhouse).....	114	37,294	331.4
Appenzell A.-Rh. (Ext.).....	101	56,426	535.7
Appenzell I.-Rh. (Int.).....	61	12,905	211.3
St. Gallen (St. Gall).....	779	247,276	292.9
Graubünden (Grisons).....	2,773	95,823	34.2
Aargau (Argovie).....	542	188,455	357.1
Thurgau (Thurgovie).....	381	110,523	274.7
Tessin (Ticino).....	1,088	128,579	116.4
Waadt (Vaud).....	1,244	264,325	199.1
Wallis (Valais).....	2,027	103,908	50.3
Neuenburg (Neuchâtel).....	312	119,329	346.6
Genf (Genève).....	108	111,732	976.9
Total.....	15,975	3,082,989	182.6

It is reported in the census reports of 1888 that 2,083,097 speak German, 634,613 French, 155,030 Italian, and 38,357 Roumansch. The number of foreigners resident in Switzerland at the date of the census was 229,650, of whom 112,342 were German, 53,627 French, 41,881 Italian, 13,737 Austrian, 2,577 British, and 1,354 Russian.

POPULATION OF THE CHIEF TOWNS. In June, 1898, the populations (communal) of the following towns were: Zürich, 146,517; Basel, 98,117; Geneva, 86,535, including suburbs; Bern, 54,577; Lausanne, 42,713; St. Gallen, 34,798; Chaux-de-Fonds, 32,048; Luzern, 27,419; Winterthur, 22,053; Neuchâtel, 19,946; Bienne, 19,697.

GOVERNMENT. On the basis of the census of 1888, the number of representatives in the National Council is 147, one for every 20,000 inhabitants. The Federal Council in 1896 consisted of but seven members, to whom were assigned the administration of the departments of Foreign Affairs, Interior, Justice and Police, Military, Finance and Customs, Agriculture and Industry, Posts and Railways. Bern is the seat of the Federal Council and of the administration. The members of the Federal Council are elected for three years by the assembly, and receive a salary of two thousand four hundred dollars. The President, also elected by the assembly, receives three thousand dollars, and serves but one year. A Vice-President is annually elected to serve in case of disability of the President. The President cannot be re-elected until the expiration of one year from the time of his giving up the office.

INSTRUCTION AND RELIGION. Education is compulsory, and schools abound, especially in the north-eastern canton, where the majority of the people are Protestants. In every district there are primary schools, and secondary schools for youths of from twelve to fifteen. In both these schools the rich and the poor are educated together, the latter being admitted gratuitously. Of the contingent for military service in 1897, 0.29 per cent were unable to read, and 1.02 per cent unable to write. In 1898, there were five Swiss universities, 38 normal schools, and 212 professional and industrial schools. There is complete liberty of conscience and creed. No bishoprics can be created on Swiss territory without the approval of the Confederation. The order of Jesuits cannot be received in any part of Switzerland. In 1888 there were: Protestants, 1,716,548; Roman Catholics, 1,183,828; and Jews, 8,069.

FINANCE. The revenue of the republic is derived largely from customs and postal charges. The total revenue for 1897 was \$18,311,308, and the expenditure was \$17,463,473.

The public debt of the Confederation amounted, on Jan. 1, 1898, to \$16,778,338 at 3½ per cent. On the other hand, there existed at the same date a so-called "Federal Fortune," or state property, valued at a total of \$32,370,965.

DEFENSE. The laws of the republic forbid the maintenance of a standing army within the limits of the Confederation; but every citizen of military age, 17 to 50, is liable to service. On Jan., 1897, the number thus liable was 527,074. These are all obliged to undergo annual exercises and reviews. The army is composed of three classes, viz.: (1) The Élite, consisting in general of all men from 20 to 32 years of age able to bear arms; (2) the Landwehr, comprising all from 33 to 44 years; (3) the Landsturm (which can only be called out in emergencies), composed of all not included in the other classes. On Jan. 1, 1898, there were of the Élite registered 147,191; of the Landwehr, 83,283; of the Landsturm, 271,780. The principal military training school is at Thun, near Bern.

PRODUCTION AND INDUSTRY. The land of the country is very equally divided among the population, there being nearly 300,000 peasant proprietors, representing a population of about 2,000,000.

Of the total area, 28.4 per cent is unproductive, and of the remainder 36 per cent is under grass, 29 per cent under forest, 19 per cent under fruit, and 16 per cent under garden crops. The chief agricultural industries are the manufacture of cheese and condensed milk. In 1897 the export of cheese amounted to 51,040,440 pounds, and of condensed milk 44,498,520 pounds. There were in 1896, 108,969 horses, 1,306,696 cattle, 271,001 sheep, 415,817 goats, 566,974 swine, the whole valued at about \$100,000,000. While, in the main, Switzerland is an agricultural country, yet manufacturing industries have an important place. In 1895 there were 4,933 factories of various kinds. There are about 1,400 hotels, the receipts of which amount annually to about \$17,500,000.

COMMERCE. In 1897 the value of the imports of the special commerce were \$222,888,419, and the exports \$149,467,297. Of the imports \$9,580,321 were of uncoined, and \$16,644,508 coined precious metals; silk, \$27,158,187; chemical substances, \$4,879,857; clocks and watches, \$636,477; and colors, \$1,539,757. Of the exports, \$2,069,907 were of uncoined, and \$10,852,686 of coined precious metals; silk, \$40,788,261; clocks and watches, \$20,753,063; and colors, \$3,462,879. The value of the cheese exported was \$7,672,805, and of the condensed milk, \$3,955,042. The effective imports in 1897 amounted to \$225,485,395, and the effective exports to \$151,550,936. The imports were mainly from Germany, France, and Italy, and the exports to Germany and Great Britain.

RAILROADS, TELEGRAPHS, ETC. In 1897 there were 2,351 miles of railroad open for traffic. The receipts of the railroads in 1896 were \$23,678,742, and the expenses \$14,102,855. The telegraphs, with the exception of those of the railroads, are the property of the state. In 1897 the length of state lines was 4,410 miles, with 1,997 offices. The telephone service had 7,368 miles of line, with 28,846 subscribers. The receipts of the telephone and telegraph were \$1,573,438, and the expenses \$1,502,548. The expense of maintaining the postal system with 1,501 offices was, in 1897, \$5,492,835, and the receipts of the department were \$5,823,441.

SYBEL, HEINRICH VON, a German historian; born at Düsseldorf, Dec. 2, 1817; studied history for four years at Berlin, under the famous Von Ranke; took his degree at the University of Bonn, and became extraordinary professor there in 1844. He was appointed director of the Prussian State Archives at Berlin in 1875. His principal work is a *History of the French Revolution* (1853-74), which has been translated into English by Mr. Walter C. Perry, from the third German edition. Another of his works is *The Foundation of the German Empire by William I* (1885-90). He died in Marburg, Aug. 1, 1895.

SYCAMORE, a city and capital of Dekalb County, northern central Illinois, on the Chicago and North-Western and the Chicago Great Western railroads. The center of an agricultural region, it has manufactories of agricultural implements, flour-mills and canning factories, and also shops producing wagons, furniture, varnish, insulated wire,

water-motors and clay products. Besides 13 churches and a good school system, there is a seminary for young ladies, Waterman Hall, occupying property valued at \$80,000 and having an average attendance of 70. The town is well equipped with water-works and electric lights, and has two banks. Population 1890, 2,987; 1900, 3,653.

SYDNEY, a township and chief port of Cape Breton, Nova Scotia, on the Intercolonial railway, 275 miles N.E. from Halifax; formerly capital of Cape Breton District, but in 1881 divided into Little Bras d'Or, North Sydney, Sydney Town, Sydney Forks, Old Sydney, Sydney Mines and Victoria. It is connected by a line of steamers with Halifax, and is a terminus of a New York, Newfoundland and London cable. It has a trade in coal, cattle and dairy products, and in 1891 its manufacturing industries employed 330 operatives and produced goods valued at \$331,045. France has a coaling station at Sydney. Population 1891, about 7,000.

SYENE, city. See **EGYPT**, Vol. VII, p. 783.

SYENITE. See **GRANITE**, Vol. XI, p. 49.

SYKES, GEORGE, an American soldier; born in Dover, Delaware, Oct. 9, 1822. He graduated at the West Point Military Academy in 1880; served in the Florida War and on the Texas frontier; was brevetted captain in the Mexican War, and took part in the expeditions against the Apaches and Navajoes in 1854-59. During the Civil War, from 1861 to 1864, he was with the Army of the Potomac, and from 1864 until his death was in the Western service. He attained the rank of major-general of volunteers, and was in command of the Fifth Corps at the battle of Gettysburg; was promoted to colonel in the regulars in 1868. He died in Brownsville, Texas, Feb. 9, 1880.

SYLLABUS. See **OLD CATHOLICS**, Vol. XVII, p. 754.

SYLLOGISM. See **LOGIC**, Vol. XIV, pp. 788-790.

SYLVANITE. See **MINERALOGY**, Vol. XVI, p. 393.

SYLVESTER, JAMES JOSEPH, an English mathematician; born in London, England, Sept. 3, 1814. After his graduation at Cambridge, he was appointed professor of natural philosophy at University College, London; was called to America in 1841 and given the chair of mathematics in the University of Virginia. He returned to England, to the Woolwich Royal Military Academy, in 1855; in 1876 went again to the United States, this time as professor of mathematics in Johns Hopkins University; was recalled to England in 1883 and elected to the Savilian professorship of geometry in Oxford. While at Johns Hopkins he established the *American Journal of Mathematics*, and contributed constantly to it and to British mathematical periodicals. He was elected to membership in the principal scientific societies of Europe and America, and was chosen a member of the Legion of Honor. He published *Laws of Verse* (1870), and advanced a number of theories of importance in mathematics, among them the theory of reciprocants, which changed algebraic methods. Died in London, March 15, 1897.

SYLVICULTURE. See **FORESTS**, Vol. IX, p. 397; and **FORESTRY**, in these Supplements.

SYLVIIDÆ. See WARBLER, Vol. XXIV, pp. 366, 367.

SYLVIUS, JACOBUS, a physician. See ANATOMY, Vol. I, p. 807.

SYMBIOSIS, a term in botany applied to cases in which different kinds of plants live in mutually helpful relations. The most notable illustration are the combinations known as lichens, which are algæ and fungi living together in symbiotic relations. See PARASITISM, Vol. XVIII, p. 268; and ECOLOGY, in these Supplements.

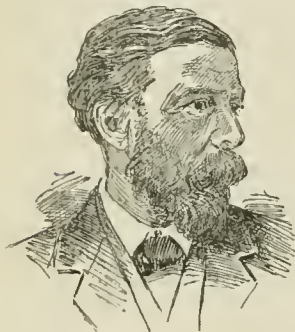
SYMBOLIC LOGIC. See LOGIC, Vol. XIV, pp. 800-802.

SYMBOLS, CHEMICAL. See CHEMISTRY, Vol. V, p. 467.

SYMONDS, JOHN ADDINGTON, an English historian and man of letters; was born Oct. 5, 1840,

in Bristol; educated at Harrow and Balliol College, Oxford, where he took the Newdigate prize, and became, in 1862, a fellow of Magdalen College. Ill-health pursued him most of his life, so that the last twenty years were passed at Davos Platz, a Swiss health-resort. While at Oxford, in 1865, a copy of Walt

Whitman's *Leaves of Grass*, reaching him in his hours of despondency, kindled in him, to use his own words, "a lifelong faith and consolation." He never overcame his early florid style of writing, nor an ardent congestion of figurative language, where metaphor is piled on metaphor, though he did much in later years to prune away these excesses. Notwithstanding, all his publications are marked by accurate learning and much critical insight. His first book was *An Introduction to the Study of Dante* (1872), followed by *Studies of the Greek Poets* (1873-76). His great work, however, is *The Renaissance in Italy*, on which he was engaged 11 years, completing it in seven volumes. These are its parts: *The Age of Despots* (1875); *The Revival of Learning* (1877); *The Fine Arts* (1877); *Italian Literature* (2 vols., 1881); and *The Catholic Reaction* (2 vols., 1886). An abridgment of this work was made, according to his desire, under the direction of his widow, by A. Pearson, and published in 1894. In addition to the works named, Mr. Symonds was the author of *Shakespeare's Predecessors in the English Drama* (1884); *Ben Jonson* (1886); *Sir Philip Sidney* (1887); *The Life of Shelley*, in the English Men of Letters Series; three volumes of essays; *Our Life in the Swiss Highlands* (1892), in conjunction with a daughter; *The Life of Michelangelo Buonarroti* (1892); and the posthumous books *Walt Whitman* (1893); and *Giovanni Boccaccio* (1894). He published several volumes of verse and a number of translations, chiefly from the Italian. Among these books are *The Autobiography of Benvenuto Cellini*, and *Wine, Women and Song*. Examples of his work may be found in the articles ITALIAN HISTORY



JOHN ADDINGTON SYMONDS.

(Vol. XIII, pp. 467, 491); THE RENAISSANCE (Vol. XX, pp. 380-394); and MACHIAVELLI (Vol. XV, pp. 146-152), in this ENCYCLOPÆDIA. For his other contributions to it, see INDEX. He died April 19, 1893, in Rome, Italy.

SYMONS, GEORGE JAMES, a British meteorologist; born in London, Aug. 6, 1838; early became a student of meteorology and a member of the Meteorological Society; in 1859 established a station for observing thunder-storms. He was appointed assistant in the Meteorological Office in 1860, and in connection with his duties founded the British rainfall observation system. In 1873 he was elected secretary of the Royal Meteorological Society, and in 1880-81 was its president; in 1880 became registrar of the Sanitary Institute, and was elected to many honorary offices, among them that of a knight of the Legion of Honor of France. He edited *British Rainfall* (1861-95); 28 volumes of the *Meteorological Magazine*; *Report of the Lightning-rod Conference* (1882); and wrote a number of papers, among them *On the Floods in England and Wales and on Water Economy* (1875).

SYMPATHETIC HEREDITY. See HEREDITY, in these Supplements.

SYMPATHETIC SYSTEM. See PHYSIOLOGY, Vol. XIX, p. 43.

SYMPHONY. See MUSIC, Vol. XVII, pp. 95-98.

SYMPHYTUM. See HORTICULTURE, Vol. XII, p. 253.

SYMPIEZOMETER. See BAROMETER, Vol. III, p. 383.

SYMPLEGADES. See ARGONAUTS, Vol. II, p. 496.

SYMPTOMS. See HOMŒOPATHY, Vol. XII, p. 126.

SYNAPTA. See ECHINODERMATA, Vol. VII, pp. 639, 640.

SYNAPTASE, same as EMULSINE. See FERMENTATION, Vol. IX, p. 96.

SYNCLINAL FOLDS. See GEOLOGY, Vol. X, pp. 300, 301, 304.

SYNCOPE. See HEART, Vol. XI, p. 554; and SURGERY, Vol. XXII, pp. 680, 681.

SYNCRETISTIC CONTROVERSY. See CALIXTUS, GEORGIUS, Vol. IV, p. 707.

SYNERGIDÆ, a name applied to the cells, usually two in number, which are associated with the egg-cell of seed-plants. Their function is obscure, but they are supposed to be of service in the process of fertilization. See figure in these Supplements, under EGG-APPARATUS.

SYNERGISM (Gr., *σύν*, with, together, and *ἔργον*, a work). The modern synergistic controversy began soon after the opening of the Reformation. Luther taught that the human will is entirely passive in regeneration. Melancthon agreed with him at first, but afterward came gradually to the view that, while the initial movement in regeneration is made by the Holy Spirit, the human will co-operates with the divine and contributes causatively to the result. A bitter attack on Melancthon was made by the more extreme of Luther's followers, who charged him with teaching that the human will takes the initiative in regeneration. Some of Melancthon's im-

mediate followers pushed his doctrine to an extreme of which he did not dream, and it came to be called "synergism." All forms of the doctrine were condemned in the "Formula of Concord," 1577; but the majority of Lutheran theologians to-day hold the view of Melancthon in substance. See LUTHERANS, Vol. XV, p. 85.

SYNGNATHIDÆ. See PIPE-FISHES, Vol. XIX, p. 112.

SYNOD, a council or meeting of the members of an organization for legislative purposes. The term is generally applied to ecclesiastical deliberative assemblies. In the Presbyterian Church the synod is the intermediate body between the General Assembly, or supreme organization, and the presbyteries. In the Northern organization of Presbyterians in the United States the district controlled by the synod is limited by the boundaries of the states. In the Southern body the synods are of irregular size. In the Lutheran Church the General Synod is the supreme governing body, and the Particular Synod one of limited jurisdiction. The Russian Synod is the highest ecclesiastical body of the land. The Presbyterian and Lutheran synods are composed of delegates elected by subordinate bodies, and are composed of both lay and clerical members. The Russian Synod is made up of only the high officials of the state church. See COUNCILS, Vol. VI, p. 510.

SYNOVIAL MEMBRANES. See ANATOMY, Vol. I, pp. 833, 849.

SYNTAX. See GRAMMAR, Vol. XI, pp. 42, 43.

SYNTHESIS. See ANALYSIS, Vol. I, pp. 793-798.

SYPHAX. See MASINISSA, Vol. XV, p. 608.

SYPHILIS. See SURGERY, Vol. XXII, pp. 686, 687; and in these Supplements.

SYRA. See HERMOPOLIS, in these Supplements.

SYRACUSE, a city of central New York and capital of Onondaga County, on the Delaware, Lackawanna

facilities, and is the seat of Syracuse University (Methodist Episcopal), a co-educational institution, organized in 1871, in 1896 occupying property valued at \$637,000, having an endowment of \$770,000, and employing a corps of 92 instructors, with an attendance of 1,012 students. In 1890 there were 1,175 manufacturing establishments, representing an investment of nearly \$18,000,000, paying nearly \$7,500,000 to about 15,500 employees annually, and producing \$25,500,000 worth of goods from material costing \$12,000,000. The most important of these industries is that producing soda-ash by a secret process. The city has well-paved, beautifully shaded streets, traversed by a system of electric railways and lighted by gas and electricity, and also a water system with 90 miles of mains, which cost \$4,000,000. Population 1900, 108,374. See also SYRACUSE, Vol. XXII, p. 818.

SYREN OR SYRENE. See ACOUSTICS, Vol. I, p. 109.

SYRIAC LANGUAGE. See SEMITIC LANGUAGES, Vol. XXI, pp. 649, 650.

SYRO-CHALDEAN RITE. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631.

SYRINGA, a genus of plants belonging to the family *Oleaceæ*, or olives, whose species are commonly known as lilacs. *S. vulgaris*, the common lilac, and *S. Persica*, the Persian lilac, are the usual species of cultivation, both of them doubtless natives of Asia. Syringa is also used as the common name of cultivated species of *Philadelphus*, a genus of the family *Saxifragaceæ*, otherwise known as mock-oranges.

SYRTIS MAJOR AND SYRTIS MINOR, the ancient names of two gulfs of the Mediterranean Sea, on the north coast of Africa. The former (now called the Gulf of Sidra) lies between Cape Mesurata, in Tripoli, and the table-lands of Barca, and forms the most southern part of the Mediterranean. The latter (now called the Gulf of Cabes) lies to the northwest, between Tunis and Tripoli. The shores of both are inhospitable, and abound in quicksands, which, carried by the wind, are said by the ancients to have frequently overwhelmed ships, and the reports of modern travelers to some extent confirm these old traditions.

SYSTOLE. See VASCULAR SYSTEM, Vol. XXIV, pp. 99, 100.

SZALAY, LADISLAUS (1813-64). See HUNGARY, Vol. XII, p. 379.

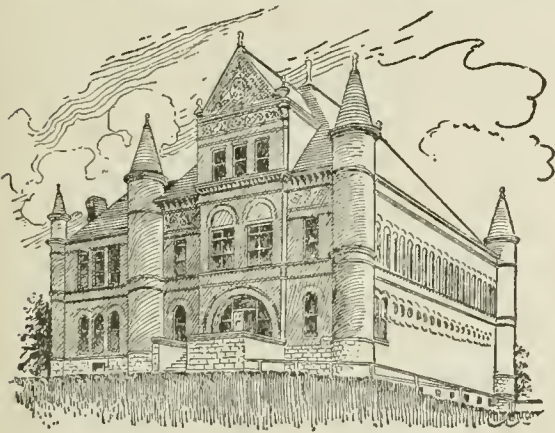
SZECHENYI, ISTVAN, COUNT. See HUNGARY, Vol. XII, p. 371.

SZE-CHUEN OR SSU-CHUEN. See CHINA, Vol. V, p. 645.

SZEGSZARD OR SZÉKSZARD, a town of southwestern Hungary, near the right bank of the Danube, about 80 miles S. of Budapest. Here excellent red wine is made. Population, 11,948.

SZEMA FAMILY. See CHINA, Vol. V, p. 645.

SZEMA TSEEN. See CHINA, Vol. V, p. 664.



LIBRARY BUILDING, SYRACUSE UNIVERSITY.

and Western, the New York Central and Hudson River, the Rome, Watertown and Ogdensburg and the West Shore railroads. The city has excellent educational

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TAAFFE—TACHÉ

TAAFFE, COUNT EDUARD FRANCIS JOSEPH, in the Austrian peerage, and Viscount Taaffe of Corren, and Baron of Ballymote, Sligo, in the Irish peerage; born in the city of Prague, Feb. 24, 1833. He was brought up in companionship with the present Emperor, Francis Joseph. The Count is a descendant of that powerful nobleman of the same name who proceeded from Ireland and made a great name in the Germanic Empire. He was appointed governor of Salzburg in 1863. In 1867 he became Austrian Minister of the Interior and vice-president of the Cisleithan Ministry. At the latter end of 1869 he served as minister president. In 1871 he accepted the office of governor of the Tyrol and Vorarlberg. In 1880 he was summoned to form a new cabinet, and held the Premiership until he resigned, Oct. 29, 1893, owing to the opposition that developed in regard to his introduction of a bill providing for a far-reaching extension of the franchise. He died on his estate at Elischau, in Bohemia, Nov. 29, 1895.

TABASCHEER OR **TABAXIR**. See **BAMBOO**, Vol. III, p. 306.

TABASCO, a state and river of southeastern Mexico; the state has an area of 9,844 square miles, and is bounded on the north by the Gulf of Mexico, east by Campeche, southeast by Guatemala, south by Chiapas, and west by Vera Cruz. From the mountains of the southern portions its surface slopes to broad plains and rolling lands of the Tabasco or Grijalva, a river rising in Chiapas, and, after a northerly course of 250 miles, a large part of which is navigable, enters the Gulf of Mexico in lat. $18^{\circ} 35' N.$, long. $92^{\circ} 37' W.$ Among the tributaries of this stream which water the surrounding territory are the Usunasinta, the Chilapa, the Chilapilla and the Tabasquillo. The state has a long extent of coast-line with many indentations, among them the Laguna de Terminos, in the northeastern part, inclosing several beautiful islands. Along the coast the land is generally low and swampy and the surface covered with a dense tangle of forest-growth. The climate is hot and damp, and while there is no well-defined rainy season, yet the heaviest rainfall is from July to October, and during December and January. The soil is fertile, and produces corn, sugar-cane, coffee, cotton, timber, dye-woods and cacao. The mineral products are unimportant, and the principal exports are logwood and cacao. Capital, San Juan Bautista. Population (estimated) 1893, 111,820.

TABER, JULIA MARLOWE, an American actress; born in England, her family name being Brough. She arrived in the United States in her fifth year, and first appeared on the stage as a child in one of the juvenile *Pinafore* companies, her aunt being at the head of the organization. This company was disbanded when the girl was 12 years of age; and

for the next four years she was sent to school, at the end of which period she went through a severe training for the stage, during which she studied such parts as Rosalind, Parthenia and Juliet. She made her début when twenty years old, in New York City, as Parthenia, since which date she has appeared in only similarly high-class parts. In 1894 she married Robert Taber, who takes the leading parts in her répertoire. In 1895 she essayed the part of Prince Hal in *Henry IV*, but she found it unsuited to her. In 1896 she appeared in an adaptation, by Elwyn A. Barron, of George Eliot's *Romola*.

TABES DORSALIS, a disease. See **PATHOLOGY**, Vol. XVIII, p. 392.

TABLE-LANDS. See **GEOLOGY**, Vol. X, pp. 374, 375.

TABLES. See **FURNITURE**, Vol. IX, p. 850.

TABOR, a town of Fremont County, southwestern Iowa, 10 miles N. of Sidney, the county capital, and 30 miles S.E. of Council Bluffs, on the Tabor and Northern railroad. It is in a rich agricultural region, and is the seat of Tabor College (Congregational), a co-educational institution, incorporated in 1854 under the name of Tabor Literary Institute, and re-incorporated in 1886 under the name it now bears. The institution has 5 buildings; the faculty consists of 8 professors and 5 instructors, and the students average over 200. The college provides courses in classics, science and literature, each extending over four years. There is a preparatory academy, an English course of four years, a conservatory of music and a department of fine arts. The property of the college is valued at \$160,000; the receipts from benefactions have amounted to \$9,511; and the total income, including receipts from tuition, is over \$18,000. The number of graduates since its organization is 136. The library contains 6,000 volumes. Pop. 1900, 934.

TABOR, MOUNT. See **GALILEE**, Vol. X, pp. 27, 28.

TABORITES. See **HUSSITES**, Vol. XII, p. 407.

TABULATA, a group. See **CORALS**, Vol. VI, p. 380.

TACAHOUT OR **MAHU**, the native name of a gall which grows on *Tamariscus Indicus*, and which yields an abundance of gallic acid.

TACAMAHAC, tree. See **POPLAR**, Vol. XIX, p. 512.

TACHÉ, ALEXANDRE ANTONINE, Canadian Roman Catholic archbishop, a son of the Canadian statesman, Sir Étienne Paschal Taché; born in Rivière-du-Loup, Canada, July 23, 1823. After graduating at the college of St. Hyacinth, and studying theology in the Seminary of Montreal, he became professor of mathematics at his old college. Remaining at St. Hyacinth but a few months, he went to Montreal, and there became a monk of the Oblate order. He at once began laboring as a missionary

among the Indians of the Red River. Suffering privations of every kind, cold, hunger and fatigue, he reached St. Boniface on Aug. 25, 1845. Here he was raised to the priesthood, and was the first priest ordained on the banks of the Red River. He spent but a few months at this mission, and then went seeking other fields of labor. His piety and zeal attracted attention, and later he was summoned to France by the superior of the Oblate Fathers, and consecrated bishop of Arath in the cathedral of Viviers, on Nov. 23, 1851. He made a visit to Rome, and then returned to Canada to his missionary work. He founded new missions, and through him many chapels and schools were built. About this time the Metis had some grievances, which Bishop Taché laid before the Canadian government, but to them no attention was paid. He was obliged to go to Italy to take part in the council of the Vatican at Rome, and during his absence the troubles came to a crisis. He at once returned and quieted the insurrection. He was empowered by the imperial and Dominion governments to offer full pardon for all political offenses committed by the insurrectionists. On Sept. 22, 1871, St. Boniface was erected into a see and Bishop Taché was appointed archbishop. He published works relating to his missionary labors in the Northwest. He died at Winnipeg, June 22, 1894.

TACHOMETER, an instrument for measuring velocities. The spherical tachometer invented by Dr. Alfred Amsler, of Switzerland, is an ingenious mechanism. A sphere is so mounted that it may be rotated in any direction with equal ease. A wheel driven by clockwork being brought against it, the speed of its rotation is noted. If then the sphere be brought at right angles to the clock-wheel, against another wheel whose velocity it is desired to test, the same pressure being applied as against the clock-wheel, the direction of motion of the surface of the sphere will depend upon the relative velocities of the wheel tested and the clock-wheel, and may be read from an arc. This instrument is used for testing the speed of engines. See **SPEED-RECORDER**, in these Supplements.

TACHYGLOSSUS, a genus. See **MAMMALIA**, Vol. XV, p. 378.

TACHYGRAPHY. See **SHORTHAND**, Vol. XXI, pp. 836-842.

TACHYPETIDÆ, another name for the family of frigate-birds. The family is now called *Fregatidæ*. See Vol. IX, p. 786.

TACKING. See **SEAMANSHIP**, Vol. XXI, p. 600.

TACK-MAKING. Southeastern Massachusetts is the center of the tack-making industry in the United States. Taunton, Plymouth, Kingston, Middleboro, Whitman, Abington and adjacent towns furnish most of the tacks consumed in this country, and considerable quantities for export to England, South America, Australia, France and Germany. Shoemakers' tacks are the sort most used, and the material is usually Bessemer steel. Sheets of this steel, about 20 by 36 inches, are specially rolled for the tackers, as the operatives are called. These sheets have to be first scaled by dipping in a vat of vitriol, washing in water, and then subjecting to a bath of

lime to neutralize the effect of the acid. The sheets are next fed to a cutting-machine, which shears them into strips twenty inches long. These strips are fed into the tack-making machine proper, which works on a principle somewhat like a wrought-nail cutter. The metal for each tack is bitten off and the head upset by a blow, after which it is dropped into a receptacle below. Although an entire revolution has to be made between the biting off of each tack, the speed of the machine is fifteen thousand an hour. The tacks next go to the tumbling-barrel, where a boxful of them are knocked about thoroughly for a considerable time, getting rid of any burs. An air-blast is used here to rid the tacks of all remains of the lime, and a little graphite is added to assist in giving them a good luster. The sifter for sorting out the poor tacks is a long, inclined, perforated cylinder. The tacks are dumped in at the upper end, and work down as the cylinder is slowly rotated. The headless and imperfect tacks, being smaller than their fellows, fall out through the holes, while the good ones are carried to the end of the cylinder and dropped in a box by themselves. For market the tacks are put up in boxes of stiff paper, and an experienced packer will do up one thousand or twelve hundred pounds in a day.

C. H. COCHRANE.

TACNA, a town and province of Chile. The town is on the River Tacna, in lat. $57^{\circ} 54' N.$, long. $72^{\circ} 10' W.$; nearest town is Arica, with which Tacna is connected by rail. Population of town, 12,650; of province, 29,351.

TACOMA, a city, seaport and the capital of Pierce County, Washington, on the east side of Puget Sound, on the western shore of Commencement Bay, at the mouth of the Puyallup River, and on the Northern Pacific and the Tacoma, Lake Park and Columbia River railroads, by rail 145 miles N. of Portland, Oregon, and 18 S.W. of Seattle. In 1880 Tacoma was a village with only 1,098 inhabitants; in 1890 it was a flourishing city, with street-railways, water, gas and electric light, miles of wide streets, large wholesale stores, numerous mills and factories, and a busy port. In the district around are coal, iron, precious metals, lumber, fields of wheat, hops, fruit and vegetables. Yet there are traces of the earlier condition of the locality, in the forest close at hand, and in the number of Indians seen in the streets from the reservation across the bay. Behind the city an open valley runs toward where the beautiful Mount Tacoma (or Rainier) rises from a ridge of snow-covered mountains to a height of 14,444 feet.

Tacoma has warehouse and elevator capacity of 3,500,000 bushels. The export of flour amounts to 300,000 barrels annually. Wheat, to the amount of 6,000,000 bushels, is annually exported, chiefly to Liverpool. Coal, to the extent of 300,000 tons annually, is sent to San Francisco. In 1895, 94,056,689 feet of lumber were shipped, principally to Africa. Shingles, doors, sashes, coffins, lounges, mattresses, matches, tubs and pails are largely manufactured. There is an annual meat-packing product of \$750,000. The total amount of ore handled in 1895 was 34,000,000 pounds, valued at \$750,000. Seventy-

five per cent of the tea-crop brought into the United States comes to Tacoma from Yokohama and Hongkong. In 1895 the value of imports of oriental merchandise amounted to \$17,711,630; exports were valued at \$4,633,389; the manufactured output was valued at \$10,313,000; jobbing trade at \$10,034,000; bank clearances at \$28,793,689; and the assessed valuation of the city at \$26,452,812. The total miles of wharfage extend to 2 miles; the depth of water at dock at lowest tide is 30 feet; the number of deep-sea arrivals was 417. The total tons of inward cargo amounted to 102,516, and of outward cargo to 652,187.

There are 111 miles of graded streets, 54 miles of sewers and 74 miles of electric and cable railways. It has 65 church organizations, 17 public schools, with seminaries, colleges, libraries, etc. The water and light plant is valued at \$1,750,000, and is owned by the city. Its chief parks are Wright Park, in the heart of the city, 40 acres, and Point Defiance Park, 662 acres. The city hall cost \$260,000; Pierce County courthouse, \$300,000; Northern Pacific offices, \$150,000; Chamber of Commerce, \$150,000. The Ferry Museum of Art is located in the courthouse. The population of the city in 1890 was 36,000; in 1900 it was 37,714.

PUGET SOUND UNIVERSITY is located at Tacoma. It was founded in 1879 as a Methodist Episcopal institution. Its total income amounted to \$12,500 in 1895, and its benefactions to \$10,000. It had 1,200 volumes in its library; had 236 students and 18 professors, its president being Rev. C. R. Thorburn, A. M.

TACONICS OR TAGHKANIC, a mountain-range. See MASSACHUSETTS, Vol. XV, p. 611.

TACTICS. See WAR, Vol. XXIV, pp. 353-363; naval, 365, 366.

TACUBAYA, suburb. See MEXICO, Vol. XVI, p. 221.

TADMOR, city. See PALMYRA, Vol. XVIII, pp. 198-203.

TADOUSAC, a town of the united parishes of Chicoutimi and Saguenay, Quebec, near the junction of the Saguenay with the St. Lawrence. It is noted as the oldest village in Canada, being the headquarters of the fur-trade in the early days. It contains the oldest church building in Canada, and traces of the Jesuits' establishment remain. Father Marquette made the place his home for a period. It is a fishing-center. Population 1891, 2,440.

TADPOLE. See FROG, Vol. IX, p. 795.

TÆL, a coin. See CANTON, Vol. V, p. 38.

TÆNIADÆ. See TAPEWORM, Vol. XXIII, p. 55.

TÆNIOGLOSSA. See MOLLUSCA, Vol. XVI, pp. 648, 649.

TAFT, LORADO, an American sculptor; born in Elmwood, Illinois, April 29, 1860; graduated at the University of Illinois, in 1879; studied in Paris at L'École des Beaux-Arts (1880-83); and exhibited in succeeding salons. He settled in Chicago in 1886, where he shortly became connected with the Art Institute as instructor in sculpture; and lectured upon sculpture and painting before university extension classes. Among his works are a statue of Schuyler Colfax, in Indianapolis; reliefs for the Michigan regimental monuments on the field of Get-

tysburg, and various other military monuments; a statue of General Grant; decorations for the Horticultural Building, Columbian Exposition. The principal sculptural decoration of this beautiful building consisted of two large groups just outside the main or eastern entrance known as *The Sleep and the Awakening of the Flowers*; *The Painting of the Lily*, on the south end of the structure; an unnamed figure symbolic of the cultivation of the grape; a figure on the north pavilion, the personification of botany; an ancient gardener, also on the north pavilion. The symbolical beauty of his sculptures won universal praise.



LORADO TAFT.

TAHLEQUAH, a town, the capital of the Cherokee Nation, Indian Territory, founded in 1840; is in a grazing region in the valley of the Illinois river, 1 mile from the river and 20 miles E. of Fort Gibson; has the national capitol, seminaries, insane and blind asylum, public schools, penitentiary, churches, a bank, and 3 newspapers, one being printed in both English and Cherokee. Pop. 1895, about 3,000.

TAHOE LAKE. See CALIFORNIA, Vol. IV, 698.

TAILOR-BIRD. See WARBLER, Vol. XXIV, 367.

TAINAN, formerly TAIWAN-FU, a city in Formosa, Japan (formerly the capital), on the west coast; a treaty port since 1858; has 2 famous temples, the harbor is now choked with sand, and has only 6 feet of water over the bar. Population variously estimated at from 50,000 to 135,000.

TAINÉ, HIPPOLYTE ADOLPHE, French historian and critic; born at Vouziers, in Ardennes, April 21, 1828; studied at the Collège de Bourbon and l'École Normale, Paris, and then filled some minor educational positions. In 1853, after gaining his doctor's degree, he withdrew from the career of university-teaching and devoted himself to literature. Meanwhile he won the academy prize for an essay on *Livy*, and published his delightful *Travels in the Pyrenees* (1855). The latter was followed by an elaborate work on the *French Philosophers of the Nineteenth Century* (1856); and by two series of *Critical and Historical Essays*, in which are penetrative estimates of Carlyle and John Stuart Mill. In 1864 he won an English hearing through his acute *History of English Literature* (4 vols.), a work of remarkable force, lucidity, order, and graphic writing, in which he treated English literature as a historical evolution of a definite ethnic type through a remarkable environment. It is one of the best and most entertaining treatments of the subject. In the same year he became professor of the history of art and æsthetics in l'École des Beaux-Arts, Paris, a post for which he was not over well-fitted, if he is to be judged by his criticisms on art embodied in his two series of lectures, *The Philosophy of Art*, *The Ideal in Art* and *The Philosophy of Art in Italy, Greece and the*

Netherlands (1866), and by his later work, *The Philosophy of Art in Greece* (1870). In 1871 M. Taine received from Oxford the degree of D. C. L., and in 1878 was elected member of the French Academy. Meanwhile, he published a criticism of English society and English characteristics, entitled *Notes on England* (1871); and his greatest work, of which there speedily appeared an English translation, *Origin of Contemporary France* (5 vols., 1876-90). The work, comprising *The Ancient Régime*, *The Revolution*, and *The Modern Régime*, is a powerfully written psychological history of the social condition of France for a hundred years, and a courageous arraignment of the men and motives of the Revolution. The critical method of this great work is that which he early pursued in his historical studies, and which takes account of race, environment and social characteristics of the era of which he treats, and, in the case of portraiture, makes a searching investigation into the antecedents, condition of life and other circumstances which influence and mold the life of the individual. M. Taine's other writings include a *Voyage to Italy* (1866); *On the Intelligence* (1870); and *Notes on Paris* (1867). Died March 6, 1893, in Paris.

TAIPING REBELLION. See CHINA, Vol. V, pp. 651, 652.

TAIRA CLAN. See JAPAN, Vol. XIII, p. 582.

TAIT, ARCHIBALD CAMPBELL, an English prelate; born at Edinburgh, Scotland, Dec. 22, 1811; educated at the Edinburgh Academy and at Glasgow University, from which he proceeded to Balliol College, Oxford, of which he became scholar, tutor and fellow. He was one of the four tutors who protested against Newman's tract, and became one of the leading opponents of the Tractarians or Puseyites. In 1842 he succeeded Dr. Arnold as head-master of Rugby, which position he held until 1849, when he was appointed to the deanery of Carlisle. In 1856 he succeeded Dr. Blomfield as bishop of London. In this capacity he was assiduous in his pastoral duties, and instituted the evening services in St. Paul's Cathedral. He organized a "bishop of London's Fund" for building schools, churches and parsonages, by means of which he raised about a million dollars. He declined the archbishopric of York in 1862, but in 1868 he accepted the archbishopric of Canterbury, tendered him by Mr. Disraeli. By this appointment he became primate of all England. On the publication of Bishop Colenso's works on *The Pentateuch* the archbishop strongly opposed the views expressed by the Natal dignitary, but intervened to see him obtain a fair hearing in the church tribunals. He labored to secure harmony during the public discussion and agitation of church questions, especially in regard to the disestablishment of the Irish church. In 1878 the Lambeth Conference occurred under his auspices. Among his published works are *The Dangers and Safeguards of Modern Theology* (1861); *The Word of God and the Ground of Faith* (1863); *Harmony of Revelation*

and the Sciences (1864); *The Present Position of the Church of England* (1872); *Some Thoughts on the Duties of the Established Church of England as a National Church* (1876); *The Church of the Future* (1880). He died Dec. 3, 1882.

TAIT, ARTHUR FITZWILLIAM, an American painter; born at Livesey Hall, near Liverpool, England, Aug. 5, 1819. In his profession he was self-taught. He went to the United States in 1850, and soon began to attract attention by his pictures of animals. Many of his works have been lithographed or engraved. In 1858 he was elected a member of the National Academy. In 1874 he went to Europe, spending four months. Among his works are *A Duck and Her Young* (1868); *Ruffed Grouse* (1869); *Woodcock Shooting* (1871); *Racquette Lake* (1873); *There's a Good Time Coming* (1876); and *The Portage*, exhibited at the Centennial at Philadelphia (1876).

TAIT, JOHN ROBINSON, an American artist; born in Cincinnati, Ohio, Jan. 14, 1834. Graduating at Bethany College, Virginia, in 1852, he went abroad. It was nearly twenty years after this before he made himself any reputation as an artist, having devoted his time mainly to literature and to amateur sketching. In 1859 he went abroad a second time, and began studying at Düsseldorf, under August Weber and Andreas Achenbach. In 1871 and 1872 he received first-class medals of the art department of the Cincinnati Industrial Exhibition. Most of his pictures have been exhibited and sold abroad, his *Waterfall*, *Pyrenees*, being owned in Scotland, while his *Meyringen* is owned in England. His *Waterfall* is owned by Prince Heinrich XVIII of Reuss. His *Lake of Wallentadt* is owned in Cincinnati, and his *Solitude* in Baltimore. At the Paris Salon of 1876 he exhibited his *Evening on the Lake* and his *Tyrolese Idyl*, and in the same year, at the Centennial at Philadelphia, he exhibited his *Summer*.

TAIT, LAWSON, Scotch physician; born at Edinburgh, May 1, 1845; educated at Edinburgh University, graduating in arts and medicine. He settled in Birmingham in 1870, and became surgeon to the Birmingham Hospital for Women. In 1870 he was elected an honorary fellow of the Royal College of Surgeons of Edinburgh, and in 1871 passed the examination for fellow of the Royal College of Surgeons of London. He was one of the foremost gynæcologists in Britain, and wrote *The Diseases of Women* (1877), which went through numerous editions; translated *Compendium of Children's Diseases*, by Johann Steiner, M. D.; and also published *Hospital Mortality in Great Britain* (1877); *The Uselessness of Vivisection upon Animals as a Scientific Research* (1882); and *Abdominal Surgery* (1898). Died in London, June 13, 1899.

TAIT, PETER GUTHRIE, a Scotch physicist; born at Dalkeith, April 28, 1831; educated at the Academy and University of Edinburgh, and at Cambridge, where he was senior wrangler and first Smith's prizeman. In 1852 he was elected a fellow of St. Peter's College, and two years later was appointed professor of mathematics in

Queen's College. He remained there until 1860, when he became professor of natural philosophy in the University of Edinburgh. Among his important works are *Dynamics of a Particle*, in conjunction with William John Steele (1856); *Elementary Treatise on Quaternions* (1867); *A Treatise on Natural Philosophy*, in conjunction with Sir William Thomson (Lord Kelvin) (1867-79); *The Unseen Universe*, in conjunction with Professor Balfour Stewart (1875); *Recent Advances in Physical Science* (1876); *Heat and Light* (1884); and *Properties of Matter* (1885). He contributed to this ENCYCLOPEDIA the articles QUATERNIONS; RADIATION; THERMODYNAMICS, etc.; and to the *Challenger Reports* an experimental discussion of *The Pressure Errors of the Challenger Thermometers* and also of *The Physical Properties of Water*; and, in conjunction with Dr. Andrews, *Volumetric Relations of Ozone*.

TAIWAN, a Seaport. See FORMOSA, Vol. IX, p. 417.

TAKU FORTS. See CHINA, Vol. V, p. 652.

TALBOTTON, a village and the capital of Talbot County, western Georgia, about 36 miles E.N.E. of Columbus, on the Central Railroad of Georgia. It contains five churches, the Collinsworth Institute, for boys, a college for girls, banks, a steam grist-mill, a cotton-gin, and has two newspapers. Population 1880, 1,008; 1890, 1,140; 1900, 1,131.

TALC. See MINERALOGY, Vol. XVI, p. 414.

TALCOTT, ANDREW, an American engineer; born at Glastonbury, Connecticut, April 20, 1797; graduated at West Point (1818); was assigned to the engineers; accompanied General Henry Atkinson as engineer in an expedition to establish military posts on the upper Missouri and Yellowstone rivers; appointed first lieutenant (1820); engaged in constructing the defenses of Hampton Roads, Virginia (1821), and in constructing Fort Delaware (1825-26); engineer of canals through the Dismal Swamp, Virginia (1826-28); superintending engineer on the forts at Hampton Roads, Virginia, and engaged as astronomer in determining the Ohio-Michigan boundary line (1828-35); promoted captain (1830); in charge of the improvement of Hudson River (1834-36); resigned his commission in 1836. He then engaged in surveying and constructing railroads; fixed the northern boundary line of Iowa, engineered a railroad across Mexico in 1857, and surveyed the line from Vera Cruz to the City of Mexico; returned to the United States and was appointed chief engineer of Virginia. In 1862 he went back to Mexico as chief engineer of the railroad from Mexico to the gulf, remaining in charge until 1867. He returned to New York to secure supplies, but was seized as a spy and accused of constructing the fortifications around Richmond, but was released by General Dix. He devised a method, known by his name, for determining territorial latitudes by the observation of stars near the zenith, contriving a modification of the zenith-instrument for the purpose. He died in Richmond, Virginia, April 22, 1883.

TALENT. See NUMISMATICS, Vol. XVII, p. 631.

TALIESSIN, BOOK OF. See CELTIC LITERATURE, Vol. V, pp. 316, 317.

TALIPES, a disease. See CLUB-FOOT, Vol. VI, p. 42.

TALIPOT. See PALM, Vol. XVIII, p. 191.

TALLADEGA, a city and the capital of Talladega County, northeast central Alabama, on the Southern, the Louisville and Nashville and the Birmingham and Atlantic railroads, about 85 miles N. by E. of Montgomery. It has a saw and planing mill, iron foundry, sash-works, blast-furnaces, cotton factory and a steam grist-mill. In it is the Alabama Deaf, Dumb and Blind School. Mineral springs and various minerals are found in the vicinity. It has two weekly newspapers. Population 1880, 1,233; 1890, 2,063; 1900, 2,661.

TALLAHASSEE, a city and the capital of Leon County and of the state of Florida, situated in the northern part of the state, 26 miles N. of the Gulf of Mexico and 165 miles W. of Jacksonville, on the Jacksonville, Pensacola and Mobile railroad. It is in the center of a farming and fruit region, in which cotton and tobacco are cultivated; wine-making and novelty wood articles are growing industries. It has two libraries, two banks and two weekly newspapers. Population 1880, 2,494; 1890, 2,934; 1900, 2,981.

TALLAHATCHIE, a river of Mississippi, rising in Tippah County, in the northeast part of the state, drains the northern and western parts of Union County, runs southwestward through Panola County, then southward through Tallahatchie County, and at Greenwood, in Leflore County, is joined by the Yallobusha River, the united stream being thence known as the Yazoo. The Tallahatchie is 250 miles long, and is navigable for more than half that distance.

TALLAPOOSA, a city of Haralson County, northwestern Georgia, $3\frac{1}{2}$ miles from the Tallapoosa River, and on the Southern railroad, 64 miles west of Atlanta. It is in a farming, fruit, timber and iron region; has iron-works, saw-mills and other manufactures. Grape-growing is an important industry in the neighborhood. It has six churches, a bank and one newspaper. Population 1890, 1,699; 1900, 2,128.

TALLAPOOSA RIVER THE, rises in Paulding County, Georgia, flows in a southwesterly direction through Haralson County, then enters Alabama, flowing through Cleburne and Randolph Counties, in a southwesterly direction through the northwest corner of Chambers County, south through Tallapoosa County, westward forming part of the northwestern boundary of Macon County, and also the boundary between Montgomery and Elmore Counties; is joined by the Coosa from the north, near Old Fort Jackson, and becomes the Alabama River. The Tallapoosa is 250 miles long and is navigable for 40 miles.

TALLMADGE, BENJAMIN, an American soldier; born at Setauket, Long Island, Feb. 25, 1754; graduated at Yale College in 1773, and became principal of a high school at Wethersfield,

Connecticut; enlisted in a Connecticut regiment, and served in the War of the Revolution; was promoted to be major, Sept. 5, 1779; he surprised and captured a body of five hundred Tories at Lloyd's Neck, Long Island, and in May, 1780, captured Fort George, on Oyster Bay, Long Island, and was also engaged at Brandywine, Germantown and Monmouth. He had charge of the execution of Major André at Tappan, Oct. 2, 1780. He reached the grade of colonel before the end of the war, and afterward engaged in mercantile pursuits at Litchfield, Connecticut. He was a member of Congress from 1801 to 1817. He died at Litchfield, Connecticut, March 7, 1835.—His son, FREDERICK AUGUSTUS, jurist, was born at Litchfield, Connecticut, Aug. 29, 1792; graduated at Yale College in 1811; was admitted to the bar at Litchfield, and removed to New York (1814); was a member of the state senate, and for a period its president (1837-40); judge of the supreme court of error (1841-46 and 1848-51); member of Congress (1847-49); superintendent of the New York police (1857); clerk of the court of appeals (1862-65). While he was recorder of New York City the Astor Place riot, in May, 1849, occurred, during which he exhibited great firmness, and which he succeeded in suppressing. He died at Litchfield, Sept. 17, 1869.

TALLOW TREE, a name given to several plants whose fruits or seeds yield tallow, notably *Stillingia sabinifera* of China. See also STILLINGIA, in these Supplements.

TALMAGE, THOMAS DE WITT, an American divine; born at Bound Brook, New Jersey, Jan. 7, 1832. He entered the legal profession, but, after a short period, prepared for the ministry at the New Brunswick Theological Seminary, graduating there in 1856. His first pastorate was at Belleville, New Jersey; he afterward removed to Philadelphia, where his rising fame induced the church at Brooklyn to make strenuous efforts to obtain his services as their minister, and he preached his first sermon there in March, 1869. The great success which attended Dr. Talmage's preaching necessitated the enlargement of the Tabernacle in 1871, but it was burned a year later. A larger and finer structure was soon built, however, but this also was burned down in 1889. A new church was built, at a cost of about \$400,000, and dedicated in 1891, but this, too, was burned in May, 1894, and was not rebuilt. In 1895 he removed to Washington, D. C., as pastor of the First Presbyterian church, a position which he resigned in March, 1899. He visited England in 1889, and afterward made a tour of Palestine and on the Continent. He published many sermons and religious works.

TALPIDÆ, a family. See MAMMALIA, Vol. XV, pp. 403, 404.

TAMA, a city of Tama County, east-central Iowa, on the Chicago and North-Western and the Chicago, Milwaukee and St. Paul railroads, 50 miles W. of Cedar Rapids. It is in the center of a farming region, and has excellent water-power from the Iowa River; has flour, saw and paper-mills, farm-implement works, egg-case, broom

and cigar factories. The city has a public park, electric light and street-railway, 6 churches, 2 banks and 2 weekly newspapers. Population 1880, 1,289; 1890, 1,741; 1900, 2,649.

TAMANDUA, a genus. See MAMMALIA, Vol. XV, p. 386.

TAMAQUA, a borough among the hills of Schuylkill County, east-central Pennsylvania, on the Tamaqua or Schuylkill River, and the Philadelphia and Reading railroad and Central Railroad of New Jersey, 98 miles S. E. of Philadelphia. It is in the center of some of the richest anthracite coal territory of the state. It contains two banks, one semiweekly and one weekly paper, 12 churches, a high school, public library and a number of stores and hotels. It has iron foundries and machine-shops, flour-mills, stove foundry, powder-mill, screen-works, boot and shoe factories, carriage manufactories, truss and cigar factories. Population 1890, 6,054; 1900, 7,267.

TAMARACK OR HACMATAK. See LARCH, Vol. XIV, p. 312.

TAMATAVE, a port of Madagascar, on the east coast, in the province of Batanimena, in lat. 18° 10' S. and long. 49° 28' 30" E. The roadstead is one of the few accessible points on the east coast, and the town is approached through narrow channels formed by coral reefs. It is the principal port of the island, and has a fort. It is surrounded by palisades, and, with the exception of the residences of foreigners, the dwellings of the inhabitants are of very simple construction, with thatched roofs. It carries on a trade with Europe, Muscat, Zanzibar and the Cape. The principal trade is from the interior, the exports being india rubber, beef-hides, rice, tobacco, copal, raw silks, mats, baskets and woods. Its imports are rum, brandy, shoes, sheetings and salt. The value of imports was, in 1890, \$787,465; exports, \$846,466. The population is estimated from 7,000 to 10,000, of which 3,000 are foreigners.

TAMAULIPAS, a state in northeastern Mexico, formerly New Santander; bounded on the north by Texas, on the northwest by Coahuila, west by Nuevo Leon and San Luis Potosí, south by San Luis Potosí and Vera Cruz, and east by the Gulf of Mexico. Its length is 400 miles, average width 130 miles, and area 32,128 square miles. The surface is generally low, with occasional elevations and extensive lagoons (De la Madre, Soto de la Marena, Morales) and salt-marshes along its borders. In the southwest the surface rises to an elevation of four thousand feet, the state being there bordered by the Sierra Madre. The slopes of this range are well watered, and more thickly inhabited than other portions of the state, this region having a healthful climate. The coast region suffers in respect of climate, being hot and insalubrious. The state is drained by the Rio Grande del Norte, the Santander, the Tampico, the Fernando, and other streams. The soil is fertile, and yields good crops, grazing is an important industry, sugar and cotton are raised, and coffee is commencing to be prominent. Mining is unimportant, though silver, coal and

petroleum have been indicated. The chief ports are Tampico, on the south bank of the Pánuco, and Bagdad, on the Rio Grande. The capital is Ciudad Victoria, with 14,774 inhabitants in 1895. According to the census of Oct. 20, 1895, the population of the state was 206,502. The Zona Libre, or Free Zone, was established by the state in 1858, and consists of a strip about twenty kilos wide, now extended along the northern frontier of Mexico. In this zone, imports, except cattle, pay only ten per cent of the regular duties.

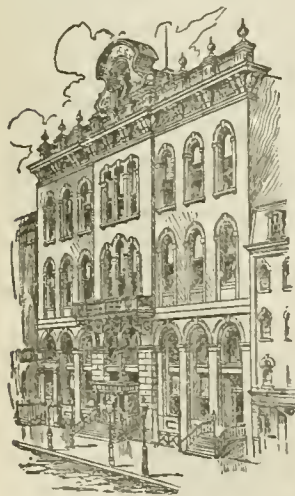
TAMBORA, a volcano. See **SUMBAWA**, Vol. XXII, p. 641.

TAMBOURINE, a percussion musical device, consisting of a wooden hoop, on one side of which is stretched a vellum head. The other side is open. Small rods with fly-nuts enable the player to tighten or loosen the head. The instrument is beaten with the hand, without a stick. The metal plates, which jingle whenever the instrument is struck or shaken, are fixed loosely round the hoop by a wire passing through the centers of each pair. When the fingers are glided along the head, a rolling sound is produced. Another effect is produced by rubbing the vellum, without quitting it, with the whole weight of the thumb. The tambourine is much used by Italian and Biscayan gypsies, and is sometimes used in orchestras. The name is also given to a French dance.

TAMERLANE, a Tatar sultan. See **TIMUR**, Vol. XXIII, pp. 399, 400

TAMMANY SOCIETY, a society founded in New York City, in the last century, originally as

a benefit society, but which became identified with politics. Tammany was an Indian chief of the Delaware nation, who lived about the middle of the seventeenth century. He was brave and influential, a great friend of the whites, and around his name many traditions gathered. His local fame was such that in the latter part of the Revolution he became the recognized patron saint of the soldiery. On May 12, 1789, William Mooney, an Irish-American politician, and an upholsterer, founded, in New York City, the Co-



TAMMANY HALL.

lumbian Order, a secret society. This, in 1805, was incorporated as the Tammany Society, being named after the Indian chief. The members adopted Indian insignia, especially a buck's tail. The formation of the society was due to a popular desire in New York City to have a counterweight to the "aristocratic" Society of the Cincinnati. Its grand sachem and 13 sachems were designed to typify the President and 13 governors of the original states. The society, nominally

a charitable and social organization, is distinct from the general committee of Tammany Democracy, which is strictly political, and cannot use Tammany Hall without the consent of the society.

Under Aaron Burr's careful management the order was able, so early as 1800, to control New York City politics. Then, under Daniel D. Tompkins, it succeeded in becoming the administration wing of the Democratic party in the city of New York. Indeed, the Bucktails and the Albany Regency had control of state politics for a long period. In 1822 the power of the society was merged in its general committee. The organization of the society became more and more perfect, and Tammany developed into a mere political engine. The number of the general committee rose to over 1,400, delegates being ultimately sent from each district and precinct. A central committee on organization was chosen from this unwieldy body, whose chairman was "boss" of the Hall. It was indifferent to principle, and in this respect grew worse after the influx of foreigners into New York City. Its corruption culminated after the war in the scandals associated with the "Tweed ring," which was finally suppressed in 1871. William Marcy Tweed was sent to jail, where he died while suits were pending against him for the recovery, by the city, of \$6,000,000. This catastrophe crippled the power of the Hall for a time. Since 1871 the Hall has been under the control of John Kelly, Richard Croker, Frederick Smyth, and Thomas L. Feitner, grand sachems.

In 1880 its influence was thrown successfully against Hancock, but in 1884 unsuccessfully against Cleveland. See also **COLONIAL SOCIETIES**, in these Supplements.

TAMMUZ, a deity. See **BAEVLONIA**, Vol. III, p. 193.

TAMPA, a city, port of entry, and capital of Hillsboro County, Florida, at the head of Tampa Bay and the mouth of Hillsboro river, and on the Savannah, Florida and Western, and Florida Central and Peninsula railroads, 30 miles from the Gulf of Mexico. Its harbor has 23 feet of water at the outer bar, mean tide, and the port has steamship connections with American, Gulf, and Caribbean ports. The manufacture of cigars, the shipment of phosphate, fruit-culture, and fishing are leading industries. The city has electric lights, street railways, and a spring-water supply of 3,000,000 gallons daily; has two national banks, three daily and several weekly newspapers. During the Spanish-American war it became an important port of embarkation for troops. Population 1890, 5,532; 1900, 15,839.

TAMPA BAY is divided, in its upper portion, into Old Tampa Bay and Hillsboro Bay. Its length is about thirty-five miles, and width six to fifteen miles. The bay contains many islands, and is a favorite fishing-resort. It is protected by a line of keys, which renders the harbor safe and accessible. There is a lighthouse 45 feet high at the entrance of the bay, on Egmont Key, lat. 27° 36' N., long. 82° 45' 15" W.

TAMPICO, an important town and port of

entry of the state of Tamaulipas, Mexico, a mile above the mouth of the Pánuco. At the mouth of the river was a dangerous bar, making the harbor unsafe, but the latter has been improved, and, with a breakwater and a jetty, enables vessels drawing 24 feet of water to enter. The town, being built on flat land encircled by swamps, is rather unhealthy. Its streets are broad and regular. The Pánuco and the Tamesí are navigable for some distance by small steamers, while a canal affords internal communication with Tuxpan and Vera Cruz. Hides, tallow, bones and salted meat are exported. The annual imports average \$3,220,000, and the exports from a third to half of that amount. Population 1894, 9,885.

TAMSUI, a river and port of the island of Formosa. The river is formed by the junction of the Kelung, the Tokaham and the Sanquai, entering the Tokien Channel, in lat. 25° 10' N. The port is at the mouth of the river, and is one of the chief treaty ports of the island, the chief article of export being tea. The bar at the mouth of the river prevents vessels of heavy draft entering the harbor, and requires lightering for all but light-draft ships. Population (estimated) 1895, 100,000.

TANA OR TSANA, a lake. See **NILE**, Vol. XVII, p. 507; and **DEMBEA**, in these Supplements.

TANAGRA STATUETTES. See **TERRACOTTA**, Vol. XXIII, pp. 190-192.

TANEY, **ROGER BROOKE**, an American jurist, was born in Calvert County, Maryland, March 17, 1777. He was the son of a Roman Catholic planter, of a family that came to Maryland from England. Young Taney was graduated at Dickinson College in 1795, and was admitted to the bar, in Maryland, in 1799. Entering politics, he was elected to the house of delegates in the same year, and was the young-



ROGER B. TANEY.

est member of that body, and from 1816 to 1821 was a member of the state senate. He removed to Baltimore in 1823, and was soon regarded as the leader of the bar in that city. In 1827 he was appointed attorney-general of Maryland, and in June, 1831, Attorney-General of the United States. He became President Jackson's chief adviser, particularly in regard to the United States Bank, and this resulted in Secretary of the Treasury Duane being supplanted by Taney, Sept. 23, 1833. During his term as Secretary, Taney put himself in antagonism to the Senate by supporting Jackson in his attempt to get supreme control of the government funds. There was a clause in the charter of the Bank of the United States which allowed the Secretary of the Treasury to place deposits in other places than the bank, at the same time stating his reasons for the order. The real meaning of the clause was to cover points where there was no branch

bank, but Jackson chose to construe it to mean that the Treasurer could refuse to deposit the revenues in any branch bank, and in the mother bank as well. Taney, according to the President's request, gave the order, and the Bank of the United States received no more of the revenues. The Senate would not confirm the appointment, but he had already done the work he and the President wished. He then retired to Baltimore. In January, 1835, he was nominated by the President associate justice of the supreme court. But the Senate constantly "indefinitely postponed" the consideration of the nomination. In the mean time Chief Justice John Marshall had died, and Taney was nominated to the vacant seat, Dec. 28, 1835, and, after much opposition, his appointment was confirmed by the Senate, March 15, 1836. Then came the important decision in the famous Dred Scott case. Judge Taney, in his opinion, is reported to have used the following language: "For more than a century before the Declaration of Independence the negroes had been regarded as beings of an inferior order, and altogether unfit to associate with the white race, either in social or political relations, and so far inferior that they had no rights which the white man was bound to respect, and that the negro might justly and lawfully be reduced to slavery for his benefit." He also declared that the Missouri Compromise was unconstitutional, and that the suit Dred Scott had brought for his freedom must be dismissed for want of jurisdiction. It was proved in later years that Taney never used the language imputed to him above. He certainly did decide against Dred Scott, but he did not say that "a slave has no rights which a white man is bound to respect." The position he took on these matters in earlier years, having freed his slaves upon inheriting them, refutes the idea of his ever having used the language. On the outbreak of the war, John Merryman of Baltimore County, having been arrested by military writ and lodged in Fort McHenry, Taney issued a writ of *habeas corpus*, and endeavored to attach General Cadwalader for contempt in refusing to obey the order. The intimate connection Chief Justice Taney had with slave questions makes the date of his death, Oct. 12, 1864, peculiarly interesting. It was on this date that the state of Maryland abolished slavery. Taney was connected with a great number of important cases, both as the lawyer and the judge upon the bench. His decisions and opinions are contained in the *Supreme Court Reports* of Benjamin R. Curtis, Benjamin C. Howard and Jeremiah S. Black. At the age of 77 he began an autobiography, which forms the introduction to a *Memoir* by Samuel Tyler, published at Baltimore in 1872.

TANGENT. See **CURVE**, Vol. VI, pp. 719 et seq.

TANGLE, a seaweed. See **ALGÆ**, Vol. I, pp. 508, 509.

TANIS OR ZOAN. See **EGYPT**, Vol. VII, p. 769.

TANNING. See LEATHER, Vol. XIV, pp. 380-383.

TANREC OR TENREC (*Centetes ecaudatus*), a small hedgehog-like insectivorous mammal of the family *Centetidae*. This family is confined to Madagascar and adjacent islands. The animals are small, about six inches long, and have spines mingled with the fur. See HEDGEHOG, Vol. XI, p. 610; and MAMMALIA, Vol. XV, p. 404.

TANSY, the common name of species of *Tanacetum*, a genus of the family *Compositae*. The common tansy (*T. vulgare*) is a species of Europe, and introduced into the United States in old gardens, from which it has escaped along roadsides. It is strong-scented, with deep green, much-compounded leaves, and corymbed heads or yellow flowers.

TANTUM ERGO, the last two stanzas of the hymn uniformly sung in the Roman Catholic Church at benediction with the holy sacrament. These are the first words of the penultimate strophe of the hymn *Pange Lingua* ("Proclaim, O tongue"), composed by St. Thomas Aquinas. The *Tantum Ergo* is the most popular of all the eucharistic hymns of the Roman Catholic Church.

TAOISM, a religion. See LAO-TSZE, Vol. XIV, pp. 295-298.

TAOS INDIANS, the northernmost tribes of the Tanoan linguistic stock of North American Pueblos. They occupy a village of the same name about fifty miles north of Santa Fé, on the Rios de Taos, a tributary of the Rio Grande, in New Mexico. They belong to the Tigua division of the same Tanoan linguistic family, which includes, besides the Taos, the Pueblos of Senecú del Sur in Chihuahua, Isleta del Sur in Texas, and Isleta, Picuris and Sandia. The great divisions of the Tanoans include the Tewa, Tano, Tigua Jemez and Piro, which speak varied dialects of the same tongue. The Tanoans probably number over 3,300, while the Taos number about 400. The Taos occupy the same position, very nearly, as when they were first discovered.

TAPAJÓS, a river of Brazil, and one of the large southern tributaries of the Amazon, whose basin lies between those of the Madeira and Xingu. It is formed in western central Brazil, by the junction of the Arinos and Jaruená, and after following a northeasterly course joins the Amazon near Santarem. The river is navigable in its lower course, where it broadens into a lake-like expanse 12 miles across, although narrowing again at its mouth to less than a mile. The Tapajos and Arinos together have a length of about 1,100 miles.

TAPESTRY. See TEXTILES, Vol. XXIII, pp. 211-213.

TAPETUM, in botany, a specialized layer of cells surrounding the group of cells in a sporangium from which the spores are derived (the archesporium). For illustration, see figure under EGG-APPARATUS, in these Supplements.

TAPPAN, ARTHUR, an American merchant and abolitionist; born in Northampton, Massachusetts, May 22, 1786. Receiving an ordinary common-

school education, he started in business for himself in Portland Maine. In 1814 he removed to New York City and opened a wholesale dry-goods house, in which business he was very successful and made a great deal of money. He was noted for his charities, and was identified with a number of institutions and religious societies. In 1828 he founded the New York *Journal of Commerce*, and in 1833, being warmly interested in the slave question, he established the *Emancipator*. So thoroughly was he identified with this movement that on Oct. 2, 1835, he was chosen president of the New York City Antislavery Society, and during the years of his commercial success he gave that organization \$1,000 a month, until, unfortunately, his firm failed. He died in New Haven, Connecticut, July 23, 1865.

TAPPAN, HENRY PHILIP, was born in Rhinebeck, New York, April 23, 1805. After his graduation at Union College and Auburn Theological Seminary, he served for a year as associate pastor of a Dutch Reformed church in Schenectady, New York, and for a short time as pastor of a Congregational church in Pittsfield, Massachusetts, which charge he was compelled by ill health to resign. From 1832 until 1838 he was professor of moral philosophy in the University of the City of New York, and in 1852 he became first chancellor of the University of Michigan. In 1863 he retired and went to Europe, where he spent the remainder of his life. Union College gave him the degree of D.D. in 1845, and Columbia that of LL.D. in 1853. His works include *Review of Edwards's Inquiry Into the Freedom of the Will* (1839); *The Doctrine of the Will Determined by an Appeal to Consciousness* (1840); *The Doctrine of the Will Applied to Moral Agency and Responsibility* (1841); *Elements of Logic* (1844, 1858); *Treatise on University Education* (1851); *A Step from the New World to the Old, and Back Again* (1852). He died in Vevey, Switzerland, Nov. 15, 1881.

TAPTI, a river. See BOMBAY, Vol. IV, p. 21.

TARA, HILL OF, an eminence 507 feet high, in County Meath, Leinster, Ireland, 7 miles S.S.E. of Navan. Here, prior to 560, is said to have stood the hall of the kings of Ireland, and here O'Connell held a monster meeting on Aug. 15, 1843. See also IRELAND, Vol. XIII, pp. 245, 250.

TARANTISM. See TARANTULA, Vol. XXIII, p. 60.

TARANTO, a city and gulf of Italy. See TARENTUM, Vol. XXIII, p. 61.

TARAPACÁ, a province of northern Chile, extending from Tacna on the north to Antofagasta on the south, and lying between the Pacific Ocean and the Andes of Bolivia; area, 19,306 sq. miles. A range of mountains runs through the province parallel with the coast, and the soil is dry and barren, except where a few watercourses find their way from the mountains. The importance of the province is in its vast deposits of saltpeter, found in the interior, 20 miles from the coast. From Iquique (pop. 1895, 33,031), the capital and principal seaport, and Pisagua, railroads have been built to the saltpeter beds, and at various points reducing-

works have been built. The saltpeter annually exported from Iquique and Pisagua is valued at over \$27,000,000. In addition to this product, silver is also found. Tarapacá was formerly a department of Peru, but by the treaty of 1884 was formally ceded to Chile. The population, nearly all of whom are engaged in the saltpeter trade, according to the census of 1895, was 89,751.

TARBELL, IDA M., an American authoress, was born in 1860, near Titusville, Pennsylvania, on a farm; passed her girlhood among the hills of the oil region; went to school in Meadville, Pennsylvania; embarked at once on editorial work, having joined the staff of the *Chautauquan*, which she raised to wide repute; passed some years in Paris writing for American periodicals and newspapers, and forming an extensive acquaintance in the literary and art world of that city; became connected with *McClure's Magazine* in New York, and contributed to it serially *A Life of Napoleon*, which was completed in 1895, and *A Life of Lincoln*, finished in 1896. She also published a *Life of Madame Roland* (1896). Although her themes have been trite, she has been diligent in seeking original documents, and with a lucid and vigorous style has added new interest to them.

TARBORO, a town and the capital of Edgecombe County, eastern central North Carolina, about 60 miles E. N. E. of Raleigh, and 41 miles N. W. of Washington, at the head of navigation on the Tar River, and on the Wilmington and Weldon branch of the Atlantic Coast Line railroad. It is the center of a region producing cotton, corn and peanuts; contains churches and several graded schools, and has a cottonseed-oil mill, cotton and knitting factories, and manufactures of agricultural implements. Population 1890, 1,924; 1900, 2,499.

TARENTUM, a borough of Allegheny County, west-southwestern Pennsylvania, 21 miles N. E. of Pittsburg, on the Allegheny River, and on the Allegheny Valley and Pennsylvania railroads. It is in an agricultural and coal-producing region, and has plate-glass factories employing five hundred hands, a flint-glass factory, foundry, table and fancy-ware factories and paper-mill. Population 1890, 4,627; 1900, 5,472.

TARIFF, a table, usually in alphabetical order, of the duties charged on the imports or exports of a country, as settled by the governmental authority or by agreement between different states. The principles upon which the tariffs are fixed depend upon the commercial policy as well as the wants and interests of different countries. Tariffs may be prohibitory, retaliatory or differential, and may be assessed *ad valorem* or specifically. The word is popularly derived from the town of Tarifa, on Gibraltar, where Tarik the Saracen landed in A. D. 711, and where duties were levied on African commerce.

The various tariff laws that have been in force in the United States are noticed here.

The first tariff act was signed by President Washington on July 4, 1789. Alexander Hamil-

ton was the author of the measure, which was modeled on the five-per-cent import duty that the Congress of the Confederation had tried in vain to impose. This first law imposed specific duties on 47 articles, and *ad valorem* rates of 7 1-2, 10, 12 1-2 and 15 per cent on four commodities or small groups. The unenumerated goods were compelled to pay 5 per cent.

The second tariff act was approved by the President on Aug. 10, 1790. This act was longer than its predecessor, and the scale of duties was higher. Then followed the act of May 2, 1792, which became operative in the following July. It raised the duty on unenumerated merchandise to 7 1-2 per cent, and that on many articles paying 7 1-2 to 10 per cent. Another tariff bill was passed on June 7, 1794, going into effect on July 1st. It imposed numerous rates in addition to those already exacted, some of them specific and others 2 1-2 and 5 per cent *ad valorem*. Additional tariff measures were enacted on March 3 and July 8, 1797, and on May 13, 1800. These acts imposed additional rates, and there was a further increase of 2 1-2 per cent on March 26, 1804, on all imports then paying *ad valorem* rates.

In 1807-08, Napoleon's Berlin and Milan decrees were followed by the English Orders in Council, and Mr. Jefferson's administration retaliated for the outrages on our commerce by the embargo in December, 1807. This was followed by the non-intercourse act in 1809, and by the declaration of war against England in 1812. During the progress of hostilities all commercial intercourse with Great Britain was, of course, suspended, and all import duties were doubled as a war measure, known as the "Tariff of 1812," amendments to which were adopted on February 25, and again on July 29, 1813. On Feb. 15, 1816, the additional duties imposed by the act of 1812 were repealed, and additional duties of 42 per cent, to take effect on July 1st, were substituted, but the law did not go into operation.

The next great tariff measure is known as the Lowndes-Calhoun Bill of 1816, which took effect in July, 1816, and may be said to be the first of the protective tariffs. It was not wholly set aside until 1842, under the administration of Mr. Polk. The *ad valorem* duties under it ranged from 7 1-2 to 33 per cent. The unenumerated goods paid 15 per cent; the manufacturers of iron and other metals generally, 15 per cent; the majority of woolen goods, 25 per cent; cotton goods, 25 per cent, "with clauses establishing 'minimums,'" that is, in reckoning duties, 25 cents per square yard was to be deemed the minimum cost of cotton cloth, unbleached and uncolored yarn 60 cents, and bleached or colored yarn 75 cents per pound. These rates became practically prohibitory on the cheaper goods. The law was amended April 20, 1818, and again on March 3, 1819.

The Clay Tariff went into effect July 1, 1824, and remained in force in almost its entirety until 1842. It raised the duty on woolen goods from 25 to 30 per cent for one year, and then to 33 1-3 per cent. There was a "minimum" of 30 cents

per square yard on cotton cloth. Wool over 10 cents a pound was rated at 20 per cent until June 1, 1825, then 25 per cent for one year, and then 30 per cent.

The "Tariff of Abominations," as it is called, was approved May 19, 1828, and went in operation, part the following July and part in September. It had special reference to iron, wool and manufactures of wool. The duty on wool was 4 cents per pound and forty per cent for one year; then 4 cents and 45 per cent for a year; then 4 cents and 50 per cent. Somewhat lower duties were provided for in an act passed on May 24, 1828, again in May, 1830, and still again on July 13, 1832.

The Modifying Tariff of 1832, intended "to correct the inequalities of that of 1828," levied high duties on cotton and woolen goods and other articles to which protection was meant to be applied, and took effect March 3, 1833. The existing duties were superseded by the act, some of them reduced and a few raised. In a separate act of the same date railroad iron was made free.

The Compromise Tariff of 1833 provided for taking off one third of the duties each year, until a uniform rate of twenty per cent on all should be reached. It took effect Jan. 1, 1834. The terms of the compromise were, that all duties which in the tariff of 1832 exceeded twenty per cent should have one tenth of the excess over twenty per cent taken off on Jan. 1, 1834; one tenth more on Jan. 2, 1836; again one tenth in 1838, and another one tenth in 1840; so that by 1840 four tenths of the excess over twenty per cent would be disposed of. Then, on Jan. 1, 1842, one half of this remaining excess was to be taken off, and on July 1, 1842, the other half of the remaining excess was to go. There would, therefore, after July 1, 1842, have been a uniform rate of twenty per cent on all articles.

The Tariff of 1842, avowedly a protective measure, took effect August 30, changed all existing rates, was amended in March, 1843, and died Dec. 1, 1846.

The Polk-Walker Tariff of 1846, one of the most noteworthy acts in the fiscal history of the country, was approved by Mr. Polk on July 30, 1846, and remained in force until 1857. It swept away specific and compound duties. It divided all dutiable merchandise into eight classes, which introduced greater simplicity into the whole system of customs regulations, the average duty on all imports being, from 1847 to 1857, 23.20 per cent, and on dutiable articles 26.22 per cent.

The Tariff of 1857, which made a still further reduction in duties, took effect on July 1st, and remained in force until April 1, 1861.

The Morrill Tariff of 1861 differed from all its predecessors in that it provided for a general system of compound and differential duties, specific and *ad valorem*, and also made a distinction between goods imported from different parts of the world. It was frequently changed during the War of the Rebellion, ostensibly for purposes of revenue. At an early period in its history the number of rates ran up to over two thousand. From

1861 to 1869 every year produced some enlargement of the original scheme. In 1870 there was some modification of rates, generally in the line of reduction. Tea and coffee, taxed since 1861, were then put on the free list, and the duties on cotton and woolen goods, wool, iron, paper, glass and leather were lowered about ten per cent. The free list was somewhat enlarged, but the reduction was rescinded in the act of March 3, 1875. The duty on quinine was abolished on July 1, 1879.

The Commission Tariff reduced some protective duties. The duty on pig-iron was reduced from \$7 to \$6.72 per ton; on steel rails, from \$28 to \$17 per ton; on wool, from 11 1-2 to 10 cents per pound; on manufactured silks, from 60 to 50 per cent. The duties on the cheaper grades of woolen and cotton goods (the former of which had ceased to be imported and the latter never had been imported) were reduced, while those on the finer grades (of which the importation was considerable) were increased. This act was in force until Oct. 6, 1890, when it was superseded, except as to tobacco and tin plate, by the McKinley Tariff, which embodied the principle of high protection. Not only were duties advanced, but laid upon agricultural products, notably upon wool, and large use was made of specific duties, which were often compounded with *ad valorem* imposts. The aim of the Act was to build up manufactures as well as the home supply of raw materials. Thus a duty was laid upon tin-plate of 1 1-5 cents a pound, which resulted in adding that as a new industry to the products of the country. On the other hand, sugar was placed upon the free list, as the revenues of the government were then deemed excessive, but a bounty of 2 cents a pound was authorized to be paid on all sugars raised in the United States, a bounty subsequently repealed by the tariff of 1894. The effect of the duty on wool was two-fold. In three years' time there were added nearly 5,000,000 head of sheep to the flocks of the country; but the tax on the fleeces made it necessary to add what were called "compensatory duties" for the protection of the manufacturer, for whom the price of his wool was enhanced by the tax on the raw material. Computed into *ad valorem* duties it was estimated that the McKinley Tariff placed on importations an average tax-rate of 49.58 per cent.

This tariff of 1890 also embodied provisions under which the President might make commercial treaties with other nations, particularly with Latin American States, upon the basis of mutual equivalent concessions of import duties by the contracting powers. See RECIPROcity, p. 2517, in these SUPPLEMENTS. Several such treaties were made by President Harrison, but they were soon revoked by a new administration.

In 1892 a popular reaction placed Mr. Cleveland in the White House with a large Democratic majority in both Houses of Congress. This party was pledged to reduce the customs duties with a view to revenue only, and it redeemed its pledge by enacting the so-called Wilson-Gorman

measure, which became a law, August 15, 1894, without the signature of the President. It removed duties on raw materials, particularly from lower grades of wool, returned very largely to *ad valorem* duties and made sugars dutiable. Flax, lumber, hides and many chemicals went upon the free list.

There was a severe conflict between the two Houses of Congress over this bill, the Senate fearing to risk business convulsions by a too radical change in customs duties. It was substantially the Senate bill that became a statute. There was incorporated into this law a provision for levying an income tax, which was set aside by the Supreme Court. See INCOME TAX, p. 1662, in these SUPPLEMENTS.

Mr. McKinley's election in 1896 again placed in power the party favorable to protection. By proclamation he called Congress together, March 15, 1897, and it adjourned on the 24th of July, having placed the Dingley tariff upon the statute book, which followed quite closely the former McKinley law. Again there was a recurrence to the principle of specific and compensatory duties, though somewhat freely compounded with *ad valorem* duties. The tax on sugar was advanced, and wool, hemp, tow and hides were restored to the dutiable list, with other raw materials. The computation made in the House was that the new duties would be equivalent to 54.14 per cent on cotton goods as against 43.75 of the Wilson law; 49.52 per cent on manufactures of flax, as compared with 40.38 of the superseded law; 81.57 on wool and its products, compared with 47.62, and 53.89 on silk and silk goods as against 46.96. But these estimates are subject to revision from experience. A large measure of protection is accorded to farmers.

Two other features were introduced into this law: one permitting the President to enter into new reciprocity treaties, and authorizing him to remit one fifth of the customs in cases where other nations should grant equivalent trade concessions.

The other feature was the imposition of a discriminating duty of ten per cent in addition to those imposed by law on "goods, wares or merchandise which shall be imported in vessels not of the United States, or which, being the production or manufacture of any foreign country not contiguous to the United States, shall come into the United States from such contiguous country." The object of this provision seemed to be to stop the transportation of goods destined for the United States and coming from a foreign country through Canadian territory. Although this feature of the statute has not been adjudicated in any court, the Attorney General of the United States, Mr. McKenna, gave his opinion in Sept., 1897, that there was not satisfactory evidence that Congress intended to place this provision in the law, but that it got there by some oversight. Hence this discriminating duty will not be imposed under existing circumstances.

TARIJA, a town of southeastern Bolivia, capital of the department of the same name, situated 173 miles S. E. of Potosi, on the Tarija River. It is built upon a plain in which are found the remains of mastodons and other fossils. It is the seat of a university, and had a population of 11,942 in 1893. The department of Tarija has an area of 34,610 square miles, and a population (1893) of 89,650.

TARKIO, a village of Atchison County, extreme northwestern Missouri, 68 miles N. N. W. of St. Joseph and 8 miles N. E. of Rockport, on the Tarkio River, and on the Kansas City, St. Joseph and Council Bluffs railroad. It is in an agricultural and stock-raising district, has some manufactures and improvements, such as water-works

and electric lights, and is the seat of Tarkio College (United Presbyterian), a co-educational institution founded in 1884, and having, in 1895, 13 instructors, 241 students and a library of 1,010 volumes. Population 1900, 1,901.

TARLETON, SIR BANASTRE, an English officer, noted for his cruelty, who came to America with Lord Cornwallis. He was born in Liverpool, England, on Aug. 21, 1754. He accompanied Lord Cornwallis to America in 1776, engaged in the raid upon Baskingridge, New Jersey, and in 1779 organized the "British Legion," or "Tarleton's Legion," in South Carolina. He annihilated Colonel Buford's regiment at Waxhaw Creek, May 20, 1780. He fought at Camden, August 16th; and at Fishing Creek, August 18th, but was defeated at Blackstock Hill, November 20th, by General Sumter, and by General Morgan at Cowpens, South Carolina, Jan. 7, 1781, and surrendered with Cornwallis at Yorktown, October 7th. He was a member of Parliament from 1790 to 1806; was promoted to be lieutenant-general in 1817, and created a baronet in 1818. He wrote a *History of the Campaigns of 1780-81*. He died in England, Jan. 23, 1833.

TARNOPOL, a town in Galicia, Austria-Hungary, famous for its horse fairs. It is located on the river Sered, 80 miles by rail E. S. E. of Lemberg; has manufactures of sugar and leather, and a thriving trade in wax and honey. Population 1890, 27,400.

TARNOW, a town of Austrian Galicia, near the right bank of the Dunajec, a navigable tributary of the Vistula, 50 miles E. of Cracow by the Vienna and Lemberg railway. It is the seat of a Catholic bishop, contains a theological college and a beautiful cathedral, in which are numerous monuments of marble surmounted by statues, enriched with *bassorilievo*, and rising to from sixty to seventy feet in height. Several industries are actively carried on, and there is a good general trade. Population (including suburbs), 27,574.

TARO OR TARA, the native name of the East Indian *Alocasia macrorhiza*, a plant belonging to the family *Araceæ*, or arums, whose large farinaceous root is an important article of food.

TARPEIAN ROCK, the name of a portion of the Capitoline Hill at Rome. It was named from Tarpeia, daughter of Tarpeius, Governor of the Roman citadel on the Saturnine (Capitoline) Hill. She was tempted by the promise of the gold on the bracelets and collars on the Sabines to open the gate of the fortress to T. Tatius. As the Sabines entered they threw their shields upon Tarpeia, crushing her to death. She was buried upon the hill. This legend of the time of Romulus still survives in the popular imagination of inhabitants of Rome, who say that Tarpeia sits in the heart of the hill, wearing rich jewels and bound by a spell. It was once customary to hurl condemned criminals from the Tarpeian Rock.

TARPON (*Megalops thrissoides*), a fish allied to the herrings. It reaches a length of six feet, and

a weight of 140 pounds. On the Florida coast and in the West Indies it is a favorite with sportsmen. The large scales are often used in decorative work. The fish is also known as tarpum.

TARRAGON, a pot-herb having a flavor resembling anise. See **HORTICULTURE**, Vol. XII, p. 289.

TAR RIVER, a stream rising in Granville County, northern North Carolina, and after following a winding southeasterly course of about two hundred miles, during which it intersects the counties of Franklin, Nash, Edgecombe and Pitt, it falls into Pamlico Sound on the boundary between Beaufort and Pamlico counties. The river, in its lower course, which forms a wide estuary, is known as the Pamlico. It has a rapid current, and is navigable for steamboats to Tarboro, a distance of 85 miles.

TARRYTOWN, one of many beautiful villages which dot the landscape of New York state in almost every direction, is handsomely situated on the hillside overlooking the expansion of the Hudson River known as the Tappan Sea. It is located in Westchester County, southeastern New York, 27 miles above New York and 116 miles below Albany, with both of which cities it is connected by river steamers and by the New York Central and Hudson River railroad. The village is an attractive and popular place of residence for many New York business men, and has much about it of literary and historical interest, containing, as it does, a manor-house and church, built by the Dutch in the seventeenth century, and Sunnyside, the home of Irving, and Sleepy Hollow, which he made immortal. It was also the scene of the capture of Major André, Dec. 25, 1780. The industries of the village include flour mills, blank-book, boot and shoe, cigar, canned goods, sash, door, and blind factories. North and East Tarrytown, adjoining the village, are prosperous suburbs. Population 1900. 4,770.

TARSIIDÆ, a family. See **LEMUR**, Vol. XIV, p. 443.

TARSIPEDINÆ, a subfamily. See **MAMMALIA**, Vol. XV, p. 382.

TARSUS, bones. See **SKELETON**, Vol. XXII, p. 118.

TARTAR, **CREAM OF TARTAR** and **TARTAR EMETIC**. See **TARTARIC ACID**, Vol. XXIII, p. 69.

TARTARIAN. See **BAROMETZ**, in these Supplements.

TARTARY. See **TURKESTAN**, Vol. XXIII, p. 631.

TARUDANT, a town. See **MOROCCO**, Vol. XVI, p. 834.

TASCHEREAU, **ELZÉAR ALEXANDRE**, cardinal and archbishop of Quebec, was born at Sainte Marie de la Beauce, Quebec, Feb. 17, 1820. He was educated at the Seminary of Quebec and in Rome, receiving the tonsure at the age of 18. In 1842 he was ordained a priest at Quebec, and from that year until 1854 occupied the chair of moral philosophy at the Quebec Seminary. He resumed his studies in Rome in 1854, and in 1856 the degree of doctor of canon law was conferred upon him by the Roman Seminary. Returning to Quebec he was director of the Petit Séminaire until 1859, when he became director of the Grand Séminaire

and a member of the Council of Public Instruction for Lower Canada. He was made superior of the Grand Séminaire and rector of Laval University in 1860, and vicar-general of the diocese of Quebec in 1862. In 1866 he again became director, and in 1869 he was re-elected superior of the Grand Séminaire. He was consecrated archbishop of Quebec in 1871, and in 1886 was made a cardinal, being the first Canadian to receive the biretta, and was congratulated alike by the Protestant and by the Catholic press, his advancement being regarded as the merited reward of a long life devoted to educational progress. Died at Quebec, April 12, 1898.

TASCHEREAU, **HENRI ELZÉAR**, a Canadian jurist, born at the seigniorial manor-house, in the county of Beauce, province of Quebec, Oct. 7, 1836; a nephew of Cardinal Taschereau; educated at the Quebec seminary; studied law, and was called to the bar in 1857. He soon gained a high reputation, and in 1861 was elected to the legislative assembly for the county of Beauce and represented that constituency until 1867, in which year he was made a queen's counsel, and in 1868 was appointed clerk of the peace for the district of Quebec, but resigned this position after holding it only three days, on account of a difference with the government. January, 1871, he was appointed puisne judge of the superior court of the province of Quebec, and in 1878 was elevated to the bench of the supreme court of Canada. He published *The Criminal Law Amendment Acts of 1869, etc.* (1874); and *Le Code de Procédure Civile du Bas-Canada, avec Annotations* (1876).—His nephew, **HENRY T.**, was a judge of the superior court of the province of Quebec.

TASHKURGAN, a town, river and province of **AFGHANISTAN**; q.v., Vol. I, p. 242.

TASIMETER. See **MICROTASIMETER**, in these Supplements.

TASMA, the pseudonym of **COUVREUR**, **MARIE AUGUSTE**; q.v., in these Supplements.

TASMANIA, a British colony in Australia. (For general article, see **TASMANIA**, Vol. XXIII, pp. 72-75). The census of 1891 estimated the area at 26,385 square miles (including Macquarie, 170 square miles), or about 16,886,000 acres, of which 15,571,500 acres are the area of Tasmania proper, the rest being the area of a number of small islands, which form two main groups, northeast and northwest. The population in 1891 was 146,667,—an increase of 3.84 per cent per annum. The population of Hobart, the capital, was 24,905, in April, 1891; that of Launceston was 17,108.

Constitution. The Parliament of Tasmania, under the acts of 1871, 1885, and 1886, consists of a Legislative Council and a House of Assembly. The Council is composed of eighteen members, elected by all natural-born or naturalized subjects of the crown, who possess either a freehold worth \$75 a year or a leasehold of \$250, or are barristers or solicitors on roll of supreme court, medical practitioners duly qualified, and all subjects holding a commission or possessing a degree. Each member is elected for six years. The House of Assembly consists of thirty-seven members, elected by all whose names appear on valuation rolls as owners or occupiers of prop-

erty, or who are in receipt of income of \$200 per annum (of which \$100 must have been received during last six months before claim to vote is sent in), and who have continuously resided in Tasmania for over twelve months. The Assembly is elected for three years. The members of each house have salaries of \$500 per annum, free railway passes, and postal and telegraph franks. The legislative authority vests in both houses, while the executive is vested in a governor appointed by the crown. The governor is, by virtue of his office, commander-in-chief of the troops in the colony; he has a salary of \$17,500 per annum. He is aided in the exercise of the executive by a cabinet of responsible ministers, consisting of five members, as follows: Premier and treasurer, chief secretary, attorney-general, minister of lands and works, minister without portfolio. Each of the ministers has a salary of \$3,750 per annum. The ministers must have a seat in one of the two houses.

Education. There were, in 1897, 13 superior schools and colleges in Tasmania, 282 public elementary schools, and 173 private schools. Education is compulsory. Two technical schools were started in 1888, at Hobart and Launceston. The higher education is under a university, which holds examinations and grants degrees, being at present merely an examining body. Elementary education is under the control of a director working under a ministerial head. There are several valuable scholarships from the lower to the higher schools. At the census of 1891 the number of persons returned as unable to read and write was 37,034, or 25.38 per cent of the population; and the cost to the government of conducting the schools was, in 1897, \$195,030.

Religion. According to the census of 1891, the population was divided into the various denominations as follows: Church of England, 76,082; Roman Catholic, 25,805; Wesleyan Methodists, 17,150; Presbyterians, 9,756; Independents, 4,501; Baptists, 3,285; Friends, 176; Jews, 84; and others, 9,828. The government contributes \$875 annually for various religious purposes.

Revenue, Expenditure, Debt, and Trade. The revenue for 1897 was \$4,225,095, and the expenditure, \$3,925,130. The public debt on Jan. 1, 1898, amounted to \$41,950,130, consisting of 3½ and 4 per-cent debentures, and wholly raised for the construction of public works.

There are heavy customs duties, those for 1897 amounting to over \$1,700,000, or nearly 25 per cent of the total imports, whose value was about \$6,838,040; the exports amounted, for the same period, to \$8,722,305. The registered shipping for 1897 consisted of 199 vessels, of 14,376 tons; the vessels entering Tasmanian ports numbered 699, of 542,049 tons; and vessels leaving, 717, of 542,119 tons.

TASMANIAN DEVIL. See MAMMALIA, Vol. XV, p. 380.

TASMANIAN WOLF OR HYÆNA. See MAMMALIA, Vol. XV, p. 380.

TASSO, BERNARDO (1493-1569), a Venetian poet. See ROMANCE, Vol. XX, p. 654.

TASTE, DEVELOPMENT OF. See SENSE-ORGANS, in these Supplements.

TATTERSALL'S, a celebrated mart in London for the sale of racing and other high-class horses, and one of the principal haunts of racing-men, so called from Richard Tattersall (1724-95), a native of Hurstwood, in Lancashire, who came early to London, entered the service of the second Duke of Kingston, and ultimately became an auctioneer. In 1766 he took a 99 years' lease from Lord Grosvenor of premises in Hyde Park Corner, and after its expiry Tattersall's was removed to Knightsbridge Green (1867). In 1779, Richard Tattersall bought the famous horse, Highflyer, of Lord Bolingbroke, for £2,500, and named his house at New Barns, near Ely, Highflyer Hall. Here he was often visited by the Prince of Wales from Newmarket. The Prince was also a joint owner with "Old Tatt" in the *Morning Post*, and lost thereby £10,000, which was paid to Tattersall's heirs in 1810. See *Memories of Hurstwood* (Burnley, 1889), by Tattersall Wilkinson and J. F. Tattersall.

TATTLERS, birds. See GREENSHANK, Vol. XI, p. 173.

TATTOO, a mark on the skin by means of punctures and the use of coloring-matter. The word is of Tahitian origin. The practice is very widely spread, being common among the South Sea Islanders, the North and South American Indians, the Dyaks, the Burmese, the Chinese and the Japanese. Among the Polynesians the figures represented had a religious and symbolic significance, and the operation was accomplished with much ceremony. The Maoris of New Zealand were experts at this form of decoration, the face being the chief object of their skill. But it was in Japan where tattooing reached its greatest development. There it was used to cover artistically, with representations of real clothing, etc., the exposed portions of the bodies of the semi-nude grooms, runners and bearers. Since this, clothing the body has become compulsory in Japan, and tattooing has been prohibited. In Japan and China India ink was used, and in New Zealand a mixture of charcoal and water. In the brown-skinned races the mark appeared black, and in light-skinned blue. It would appear from a passage in Lev. xix. 28, that the Jews were prohibited from its use: "Ye shall not make any cuttings in your flesh for the dead, nor print any marks upon you." From this it is inferred that the custom was common among the neighbors of the chosen people. The Bedouins to-day practice tattooing, it being a favorite mode of female adornment. The Tunguses (Siberian Mongols) tattooed themselves. It was common among the ancient Thracians, who had ethnic relations with the Scythians and Celts. Hence we find the custom common among the Britons and Irish of early times. The custom can thus be traced around the world. Its origin may thus be regarded as dating from the earliest human origins. We might indeed see in its early adoption by the as yet untutored race the suggestion of the practice as a means of disguise, etc., by a rough and ready sort of imitativeness that has been later credited to insects and higher animals. Like all outdoor sports of modern times, which are "survivals" of the hunting habits of savage man, tattooing has survived

as a practice among certain classes of people, such as sailors, etc. A notable instance of it was that of the tattooing of the sons of the Prince of Wales during their cruise of 1877-79. As an instance of its value as evidence as to identity, the Tichborne trial may be cited. In this case, Lord Bellew swore that he had tattooed Sir Roger Tichborne when both were schoolmates. A witness also swore that Arthur Orton had been tattooed on the arm. The claimant swore that he had never been tattooed in his life; while on the arm, where Arthur Orton's initials had been pricked, there was a scar which was suspiciously suggestive. The inferences from these facts were clearly put to the jury by the Lord Chief Justice in summing up. See also *ANDAMAN ISLANDS*, Vol. II, p. 11; *IRELAND*, Vol. XIII, p. 257; *LEW CHEW*, Vol. XIV, p. 490; *NEW GUINEA*, Vol. XVII, p. 389; *SHANS*, Vol. XXI, p. 774; and *TOTEMISM*, Vol. XXIII, p. 469.

TAUCHNITZ, KARL CHRISTOPH TRAUOGT, a German printer and bookseller; born at Grossparadau, near Leipsic, Oct. 29, 1761; died at Leipsic, Jan. 14, 1836. In 1809 he began the issue of a series of editions of classic authors, the elegance and cheapness of which gave them a European circulation. By offering a prize of a ducat for every error pointed out, he was able to bring out, in 1828, an edition of Homer of extraordinary correctness. He was the first to introduce (1816) stereotyping into Germany; and he also applied it to music, which had not been attempted before. In the latter years of his busy life he stereotyped the Hebrew Bible, and the Koran in the original Arabic. On his death, the business was continued by his son, **KARL CHRISTIAN PHIL. TAUCHNITZ**.—A nephew of the elder Tauchnitz, **BARON CHRISTIAN BERNHARD TAUCHNITZ**, born in Schleinitz, near Naumburg, Aug. 25, 1816, also set up a printing and publishing establishment in Leipsic in 1837. Among the most noted of his undertakings was the issue of British authors begun in 1842, the "Tauchnitz Edition," so well known to all English travelers on the Continent. He also published a series of English translations of German authors; and a "Students'" series. In 1860 he was created a baron, and in 1877 became a Saxon life peer. Died in Leipsic, Aug. 14, 1895.

TAUNTON, a city, port of entry and the capital of Bristol County, southeastern Massachusetts, on the New York, New Haven and Hartford Railroad, and is one of the best-known manufacturing points in the state. The city is regularly laid out and embraces a large number of handsome residences in the midst of surroundings equally handsome. Among its more prominent edifices are the locomotive-works, giving employment to a force of more than 1,000 men; the buildings, shops, etc., of the Copper Company, occupying an area of from ten to fifteen acres in extent; the extensive buildings connected with the State Insane Asylum, the Congregational, Unitarian, Episcopal, Baptist and Catholic church edifices, and others, which are especially noted for their architectural superiority. Taunton, according to the census returns, had, in 1890, 310 manufacturing establishments, representing over 65 industries, with an aggregate invested capital of \$7,750,000;

and paying in wages, to over 6,000 persons, \$3,100,000, and for materials \$4,770,000, from which goods valued at nearly \$10,000,000 were produced. In addition to those mentioned, the industries include saw, grist, planing and paint mills; Britannia-ware, button, tack, blueing, shuttle, boot and shoe, pump, printing-press, and soap factories; cotton-mills, including among their products cotton batting, yarn, flannels, print-cloths, denims and tickings; manufactories of stove and hardware specialties, agricultural implements, silver-plated ware, carriages, furnaces, paper, coffin-trimmings, and common, sewer, pressed and fire brick, the combined output of the last four commodities annually aggregating from ten to twenty millions of brick. The schools are made up of a high school and intermediate departments, also the Bristol Academy, and a number of private institutions. The city is provided with a free library, containing 15,000 volumes, and has several daily and weekly newspapers, also national, co-operative and savings banks. The assessed valuation of city property in 1894 was nearly \$19,000,000. Population, 1890, 25,448; 1900, 31,036.

TAURUS, a mountain range. See *ASIA MINOR*, Vol. II, p. 704.

TAURUS, a sign. See *ZODIAC*, Vol. XXIV, pp. 791, 792, 795.

TAUSEN, HANS, a reformer. See *DENMARK*, Vol. VII, p. 90.

TAUSSIG, FRANK WILLIAM, an American political economist; born at St. Louis, Dec. 28, 1859; graduated at Harvard in 1879, from which he obtained the degree of Ph.D. in 1883, and LL.B. in 1886. After spending a year in Europe he became professor of political economy in Harvard. His works include *Tariff History of the United States* (1888, 1892) and *The Silver Situation in the United States* (1892).

TAUTOG, a fish. See *WRASSE*, Vol. XXIV, p. 686.

TAWAS CITY, a village and the capital of Iosco County, in the northeastern part of the southern peninsula of Michigan, 65 miles N.N.E. of Bay City, on Saginaw Bay, at the mouth of the Tawas River, and on the Detroit and Mackinac railroad. It is in a region devoted to lumbering and agriculture and containing valuable salt-deposits; has one of the best harbors on Lake Huron, and is chiefly engaged in the manufacture and shipment of lumber and salt. Population 1890, 1,544; 1900, 1,228.

TAWING, a process. See *LEATHER*, Vol. XIV, pp. 389, 390.

TAXONOMY. See *BIOLOGY*, Vol. III, p. 683.

TAXONOMY, a plant. See *CLASSIFICATION*, in these Supplements.

TAX SALES, official and public sales of land made in pursuance of law for the non-payment of taxes which have been assessed upon them. The power of sale is invariably statutory, and has to be strictly construed. Tax sales in America are extremely common, and the construction of the statutes governing them forms an important part of the jurisprudence and practice of the various states. Necessarily varying in detail, and in their specific

provisions as to assessment, the manner of making sales, the effect of sales, and the right of redemption, certain general principles underlie tax statutes and regulate the proceedings under them. In order that a sale may be valid, the land must have been regularly assessed without an exception thereto, and the tax must have been unpaid at the date of sale. Payment, or a legal tender, of the amount due, by the owner or any person whose interests would be prejudicially affected by the sale, destroys the power of sale, and renders all proceedings thereafter void. A tax sale is necessarily an *ex parte* proceeding, and in conformity with general principles of law must be conducted in accordance with every statutory requirement. Next, due notice must have been given of the sale, of its time and place, with a description of the property to be sold; and all statutory provisions as to advertisement of the same, and as to the amount of land to be sold, must be complied with, and the sale be conducted by a person authorized so to do by law. In some states, it is optional with the officer conducting the sale to sell a sufficient portion to pay the tax; in others, it is necessary so to do; but in every case each separately assessed parcel of land must be sold by itself, generally for cash, and to the highest bidder, but for a sum not less than the total amount of taxes and costs.

After a sale, the officer conducting the same is generally required to issue a certificate of sale, which, at the expiration of the statutory period for redemption, as a rule, entitles the purchaser to a deed of conveyance of the land, executed by the proper state official. The officer conducting the sale is, as a general rule, required to make a return of all proceedings in connection therewith to the proper officials. The right of redemption varies in the separate states. Some states provide that notice to redeem must be given to a delinquent owner; others leave to the owner the duty of guarding his own interests. The clauses in relation to right of redemption are, as a rule, liberally construed. The entire subject of tax sales and titles thereunder depends, in each state, upon the statute or statutes regulating the same.

TAYGETUS. See Vol. XIV, p. 193.

TAYLOR, a town of Williamson Co., Texas, 35 miles N. E. of Austin; has railway shops and round-houses, a cotton-compress, cottonseed-oil mills, electric-light and street-railway plants. Pop. 1900, 4,211.

TAYLOR, ALFRED SWAINE, an English physician and toxicologist; born at Northfleet, Kent, Dec., 1806. He was professor of chemistry in Guy's Hospital, London, and its first professor of medical jurisprudence. He wrote *Photogenic Drawing* (1840); *A Manual of Medical Jurisprudence* (1843); *Poisons in Relation to Medical Jurisprudence and Medicine* (1848); *Poisoning by Strychnia* (1856); *Principles and Practice of Medical Jurisprudence* (1865); in conjunction with Dr. W. T. Brande, *Manual of Chemistry*; and edited the *Medical Gazette*. Died May 27, 1880.

TAYLOR, GEORGE, signer of the Declaration of Independence; born in Ireland in 1716, left home clandestinely, emigrated to America in 1736 as a redemptioner; bound out on his arrival to an iron-founder at Durham, Pa., for whom he worked as a clerk. On

the death of his employer he married the widow, and became owner of the iron-works; removed to Northampton, and established an iron-mill; elected to the Pennsylvania assembly in 1764; became county court judge in 1770; member of the provincial assemblies in Philadelphia in 1774-75; and in 1776 was elected to the Continental Congress that met July 20th, and served until March, 1777. He was not, therefore, present when the Declaration of Independence was adopted, but he signed the document. Died at Easton, Pa., Feb. 23, 1781.

TAYLOR, HENRY CLAY, American naval officer; born in the District of Columbia in 1843. On Sept. 28, 1860, he was appointed from Ohio to the Naval Academy, and he graduated in 1863. On May 28, 1863, he was made ensign, and during 1863-64 was attached to the steam-sloop *Shenandoah*, of the North Atlantic blockading squadron. He was made master on Nov. 10, 1865, and lieutenant on Nov. 10, 1866; and in 1867-68 was attached to the steam-sloop *Susquehanna*, the flagship of the North Atlantic squadron. In March, 1868, he was made lieutenant-commander. In 1868-69 he was attached to the store-ship *Guard*, of the European squadron; in 1869-71 he was on duty at the Naval Academy; in 1874-77 he was in command of the coast-survey steamer *Hassler*; and in 1879-80 was on duty at the Navy Yard, Washington, obtaining his promotion as commander in December, 1879. In 1880-84 he was in command of the training-ship *Saratoga*; in 1890-91 he commanded the *Alliance*, on the Asiatic station; and in 1893-95 was president of the Naval War College at Newport, R. I., obtaining his promotion as captain on April 16, 1894. In 1897 he was made commander of the first-class battleship *Indiana*, and during the war with Spain (April-August, 1898) he did excellent service at the bombardment of the forts of San Juan in Puerto Rico (May 12) and at the battle off Santiago de Cuba (July 3), when the Spanish squadron under Admiral Cervera was destroyed.

TAYLOR, ISAAC, an English ecclesiastic and scholar; born at Stanford Rivers, May 2, 1829; the eldest son of Isaac Taylor, author of the *Natural History of Enthusiasm*. Educated at Trinity College, Cambridge; he graduated as a wrangler in 1853. In 1854 he edited a translation of Becker's *Charicles*. He was ordained in 1857, and published in 1860 *The Liturgy and the Dissenters*. He afterward took charge of two London curacies, and in 1864 published his well-known *Words and Places*. He then took charge of one of the poorest parishes in Bethnal Green, and described his labors in *The Burden of the Poor*. In 1867 appeared *The Family Pen*, being memorials of the Taylors of Ongar. In 1869 he removed to Twickenham. During a visit to Italy in 1872 he investigated the language and ethnological affinities of the Etruscans, publishing *Etruscan Researches* (1874). In 1879 he was made LL. D. by the University of Edinburgh. In his important work, *The Alphabet: An Account of the Origin and Development of Letters* (2 vols., 1883), he endeavored to trace the origin of all known alphabets to one primitive script, developed by the Phœnicians from the hieratic Egyptian writing. In 1885 he was made canon of York. In 1887 he read a paper before the British Association at Manchester,

which in 1889 appeared in a volume as *The Origin of the Aryans*. In this he combated the usually accepted opinion as to this question, preferring a European instead of an Asiatic origin. His other works include *Greeks and Goths, a Study on the Runes* (1879); *Leaves from an Egyptian Note-Book* (1888); *Domesday Survivals; The Ploughland and the Plough; Wapentakes and Hundreds, in Domesday Studies* (1888); and *Names and Their Histories* (1896).

TAYLOR, JAMES HUDSON, an English missionary; born at Barnsley, Yorkshire, May 31, 1832. After studying medicine and surgery and practicing in Hull, he went out to China in 1853 as the first representative of the Chinese Evangelization Society, from which he disconnected himself in 1857, and for the next three years labored alone. He returned to England, remaining for five years, and founded the China Inland Mission in 1865, and went back to China the following year. The China Inland Mission has had a noteworthy career; its missionaries are derived from all denominations; they have no salary guaranteed to them; donations are never solicited, nor the names of donors of funds published; the missionaries, often supporting themselves, dress in native costume, and adopt the native customs as far as they can. Miss M. Geraldine Guinness published *The Story of the China Inland Mission* (1893).

TAYLOR, JAMES MONROE, a Baptist divine; born at Brooklyn, New York, Aug. 5, 1848, and educated at the University of Rochester; subsequently graduated at the Rochester Theological Seminary, and completed his studies in Europe. From 1873 to 1881 he was stationed at South Norwalk in charge of a Baptist church, and at Providence, Rhode Island, until June, 1886, when he became president of Vassar College. He published *The Place of Preaching in the Plan of God* (1880); *The Catechumenate* (1875); *The Future of the Woman's College* (1890); and *Psychology* (1892).

TAYLOR, NATHANIEL WILLIAM, an American theologian; born at New Milford, Connecticut, June 23, 1786; graduated at Yale in 1807; studied theology and was called to the First Congregational Church in New Haven, which he resigned on being appointed Dwight professor of didactic theology at Yale. He seems to have imbibed the views of Timothy Dwight, for whom he had acted as an amanuensis for two years after leaving college. In 1828, in the annual address to the clergy, in which he expressed his views on total depravity and other dogmas, he held the belief that the divine purpose, for wise and beneficent reasons, was for the regeneration of a part of the race, rather than an election of individuals as such. A heated controversy arose, which was carried into the columns of the *Christian Spectator*, etc., the chief opponent of the views expressed by Dr. Taylor being Dr. Bennett Tyler; hence the principles involved in the controversy were referred to as "Taylorism" and "Tylerism." The controversy led, in 1833, to the founding, by the opponents of Taylor, of the East Windsor Theological Seminary, afterward removed to Hartford. Dr. Taylor still continued to lead the

New Haven School of Theology and retained his professorship until his death, which occurred March 10, 1856. Among his writings published (posthumously) are *Practical Sermons; Lectures on the Moral Government of God; and Essays and Lectures upon Select Topics in Revealed Theology*.

TAYLOR, RICHARD, an American soldier; only son of President Zachary Taylor; graduated at Yale in 1845; was in the Mexican War with his father, and on the outbreak of the Civil War entered the Confederate army as a colonel of a Louisiana regiment; was present at the first battle of Bull Run, July 21, 1861; appointed brigadier-general, October, 1861; commanded a brigade in General Jackson's campaign in Virginia; distinguished himself at Middletown, Winchester, Cross Keys, Port Republic, as well as in the seven days' fight before Richmond. He was promoted to major-general, and in 1863 and 1864 commanded the department west of the Mississippi, routing General Banks at Sabine Cross Roads, April 8th. In September, 1864, was appointed to the command of the Department of East Louisiana. On May 8, 1865, he surrendered to General Canby. After the war he returned to his Louisiana plantation, and published *Destruction and Reconstruction* (1879). He died at New York City, April 12, 1879.

TAYLOR, WILLIAM, a bishop of the Methodist Episcopal Church; was born in Rockbridge County, Virginia, May 2, 1821, and became an itinerant in 1843. Since then his missionary labors in all parts of Europe, Egypt, Australia, Tasmania, New Zealand, Asia, Africa and India have been constant and productive of great good. On May 22, 1882, he was consecrated missionary bishop of Africa, and going to Central Africa located 36 mission stations, also providing 70 missionaries for their management and conduct. He was retired by the General Conference in 1896, but he continued independently to devote himself to missionary work. He is the author of *Seven Years of Street Preaching in San Francisco* (1856); *California Life Illustrated* (1858); *The Model Preacher* (1860); *Reconciliation; or, How to be Saved* (1867); *Infancy and Manhood of Christian Life and Christian Adventure in South Africa* (1867); *The Election of Grace* (1868); *Four Years' Campaign in India* (1875); *Our South American Cousins* (1878); *Letters to a Quaker on Baptism* (1882); *Four Years of Self-Supporting Missions in India* (1882); *Pauline Methods of Missionary Work* (1889).

TAYLOR, WILLIAM MACKERGO, a Scotch-American clergyman; born at Kilmarnock, Ayrshire, Oct. 23, 1829; graduated at the University of Glasgow in 1849; studied theology at the Divinity Hall of the United Presbyterian Church at Edinburgh; licensed to preach by the presbytery of Kilmarnock in 1852; ordained pastor of the United Presbyterian Church at Kilmaurs in 1853; and in 1855 was called to the United Presbyterian Church, on the Derby Road, Liverpool, where he had extraordinary success. He was a delegate to the General Assembly of the United States at Chicago in 1871, and was called, in November of the same year, to the Broadway Tabernacle (Congregational) Church, New York

City, and held the charge until 1892, when he resigned. He received the degree of D.D. from Yale and Amherst colleges in 1872, and LL.D. from Princeton in 1883. In 1876 and 1886 he delivered the Lyman Beecher lectures in Yale College, and in 1880 the L. P. Stone lectures at Princeton. He published *Life Truths* (1862); *The Miracles: Helps to Faith, not Hindrances* (1865); *The Lost Found and the Wanderer Welcomed* (1870); *Prayer and Business* (1873); *David, King of Israel* (1875); *Elijah the Prophet* (1876); *The Ministry of the World* (1876); *Songs in the Night* (1877); *Peter the Apostle* (1877); *Daniel the Beloved* (1878); *Moses the Law-giver* (1879); *The Gospel Miracles in Their Relation to Christ and Christianity* (1880); *The Limits of Life, and Other Sermons* (1880); *Jesus at the Well* (1884); *John Knox: A Biography* (1885); *Joseph the Prime Minister* (1886); *The Parables of Our Saviour Expounded and Illustrated* (1886); *The Scottish Pulpit* (1887); *Ruth the Gleaner, and Esther the Queen* (1891); *Good Character: What It Is and How to Form It* (1892); *The Boy Jesus, and Other Sermons* (1893). Died in New York, Feb. 8, 1895.

TAYLOR'S THEOREM. See INFINITESIMAL CALCULUS, Vol. XIII, pp. 18, 19.

TAYLORVILLE, a city and the capital of Christian County, southern central Illinois, 26 miles S.E. of Springfield and 78 miles S.W. of Decatur, on the south fork of the Sangamon River, and on the Baltimore and Ohio and the Wabash railroads. It is the center of a region producing grain, hay and live-stock and containing coal deposits, and has several churches, a high school, banks, a daily and several other periodicals, its industries including flour-mills, carriage and wagon shops, and agricultural-implement works. Population 1900, 4,248.

TAZEWELL, formerly Jeffersonville, a town and the capital of Tazewell County, southwestern Virginia, 48 miles N.E. of Abingdon, on the Clinch River, and on the Norfolk and Western railroad. It is in a region producing lumber, cattle and grain, and containing deposits of copper, lead, coal and iron. Population 1890, 604; 1900, 1,096.

TCHAD. See CHAD, in these Supplements.

TCHERNAIEFF, MICHAEL GREGOROVITCH, a Russian soldier; born Oct. 24, 1828; entered the military service in 1847; was engaged in the Crimean War, during which he distinguished himself, attaining the rank of general of infantry. He was appointed chief of staff of a division in Poland; in 1859 commanded an expedition to Lake Aral, to aid the Khirgiss tribes, then at war with the Khivans. After serving in several capacities he was placed in command of an expeditionary force of one thousand men, being instructed to march from Orenburg, through the southern Siberian passes and across the steppes of Turkestan, to effect a junction with a detachment which had set out from Semipalatinsk, in Siberia. The junction was effected at Tchemkend, occupied by Khokanians. Tchernaiëff took the town by assault, and afterward unsuccessfully attacked Tashkend (October, 1864). The following June, Tashkend fell into his hands. In the latter exploit he had exceeded his instructions, but on his return to St. Petersburg he was

welcomed and presented with a sword of honor by the Emperor. On finding he was not assigned to further active duty, he retired from the service after a while, and contemplated engaging in a legal career, but returned to the army at the solicitation of the Emperor, and was reinstated in his rank. He waited a year without receiving active employment and again retired from the army. He purchased the *Ruski Mir*, and boldly advocated Slav interest in its columns. He retired finally from the army in 1874. On the outbreak of the war in Herzegovina in 1875, he opened a subscription in its aid, and in 1876 took command of the Servian army against the Turks; but though he had at his command reinforcements of Russian volunteers, the Servians were defeated by the Turks in several severe engagements. In 1882 Tchernaiëff took command of the government of Tashkend, was recalled in 1884, and subsequently made a member of the Council of War in St. Petersburg. In 1886 he retired from the council on account of his opposition to the projected Central Asian railway. Died at Mogilef, Aug. 17, 1898.

TCHERNAVODA, a fortified town in Roumania, in the province of Kustenji, and 33 miles W.N.W. of the city of Kustenji, with which it is connected by rail, on the right bank of the Danube. In 1895 a bridge was completed across the Danube, which will afford a direct outlet for the Roumanian and European railway systems to the port of Constanza. The bridge is a splendid specimen of engineering skill, and consists practically of three viaducts and two bridges. The principal bridge spans the Danube at Tchernavoda, then comes a viaduct and embankment across the island of Balta, which is submerged at high water, followed by the second bridge across the river Borcea at Fetesti. The two other viaducts form the approaches, the country on either side being liable to inundation. The height of the Danube section is about 98½ feet, the length of the bridge over all about 11,900 feet, and the total cost about \$6,800,000.

TCHUKTCHIS OR CHUKCHEES, Siberian Indians. See MARITIME PROVINCE, Vol. XV, p. 548.

TEACHERS' INSTITUTES. See SCHOOLS, PUBLIC, in these Supplements.

TEACHING OF THE TWELVE APOSTLES. See APOSTLES, TEACHING OF THE TWELVE, in these Supplements.

TEA FAMILY, a small tropical family of dicotyledonous trees and shrubs, the *Ternstramiaceæ*, distinguished by the simple, evergreen, more or less leathery and feather-veined leaves. The two important genera are *Camellia*, whose species are well known ornamental plants, and *Thea*, whose leaves yield the tea of commerce. See also PARAGUAY TEA, Vol. XV, p. 627, note.

TEARS. See *Lachrymal Apparatus*, under ANATOMY, Vol. I, p. 891.

TEASEL, the common name of species of *Dipsacus*, a genus belonging to a small family closely related to the *Compositæ*. They are coarse, stout herbs, with stems and midribs of leaves, often prickly, and with prickly cylindrical heads of flowers. *D. fullo-nium* is the fuller's teasel, whose prickly heads are useful for carding woolen cloth; *D. sylvestris* is the

more common and more prickly teasel, which has run wild in many parts of the United States.

TÊCHE, BAYOU, one of several small tide-water navigable channels of southern Louisiana. It originates in St. Landry Parish, and after a southerly course of about 180 miles, 100 miles of which is navigable, it empties into the Atchafalaya, at the lower end of Chetmaches Lake, three miles N.W. of Morgan City. The land adjacent to the bayou, which is above overflow, is very fertile, producing large crops of sugar and cotton. Bayou Têche was probably the lower portion of the ancient channel of the Red River.

TECHNICAL SCHOOLS IN AMERICA. Near the close of the first quarter of this the nineteenth century was established the first technical school in America which was independent of government aid; now there are some three hundred and fifty such schools, including courses in colleges and universities. It was in 1824 that Stephen Van Rensselaer established a scientific school in Troy, New York, called the "Rensselaer School," which had no dead or foreign language in its three years' course of instruction, but whose studies were chiefly those of geology, zoölogy, chemistry, mineralogy, botany and mathematics, and without endowment, except that Mr. Van Rensselaer made himself responsible for the expenses; while now millions upon millions are invested in technical instruction. In 1826 there were 25 students registered in the first Rensselaer catalogue, while now there are estimated to be over twenty thousand students in the many scientific and technical courses. In 1826 the Rensselaer School graduated nine men with the degree of bachelor of science, B.S. (r.s.),—the letters *r.s.* implying that the degree was conferred by the Rensselaer School; in 1879 there were reported to be 2,340 graduates in science and engineering in this country, and the indication is that the number is considerably larger this year. The first degree in engineering, that of civil-engineering (C.E.), was conferred in 1835 by the Rensselaer Institute (as then called) upon four of its graduates; now there are about one thousand graduates yearly in this country in engineering—civil, mechanical, mining, electrical. Then there were no manual-labor training-schools; now there are many. Then there were few suitable technical text-books; now they are numerous.

This splendid growth of less than three quarters of a century is not the result of transplanting a foreign system, but rather that of the germination of a seed impregnated with original ideas planted in the fertile soil of American possibilities, and its after-growth shaped by local conditions and general environment. It has been without a central guiding hand, and free from governmental restrictions, except, in a very mild degree, in those schools receiving the benefit of the land grant. Some schools have a single course of study, while others have several parallel courses; some develop certain subjects much more largely than others. While there has resulted great variety in details, there has been unity in making the applied sciences the prominent subjects in the curriculum.

At the World's Congress of Engineering (1893)

there arose, quite spontaneously, a "Society for the Promotion of Engineering-Education," for the purpose of securing papers and discussions upon subjects pertaining to engineering-instruction.

Its members include nearly all the instructors in technical schools in the United States, a few in foreign lands, and some others interested in such education. It has published three volumes of its transactions, and has already had an apparent good effect upon existing schools. Facts have been collated, and classifications may follow. What these schools ought to be, or were destined to be, could not be predetermined; but now that they exist in large numbers, and in great variety, they may, by mutual comparisons, not only be of benefit to each other, but may possibly solve problems which otherwise would, for a longer time, remain as speculative theories. It may be likened to the physicist who, ignorant of the law he desires to discover, makes numerous experiments, plots the results, and then makes deductions. Some of the questions which have arisen are the amount and character of laboratory, shop and field work, the place and amount of culture-studies, the degree to be conferred and the nature of the technical studies. The Rensselaer School made its impress upon the methods of technical instruction, which has been lasting, especially in what we will call "the laboratory method." Under the old system the student was simply a spectator of the experiments made by the instructor; under the "new," the student himself makes experiments. In the early years of this system the student was required to lecture to his fellow-classmates, but as the classes grew in size, this was abandoned, but the execution of experiments was retained. This system, though not necessarily original with the institute, was such a marked departure from methods then existing in this country that it had all the effect of originality and invention. The laboratory was not confined to physics, nor to the walls of the lecture-room, but was extended to all subjects involving physical objects, and to all "outdoors." Thus in the study of geology and botany the student made observations upon hills, mountains and fields, took excursions and selected specimens; in chemistry he analyzed bodies; in astronomy secured his data from observations; in surveying used the instruments in the field; in the shop handled the tools; in electricity he runs the dynamo and measures electrical quantities; shops and factories are made objects of observation and study; and all these under the direction of an instructor. The Centennial Exposition (1876) and the Columbian Exposition (1893) were great object-lessons for the student.

In the "shop," two systems have grown up. In one, the students make machines, or parts of machines; in the other, they do "exercises." In the former, they work under and by the side of skilled mechanics, producing working and salable machines; in the latter, the file, anvil, planer, lathe and other tools are used in making pieces of prescribed form and finish, but of no commercial value when done. Both have their advantages and disadvantages, and the "survival of the fittest" will determine which is better as a mode of instruction in a

college course. At the present time by far the larger number adopt the "exercise" system. When shops were first attached to the schools, attempts were made to produce tools and machines at a profit, or, at least, to defray some of the shop expenses; but experience quickly proved it to be impracticable. Even if some students do work of commercial value, the great body of them, even if unpaid, are an expense to the "shop." The machines cost more than if made in a factory, and those who adhere to the system consider instruction in "shop-work" the most efficient way, even if the resultant expense is as great. The "shop" in a school is essentially a laboratory,—a place to learn "how." The Worcester Polytechnic School is typical of the "tool-producing" system, and Stevens Institute of Technology of the "exercise" system.

The spirit pervading the school and manufactory are distinct, if not antagonistic. The student pays for learning; the man gets pay for work. In the former, knowledge is acquired; in the latter, money. The former is "dead-work"; the latter, "pay-work." Like opening a mine or erecting a factory, a wise expenditure upon the "dead-work" will have an influence upon the profits of the "pay-work." The chief mission of the school is to teach "principles" and modes of investigation. Handicraft and expertness belong to the trade; empiricism to the "craft," not to the "profession." The school should not aim to do what the factory does; if the school does not give what the factory does not, it is a failure.

In the expenditure of funds there have been unavoidable errors, but they have not been gross or numerous. It seems to have been generally understood that brains were more valuable than architecture. The Rensselaer School was housed in a building inferior to many a rich man's stable. Brick and mortar do not make a college, but students and instructors must be comfortably sheltered; machinery and tools do not make an engineer, but they are desirable for instruction; models and apparatus do not make a philosopher, but are necessary for investigation. The greatest discoveries have been made with indifferent appliances. Chemistry was born and nursed in a kitchen with tobacco-pipes. Electricity first "sparked" from a philosopher's kite. A soap-bubble reveals mysteries in optics. Laboratories filled with appliances and fancy cabinets filled with models make a fine show, but are useless for instruction without the living teacher. There is no substitute for him. His inspiration is often the most valuable part of an education. Supply the brains, and the illustrations will take care of themselves. Still, illustrations, whether with models made with artistic skill or simply extemporized, are often of unspeakable value. The Aristotelian philosophers might cavil till doomsday at Galileo's lectures, but to witness the falling of the balls from the tower of Pisa was to be convinced. The effects flowing from this simple experiment are unmeasured. It marks the dividing-line between an old and venerated system and the "new," and is the basis of the "scientific method," which is, "try it, and see how it works." Visionary schemes—perpetual motion and the like—

cannot long survive this crucial test, and may be applied to economic questions in the body politic.

The early schools, such as the Rensselaer School, the Dartmouth Scientific School, the Yale Scientific School, and others, restricted themselves almost exclusively to scientific subjects for educational purposes, regardless of utilitarian ends, but later modern languages were introduced—and some of these remain to the present; but these schools formed such a natural basis for engineering-instruction that many were changed to engineering-schools, or engineering courses were added. It is not claimed that there was a demand upon the schools for engineers. The supply, limited as it was, was filled by graduates from the Military Academy at West Point. It was a process of creating a demand by educators and scholastic philanthropists who believed in the advantage of technically trained men, and the success of the graduates and the growth of the schools have confirmed the wisdom of these advanced thinkers. Of the professional schools, those of civil-engineering lead. From 1835 to 1860 the graduates in civil-engineering were less than 40 in one year, falling to 25 in 1864, then rising to nearly 400 in 1865. After 1860, schools for mining, the mechanic arts, agriculture, architecture and manual-labor training came rapidly into existence. Private benefactions amounting to millions of dollars were bestowed upon them, and the great Congressional land grant of 1862 for schools of agriculture and the mechanic arts gave to them an independence and impetus which has been, and will long continue to be, felt. The accompanying diagram, Fig. 1, originally prepared by the *Engineering News*, shows the number and relation of the graduates in the three professional courses, civil, mechanical and mining engineering, from 1864 to 1892. More recently, some institutions have conferred the degree of electrical engineering (E.E.), while others have incorporated the study of electricity into their other courses. It will be seen that the graduates in mining have not been large, fluctuating between 30 and 60 between the years 1870 and 1892; those in civil-engineering fluctuating considerably, rising from 25 in 1864 to 213 in 1873, then falling to 148 in 1880, since which there has been, on the whole, a gradual increase to 375. In mechanical-engineering, the numbers at first were not only small, but the increase was also small, and in 1880 there were only 45 graduates, but since that date the increase has been rapid, passing the total number in civil-engineering in 1891, and in 1892 showing 435 graduates. Statistics from a few of the larger schools indicate a considerable increase since 1892. An average smooth curve substituted for the broken one, for the "mechanical," approximates to a parabola, but that law cannot be expected to long continue. During the three years succeeding 1880 the increase was almost exactly 75 per year. The diagram is suggestive. The abnormal growth of railroads and the systematic construction of bridges* after 1864 (near the close of the Civil War) made a demand for civil engineers, and the schools already organized were more largely patronized and

* The first iron bridge in this country was erected in 1817. Now it is estimated that the aggregate length of iron bridges and iron viaducts exceeds fifteen hundred miles.

grew rapidly until 1875, after which business and schools shrunk in volume until 1882, after which the sphere of activity widened, numerous smaller fields opening, and the schools again grew in numbers, and apparently more permanent. The fluctuations in schools naturally lag behind those in business. Some saw a great opening for instruction in the principles of machinery and the mechanic arts. The country was full of machinery, much of which was of the highest grade; the apprentice system in the shops was weakening, and there were no schools devoted to the science. The subject was attractive, and when schools were opened, students flocked to their doors.

Much that was included in civil-engineering is mechanical. The locomotive, pumps, running-gear, surveying-instruments, the construction of bridges, the manufacture of the tools used by workmen, the manufacture of the rails,—are all mechanical. Similarly in regard to mining, nearly all the equipments are mechanical; so with electricity; work in agriculture is largely mechanical; buildings are erected by machinery; clothes, wagons, harness, nails, bolts, farmers' fences, etc., are all made by machinery. Wherever work is done, machines force their way,—in the house, the field, the mines, in transportation, and places too numerous to mention. It robs men of their occupations, but opens up new fields; it even robs them of trades, but offers new ones. The old trades are all affected by it, and about the only one that appears to be permanent is the designing and making of machines with which to make other machines. Mechanical operations require superintendents. It seems natural, therefore, that schools which instruct in the mechanic arts should in time outstrip, in numbers, those of the other "technics."

Some schools confer a professional degree (C.E., M.E., etc.), at the end of a four-year course, while others give a bachelor's degree and leave the profession to be earned by additional study, or by professional work. A con-

sensus of opinions of a large number of educators shows a general agreement in favor of the bachelor's degree. At best, any degree or certificate given at graduation is held to imply only that one has passed a prescribed course of study, and not until he has shown both knowledge and ability to do creative work is he an engineer. The environment of the engineering-schools and the courses of study have made it necessary to devote the first year or more to non-technical studies. It would probably be a great gain, both in culture and professional attainment, if professional studies were confined to two or three years, and all other studies pursued in other schools as preparatory to the professional.

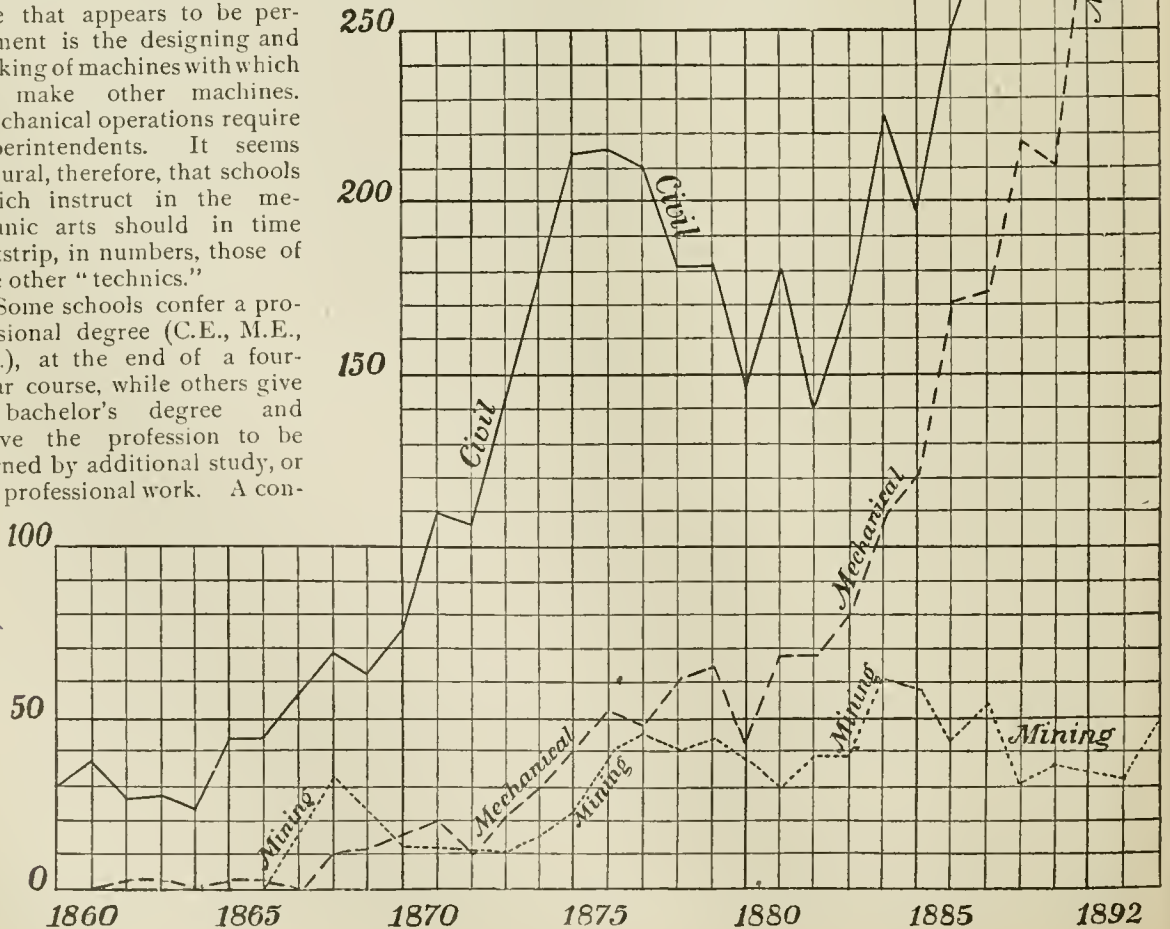


Fig. 1.

When technical schools began to attract attention, say in the sixties and before, there was much discussion among educators in regard to the educational qualities of the "new education." In this the advocates of the "new" were at a great disadvantage, for the old educators were in possession of the field; they had the chairs of learning, they had tradition and prestige, and eminent men were living witnesses of the "old." Moreover, at first the courses in the "new" were for three years, and too frequently the preparation was too meager, and when connected with the old colleges the course of instruction consisted largely of the non-classical studies of the old courses, and the classes sometimes were presided over by non-sympathetic instructors. But the new education had a firm hold upon the public, and the demand for it was so strong that it could not be ignored, and so it was patronized and tolerated by many who were unfriendly to it. Opposition and criticism only served to point out defects to be remedied; the courses were extended to four years, with independent classes and instructors; the requirements for admission raised,—the courses of study often severe; the students, generally hungry for knowledge, made great improvement, and in time graduates filled positions of trust and responsibility with credit and honor to themselves. Then agitation ceased. The victory had been won by the results achieved. The advocates of the "new" were no longer apologists for the system, but, as aggressors, claimed that the subjects and methods of the new education were better adapted to develop integrity of character and true manhood, since they require a constant inquiry after truth, and for the sake of truth only. The "new" has influenced the "old." Nearly all the abstract sciences have been introduced into the classical courses, so that they have become quite scientific. Indeed, language has a science, so that in the broadest sense they may be truly scientific. Even theology has modified its teachings. Instead of an extraordinary and unnecessary exhibition of almighty power in creating stratified rocks, fossils and petrification in an hour, there is substituted the economic operations of law acting through ages. Science has broadened the mind, reaching in one direction toward the infinitely great, in the other toward the infinitely small. The material benefits resulting from the applications of science, producing wealth, comforts, luxuries, conveniences, pleasures, is an attractive subject for the economist.

Fear has been expressed that these professional schools would graduate too many; that they would fill the country with pretentious engineers for whom there is no place. Such a condition cannot be determined beforehand, and can be settled only by trial. New fields open, the hap-hazard "rule-of-thumb" methods give way to the systematic methods of the engineer; the ignorant superintendent is displaced by an educated one, technical journalism and teaching absorb some, consulting-engineering others, while many seek a technical education as a preparation for business life or for other professions, and not a few will be mechanical workmen, more intelligent for the drill they have had. There is no danger of

educating too many sensible men. Education makes true men humble and serviceable, and if the indolent, the vain, the pretentious, are graduated, they will find a lower level in the world. Shake a sieve filled with sand and gravel and the small stuff falls through, the lumps remain, the larger on top. The world is a pitiless screen. The schools cast in their products and abide the result.

DE VOLSON WOOD.

TECK, an ancient principality of Swabia, named from the castle, the ruins of which are still to be seen, on the Teck, a peak of the Swabian Alb, 20 miles S.E. of Stuttgart. It was held by various families from the eleventh century, and passed in 1498 to the Dukes of Württemberg. In 1863 the King of Württemberg conferred the principality on the son of Duke Albert of Württemberg by his marriage with the Countess Claudine Rhédey and Countess of Hohenstein. This son, Francis Paul Charles Louis Alexander, was born Aug. 27, 1837, and married, June 12, 1866, Her Royal Highness the Princess MARY ADELAIDE (born Nov. 27, 1833; died at Richmond, Oct. 27, 1897), daughter of His Royal Highness Prince Adolphus Frederick, Duke of Cambridge, seventh son of King George III. Their eldest child, Princess Victoria Mary Augusta Louise Olga Pauline Claudine Agnes, born at Kensington Palace, London, May 26, 1867, was married, July 6, 1893, to Prince Adolphus Charles Alexander Albert Edward George Philip Louis Ladislaus, Duke of York, only surviving son of the Prince of Wales, heir apparent to the British throne. Of this union there have been born two sons and a daughter. The Duke of Teck served in the Austrian army, was in the Austrian-Italian campaign, and was mentioned in the dispatches. He was on the staff of Lord Wolseley in Egypt in 1882, and was then also mentioned in the dispatches, and received the Egyptian medal and the Khedive's star. He is a general in the British army and president of the Royal Botanic Society of London, etc.

TECUMSEH, a village of Lenawee County, in the southern part of the southern peninsula of Michigan, on the Raisin River, and on the Lake Shore and Michigan Southern and the Cincinnati, Jackson and Mackinaw railroads, 33 miles S.E. of Jackson. It is in a region which produces grain, fruit and celery, and raises blooded live-stock. The industries of the village include flour-mills, bent-wood and furniture factories, carriage factories, foundries, tile factories, paper and planing mills. Population 1890, 2,310; 1900, 2,400.

TECUMSEH, a city and the capital of Johnson County, southeastern Nebraska, 50 miles S.E. of Lincoln, on the north fork of the Nemaha, and on the Burlington and Missouri River Railroad in Nebraska. It is in an agricultural region, and has churches, high and lower grade school, water-works and electric-light plant, flour-mills and a cannery. Population 1890, 1,654; 1900, 2,005.

TECUMSEH, an Indian chief; born near the site of Springfield, Ohio, about 1768. As chief of the Shawnee Indians he went on the war-path, leading his Indians against the Kentucky militia

in 1791; fought at Mad River and in the attack on Fort Recovery in 1794. About 1805 he attempted, with the aid of his brother, Elskwatawa, "the Prophet," to organize the Western Indians against the whites. He visited the tribes on the Upper Lakes and down the Mississippi valley to the Gulf of Mexico, and while he was in the South his followers collected on the upper Wabash. At Tippecanoe, Nov. 7, 1811, General Harrison routed the Indians under Elskwatawa. In the war of 1812, Tecumseh gave his services to the British. He aided the British with his braves at the battles of Maguaga and Raisin river, in Michigan. He was made brigadier-general by the British, and was joint commander with General Proctor at the siege of Fort Meigs, April 26 to May 8, 1813, during which he protected the Kentucky militia, recklessly led by Colonel Dudley into an ambush, from annihilation. He was wounded at the battle of Lake Erie, and commanded the British right wing at the battle on the Thames, in Canada, Oct. 5, where he removed his adopted uniform, donned his Indian costume, and was killed.

TEETH. See DIGESTIVE ORGANS, Vol. VII, pp. 232-37; and DENTISTRY, Vol. VII, pp. 95-100.

TEGUCIGALPA, a city, the capital of the department of the same name and of Honduras, 60 miles from its port of Amapala, beautifully situated in a fertile plain or basin, in the most thickly populated part of the country, which contains valuable deposits of gold and silver. The most conspicuous building is the cathedral; has also a university and a ladies' seminary. The climate is mild and healthful. Pop. about 14,000. Tegucigalpa department has an area of 3,475 sq. miles; pop. in 1887, 60,170.

TEHRI. See ORCHHA, Vol. XVII, p. 816.

TEHUACANA, a village of Limestone Co., Texas, 85 miles S. of Dallas; is the seat of Trinity University (Cumberland Presbyterian), established in 1869, which, in 1898, had 17 instructors, 245 students, and a library of 3,000 volumes.

TEIGNMOUTH, JOHN SHORE, BARON (1751-1834). See BENGAL, Vol. III, p. 570.

TEIIDÆ, a family of lizards, all American, and mostly tropical. The largest is the tequexin of South America, which is 5 to 6 feet long. When attacked, this animal fights savagely, dealing powerful blows with its tail. Its flesh is esteemed by the natives. Several species of *Cnemidophorus* are found in the Western states.

TEINDS, a Scotch tithing. See TITHES, Vol. XXIII, p. 413.

TEJUCO. See DIAMANTINA, Vol. VII, p. 162.

TEKAMAH, a town, the capital of Burt Co., Neb., 5 miles W. of the Missouri and 42 miles N. N. W. of Omaha, in a grain, fruit, and vegetable growing and stock-raising district; has a flour-mill and a large canning factory. Pop. 1900, 1,597.

TELAUTOGRAPH, a form of copying-telegraph invented by Elisha Gray, that reproduces drawings or writings at a distance, through a complex mechanism controlled by electric currents on four wires. At the transmitting-instrument is an ordinary lead pencil, which is attached near the point to two fine silk cords, which shorten or lengthen according to the motion of the pencil,

regulating the current-impulses which control the pen at the receiver. The writing is done on a roll of paper drawn over drums, and arranged so that it can be shifted forward at intervals by means of a small lever at the left of the operator. The receiving-pen is a simple glass tube, sufficiently small to draw a writing-fluid by capillary attraction. It is held at the lower end by two aluminum arms, at right angles to the plane of the paper. One of these arms supplies ink to the pen, through a rubber tube. The receiving-pen, being controlled by the current-impulses from the transmitting-pencil, moves simultaneously with it, reproducing all its movements, whether in the formation of pictures, letters, signs, or anything that may be drawn. An ordinary telegraphic battery may be used to furnish the current. See also *Writing Telegraph*, under TELEGRAPH, Vol. XXIII, p. 121.

TELEDIAGRAPH, an apparatus invented by Ernest A. Hummell, of St. Paul, Minn., for transmitting pictures by telegraph. The picture is first drawn on tinfoil with a kind of ink which will not easily blur by rubbing. This foil is wrapped round a cylinder similar to the wax cylinder in a phonograph; and a needle or platinum point is made to trace over the surface of the tinfoil, moving down the revolving cylinder a certain distance at each revolution. When the needle comes in contact with the ink lines it is thereby removed from contact with the surface of the foil, and the circuit is broken. At the receiving end a similar apparatus is arranged to work synchronously, but instead of tinfoil a sheet of manifold copying or carbon paper is placed between two blank sheets of paper, and a needle corresponding to that of the transmitter reproduces the pulsations of the transmitter needle, and, pressing against one of the blank sheets in contact with the carbon paper, traces on it the impression of the picture.

TELEDU or **STINKARD** (*Mydaus meliceps*), a carnivorous mammal of the family *Mustelidæ*, found in high altitudes in Java and Sumatra. Its habits are like those of the badgers. The color is dark brown, with a white band along the whole dorsal side. Like the skunks, it secretes a highly offensive odoriferous fluid. It is eaten by the islanders. See MAMMALIA, Vol. XV, p. 440.

TELEGONY. See HEREDITY, *ante*, p. 1571.

TELEGRAPHIC DEVICES. Several systems of synchronous multiplex telegraphy have been developed within a few years. The first, that of Patrick B. Delaney, was introduced in 1884, and is now in use by the British Postal-Telegraph Department. Lieut. F. J. Patten of the United States has also invented a mechanism, in which the synchronism may be automatically corrected 4, 8, or 12 times during each rotation of the armatures. The S. D. Field sextuplex telegraph employs three qualities of current, each of which can be duplexed by the compensating method. The currents are: a direct current of increasing and decreasing strength, operating a neutral relay; a reversed current, operating a polarized relay; a rapid vibratory current that sets a telephonic diaphragm in vibration. Duplexing was not practicable for offices having a single Morse

circuit until the phonoplex system of Edison was introduced. This system more than doubles the service obtainable from a single wire, and does not involve expensive changes in apparatus. The ordinary Morse waves are used for one instrument, and additional induced currents are connected with the phonoplex apparatus.

In the field of ocean-telegraphy, there are two valuable improvements on the Thomson siphon recorder. One was devised by Eugene Baron of Germany, who utilizes the deflecting-coil of the siphon recorder to change the position of a screen, that moves before two slits so as to admit light to and shut it off from two selenium cells. The armature is deflected in one direction or the other, according to the admission of light to the respective cells. These movements are recorded by the armature, either directly or by the closing of an auxiliary local circuit. The Cuttriss improvement has to do with the siphon vibrator, and substitutes an electromagnet for static electricity for vibrating the siphon. The result is

the same way on the roofs. A telegraphic office being set up in a car, and connected with the roof, is then in communication with offices along the line. The Lucius J. Phelps system employs a wire laid in a trough between the rails. Above this, suspended from the under side of the car, is a pipe containing a conductor connected with the apparatus on the train.

C. H. COCHRANE.

TELEGRAPH SYSTEM IN THE UNITED STATES. The telegraph service of the United States is almost entirely in the hands of the Western Union Telegraph Company, which, by buying up competing companies, had in 1894 acquired 190,303 miles of lines, and had no competitor worthy the name except the Postal Telegraph and Cable Company, which was operating about 30,000 miles additional. The following table gives a statement of the business of the Western Union Company for each tenth year from 1866 to the end of June, 1896:

The greatly increased mileage is principally due

YEAR.	MILES OF POLES AND CABLES.	MILES OF WIRE.	OFFICES.	MESSAGES.	RECEIPTS.	EXPENSES.	PROFITS.	AVERAGE TOLLS PER MESSAGE.	AVERAGE COST OF MESSAGE TO COMPANY.
1866	37,380	75,686	2,250	.....	.....	.....	.....	.....	.....
1876	73,532	183,832	7,072	18,729,567	\$10,034,983 66	\$ 6 635,473 69	\$3,399,509 97	50.9	33 5
1886	151,832	489,607	15,142	43,289,807	16,298 638 55	12,378,783 42	3,919,855 13	31.3	23.4
1896	189,918	826,929	21,725	58,760,444	22,612 736 28	16,714,756 10	5,879,980 18	30.9	24
1897	190,614	841,002	21,769	58,151,684	22 638,859 00	16,906,656 00	5,732,203 00	30.5	24.3

satisfactory, working in all weathers, whereas static electricity is not to be depended upon in damp weather.

Patrick B. Delany has devised an improved arrangement for telegraphing long distances by means of Morse characters. In 1888 he sent a message over a line nearly nine hundred miles in length, in Morse characters, at a speed of twenty words a minute. He expects to introduce his system upon ocean lines, and also between New York and Chicago.

The Michela and Cassagnes system of stenographic telegraphy employs a keyboard at one end of the line, and a printing-apparatus consisting of a series of type-levers at the other end. The characters, being those of the stenographic sound alphabet, may be used to print messages in any language.

The Essick printing-telegraph is a long-distance typewriter that prints in lines, as in the columns of a newspaper, on a roll four and a half inches wide. Fourteen impulses are made to represent the entire alphabet, and a speed of fifty words a minute is claimed. The apparatus prints both at the sender and receiver, so that the operator is able to note any errors in transmission.

Two systems of train-telegraphy, depending upon induction, are in use. It should be understood that when telegraphic conductors are arranged in a parallel manner a transfer of electricity takes place by induction. In the Edison-Smith system the metal roofs of the cars are so charged that they act inductively on the telegraph wires along the line, and the wires act in

to the fact that in 1881 the Western Union Telegraph Company absorbed, by purchase, all the lines of the American Union and the Atlantic and Pacific Telegraph Company, the former having previously in operation over 12,000 miles of line, and the latter 8,706 miles. The Mutual Union Telegraph Company, the Baltimore and Ohio Railroad Telegraph, and the American Rapid Telegraph Company, all representing a capital of \$11,500,000, have also since been absorbed by the Western Union. The capital stock of the Western Union was (1896) \$95,350,000.

The Western Union has exclusive contracts with several international cable companies, operating eight Atlantic cables, and guarantees five per cent annual dividends on the stock of the American Cable Company; amount, \$14,000,000.

The Postal Telegraph and Cable Company of New York, organized June 21, 1881, has about 12,000 miles of line and 30,000 miles of wire in operation from New York to Chicago, etc., and owns what are claimed to be very valuable patents in improved wires and telegraphy. Authorized capital stock, \$21,000,000, of which about \$7,000,000 has been issued. The Bankers' and Merchants' Telegraph Company of New York was purchased by the Postal Telegraph and Cable Company, which is now operated by the United Lines of Telegraph.

Besides the above, there are many new lines of telegraph, which have complied with the United States Telegraph Act of 1866, and are operating wires with or without connection with railway companies. The aggregate mileage of telegraph

lines in the United States open for public business exceeds 220,000 miles, besides railway, government, private, and telephonic lines, length not ascertainable. Comparing the American with the British telegraph system, which is under the control of the government, the British sends about twice as many messages per head of population as the American. It is only recently that the American or Morse sound-reading system has been introduced into Britain. For the three years, 1896-98, the telegraph business in Britain resulted in an annual deficit of about \$800,000 for each year.

The rapid growth of the telegraph service of the world is shown by the following figures:

Number of messages, 1870: Russia, 2,716,300; Norway, 466,700; Sweden, 590,300; Denmark, 513,623; Germany, 8,207,800; Holland, 1,837,800; Belgium, 1,998,800; France, 5,663,800; Switzerland, 1,629,235; Spain, 1,050,000; Italy, 2,189,000; Austria, 3,388,249; Hungary, 1,489,000; United States, 9,157,646; Great Britain and Ireland, 9,650,000.

Number of messages, 1890: Russia, 9,949,405; Norway, 1,453,932; Sweden, 1,755,000; Denmark, 1,502,965; Germany, 25,847,836; Holland, 4,285,516; Belgium, 5,312,205; France, 28,094,000; Switzerland, 3,695,988; Spain, 4,084,704; Italy, 8,175,870; Austria, 9,081,631; Hungary, 4,464,277; United States, 60,000,000; Great Britain and Ireland, 66,409,000.

The total number of messages transmitted in the world in a year is about 300,000,000. See also TELEGRAPH, Vol. XXIII, pp. 112-126.

TELEGRAPHY, SUBMARINE. See TELEGRAPH, Vol. XXIII, pp. 114-116, 117-119, 124-126.

TELEGRAPHY, WIRELESS, is the transmission of electric signals through space without the use of wires between the transmitting and receiving instruments. For this purpose two chief methods have been adopted: 1. By means of ordinary electric waves; and 2. By means of the so-called Hertzian waves.

1. SPACE TELEGRAPHY BY MEANS OF ORDINARY ELECTRIC WAVES. Two methods have been adopted for accomplishing this: (a) By conduction; (b) by induction.

(a) *By conduction.* The first person to conceive the idea of space telegraphy seems to have been an Italian named Famiano Strada (born 1572, died 1649), who in 1617 published a work entitled *Proclusiones Academicas*, in which was described a magnetic device for communicating with persons at a distance. The device, however, does not seem to have been of any practical utility. In 1746 Johann Heinrich Winckler, at Leipsic, succeeded in transmitting electric signals a short distance without wire connection; and in 1747 Dr. Watson, Bishop of Llandaff, showed that electric currents might be transmitted across the Thames, through the water, so that shocks could be felt at the other side. In 1748 Franklin made similar experiments across the Schuylkill river at Philadelphia; and in 1749 De Luc sent electricity across Lake Geneva. On Dec. 16, 1842, Samuel F. B. Morse sent a message without wires 80 feet across the Potomac at Wash-

ington; and in 1842-43 he suggested similar experiments, which were carried out on the Susquehanna river by his friend Leonard D. Gale. In 1849 Wilkins, a telegraph engineer, suggested the possibility of establishing communication between England and France, by conduction through the water of the English Channel. In 1854 James Bowman Lindsay, a learned weaver, of Dundee, Scotland, patented a device for telegraphing through water, without wires, by means of which he telegraphed through water 500 yards wide, at Portsmouth, England; and in 1859 he telegraphed across the Tay at Glencarse, where it is half a mile wide. Twenty years previously he had succeeded in lighting his room by electricity. In the Dundee *Advertiser* of April 11, 1834, he predicted that "houses and towns will, in a short time, be lighted by electricity instead of gas, and heated by it instead of coals; and machinery will be wrought by it instead of steam, all at a trifling expense." In 1882 messages were sent, in a fashion similar to that of Lindsay's, across The Solent, in England; and in July, 1895, communication was had with the Fastnet light, $4\frac{1}{2}$ miles W. S. W. of Cape Clear, in Ireland, by a conduction method devised by Mr. Willoughby Smith. During the past ten years correspondence has been carried on across some of the great rivers in India by means of a plan devised by Mr. Melhuish, similar to that adopted by Lindsay.

(b) *By induction.* Space telegraphy by induction, however, has been attended by greater success than that by conduction. The first experiments in this direction appear to have been made in 1838 by Joseph Henry, who sent signals from a coil of wire in one room to a coil in another room at a distance of 18 feet. In 1842-43 Samuel F. B. Morse suggested experiments which were carried out with parallel wires along the Susquehanna river, by his friend Leonard D. Gale, his partner and assistant Alfred Vail, and his adviser Henry J. Rogers. In 1855 Joseph Henry, using nearly the same apparatus as that employed by him in 1838, transmitted signals much further than 18 feet; and in 1877 Elisha Gray, with a similar apparatus, sent signals across the Western Electric Company's works at Chicago. In 1879 David Edward Hughes, who in the preceding year had invented the microphone, found that the microphone produced a sound in the receiver even when placed 60 feet distant from the coils and after passing through several rooms, and that such signals could be obtained in the open air up to a distance of 500 yards. Later the induction method was employed in signalling to trains in motion. The first patent for such a method was obtained by Mr. Willoughby Smith in 1881, his plan being to connect the insulated metallic roof of a railroad car with a wire leading to one terminal of a telephone receiver, the other terminal being connected with the ground through the wheels of the car and the rails. A telegraph wire is strung along the track, which, when telephoned over, affects the metal roof of the car inductively, and in this way affords a means of telegraphing. In 1885-87 Mr.

W. H. Preece, head of the British Postal Telegraph Department, showed by experiments with alternating currents at Newcastle-on-Tyne that one wire is affected inductively by disturbances in a parallel wire a quarter of a mile distant; and later he sent messages over the Bristol Channel between Penarth, in Wales, and Flat Holm island, a distance of five miles. His system is now in regular use by the British War Department for signalling between the fort on Flat Holm and Lavernock Point, in Wales, a distance of over three miles. The wire at Lavernock is 1300 yards long; that on Flat Holm is about 440 yards. In 1886 some successful experiments were made in this country by Messrs. Edison, Galliland, and Phelps, to communicate with a train in motion by means of a wire strung on poles along the line; and the system was adopted by the Lehigh Valley Railroad, but was afterward abandoned because it was not needed.

2. SPACE TELEGRAPHY BY MEANS OF HERTZIAN WAVES. The methods of wireless telegraphy above described are based on the utilization of the ordinary electric waves of low frequency. Another method has been devised by Signor Guglielmo Marconi, an Anglo-Italian, born in Marzabotto, near Bologna, in 1875, the son of an Italian father and an English mother. This method is based on the utilization of the so-called Hertzian electric waves of high frequency. The existence of these waves had been deduced mathematically or theoretically in 1864 by James Clerk Maxwell, and in 1890 it was experimentally demonstrated by HEINRICH HERTZ (see Sup. 1574-75). They are generated by an apparatus consisting of a battery, an induction coil, and a pair of brass knobs. When the current is made, sparks pass between the knobs and generate the Hertzian waves, which travel outward in all directions with the velocity of light. So far as known the only substances opaque to these waves are metals. For signalling to long distances four knobs are used, the two inner ones being half immersed in vaseline oil; this gives greater energy to the spark and to the waves, and the oil reduces the rapidity of the wave vibrations. The power of the transmitter is further increased by connecting one of the brass knobs with an insulated vertical wire, or conductor, which may be of any practicable desired length. In 1897 Dr. Slaby, of the Technical High School at Charlottenberg, near Berlin, announced as the result of experiments that the signalling distance varied proportionately to the height of the vertical wire; and he computed that a length of 260 feet would be needed to signal across the Strait of Dover, and that to signal across the Atlantic would need a wire a mile and one-fifth high. The Hertzian waves thus produced are about four feet long, and as they travel with the speed of light, or about 186,000 miles a second, about 245,520,000 of them impinge on any object in their path during each second of time. These waves can be intercepted at any desired spot by a receiving apparatus, or detector, the chief components of which are a battery and an exhausted glass tube from one and a-half to three inches long, and from a tenth to a

quarter of an inch in diameter, into which are closely fitted two silver plugs, or pole pieces, to which wires fused into the glass are soldered. The faces of the plugs are from $\frac{1}{50}$ to $\frac{1}{16}$ of an inch apart, and between them is a layer of metallic dust composed of about 96 per cent of hard nickel filings and 4 per cent of silver, with a trace of mercury. The sensitiveness is increased by increasing the proportion of silver. Under ordinary circumstances this dust will not conduct electricity, but when it is acted on by the Hertzian waves it coheres, or becomes polarized or arranged in order, and then conducts the current, and thus completes an electric circuit from the battery. In order to break this circuit, a small hammer, or decoherer, is so arranged that, as soon as a current passes through the glass tube, it taps the tube and loosens, or depolarizes, the powder. In this way, by the alternate closing and breaking of the circuit, the desired signalling is produced, the ordinary dot-and-dash system of the Morse code being used. When the induction coil of the transmitter is powerful enough to give a six-inch spark, the receiver will respond to the waves at a distance of four miles; for greater distances a more powerful coil is needed. The coherer was invented in 1890 by Professor Calzecchi Onesti of Fermo, and modified in the same year by M. Édouard Branly, who called it a "radio-conductor," and further modified in 1893 by Dr. Oliver Lodge, who gave it the name "coherer." The sensitiveness of the coherer is increased by attaching to one end of it a vertical insulated wire, or conductor, similar to that connected with the transmitter, the object being to collect from the transmitter Hertzian waves which would otherwise run to waste. The receiver is made still more sensitive by attaching copper "wings" to the coherer, and by other devices, for the purpose of bringing it in tune with the transmitter, so that the two instruments resemble a pair of tuning-forks in unison. By this device secrecy as well as increased range is secured. This apparatus of Marconi's has been modified in important respects by Mr. W. J. Clarke, an American engineer. Other methods of wireless telegraphy have been devised by Herr Wehnelt and by Professor Zickler, an Austrian physicist, who uses the invisible ultra-violet rays from a source of light.

One of Signor Marconi's first achievements was sending messages across the Bristol Channel, from Penarth, in Wales, to Weston-super-Mare, in Somersetshire, a distance of nine miles. This was in 1896. Another was in Italy, where, in July, 1897, he sent messages from the fortress of San Bartolomeo, at Spezia, to the warship *San Martino*, 12 miles out at sea. Later, during stormy weather, he signalled from Alum Bay, Isle of Wight, to a moving steamer off Swanage, on the mainland, over 17 miles distant. After this, regular communication, at the rate of 1,000 words a day, was kept up between Alum Bay and Bournemouth, 14 miles distant, and Poole, 18 miles away. In May, 1898, signals were sent between Ballycastle and Rathlin island, off the north of Ireland, a distance of over seven miles; and on July 20, 1898, the

regatta at Kingstown, near Dublin, was reported for a newspaper from a steam-tug, carrying Signor Marconi, which followed the yachts out to Kishlight, the tug being at times ten miles distant from the receiving station at Kingstown. A vertical wire 75 feet high was attached to the mast of the tug. In August, 1898, over 100 messages were sent from the Prince of Wales's yacht *Osborne*, in Cowes Bay, to Queen Victoria at Osborne House, on the Isle of Wight, the yacht at times being seven miles distant. At the electrical exhibition in New York, in 1898, Mr. W. J. Clarke demonstrated experimentally that submarine military mines, disconnected with the land, could be exploded by a transmitter on shore, through the action of the Hertzian waves on a coherer attached to a battery connected with the mine. During the winter of 1898-99 messages were sent regularly between the lighthouse at South Foreland, Kent, England, and the East Goodwin lightship, 12 miles at sea, the service working excellently, even during the severest winter storms. On March 27, 1899, messages were sent across the English Channel from Wimereux, near Boulogne, in France, to South Foreland, in England, a distance of 32 miles, the Morse code being used. In October, 1899, under the direction of Signor Marconi, the yacht races at New York for the America's cup, between the *Columbia* and the *Shamrock*, were reported for a New York newspaper, from the steamers *Ponce* and *La Grande Duchesse*, the latter vessel carrying a vertical wire 120 feet high, and a similar wire being suspended from a mast at the Navesink Highlands, N. J., and also from the foremast of a cable steamer anchored near the Sandy Hook lightship, where the races were started and finished, both the Highlands and the cable ship having temporary cable connection with New York. The highest speed so far attained by the Marconi system has been from 12 to 15 words a minute.

TEL-EL-AMARNA. See AMARNA, in these Supplements.

TEL-EL-KEBIR (the "Great Mound"), situated on the border of the Egyptian desert, 30 miles from Ismailia, was strongly fortified by Arabi Pasha to check the advance of the British under Sir Garnet Wolseley. After a midnight march the British general here surprised and within two hours utterly routed the Egyptians (Sept. 13, 1882), and so finished the campaign.

TELEMACHUS, an Homeric hero, the son of Ulysses (Odysseus) and Penelope. When he was still an infant, his father set out for the siege of Troy, and was absent twenty years. During this period the home of Telemachus was pestered with suitors for his mother's hand and other undesirable guests, whom Telemachus vainly endeavored to get rid of. Athene (Minerva) assumed the form of Mentor, king of the Taphians, his father's dearest friend, and at her suggestion he set out in search of his long-gone sire. He first went to Pylos, and was hospitably received by Nestor, the king, who sent his own son to guide Telemachus to Sparta. King Menelaus received the wanderer

kindly, in the midst of the celebration of the marriage of his daughter Hermione with Neoptolemus and of his son Megapenthes with a daughter of Alector. Menelaus communicated to Telemachus the prophecy of Proteus concerning his absent father. Telemachus then returned home, where his father had arrived, changed by disguise into the form of a beggar, residing with Eumæus, the swineherd. The father discovered himself to his son, and a plan of extirpating the suitors of Penelope was matured. Penelope was with great difficulty made to promise that she would marry him who should overcome the others with the bow of Ulysses. None of the suitors being able to draw the bow, its owner, taking it, then slew, one after another, the importunate candidates for the hand of his wife. The husband then made himself known to her. The adventures of Ulysses after the siege of Troy form the theme of Homer's *Odyssey*. Some accounts make Telemachus the father of Perseptolis, either by Polycaste, the daughter of Nestor, or by Nausicaa, the daughter of Alcinous. Other accounts are that he was induced to marry Circe, and by her became the father of Latinus; and still other accounts have it that he married Cassiphone, the daughter of Circe, and in a quarrel slew his mother-in-law, for which deed he was in turn slain by Cassiphone. He is also represented as the founder of Clusium, in Etruria. He is made the hero, too, of Fénelon's *Télémaque*. See ODYSSEUS, Vol. XVII, p. 729.

TELEOLOGY. See ZOÖLOGY, Vol. XXIV, pp. 802, 817.

TELEOSTEI. See ICHTHYOLOGY, Vol. XII, p. 640.

TELEPATHY, feeling or sympathy at a distance, a word introduced by the "Society for Psychical Research" to designate the supposed communication between two minds at a distance without the aid of any known medium, as sight or sound, or under any known physical law. The terms *thought-transference* and *mind-reading* have also been applied. For quite a number of years previous to the death, in 1891, of Madame Helena Blavatsky (q. v., in these Supplements), the influence which she exerted upon the thought of the world was so large, through the publication of her book *Isis Unveiled* (New York, 1877), and her periodical *The Theosophist*, together with the growth in numbers of theosophical societies grounded upon her teachings, that the attention of scholarly and unprejudiced men became directed toward her so-called *occultism*, with the end in view of investigating and sifting all testimony pertaining to psychological mysteries, so as to determine their real value or truth. The result was the formation of the "Psychical Research Society" in England which made its first report in 1882, and which, together with the branch American (or Massachusetts) society—founded shortly afterward for the same purpose—declared (1885-86) that the wonderful manifestations which Madame Blavatsky professed to perform, such as communications between the living and the dead, and telepathic messages and declarations transmitted to her from Tibetan

mahatmas, bore the stamp of forgery and trickery. The deliberations of the societies have, in the main, been conducted in a remarkable spirit of fairness and lack of bias; inasmuch as their membership was largely composed of men whose first and highest wish was to learn the truth. Their efforts and interest were directed, not toward the field of *a priori* speculation, but to the wide-open arena of *evidence* and *testimony*, in the course of which, during the nine or ten years down to 1892, upward of eight hundred cases, embracing the strongest and most abundantly vouched existences of psychological mystery, were investigated. The result has been "a most interesting study of human fallibility." Besides the instances of palpable fraud, there were many which were stoutly believed in by sincere and earnest people, and concerning these one of the investigators writes: "What visions, illusions, delusions, hallucinations, have been traced directly to the cerebral organs, and shown to be products of nerve-cells! They may be products of disease, or results of temperament. Perhaps abnormal, perhaps normal. At all events, they are inside the constitution. The cerebral organization plays strange tricks." Of these seven or eight hundred cases, there were many which were declared genuine by a multiplicity of witnesses. There were forewarnings of impending disaster, and notifications of the deaths of friends, transmitted instantaneously and at the moment of dissolution, from the remotest ends of the earth; letters between correspondents, identical in character and written simultaneously, which *crossed each other* in transmission. But, when analyzed and submitted to searching examination, there was *not one* case concerning which the investigators could do otherwise than write down the verdict "not proven."

It has been no part of the efforts of the societies to obtain testimony for the disproof of alleged phenomena. Their concern has only been to enable witnesses to prove their own cases, if they were able; and while many of them are not proven, they yet freely admit them to have been not disproven. When facts are inconclusive, they say they are not proven; and the later reports of the societies are to the effect that among the great number of cases they have investigated, there should have been some which were susceptible of conclusive proof. An English investigator, A. Taylor Innes, submitted, in the *Nineteenth Century*, in 1891, a logical test, wherein psychical phenomena are compared with other phenomena. He says: "A startling experience is one which is likely to be recorded at the time. The very meaning of its being startling is, that it strikes the mind as noteworthy; most of all, if it is of such a nature as to point forward to a startling fulfillment. In such a case the chances are strongly in favor of some document existing; and we find, in point of fact, that of all other startling events in our time, whether public, domestic or private, records do exist, generally in the form of letters. What is the inference if the class of

telepathic or wraith stories is uniformly distinguished from others equally startling, either by this class alone having no record at the time, or by its being invariably found impossible to produce the document, even when it is part of the story that it was actually written?"

This is "a mere application of the rules of ordinary common sense to the ordinary facts of testimony."

These investigations, and the conclusions arrived at concerning them, relate to cases where the alleged transmissions of impressions are from a distance.

They are not to be regarded as necessarily final, nor do the societies assume them to be so. There still remain abundant opportunities for individual beliefs and convictions, even should there continue to be a lack of evidence of a scientific or positive character. Another class of phenomena which has been investigated by the society pertains to the field which has ordinarily been designated as *mind-reading*.

In conducting these experiments (wherein the percipient and the agent either occupy the same room, or adjoining rooms at no great distance apart, but where there is no direct contact or other direct communication between the parties) the results have seemingly established the fact that in a large percentage of cases telepathic communications may take and have taken place. Not only have the drawings of simple figures been reproduced, but transmissions of mental impressions and interchange of thoughts by telepathic process have apparently been of such frequent and established occurrence as, after the elimination of all percentages which might have been due to guessing, to prove that there still remains a large residuum of probability, if not of conclusiveness, that such phenomena are not always delusions, but real facts, although doubtless within the pale of natural laws which, as yet, are not explainable. But the last word has, unquestionably, not yet been uttered. See also THEOSOPHY, in these Supplements.

TELEPHONES, LONG-DISTANCE. The special interest in the telephone long centered in its availability and use over long distances. In April, 1891, a telephone line was opened for public use between Paris and London, a distance of 297 miles. There had been telephoning over much greater distances in the United States since 1883, when conversation was carried on between New York and Cleveland, a distance of 650 miles, and at the time of the great blizzard of 1888 the only direct means of communication between Boston and New York for several days was over a long-distance telephone wire which withstood the storm that prostrated all the other lines.

On Oct. 18, 1892, a new line between New York and Chicago was opened, and it was practically demonstrated that conversation could be carried on between these two points, nearly one thousand miles apart, with as much ease as over local lines. Communications sent over the line from each end were distinctly heard at the other, and

answers were received to questions whispered into the transmitter.

This new line was about twice the length of any other in use. It extended from New York City, through Easton, Harrisburg, Pittsburg and Newcastle, Pennsylvania; Youngstown, Cuyahoga Falls and Maumee, Ohio; and thence through South Bend, Indiana, to Chicago, with branch lines to Cleveland, Akron and Toledo. The line was practically an extension of the Long Distance Telephone Company's system, which operates between the principal cities on the Atlantic seaboard from Portland, Maine, to Washington, District of Columbia.

In 1895, as a result of this wonderful achievement, it was possible to converse over a circuit 950 miles in length. The New York-Chicago line is constructed in a most substantial manner. The wire used is hard-drawn copper, No. 8 B.W.G., weighing 435 pounds to the mile, and the entire circuit contains about 826,500 pounds of copper. Heretofore No. 12 N.B.S. wire had been employed in the construction of the company's circuits, but were this wire used on this line the weight of the total amount would be reduced to 200,000 pounds.

The use of cables, which are exceedingly detrimental to long-distance telephone transmission, has been almost entirely avoided in this line, for in the entire circuit of 950 miles there are but five eighths of a mile of cables, approximately, 1,600 feet in New York and the same number of feet in Chicago. Prior to the construction of this line, it was impossible to converse over a distance of more than 500 miles, which was the length of the longest known line in this country.

In April, 1893, a supreme test was made of the efficiency of this service. The wire being connected to the Boston line, which increased its length to 1,259 miles, some sixty listeners at Chicago, mostly journalists and literati, were enabled to appreciate thoroughly a programme of song and recitation given in the former city by Mrs. May Albert Barker.

These results are due mainly to the metallic circuit and the long-distance transmitter, the receiver remaining practically the same as it was at first.

In 1894 and 1895, the long-distance circuits between New York and Boston, New York and Philadelphia, New York and Chicago, and Chicago and Philadelphia were in almost constant use, business houses preferring that means of communication to the telegraph. In 1896 more than one hundred thousand miles of wire were in regular and constant service for long-distance telephone work exclusively, and the distance over which conversations could be successfully maintained extended to 1,600 miles, that being the length of the circuit between Boston, Massachusetts, and Memphis, Tennessee.

TELEPHONIC APPARATUS. The telephone has been introduced in all the civilized countries of the globe, but reports from Europe go to show that the instruments have reached a

higher state of perfection in the United States than elsewhere. The instruments used in some European cities are quite crude. For instance, in Vienna, what is called the Deckert transmitter is used. It has two boxes, side by side. A central button has to be pressed by the finger before the bell can be rung, so that both hands have to be used a good part of the time, preventing the person using the instrument from any writing in the way of notes, etc., which is further prohibited by the absence of any desk or shelf. The later forms of instrument in this country produce very clear sounds, though the public still suffers in many instances from the poor policy of companies which retain old-style instruments until they are worn out. The leading patents have expired, and several new telephones are being placed on the market, which should tend to improve the service generally. The most marked change within the past few years in telephonic apparatus is brought about by the local ordinances requiring wires to be placed underground. For this purpose conduits are coming largely into use. They are made of iron pipe, which is best with a cement lining, of cement pipes and of creosoted wood. A number of telephone wires are laid in a conduit until a point is reached central to several subscribers. Here a pole is erected, up which the cable is led from the conduit to a cable-box, which is necessary to protect the connections from the weather. A lightning-arrester of some form is always placed at the box, to prevent any possibility of such an electric discharge being conducted into the conduit. The cable-head is hermetically sealed to keep out moisture, and the distributing-wires are attached to it by binding-posts.

A. C. White, of the American Bell Telephone Company, has invented an apparatus for testing the conductivity and resistance per mile of wire by comparison with a standard piece of wire of known conductivity and resistance.

Recent improvements in insulation within cables comprise the use of both cotton and paper to separate the wires. At first, rubber was used. This is costly. Then various fibrous materials were used, and as these all possessed more or less capillary properties, it was necessary to make the cables water-proof. This opened the way for cotton and paper insulation, which is said to be quite satisfactory.

The switch-board has had so many improvements that it is now a very complicated piece of mechanism. Multiple switchboards are much used, in which every line on the exchange is within reach of every operator, so that a subscriber may be connected with any other subscriber without the use of trunk wires in the central office. In the most recent boards the connecting-jacks are placed in groups of 100, these being so divided that the eye may readily catch any number. The board being divided into sections, and a jack for each line in the exchange being placed in each section, the work of the operator is easy, though the appearance of the switch-board is much complicated.

What is known as the wire-core telephone has been objected to because of its imperfect sounding, though its precision of working was admirable. In 1894 W. Ohnesorge, of Frankfort, Germany, improved it by allowing the spiral iron wire forming the core to project from the coil a certain amount, with the result of securing good sounding qualities.

C. H. COCHRANE.

TELESCOPE. The article TELESCOPE in the original edition of the *ENCYCLOPÆDIA* (see Vol. XXIII, pp. 135-154) is so fully up to this date that but little is to be added. The principal advances which have been made consist in the continuous enlargement of the refracting telescope, and the efforts made in Germany to discover some kind of glass which would form a combination more perfectly achromatic than the crown and flint glasses heretofore in use. In 1887 the great telescope of the Lick Observatory was completed. The object-glass of 36 inches aperture is from the celebrated firm of Alvan Clark and Sons, at Cambridgeport, Massachusetts. It was made from disks supplied from Mantois, of Paris, who has brought the art of making these disks to a perfection never before approached. His success has consisted not only in the immense size to which he has carried his disks, but in their extreme whiteness, transparency and freedom from bubbles. The mounting of the telescope was made by Warner and Swazey, of Cleveland. The focal length is very great, no less than 57 feet. This is even a larger proportion of focal length to aperture than is found in small telescopes. This great length was given in order to diminish the effect of the imperfections in the dispersing power of glass, which prevents the rays of all colors from being brought to absolutely the same focus even with the best combination of crown and flint that can be made.

About the same time the brothers Henry, of Paris, completed a telescope of 30 inches aperture for the Observatory of Nice, the splendid gift of Mr. Bischoffsheim to that city. The proportions of this telescope are nearly the same as those of the Pulkowa instrument, of which the object-glass is by Alvan Clark & Sons, and the mounting by the Repsold.

SIMON NEWCOMB.

TELESCOPE, THE YERKES, for the observatory at Lake Geneva, Wisconsin, 75 miles N. of Chicago, is the largest refracting telescope yet built. Its object-glass is forty inches in diameter, being four inches superior in this respect to the telescope of the Lick Observatory. The large disks of optical glass were made by Mantois; the grinding was done by Alvan G. Clark, of Cambridgeport, Massachusetts, and the mounting by Warner and Swazey, of Cleveland, Ohio. The tube is 62½ feet long, exclusive of the eye end. This tube is of steel, the largest diameter being 53 inches, and the three sections weigh six tons. The middle section is a quarter of an inch thick. The lens was completed after two and a half years' labor,

in the workshop of Alvan G. Clark. Its focal distance is 61 feet, the extreme diameter of the clear aperture is 41¾ inches. The crown is about 3 inches thick at the middle and 1¼ inches thick at the outer edges, and weighs 205 pounds; the flint weighs 310 pounds; the lens and its iron ring and cell weigh about 1,000 pounds. The cost of the glass plates in Paris was \$40,000, and the entire cost of the lens is estimated to have been \$100,000. The diameter of the dome is 85 feet, and that of the elevator floor 70 feet. The dome is rotated and the shutters operated by electric motors. The floor can be raised or depressed by hydraulic apparatus driven by an electric motor. This does away with the use of a tall observing-chair. The foundations are of masonry, and the pier is of cast-iron, being made in five sections, each seven feet high. The lower section weighs 18 tons, the others about 5½ tons each. The hour-axis is a rod of hardened steel 15 feet long, and 13 inches in diameter, weighing 3½ tons. The declination-axis is 12 inches in diameter and weighs 1¾ tons. The driving-clock, which moves the mechanism so as to keep it in harmony with the apparent motion of the celestial sphere, weighs 1½ tons, and is controlled magnetically. The spectroscopic attachments are a spectroheliograph, for photographing the solar chromosphere, prominences and faculæ by monochromatic light; a stellar spectroscope, for both photographic and visual inspection of stellar spectra, and determination of motion in the line of sight; a solar spectroscope, also arranged for both photographic and visual study of solar phenomena. All the important mechanisms connected with the telescope are operated by electric power, the mere touch of a button serving to elevate the massive floor or to rotate the great dome. The starting and stopping of the clock, and the quick or slow motions in right ascensions or declinations, are brought about in like manner. The hour and declination circles can be read from the balcony, and buttons are also located there for the operation of all the mechanism, as well as at the eye end. Although the power of this telescope is considerably greater than that of the Lick Observatory on Mount Hamilton, California, its location is less favorable, being on lower ground, in a more misty atmosphere. The whole cost of this telescope and the observatory was borne by Charles T. Yerkes, a street-railway magnate of Chicago, who expended \$500,000 on them.

C. H. COCHRANE.

TELL CITY, a city of Perry County, southern Indiana, on the Ohio River, 70 miles E. of Evansville, on the Louisville, Evansville and St. Louis railroad. It is the center of a coal district, and has flour, woolen and lumber-finishing mills, a foundry, machine-shop, plow factory, distilleries, breweries, and a furniture factory. Its population in 1890 was 2,094; in 1900, 2,680.

TELL-EL-AMARINEH OR **TELL-EL-AMARNA.** See *EGYPT*, Vol. VII, p. 775.

TELLER, HENRY MOORE, United States Senator; born in Allegany County, New York, May

23, 1830. He studied law, was admitted to the bar in New York, and afterward practiced; removed to Illinois in 1858, and thence to Colorado in 1861; was elected to the United States Senate (on the admission of Colorado as a state), and took his seat Dec. 4, 1876; was re-elected Dec. 11, 1876, and served until April 17, 1882, when he was appointed Secretary of the Interior by President Arthur, and served until March 3, 1885; was again



HENRY M. TELLER.

elected to the United States Senate, and took his seat March 4, 1885, and was re-elected in 1891. At the St. Louis National Republican Convention in 1896 he led the free silver forces of the party in their exodus from the convention, one of the most dramatic incidents of recent conventions.

TELLURIDE, a town and the capital of San Miguel County, southwestern Colorado, about 10 miles S.W. from Ouray, on the Rio Grande Southern railway. It is in a mining and grazing district, and had a population in 1890 of 766. Pop. 1900, 2,446.

TELLURIDES are compounds of the rare element tellurium with metals. A number of them occur in nature as minerals. Thus, altaite is the telluride of lead; coloradoite, that of mercury; hessite, that of silver; and calaverite, that of gold. They can be made artificially by precipitating salts of the metals with hydrogen telluride or by heating the metal directly with tellurium.

TELLURIUM. See SELENIUM, Vol. XXI, pp. 631, 632.

TELPHERAGE. See TRACTION, Vol. XXIII, pp. 496, 497.

TEMISCAMINGUE LAKE, a body of water 30 miles long and 15 broad, on the Ontario and Quebec boundary-line. It empties south into the Ottawa River, and its basin is the location of a French-Canadian colony.

TEMPE, VALE OF. See THESSALY, Vol. XXIII, pp. 298, 299.

TEMPERAMENT. See MUSIC, Vol. XVII, p. 91.

TEMPERAMENT, GROWTH OF. See PSYCHOLOGY, Vol. XX, p. 84.

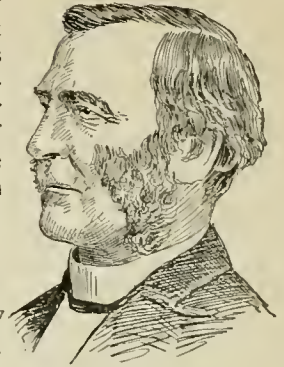
TEMPERATURE. See HEAT, Vol. XI, pp. 554, et seq.

TEMPERATURE, EARTH'S INTERIOR. See GEOLOGY, Vol. X, pp. 224-227.

TEMPERATURE, ERRORS IN BODILY. See PATHOLOGY, Vol. XVIII, pp. 393-398.

TEMPLE, FREDERICK, Archbishop of Canterbury; born Nov. 30, 1821, in Lenkas, one of the Ionian Islands, where his father was a British officer. He was educated at Blundell's School at Tiverton and Balliol College, Oxford, where, in 1842, he graduated as a double first-class and afterward became a fellow and mathematical tutor of

his college. In 1846 he took orders in the English Church, and in 1848 was appointed principal of a training-college near Twickenham. This post he resigned ten years later, to accept the head-mastership of Rugby and an inspectorship of schools. In 1860 he gained much notoriety in the theological world by a mild article, though it was then deemed heretical by High Churchmen, in the famous *Essays and Reviews*. The publication of the essay gave Dr.



ARCHBISHOP TEMPLE.

Temple a taste for controversy, which has since characterized him in his Broad Church career. In 1868 he gave Mr. Gladstone's Irish Church Disestablishment Bill a warm support, and in the following year the Liberal leader appointed him, in spite of strong clerical opposition, to the see of Exeter. An able administrator and a man of indefatigable energy, he made his mark at Exeter, and when the bishopric of London fell vacant, in 1885, Dr. Temple's appointment to it found few critics. In London Bishop Temple had a distinguished record, and on the death in 1896 of Archbishop Benson, he was appointed Archbishop See of Canterbury. Archbishop Temple took an active part in temperance reform, and manifested singular capacity for administrative and charitable work. In 1861 he published a volume of *Sermons Preached in Rugby Chapel*, and in 1884 delivered the Bampton Lectures for the year.

TEMPLE, SIR RICHARD, an English statesman; born in Worcestershire, England, in 1826; entered the third class of the Bengal civil service in 1846, and eventually was appointed political resident at Hyderabad. He was foreign secretary and member of council to the governor-general of India from 1868 to 1874. His services, especially during the famine years 1874 to 1877, were remarkable. On his return home he offered himself as a Conservative candidate for East Worcestershire, but was defeated. He was successful, however, in the Evesham division, and sat for the Kingston division of Surrey from 1892 to 1895; was vice-chairman of the London School Board; president of the Social Science Congress. His works include *India in 1880* (1882); *Men and Events of My Time in India* (1882); *Oriental Experience* (1883); *Cosmopolitan Essays* (1886); *A Bird's-Eye View of Picturesque India* (1898); etc. He contributed the article MAHRATTAS to this ENCYCLOPÆDIA.

TEMPLE, WILLIAM GRENVILLE, an American naval officer; born in Rutland, Vermont, March 23, 1824, and graduated at the United States Naval Academy in 1846. He participated in the capture of Vera Cruz, and in the naval operations against Mexico. He also assisted in the survey of the canal and railroad across the Isthmus of Tehuantepec, in 1852. During the Civil War he

was attached to the eastern and western Gulf squadrons, and participated in the attack upon Fort Fisher, the capture of Wilmington, North Carolina; in the bombardment of the James River forts, and capture of Petersburg and Richmond. After the war he served on examining and retiring boards, and was president of the *Jeanette* court of inquiry. He was promoted through the various official grades to rear-admiral, Feb. 22, 1884, and retired from the service Feb. 29, 1885. He died at Washington, District of Columbia, June 28, 1894.

TEMPLETON, a town of Worcester County, northern Massachusetts, 30 miles N.W. from Worcester and 10 miles S. of Winchendon, on the Boston and Albany railroad. It contains, besides the village of Templeton, East Templeton, Otter River and Baldwinsville; and has six churches, a good school system, a public library, a savings bank and manufactories of furniture and other wooden goods. Population 1900, 3,489.

TEMPORAL BONES. See ANATOMY, Vol. I, p. 824.

TEMPORAL POWER. See STATES OF THE CHURCH, Vol. XXII, p. 460. Abolition of. See POPEDOM, Vol. XIX, p. 508.

TENAILLES. See FORTIFICATION, Vol. IX, p. 437.

TENANCY. See LANDLORD AND TENANT, Vol. XIV, pp. 272-278.

TEN BRINK. See BRINK, in these Supplements.

TENDER OF PAYMENT. See PAYMENT, Vol. XVIII, pp. 440, 441; and LEGAL TENDER, in these Supplements.

TENEBRIO. See COLEOPTERA, Vol. VI, p. 133.

TENEDOS, an Ægean island near the Dardanelles, where the Greek ships were moored in the Trojan war.

TENEMENT LIFE refers popularly to "how the other half lives" in large cities. The trend of nineteenth-century civilization is toward the concentration of population in cities. The great increase of population consequent thereon necessitated the congregation of families in compact areas. This caused the conversion of unsuitable houses, many of them the former residences of of well-to-do citizens, into tenement-houses, while the unoccupied spaces in the rear and down-town districts became covered with similar structures. The greater the population the greater the rent extorted for desirable tenements, resulting in the throwing of all the poorest and most helpless into the worst and most unsanitary neighborhoods. Under such conditions two or more families would be crowded on one floor, and sometimes literally herded together, living promiscuously. Houses, not adapted but adopted, for this purpose soon came to be known as the worst kind of tenement-houses. If the rents could not be collected, the miserable occupants were remorselessly evicted. In fact, there have occurred in the city of New York more evictions of this kind in one year than in the whole of Ireland in the same period. Such crowding and such life engender the worst form of social discontent as well as moral corruption.

In 1880 in the Tenth Ward of New York City there were 334,080 persons to the square acre, which number was about double that of the same area in London. In the American metropolis the health department found five families living in a room 12 feet square. On the top floor of the same house one family was paying \$8.50 per month for one room seven feet square. Such "homes" reek with the contagion of disease, crime and immorality. They are "valleys" of corruption, hot-beds of instinctive crime. In these older tenement-houses the windows of the sleeping-rooms would sometimes open only into a dark hallway or stairway. There was no ventilation, no penetration of daylight. There were poor, or rather no sanitary arrangements. These vicious and vitiating conditions gave origin to the Tenement House Act of 1867. Five years elapsed before 550 cellars could be converted from such use. In 1869 the health department of the city ordered the cutting of forty-six thousand windows.

From 1880 to 1890 13,600 tenement and apartment houses were built in New York; apartment-houses being of a higher grade than tenements, it is difficult to state the exact number of the latter. In 1893, 1,332,772 persons out of a population of 1,891,306 lived in 39,138 tenement houses. In 1894 New York had a density of population of 143.2 persons to the acre, greater than any other city in the world. In the Tenth Ward of the city there were 626.26 persons to the acre; while in one sanitary district extending to 32 acres, in the Eleventh Ward, the average was as high as 986.26 persons to the acre. But in the Tenth Ward the death-rate in 1893, with an average density of 57.2 to the house, was 17.14 per 1,000. The general tenement-house death-rate of the entire city was 22.75, with an average density of 34 to the house. These facts show a wonderful improvement on the form of tenement-house to which these statistics refer; for the figures referring to the older tenement-houses, which have even not yet been entirely superseded, cannot compare with those just given. The laws now in force have effected a revolution in construction as to ventilation, sanitation and fire-proof requirements. The requisite for the best form of tenement construction is chiefly the provision of a sufficiently large area for a structure in which the points referred to can be most successfully and economically dealt with. The ideal tenement-house should have every window opening to the light of day, with an open court-yard, and commodious means of access, permitting all modern constructive improvements to be economically introduced. The wholesale removal of all old tenements by purchase by legal enactment by the municipality, and the erection on the site thereof of such modern structures, has been successfully adopted in some cities. The removal, too, of such classes of dwellings to the urban regions would be desirable if the transportation necessary to and from were found to offer no obstacle to the class meant to be benefited. Private individuals have devoted their means to this problem, with

the result of much progress being made in its solution.

TENERIFFE, island. See CANARY ISLANDS, Vol. IV, pp. 798, 799.

TENES, a seaport of Algeria, 100 miles W. of the city of Algiers. It is well situated for commerce, is the *entrepôt* for Orléansville and the depot for the supply of the French army in Algeria with provisions. It is at once fortunate in the agricultural resources of its territory, in its mineral wealth and its position in respect to transit-trade. The population of the commune is about 8,000.

TENIMBER, a group of islands. See TIMOR LAUT, Vol. XXIII, p. 398.

TEN KATE, JAN JACOB LODEWIJK, a Dutch poet and clergyman; born at The Hague, Dec. 23, 1819, where he studied the classics; and then attended the lectures in theology at the University of Utrecht (1838-44); was pastor on the Marquesas Islands (1845-47), and then settled in Amsterdam. He became known at an early age for his poetical talent, and published a collection of poems at the age of ten years. During his sojourn at Utrecht he published three other collections, *Bladeren en Bloemen* (1839); *Vertaalde Poezie* (1839); and *Rozen* (1839). In collaboration with Winkler Prins he published, from 1842 to 1844, a series of satires upon the literary tastes of the times, under the title of *Braga*. His other works include *Italie Reisherinneringen*, a prose work (1857); *De Schepping* (1866, 1869); *Planeten* (1869, 1872); besides translations of Milton's *Paradise Lost*; La Fontaine's *Fables*; Thompson's *Seasons*; the *Psalms*; and the *Book of Job*. An edition of his works was published at Leyden (1867-72).

TENNESSEE had a population in 1900 of 2,020,616, that of 1890 was 1,767,518, the gain con-



STATE SEAL OF TENNESSEE.

stituting an increase of 255,205. The density was, in 1890, 42.34 to the square mile; in 1880 it was 36.94. The census returns showed five cities with a population of 8,000 or over in 1890; their residents numbered 202,337, constituting an urban population of 11.45 per cent of the entire number of inhabitants of the state. At the same time the male population numbered 891,585, the female 875,933; the native-born people of the state amounted to 98.87 per cent of the whole; there were 430,678 negroes, a gain of 27,527 within the ten years preceding; the Chinese numbered 51, the Japanese 6, and civilized Indians 146.

The most recent surveys of the state show the area to be 42,050 square miles, of which 300 is water surface.

Statistics of agriculture, reported in the census of 1890, make the following showing in regard to the cereals produced in Tennessee:

Acres devoted to the cereals.....	4,288,082
Bushels produced.....	79,527,869
Percentage under corn.....	65.09
Percentage under wheat.....	20.46
Percentage under oats.....	13.72
Percentage under barley.....	0.08
Percentage under rye.....	0.62
Percentage under buckwheat.....	0.03

The following table gives the acreage and production of each of the cereals:

	ACRES.	BUSHEL.
Corn.....	2,791,324	63,635,350
Wheat.....	877,361	8,300,789
Oats.....	588,138	7,355,100
Barley.....	3,585	63,866
Rye.....	26,443	165,621
Buckwheat.....	1,231	7,143

The following statistics relative to agricultural matters are gathered from the same source as the above:

	1880.	1890.
Total number of farms.....	165,650	174,412
Acres of land in farms.....	20,666,915	20,161,583
Percentage of improved land.....	47	42
Value of lands, fences, buildings, farm implements and live-stock.....	\$259,456,170	\$312,891,650
Number of horses.....	266,119	311,800
Number of mules and asses.....	173,498	293,639
Number of cattle.....	783,674	965,339
Number of milch cows, included above.....	303,900	345,311
Number of swine.....	2,160,495	1,922,912
Number of sheep.....	672,789	540,996

The farms of the state are divided as to size as follows:

Average size of farms.....	116
Under 10 acres.....	6,844
10 and under 20 acres.....	15,237
20 and under 50 acres.....	37,074
50 and under 100 acres.....	43,328
100 and under 500 acres.....	68,076
500 and under 1,000 acres.....	3,046
1,000 and over.....	807

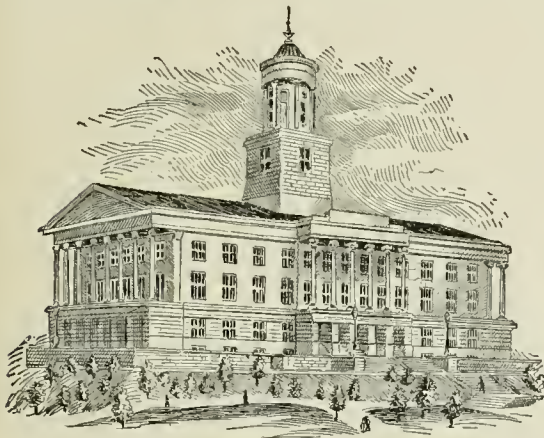
The tenure under which the farms of the state are held is as follows: Cultivated by the owners, 120,622; rented for fixed money value, 19,762; rented for a share of the products, 34,028.

In 1890 Tennessee occupied the second place among the states in the number of asses on farms, having 5,467. There were 131,793 less sheep in 1889 than in 1879. The loss of hogs by disease in 1889 amounted to over 500,000.

The area under cotton in the census year amounted to 2.80 per cent of the entire surface, the acreage being 747,471, an increase of 24,909 acres over the reported area for 1879, but the production, which was 90,906,183 pounds, was a decrease of almost 59,000,000 pounds as compared with the product for the year named. Almost 80 per cent of the cotton produced in the state in 1889 was grown in the extreme western part, in the territory specially lying between the Mississippi and Tennessee rivers. Three counties had each over 50,000 acres under cotton, eight counties had each over 25,000 acres,

and ten counties from 10,000 to 25,000 acres. The tons of cotton-seed sold during the year last mentioned numbered 55,423, amounting in value to \$511,092. In the area devoted to the culture of tobacco Tennessee stood fourth, the acreage being 51,471; and in the amount produced, 36,368,395 pounds, the position was fifth. All agricultural industries showed increased productions over the reports of the census year, up to 1896, the annual gain being considerable.

The state is very rich in minerals, the value of the production of 1889 reaching \$6,455,283. Iron-ore was produced from 16 mines to the amount of 473,294 tons, of a value of \$290,803. The coal mined amounted to 1,925,689 tons, valued at \$2,338,309. The 44 stone-quarries reporting on their output gave the value of the same at \$495,217. Of this, marble, for the production of which the state is famed, yielded \$419,467. Limestone amounted to



CAPITOL BUILDING, NASHVILLE.

\$73,028, mineral paint to \$24,237, and four springs produced mineral waters of a total value of \$5,000. Natural gas has been found in several sections of the state, but up to 1896 had not been developed to any great extent. The statistics relative to spelter and oxide of zinc are combined with the returns from Virginia, the combined product of both states being given at \$141,560. Returns for the six years succeeding the census year show the output of the mineral products named above to have varied but little from the figures as here given. Large and valuable deposits of phosphate rock have been discovered in Lewis, Hickman and Perry counties, and extensively worked since 1893. The formation at one point is four feet in thickness and extends for a distance of twenty miles to a width of three miles, the rock averaging from 60 to 80 per cent phosphate.

The value of the fisheries of the state in 1889 was \$78,337; the number of employees, 369; the capital invested, \$16,113; and the number of boats, 498.

A report issued in 1896 gives the number of white children of school age in Tennessee at 517,823, the colored children of like age at 176,614. The white enrollment was 377,879, and the colored enrollment 105,458. The school age is from 6 to 21 years. There were 7,882 public schools, in which 9,135 teachers were employed. The maintenance of the

school system is provided for by an equitable tax assessment, which brings in an annual revenue of nearly \$2,000,000. The estimated value of the school property under state management in 1896 was \$2,724,808. The number of private schools in the state was given at 975 in 1895, and the number of pupils enrolled was 44,000.

The following table shows the denominational educational institutions of Tennessee, their location, and the church under whose control they are operated:

LOCATION.	INSTITUTION.	RELIGIOUS DENOMINATION.
Athens and Chattanooga	U. S. Grant University...	Meth. Epis.
Clarksville	Southwestern Pres. Univ..	Presbyterian.
Hiwassee Coll.	Hiwassee College.....	Meth. Epis.
Jackson	Southwestern Bap. Univ..	Baptist.
Knoxville	Knoxville College.....	United Pres.
Lebanon	Cumberland University...	Cum. Pres.
McKenzie	Bethel College	Cum. Pres.
Maryville	Maryville College.....	Presbyterian.
Memphis	Christian Brothers' Coll...	Roman Cath.
Milligan	Milligan College.....	Christian.
Mossy Creek	Carson and Newman Coll.	Baptist.
Nashville	Central Tennessee Coll...	Meth. Epis.
Nashville	Fisk University.....	Congregatio'l
Nashville	Roger Williams Univ.....	Baptist.
Nashville	Vanderbilt University...	M. E. Ch. So.
Sewanee	University of the South...	Prot. Epis.
Spencer	Burritt College.....	Christian.
Sweetwater	Sweetwater College.....	—
Tusculum	Greenville and Tusculum College	Presbyterian.
Wash'gton Coll.	Washington College.....	Presbyterian.

Non-sectarian institutions are as follows: University of Tennessee, at Knoxville; Southern Normal University, at Huntingdon; and American Temperance University, at Harriman.

Tennessee had, in 1890, 6,350 church organizations, 5,792 edifices; the number of members was 551,673, constituting 31.21 per cent of the population, and the value of all church property amounted to \$9,885,943. All Baptist bodies numbered 2,412; the Roman Catholics, 60; Disciples of Christ, 322; all Methodists, 2,443; Presbyterians, 864.

A noted peculiarity of Tennessee is its division into eight natural sections, each of which is well watered, rich either in minerals, forestry or agriculture, and each absolutely peculiar to itself, chiefly by reason of variety of soils and altitudes, the latter affecting the climate.

The first of these natural divisions is a section two thousand square miles in extent, forming the eastern and southern extremity of the state, and lying at an average altitude of five thousand feet above the sea-level. Here are the climatic conditions and the distinctive growths of Maine. The land for the most part is covered by pines, firs and balsams; and it is the least productive part of the state, on account of the severe climate. The next division, known as the valley of East Tennessee, covers nine thousand two hundred square miles of territory, and lies between the Unaka and the less lofty table-land of the Cumberland range of mountains. The average elevation is about one thousand feet, and it is one of the most fertile portions of the state, and large quantities of the finest marble are taken from its quarries.

The third division, the Cumberland table-land, comprises about five thousand one hundred square miles. It is a plateau about two thousand feet in elevation, and is underlaid throughout by a seam of coal, some of which is of the finest quality. The output from the mines in 1895 was more than two million tons. In the northern half of this section petroleum in large quantities has been found. Fruit-growing is the chief agricultural industry. At an elevation of about nine hundred feet, and comprising territory to the extent of nine thousand three hundred square miles, is the fourth division, known as Highland Rim, or Terraceland. The soil is fertile and well adapted to the growth of wheat, corn, tobacco, oats and peanuts. The charcoal interests of the state center here, and the section has wealth and importance in diversified channels. The Central Basin, inclosed by the Highland Rim, is known as the garden of Tennessee. It is a rolling plain of 5,450 square miles, the elevation averaging 550 feet. Blue-grass abounds, and the most improved farms of the state, if not of the South, are found here. Stock-raising is the chief agricultural industry, and large establishments are devoted to the breeding of the purest and finest strains of cattle and horses to be found in the United States. Near the northern extremity of this basin is situated Nashville, the capital. The Valley of the Tennessee is the name given to the sixth division, which is a strip of territory averaging about twelve miles in breadth, and extending entirely across the state from north to south. The valley covers 1,200 square miles, and the average elevation is 360 feet. A plateau covering 8,850 square miles, and with an average elevation of 500 feet, constitutes the seventh division of the state. It is known as the Slope of West Tennessee, and produces cotton, corn, fruits, vegetables and hardwoods. Its chief geological difference from the other sections is the absence of rocks. The forests of hardwood are the finest in the state. The eighth, and last, division is known as the Mississippi Bottoms, a low, moist territory of almost tropical vegetation and great agricultural capabilities. The surface extends over 950 square miles, at an average elevation of 295 feet above the sea. There are many dark forests with almost impenetrable undergrowth, numerous lakes and sluggish streams, extensive canebrakes, and fields that produce large crops of cotton, corn and hay year after year without diminution of fertility.

The timbered land of Tennessee constituted about 60 per cent of the entire surface of the state in 1895, and the lumber and sawmill business was a leading industry. For many years the forests of the state have been called on for a large part of the supply of hardwood for the entire country, black walnut especially constituting a large part of the annual output. Poplar grows to large proportions in nearly all sections, next in importance being the oak, which is shipped in large quantities to Europe. Hickory and ash are still plentiful, as are cottonwood, red cedar, cypress, pine, chestnut, hemlock, beech, fir, maple, wild cherry, elm, linn and sycamore.

While by natural characteristics Tennessee is divided into eight sections, the civil divisions are three. The sections are known as East, Middle and

West Tennessee. The supreme court of the state holds an annual session in each of these divisions, and the people of each differ in general characteristics from those of the other two parts. The mean annual temperature for the Eastern division is about 58°, for the Middle 60° and for the Western 62°. The lowest monthly average for the entire state is 31° in January and 82° in July. The mean annual precipitation for a period of 25 years preceding 1895 was about 53 inches. The average annual snowfall is reported by the United States weather bureau at about 8 inches.

In 1899 the total valuation of taxable property was \$355,000,000. For the years 1893 and 1894 the state had received as a revenue from taxation \$3,593,700, and the disbursements for the same period were \$3,114,800. In 1898 the ordinary revenue was \$1,700,000; expenditure the same. The net state debt on Jan. 1, 1898, was \$17,000,000, besides a floating debt of \$850,000. The rate of taxation for state purposes was, in 1896, 35 cents on every \$100, and a poll-tax of one dollar assessed against each voter; the revenue thus derived is devoted exclusively to school purposes. Three-sevenths of the *ad-valorem* tax is also used for schools. The capital stock of corporations is not taxed.

The charitable and penal institutions of Tennessee comprise three hospitals for the insane,—the Eastern, located at Knoxville; the Central at Nashville, and the Western at Bolivar, the aggregate number of inmates in 1895 having been 1,155; the School for the Deaf and Dumb, located at Knoxville, and having 196 pupils in 1895; the School for the Blind, at Nashville; the Industrial School, near Nashville; and the penitentiary, also at Nashville. The latter institution has been run for many years prior to 1895 on the lease plan, but at the time mentioned a farm near the capital city was purchased for \$75,000 and about \$600,000 was set aside to be expended in fitting the same for a model penitentiary. The state also owns a large tract of valuable coal land in the interior, which will be worked by convicts. In 1895 the number of prisoners confined was 1,600, the main prison having 600, Tracy City about 425, Brushy Mountain 350, Coal Creek 100, new prison 50 and quarry 50. The contract system has been abolished, and on the completion of the new buildings prisoners will be kept at the institution or at the coal mines belonging to the state.

Tennessee has navigable waters to the extent of more than twelve hundred miles, the three principal streams being the Mississippi on the western border and the Cumberland and Tennessee crossing the state, and with their navigable tributaries, affording facilities for the cheap transportation of the products of the mines, the soil and the forests. In 1895 there were 3,044 miles of railway in the state, the average assessed value being \$13,284 per mile.

There is no limitation on the strength of the National Guard of Tennessee. The actual force consisted in 1895 of 1,468 officers and enlisted men, formed into a brigade consisting of two regiments, two battalions and two unattached companies of infantry, also a battery and two detachments of artillery. For 1895 the state appropriated \$15,000 for the ex-

penses of the Guard, and the Federal appropriation amounted to \$10,000.

Jan. 1, 1899, there were published in Tennessee 306 newspapers, of which 15 were daily, 10 semi-weekly, 223 weekly, 2 fortnightly, 6 semimonthly, 39 monthly, 1 bimonthly, and 10 quarterly. Papers were published in 92 of the 96 counties of the state, in 133 of the cities, towns, and villages, in which number is included 85 county seats.

The following is a list of the principal cities and towns of Tennessee, with the populations of 1900: Nashville, 80,865; Memphis, 102,320; Chattanooga, 32,490; Knoxville, including the suburbs, 32,637; Jackson, 14,511; Clarksville, 9,431; Columbia, 6,052; Johnson City, 4,645; Murfreesboro, 3,999; Union City, 3,407; Bristol, only partially within the state, 5,271; and Cleveland, 3,858.

Tennessee had 4,559 specified manufacturing industries at the date of the eleventh decennial census, in which there was invested capital to the amount of \$51,475,092 and in which 42,759 persons were employed, receiving as annual wages the sum of \$16,899,351. The cost of the material used was estimated at \$40,463,782 and the value of the finished products at \$72,355,286. The leading lines were flouring and gristmill products, \$12,474,284; lumber in its different forms, \$12,392,238; iron and steel, \$4,247,868; and foundry and machine-shop products, \$4,427,187. Other industries of importance were brick and tile, carriages and wagons. On May 1, 1897, there was opened at Nashville an Exposition in celebration of the hundredth anniversary of the state's admission to the Union.

The following is a list of the governors of Tennessee since 1796, the date of the admission of the state into the Union, together with their respective terms of office: John Sevier, 1796-1801; Archibald Roane, 1801-3; John Sevier, 1803-9; William Blount, 1809-15; Joseph McMinn, 1815-21; William Carroll, 1821-27; Samuel Houston, 1827-29; William Carroll, 1829-35; Newton Cannon, 1835-39; James K. Polk, 1839-41; James C. Jones, 1841-45; Aaron V. Brown, 1845-47; Neil S. Brown, 1847-49; William Trousdale, 1849-51; William B. Campbell, 1851-53; Andrew Johnson, 1853-57; Isham G. Harris, 1857-61; Andrew Johnson, 1861-65; W. G. Brownlow, 1865-69; DeWitt C. Senter, 1869-71; John C. Brown, 1871-75; James D. Porter, Jr., 1875-79; Albert S. Marks, 1879-81; Alvin Hawkins, 1881-83; William B. Bate, 1883-87; Robert L. Taylor, 1887-91; John P. Buchanan, 1891-93; Peter Turney, 1893-97; R. L. Taylor, 1897-99; Benton McMillin, 1899-. See also TENNESSEE, Vol. XXIII, pp. 176-79.

TENNESSEE, UNIVERSITY OF, at Knoxville, was chartered in 1794 as the Blount College. In 1805 the name was changed to East Tennessee College, in 1840 to East Tennessee University, and in 1879 to the University of Tennessee. The grounds extend to 40 acres, the elevation being more than 1,000 feet above sea-level. The buildings, 12 in number, are of stone and brick. The university is non-sectarian, and is open to both sexes; and the academic department provides free tuition to all qualified students from any part of the Union. There are also departments

of law, medicine, and dentistry; and instruction is provided in military science. The university received the United States appropriations for agricultural colleges for its agricultural and mechanical department. The president is Charles W. Dabney, Jr., LL.D., and in 1898 the institution had 56 instructors and 598 students. In 1898 its productive funds were \$425,000; its total income was \$72,948; and its library contained 15,500 volumes.

TENNESSEE RIVER. See Vol. XXIII, p. 177.

TENNEY, SANBORN, an American naturalist; born at Stoddard, New Hampshire, Jan. 13, 1827; graduated at Amherst in 1853, and became lecturer on physical geography and natural history in the Massachusetts Teachers' Institute and professor of natural history at Vassar College, and later at Williams College. He published *Geology for Teachers*, etc., which went through many editions after its publication in 1859; *Natural History, a Manual of Zoölogy* (1865); and *Elements of Zoölogy* (1876). He died at Buchanan, Michigan, July 9, 1877.

TENNIEL, SIR JOHN, an English artist; born, 1820; early showed the possession of artistic taste, and was entirely self-taught. He was a successful candidate in one of the cartoon competitions for the decoration of Westminster Hall in 1845, and painted a fresco for the palace at Westminster. His illustrations of books have always been characterized by great taste. He illustrated *Æsop's Fables*; *Lalla Rookh*; and *The Ingoldsby Legends*. When *Alice in Wonderland* made its appearance, some portion of the fame it obtained may fairly be attributed to Tenniel's illustrations of the book. He also illustrated the sequel to the preceding, *Through the Looking-Glass*. In 1851 he joined the staff of *Punch*, for which he drew the cartoons. Many of his *Punch* sketches have obtained world-wide notice by this means, among the most famous of his recent cartoons being one that appeared in March, 1890, entitled *Dropping the Pilot*. The original of this sketch, which had reference to the resignation of Bismarck, was presented by the Earl of Rosebery to the ex-chancellor. Tenniel was knighted in 1893.

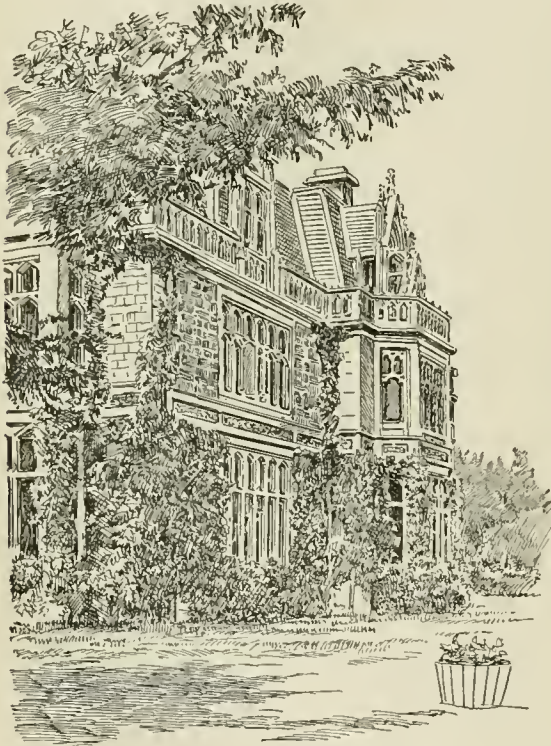
TENNYSON, ALFRED, BARON, an English Poet Laureate; born at Somersby Rectory, Lincolnshire, Aug. 6, 1809. He received his early training at the hands of his scholarly father, rector of Somersby, and afterward at Trinity College, Cambridge, where, in 1829, he won the Chancellor's medal for the English poem *Timbuctoo*. Two of his brothers were endowed also with poetic gifts, Charles, later on, joining the future laureate in the publication of *Poems, by Two Brothers*



LORD TENNYSON.

(1827). At college Tennyson made the acquaintance of Monckton Milnes (afterward Lord Houghton), Dean Alford, Frederick Denison Maurice and

Arthur Henry Hallam, son of the historian, whose memory he has immortalized in *In Memoriam*. In 1830 appeared his *Poems, Chiefly Lyrical*, containing a number of familiar pieces, with some fine contemplative verse, somewhat overloaded, however, with ornament. Two years later appeared a new collection, entitled *Poems*, which show a ripening of the poet's powers and a further development of his art. The volume contained a larger number of poems which have since become classic, with many elaborately finished pieces of great rhythmical beauty. Meanwhile his rare poetic gifts rapidly developed, and the collection, *Poems by Alfred Tennyson* (1842), won for him a place among English poets of the first rank. In 1847 appeared the first of his longer poems, *The Princess: A Medley*, the motive of which is to illustrate woman's aspirations and indi-



TENNYSON'S LATER HOME, ALDWORTH.

cate her place in relation to man. A later edition of the work was enriched by the songs which for lyrical beauty are perhaps unsurpassed in English literature. In 1850 appeared the famous elegy *In Memoriam*, the most characteristic of Tennyson's verse, in which the poet gives noble expression to his sorrow at the death of young Hallam. The sentimental metrical romance *Maud* appeared in 1855, together with some additional poems, including the *Charge of the Light Brigade* and an *Ode on the Death of the Duke of Wellington*. The University of Oxford at this period conferred on the poet the honorary degree of Doctor of Laws, while five years previously, on the death of Wordsworth, he was awarded the English poet-laureateship. Tennyson's masterpiece, the *Idylls of the King*, an epic of chivalry, interpreted as personifying in its various characters the soul at war with the senses, appeared

during the years 1859 and 1872. In 1864 came *Enoch Arden*, a pathetic story of domestic life in a seafarer's home, to which was appended a number of minor poems and a dialect poem, *The Northern Farmer*. Other later productions are the volumes entitled *Tiresias* (1885); *Demeter and Other Poems* (1889); *The Death of Enone, Akbar's Dream, and Other Poems* (1892). His more ambitious modern work, which is full of much vigor and freshness, includes the historical dramas *Queen Mary* (1875); *Harold* (1876); and *Becket* (1884). Two of these have been placed on the stage with fine accessories by Sir Henry Irving, together with *The Cup*, a Græco-Roman tale, *The Promise of May*, and a version of the Robin Hood legend entitled *The Foresters* (1892). The dramatic plays are chiefly distinguished as historical delineations of notable incidents in English history, enriched by vivid character-painting and marked by numerous passages of strenuous and lofty thought.

Tennyson's supreme excellence lies not so much in his themes as in his transcendent art. It is this that has given him his hold upon a cultured age and won for him immortality. His work is the perfection of literary form, and in his lyrical pieces exquisite is the melody. Not less masterly is his power of construction, while his sensibility to beauty is phenomenal. His secluded life brought him close to nature's heart and made him familiar with her every voice and mood. In interpreting these, much of the charm lies in the fidelity of his descriptions, and in the surpassing beauty of the word-painting. In the Shakespearian sense, he lacked the dramatic faculty, and he had but slender gifts of invention and creation. But broad, if not always strong, was his intelligence, and keen his interest in the problems of the time. Though living apart from the world, he was yet of it; and in many of his poems may be traced not only the doings but the thought and tendencies of his age. His Christianity, though undogmatic, was real and pervasive, and his love for nature was a devotion. In national affairs, he showed himself the historic as well as the modern Englishman, and great, as his writings prove, was his reverence for law and freedom. Attractive also, if at times somewhat commonplace, is the quiet domestic sphere which Tennyson has hallowed in the many modern idylls which depict the joys and sorrows of humble life. No trait in the poet's many-sided character is more beautiful than the sympathy he has manifested in these poems with the world's toilers; while nothing could well be more touching than the pathos with which he invests their simple annals.

In 1884 the poet was raised to the peerage, a distinction conferred upon him as a tribute to once to Lord Tennyson's work and worth. He died in his eighty-fourth year, Oct. 6, 1892, at his seat, Ald-



LADY TENNYSON.

worth, Surrey, a view of which will be found herewith. His widow, Lady Tennyson, survived him four years, dying Aug. 10, 1896.

G. MERCER ADAM.

TENOCHTITLAN. See MEXICO, Vol. XVI, p. 209.

TENOR, a part. See MUSIC, Vol. XVII, p. 82, note.

TENOS, an island of the Cyclades group of the Grecian Archipelago; lies southeast of Andros Island. It is 5 miles in width and 18 miles long; has a very fertile soil and raises large quantities of figs, oranges, barley, honey, wine and silk; fine marble is quarried, and silver is mined to a small extent. Oxomeria, Panormos and San Nicolo are the principal towns. Population of island 1895, 12,000.

TEN-PINS, a game. See BOWLS, Vol. IV, pp. 180, 181.

TENREC, an animal. See HEDGEHOG, Vol. XI, p. 610; and TANREC, in these Supplements.

TENSAS OR TENSAW, bayou or river; a stream which leaves the Alabama River just before its union with the Tombigbee, and flows into Mobile Bay by a course parallel to that of the Mobile River.

TENTERDEN, LORD. See ABBOTT, CHARLES, in these Supplements.

TENUIROSTRES, a name formerly given to a group or order of birds with a thin, slender bill. This was the principal character. The order included chiefly the sun-birds (*Nectarinidæ*), and the honey-eaters (*Melophagidæ*), both Old World families. The order is not recognized by most recent authors.

TENURES. See LAND, Vol. XIV, pp. 259-271.

TEOCALLIS. See ARCHITECTURE, Vol. II, p. 450.

TEOS, a city of Asia Minor; near Mount Minas, on the land connecting that peninsula with the Lydia mainland. It was an Ionian city of some importance, had a large commerce, and on account of its two harbors was highly valued as a seaport. It began to diminish in importance toward the last of the Persian rule, although it retained a large trade under Roman rule. Hecataeus and Anacreon were born there.

TEPIC, a city of the province of same name, central western Mexico; about 25 miles E. of San Blas; connected by railroad with the City of Mexico. It is somewhat of a health-resort, being situated in the highlands. Commercially, it is of little importance. Population 1895, about 12,000.

TERATOLOGY. See BOTANY, Vol. IV, pp. 128, et seq.

TERBIUM. See LANTHANUM, Vol. XIV, p. 292.

TERCEIRA, an island. See AZORES, Vol. III, p. 171.

TEREBINTH, a tree. See TURPENTINE, Vol. XXIII, p. 669.

TEREBRATULIDÆ. See BRACHIPODA, Vol. IV, p. 194.

TERHUNE, MARY VIRGINIA, known as "Marion Harland"; was born in Amelia County, Virginia, about 1830. Her father was Samuel P. Hawes, formerly of Massachusetts, but who afterward went to

Virginia, and there established a mercantile business. Miss Hawes began writing at an early age; at 14 she was a regular contributor to a weekly paper in Richmond, and two years later sent a sketch entitled, *Marrying Through Prudential Motives*, to a magazine. In 1856 Miss Hawes married a minister named E. P. Terhune, and moved North, making her home mainly in Newark, New Jersey, and in Springfield, Massachusetts. She was an untiring writer, and has



"MARION HARLAND."

contributed largely to magazines. She edited a monthly called *Babyhood* for two years, besides conducting departments in *Wide Awake* and *St. Nicholas*. In 1888 she established a magazine called *The Home-Maker*. Her publications include *Alone* (1854); *The Hidden Path* (1855); *Moss-Side* (1857); *Sunnybank* (1866); *Christmas Holly* (1867); *Miriam* (1860); *Husks* (1863); *Husbands and Homes* (1865); *Helen Gardner's Wedding Day* (1867); *Ruby's Husband* (1868); *Phemie's Temptation* (1869); *At Last* (1870); *Jessamine* (1870); *Handicapped* (1881); *Judith* (1883); *A Gallant Fight* (1888); *His Great Self* (1892); *My Little Love* (new edition, 1893); and *Mr. Wayt's Wife's Sister and Other Stories* (1894).

TERMITES, or WHITE ANTS. See ANT, Vol. II, pp. 99, 100.

TERPSICHORE. See MUSES, Vol. XVII, p. 74.

TERRA ALBA. See PIPE-CLAY, in these Supplements.

TERRACES. See GEOLOGY, Vol. X, pp. 368-370.

TERRA COTTA, AMERICAN. See CERAMIC ART, in these Supplements.

TERRA DEL FUEGO. See TIERRA DEL FUEGO, Vol. XXIII, pp. 383-385.

TERRA DI LAVORO. See ITALY, Vol. XIII, p. 443.

TERRA JAPONICA. See CATECHU, Vol. V, p. 220.

TERRAPIN, a popular name for many species of tortoises of the family *Emydidae*. Many species in the United States are given the name. The well-known salt-water terrapin (*Malacoclemmys palustris*) is found in the marshes of the Atlantic coast from Cape Cod even around the Gulf coast to South America. The red-bellied terrapin of the Eastern states is *Pseudemys rugosa*. See also TERRAPIN, Vol. XXIII, p. 455.

TERRA ROSSA, a name given to a ferruginous red earth which is extensively developed in the limestone districts of southeastern Europe, especially in Istria and Dalmatia.

TERREBONNE, a town of Terrebonne district, southwestern Quebec, Canada, 16 miles N. of Montreal, on the Canadian Pacific railroad, and on the Jesus River. It has manufacturing of leather, agricultural implements, iron castings, and has saw and grist mills. A Roman Catholic college is located

here and limestone is quarried in the vicinity. Population 1891, 1,278.

TERRE HAUTE, a town and county seat of Vigo County, central western Indiana, a prominent railroad center and a manufacturing city of conspicuous importance, is situated on the Wabash River, 73 miles W. of Indianapolis, on the main line of the Chicago and Eastern Illinois, St. Louis, Vandalia, Terre Haute and Indianapolis, Evansville and Terre Haute, Terre Haute and Peoria, Terre Haute and Southeastern, and Indianapolis and St. Louis railroads, which, with the Wabash and Erie canal, place the city in immediate connection with all points of interest in Indiana and adjoining states, as also with the seaboard and Western territories. The city occupies an elevated plateau, which adds to its attractive appearance, and is laid out with every regard to the elaboration of its natural advantages, both in respect to beauty of site and picturesque surroundings. The residence portion of Terre Haute has been made a feature of the city's improvements, many of the houses having been erected in the midst of groves and gardens, and otherwise rendered specially attractive. The business district of the city is also well built, and contains many prominent and substantial edifices for commercial, educational, religious and general purposes. There are three national banks, with a total capital of \$550,000, doing business in Terre Haute, besides one savings and two private banks. One triweekly, five weekly and two daily papers are issued, also one semimonthly and three monthly periodicals. A courthouse and an opera-house commodious and handsomely appointed are among the leading structures, in addition to which the city is the location of the State Normal School, the Rose Polytechnique Institute, the Coates College (Presbyterian) for young women, and St. Mary's in the Woods (Roman Catholic), a seminary for girls, and Providence Hospital. It also contains seven public schoolhouses, nineteen churches, a number of hotels, together with halls and public institutions of leading importance. The manufactures embrace foundries and machine-shops, nail, tool and car works, flour and hominy mills, strawboard works, distilleries, blast-furnaces, etc.—all told, according to the eleventh census, 367 establishments, paying annually \$2,154,001 to 5,205 employees, and producing goods valued at \$13,720,529 from materials costing \$6,785,616. The city is connected with the west bank of the Wabash River by an iron bridge, and important coal-mines are in operation in the vicinity. The city is fully equipped with electric street-railways, gas and electric lighting and sufficient water and sewerage systems. The population was 8,594 in 1860; 16,103 in 1870; 26,042 in 1880; 30,217 in 1890; and 36,673 in 1900.

TERRELL, a city of Kaufman County, northeastern Texas, 32 miles E. of Dallas, on the Texas Midland and the Texas and Pacific railroads. It is surrounded by extensive cattle-ranges, hardwood forests and rich cotton and fruit plantations, the annual shipments of cotton reaching twenty thousand bales, and has large cotton and woolen factories, an extensive flour-mill, tannery, cotton gins and com-

press and a large creamery. Population 1890, 2,988; 1900, 6,330.

TERRESTRIAL MAGNETISM. See METEOROLOGY, Vol. XVI, pp. 159, 184.

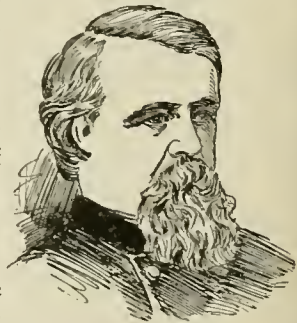
TERRIER. See DOG, Vol. VII, p. 331.

TERRITORY, in the United States, is an organized circumscription of the country, not as yet admitted to the general statehood. The organization is authorized by Congressional enactment. The governor, judges and other administrative officers are appointed by the President. There is a territorial legislature, intrusted with limited powers, subject to Congressional approval or revision. Each territory sends one delegate to Congress, who takes his seat in the Lower House, has a voice in territorial affairs, but cannot vote. Upon the population of a territory becoming sufficient to entitle it to one representative in the House, the territory is eligible to acquire, by a special act of Congress, a state constitution and admission to the Union with rights coequal with other states. All the states of the Union, with the exception of the original 13, and Texas, California and West Virginia, have passed through the territorial stage. There are three territories, Arizona, organized 1863; New Mexico, organized 1885, and Oklahoma, organized (from the unoccupied Indian Territory) 1890. The Indian Territory is the only unorganized territory in the United States. Alaska Territory was organized as a district in 1884. The District of Columbia was originally under territorial government, but in 1874 the government was placed directly under Congressional control.

In Canada there are certain provisional districts, besides other unorganized territory, included under the term Northwest Territories (q.v., in these Supplements), which have not yet become provinces of the Dominion. The term *territory* is also applicable in a sense similar to its use in the United States, as the territories of El Chaco, La Pampa, Santa Cruz, etc., in the Argentine Republic.

TERROR, MOUNT. See EREBUS, MOUNT, in these Supplements.

TERRY, ALFRED HOWE, an American soldier; born at Hartford, Connecticut, Nov. 10, 1827. He studied law at Yale College, was admitted to the bar in 1849, and practiced for a number of years. From 1854 to 1860 he was clerk of the superior and supreme courts of Connecticut. He was appointed, in 1854, colonel of the Second Connecticut Militia Regiment. While abroad in 1858, he carefully studied the defenses in the Crimea, and the most important European fortifications. On the outbreak of the Civil War his regiment was mustered into the United States service, at the first call for troops, as the Second Connecticut Volunteers. Colonel Terry remained at its head until April 1862, when he



GEN. A. H. TERRY.

was made a brigadier-general of volunteers and took a prominent part in the capture of Fort Wagner. General Terry was appointed commander of the northern district of the Department of the South, including the islands from which the operations against Charleston had been carried on. His military career was one of great brilliancy and efficiency, but, though in numerous severe engagements, his most notable feat was, in all probability, the capture of Fort Fisher, which was accomplished in conjunction with Admiral Porter's naval forces. Fort Fisher commanded the sea-approaches to Wilmington, North Carolina, and after the failure of a first attempt to capture it, General Terry was ordered by Grant to renew the attack, which he did with a force of about eight thousand men. After landing his troops, he threw up intrenchments about two miles north of the fort. Admiral Porter then opened fire, and from 4:30 to 6 p. m. there were fired four shots per second, or twenty thousand in all. This, it is claimed, was the heaviest bombardment of the war. This was on Jan. 13, 1865. On the 14th, the line of intrenchments was all completed, and General Charles J. Paine was placed in command, with a division of infantry. General Terry had meanwhile made a reconnaissance of the fort, and as it was readily seen that supplies for his troops could only be landed with difficulty, and that an open beach in midwinter was a poor place in which to establish a siege, he determined to carry the point by assault, and made arrangements to this effect with Porter as to the plan of attack. At eleven a. m., on the 15th, Admiral Porter opened fire with every gun in his fleet, and the fort was completely silenced. Regiments were then pushed forward to within two hundred yards of the fort, taking shelter in shallow trenches. Porter landed some two thousand sailors and marines, who took up a position two hundred yards from the eastern extremity of the northern face of the fort. At 3:30 p. m., at a signal from General Terry, the fleet ceased firing and the troops rushed forward and gained a foothold upon the parapet. Then began a hot hand-to-hand fight, the opposing parties firing directly in each others' faces. The fort was more difficult to take, by reason of the traverses, each one of which was stubbornly held by the enemy. By ten o'clock the occupation of the works was complete. The garrison was originally 2,500 men, and 1,971 of them, with 112 officers, were made prisoners, the others being killed or wounded. The Union loss was 681 men, of whom only 88 were killed. General Grant, in speaking of this capture, said: "Thus was secured, by the combined efforts of the army and navy, one of the most important successes of the war." General Terry was promoted to be a brigadier-general in the regular army, and a major-general of volunteers, and Congress passed him a vote of thanks. He was brevetted major-general in the regular army on March 13, 1865. He commanded the Departments of Dakota and the South; and in 1876 led the expedition against the Sioux, driving them and their leader, Sitting Bull, into Canada. He was made a full major-general, March 3, 1886, succeeding General Hancock, and in 1888 volunta-

rily retired from the army. He died at New Haven, Connecticut, Dec. 16, 1890.

TERRY, EDWARD O'CONNOR, an English actor; born in London, March 10, 1844; made his first histrionic attempt as an amateur with the Thespian Dramatic Club, and received encouragement to enter the profession, which he did in 1863, making his first appearance in the provinces. In 1867 he appeared in London at the Surrey Theatre, and next year at the Lyceum, then leased by E. T. Smith. The following season he appeared at the Strand Theatre for 95 consecutive nights as Paul Pry. He had equal success in burlesque as in comedy. In 1887 he became manager of a theatre in the Strand, known by his name. Among his successes are Asa Trenchard to Sothorn's *Dundreary*, and Old Pete in the *Octoroon*, to the Salem Scudder of Grace. On October 1, 1889, he delivered an address at Cardiff, Wales, before the Church Congress, to an audience of two thousand, and had to redeliver the address the same night to an overflow meeting. He wrote the *Song of Complaints*, which was popular.

TERRY, ELLEN ALICE, an English actress; born at Coventry in 1848. She made her first appearance on the stage during Charles Kean's Shakespearian revivals in 1858, playing the parts of Mamilius in *The Winter's Tale* and Prince Arthur in *King John*. When only 14 she was a member of Mr. Chute's Bristol Company, which included Mrs. Kendal, Mrs. Labouchere, Kate Bishop, and several other since prominent members of the profession. She made her *début* in London in 1863, as Gertrude in *The Little Treasure*, and until 1864 played Hero in *Much Ado About Nothing*, Mary Meredith in *Our American Cousin*, and other secondary parts.

In that year she married and left the stage, but reappeared again in 1867, in *The Double Marriage*, at the New Queen's Theatre, London. She afterward joined Mr. and Mrs. Bancroft at the Prince of Wales Theatre, where she acted the part of Portia. In 1878 she made her first appearance at the Lyceum, and has since, in conjunction with Mr. Irving, played in the longest runs ever known of *Hamlet*, *The Merchant of Venice*, *Romeo and Juliet*, and *Much Ado About Nothing*. She has also appeared as Viola in *Twelfth Night*, Henrietta Maria in *Charles I*, Camma in Tennyson's tragedy of *The Cup*, and Ruth Meadows in *Eugene Aram*. She achieved immense success as Marguerite in W. G. Will's play of *Faust*. She accompanied Mr. Irving on his American tours in 1887, 1884, 1886, 1893, and 1895-96, in the intervals playing at the Lyceum. In 1889 she visited Germany, and upon her return appeared before Queen Victoria at Sandringham. In 1893 she appeared as Rosamonde in *Becket*; in 1894 as Marguerite in W. G. Will's *Faust*. She has appeared as Lucy Ashton in *Ravenswood*; as the heroine



ELLEN TERRY.

in *The Dead Heart*; as Queen Catherine in *Henry VIII*; as Lady Macbeth and Cordelia; and as Guinevere in *King Arthur* (1895).

TERRYVILLE, a thriving post village in Plymouth township, Litchfield County, Connecticut, about 15 miles N.E. from Waterbury, on the New York and New England railroad, having two churches, schools, a large iron foundry and manufactures of locks, knives, etc. Population 1890, 1,000.

TERTIARIES, a religious order. See FRANCISCANS, Vol. IX, p. 700.

TERTIARY PERIOD. See GEOLOGY, Vol. X, pp. 360-365.

TESLA, NIKOLA, an electrician and inventor; born in Herzegovina in 1858; studied engineering in the



NIKOLA TESLA.

École Polytechnique, Paris; was engineer of the Edison Station, Paris, and was employed at Edison's laboratory, near Orange, New York, leaving, after several years, to open a laboratory of his own for independent research. He believed that by causing matter to pass to a stage of luminous vibration, without remaining for any appreciable time in the stage of heat-vibration, it would

cause light without heat, and in developing his theory he has made many striking experiments and discoveries, receiving a current of 200,000 volts in his body without harm, whereas a current of 2,000 volts is fatal. He hopes to set matter into vibration at a rate of 3,000,000 vibrations a second, and in the mean time has shown that electric lamps and motors can be operated on one wire without a circuit. In 1888 he invented the rotary field-motor, the multi-phase system of which is used in the 50,000 horse-power plant built to transmit the water-power of Niagara Falls to Buffalo and other distant places. Mr. Tesla's inventions and contrivances have caused him to take rank as one of the greatest living geniuses in the field of electrical research. Cutting loose from accepted ideas, and launching forth in quest of the undiscovered facts of an inadequately known science, he has already effected improvements which bid fair to revolutionize the accepted methods of utilizing electricity for industrial purposes. It is scarcely too much to assume, that in another decade his skill will have placed untold millions of additional horse-power at the disposal of man. Wherever there is water-power or cheap fuel obtainable, there his perfected methods of converting energy into power, light, and heat, transmissible at will over wide areas, will work still greater changes than have yet been witnessed. See OSCILLATOR, TESLA'S, and ELECTRICITY, § 95, in these Supplements.

TESLA'S INDUCTION COIL. See ELECTRICITY, § 75, in these Supplements.

TEST-PAPERS are made by dipping unsized

paper into an alcoholic solution of a vegetable coloring-matter, which changes color when exposed to the action of an acid or alkaline solution. The paper, after being gently dried, is cut into slips of a suitable size. Litmus and turmeric are most commonly used as the coloring-matters—litmus for the detection of acids and turmeric for that of alkalies. Test-papers are also employed for detecting sulphuretted hydrogen, etc. Thus acetate of lead paper becomes black in presence of sulphuretted hydrogen, while starch-paper becomes blue when touched with iodine.

TESTUDO, in ancient warfare, was a defensive arrangement of the shields, by means of which a body of men advancing against a wall for assault or mining sought to protect themselves from the darts and weapons of the defenders. The men, standing in close order, joined their shields above their heads, the edges overlapping, until the whole resembled the shell of a tortoise (*testudo*). The name was also applied to a machine moving on wheels, and roofed over, under which soldiers worked in undermining the walls in a siege.

TETRABRANCHIATA, an order. See MOLLUSCA, Vol. XVI, pp. 668, 669.

TETRACHORDS, Greek scales. See MUSIC, Vol. XVII, pp. 78, 79.

TETRADECOPEDA or EDRIOPHTHALMIA. See CRUSTACEA, Vol. VI, pp. 661, 662.

TETRADYMITE, an ore. See BISMUTH, Vol. III, p. 790.

TETRAGRAMMATON. See KABBALAH, Vol. XIII, p. 812.

TETRAHEDRON. See GEOMETRY, Vol. X, pp. 388, 395.

TETRALOGY. See DRAMA, Vol. VII, p. 406.

TETRAONIDÆ, the grouse family. See GROUSE, Vol. XI, pp. 221-223.

TETRASPORES, peculiar asexual spores characteristic of the red seaweeds (*Floridææ*). They are formed by division of the mother-cell into four cells, and do not possess the power of locomotion common among the spores of algæ. The accompanying figure shows tetraspores of *Ricciocarpus natans*, in three of which three of the four cells are in view, while the fourth has not yet formed all of its divisions.



TETRASPORES.

TETRODONTS. See GLOBEFISH, Vol. X, p. 685.

TETZEL, JOHANN (1455-1519). See REFORMATION, Vol. XX, p. 326.

TEUCER, a mythical king. See TROAD, Vol. XXIII, pp. 582, 583.

TEUFFEL, BARONESS VON, better known as Blanche Willis Howard, an American novelist; born at Bangor, Maine, July 21, 1847; educated in New York city; went to Stuttgart in 1875 and engaged in teaching and in editing an English magazine; in 1890 married Baron von Teuffel, a physician of the same place. Among her publications are *One Summer* (1875); *One Year Abroad* (1877); *Aunt Serena* (1881); *Guenn* (1883); *Aulnay Tower* (1885); *Tony* (1887); *The Open Door* (1889); *No Heroes*

(1893); and with W. Sharp, *A Fellowe and His Wife* (1893). Died in Munich, Oct. 7, 1898.

TEUTHIDIDÆ. See ICHTHYOLOGY, Vol. XII, p. 689.

TEUTONIC LANGUAGES. See PHILOLOGY, Vol. XVIII, p. 785.

TEUTONIC OR GERMAN MYTHS. See *Scandinavian Divine Myths*, under MYTHOLOGY, Vol. XVII, pp. 155, 156, note.

TEWFIK, MOHAMMED TEWFIK PASHA, a Khedive of Egypt, eldest son of Ismail Pasha; born Nov. 15, 1852. He was made president of council by his father upon dismissal of Nubar in 1878, and worked for a few weeks loyally with his colleagues, Sir Rivers Wilson and M. de Balignieres, but resigned rather than be party to the *coup d'état*. On the deposition of Ismail he was proclaimed Khedive by Sultan's firman in 1879; gave loyal support to dual control (1879-82). He was unable to resist the rebellion of Arabi, but refused to take refuge in British ships. After the bombardment of Alexandria he entered into negotiations with the English, and proclaimed amnesty to all who would return to obedience; this being ineffectual after Tel-el-Kebir, Tewfik returned to Cairo. He behaved with great courage during the outbreak of cholera in 1883, when, accompanied by his wife, he visited the sick in spite of the remonstrances of ministers. After 1884 he usually acted under the influence of Sir E. Baring. Though a Mohammedan, Tewfik was strongly opposed to the Moslem institutions of polygamy and slavery. Died near Cairo, Jan. 7, 1892.

TEWKSBUURY, a town of Middlesex County, northeastern Massachusetts, 22 miles N.W. of Boston and 5 miles S.E. of Lowell, on the Shawshine River, and on the Boston and Maine railroad. The villages of the town are Wigginville, Gillmanville, Phoenix and North Tewksbury. The town has a high school, public library, the state almshouse, and is engaged in agriculture and manufacture of cotton-machinery. Population 1890, 2,515; 1900, 3,683.

TEXARKANA, the county seat of Miller County, Arkansas, is centrally located, partly in Bowie County, Texas, and is an important business and railroad center. The St. Louis, Iron Mountain and Southern, the St. Louis Southwestern, the Texas and Pacific and the Texarkana and Fort Smith railroads meet here, and occupy the union depot conjointly. The city is also situated in the midst of an extensive pine region, for which it is the distributing-point and base of supplies; ships large quantities of cotton; has banks, daily and weekly papers and electric lights. The manufacture of lumber and lumber products is largely engaged in, enlisting a large capital, and producing an annual output steadily increasing in volume and value. In addition to this there are other industries carried on, including cotton-compresses, machine and boiler works, cottonseed-oil mill and car-works. Pop. 1890, part in Arkansas, 3,528; part in Texas, 2,852; total, 6,380; 1900 (Ark.), 4,914.

TEXAS had a population, in 1900, of 3,048,710, that of 1890 was 2,235,523,—the gain constituting

an increase of 37 per cent. The gain during the preceding 10 years had been 40.44 per cent. In 1890 the density of population was 8.52 to the square mile,—an increase from 6.07 at the time of the tenth census. The number of cities having a population of 8,000 or over in 1890 was 11, in which resided 225,346 of the inhabitants of the state, constituting 10.08 per cent of the whole number. In



STATE SEAL OF TEXAS.

1890 the male citizens of the state numbered 1,172,553, the females 1,062,970; the native-born population was 93.16 per cent of the total number; the negroes numbered 488,171,—an increase of 94,787 during the 10 years preceding; there were 710 Chinese, 3 Japanese and 704 civilized Indians.

The area of Texas is 265,780 square miles, of which 3,490 square miles is water surface, leaving the land surface 262,290 square miles.

The following table shows the acreage and production of the cereals as reported in the census returns of 1890:

	ACRES.	BUSHEL.
All cereals	3,969,444	86,088,639
Corn	3,079,907	69,112,150
Wheat	352,477	4,283,344
Oats	528,924	12,581,360
Barley	2,782	48,152
Rye	5,255	62,370
Buckwheat	99	1,263

The growth of agricultural industries, especially in the production of the cereals, is shown by the following report of the crops of 1895:

	PRODUCT.	AMOUNT.	VALUE.
Corn	4,087,332	107,905,565 bu.	\$33,450,725
Wheat	365,200	2,081,640 bu.	1,373,882
Oats	703,825	14,569,178 bu.	3,787,986
Rye	4,387	24,129 bu.	18,097
Potatoes	14,338	1,276,082 bu.	995,344
Hay	457,214	676,677 tons	4,431,033

The following table gives comparisons between the reports made in the census of 1880 and that of 1890:

	1880	1890
Number of farms	174,184	228,126
Average size of farms	208	225
Acres of land in farms	36,292,219	51,406,937
Percentage improved land	35	40
Value of farms, buildings, farm property and live-stock	\$239,828,364	\$516,977,333
Number of horses	805,606	1,026,002
Number of mules and asses	132,447	227,432
Number of cattle	4,084,605	6,201,552
Number of milch cows	606,176	1,003,439
Number of sheep	2,411,633	3,454,858
Number of swine	1,950,371	2,252,476

Reports made at the beginning of 1896 make the following showing:

	NUMBER.	VALUE.
Horses -----	1,183,777	\$24,528,683
Mules -----	264,069	9,125,296
Milch cows -----	783,936	14,024,615
Oxen and other cattle -----	5,518,644	69,520,010
Sheep -----	3,065,256	3,839,540
Swine -----	3,035,119	10,896,078

The following facts are taken from the reports made in the eleventh decennial census: Six acres were mown for hay in 1889 for every acre so mown in 1879. Texas stood third in the number of horses on farms, the number being 1,026,002,—an increase of 220,396 (27.36 per cent) since 1879. The state led the south-central division in the number of horses foaled (136,382), and also led in the number of mules on farms (220,596), and led the United States in the number of asses on farms (6,836). During 1889, 492,707 hogs died of disease. Texas stood first in the number of sheep, 4,264,187 (June 1, 1890), and was one of the few states having a majority of merinos or grade merinos. The number of sheep gained between 1879 and 1889 was 612,554. The first report of the cotton raised in the state was made in 1849, when the amount was 23,228,800 pounds. In 1859 the crop was 192,001,035 pounds; in 1869 it was 152,172,552 pounds; in 1879 it was 364,793,652 pounds; and in 1889 it was 701,782,434 pounds. This gave the state the position of first in both area and product, the former being 3,934,525 acres,—19.50 per cent of the entire area planted in the United States, and an increase in acreage over the area of 1879 amounting to 1,756,090, or 80.61 per cent of a gain. In 1895 the yield reached the great total of 1,504,943,586 pounds,—more than one half the entire crop of the United States in 1879, and almost one half of the crop of 1889. Texas also stood first in the production of seed in 1889, the tons sold numbering 342,934, bringing a return of \$2,568,632. Large acreages were devoted to tobacco and rice, and the area under sugar-cane was 16,284 acres,—an increase over 1879 of 6,060 acres. The pounds of sugar produced numbered 5,482,030, the gallons of molasses 2,159,339. Large amounts of capital are invested in stock-raising in Texas, the conditions being very favorable for the industry.

Texas is rich in minerals, which, up to 1896, had not been developed to any considerable extent. The census reports of 1890 give the value for the preceding year at \$1,985,679. Among the products were: Iron ore to the amount of 13,000 long tons, of the value of \$19,750; gold to the amount of \$6,828; silver returning \$418,173; coal to the amount of 128,216 tons, valued at \$340,620; stone from 33 quarries, aggregating in value the sum of \$255,036, of which limestone was the principal product, its value reaching \$217,835. The only precious stones reported were gadolinite and fergusonite, of the total value of \$2,500. The capital invested in the production and utilization of natural gas, which is found in several portions of the state, reached \$80,-

000 in 1890, and was much increased during the five years following that date. From 14 mineral springs waters bringing a return of over \$10,000 were produced, and many medicinal springs have been discovered. In 1894 the mineral industries were much advanced over the condition reported in the census. Coal was mined during the year to the amount of 420,848 tons, of the value of \$976,458; sandstone was quarried of the value of \$62,350; limestone brought \$41,526; salt yielded \$101,000; cement valued at \$24,000 was manufactured; gypsum amounting to \$27,300 was produced; and the clay products (brick, sewer-pipe, etc.) aggregated \$1,028,000.

The fisheries of Texas were reported in the census of 1890 as having yielded a total return of \$364,017 for the year. Oysters lead with a value of \$189,515; the Gulf fisheries returned \$142,558, and the inland fisheries of the state produced \$31,944. The number of persons employed was 714; 170 vessels were engaged, and 125 boats used in the business, and the capital invested represented \$223,000. Alligator products amounted to \$34,000, and from birds (non-edible) was received the sum of \$33,600.

Texas has three natural divisions,—the eastern or timber belt, the central or cotton and grain belt, and the western portion, largely unsettled and possessing a diversified topography. The great Staked Plains were once considered as a barren waste, incapable of supporting animal life. Developments made between 1885 and 1890 showed this region to be capable of supporting a dense population. Water is found in large quantities only a short distance below the surface, and at a small outlay a water-supply can be obtained and controlled, which makes farming more safe, reliable and profitable than when the moisture for growing crops must come from the rainfall. The great valley of the Nile is not more productive than this great plain when properly watered and cultivated. From Taylor County, located well within this great Staked Plain, there were exhibited at the State Fair at Dallas the following products: All varieties of wheat, oats, rye, barley, buckwheat and sorghum, seven different varieties of corn, German millet, Hungarian grass, Colorado grass, alfalfa, broom corn, milo maize, Kaffir corn, castor beans, mesquite beans, sumac, peas and beans of many varieties; pecans and peanuts, 56 varieties of wild grasses, hay, wool, potter's clay, honey, butter, peaches, pears, plums, apples, nectarines, grapes, figs, onions, cabbage, tomatoes, okra, pepper, egg-plant, cotton and cotton lint from home gins, native woods, building-stones, bricks, lime, cucumbers, squash, pumpkins, cashaws, watermelons, canteloupes, pie-melons, gourds, Irish potatoes, sweet potatoes, onions, 30 varieties of fresh vegetables, tobacco, nursery plants, cut flowers, leather, tanned from mesquite bark, etc.

Texas had 5,268 specified manufacturing industries, as reported by the eleventh decennial census, in which there was invested as capital the sum of \$46,815,181. In them 39,475 persons were employed, whose annual wages amounted to \$18,586,338. The cost of the material used was estimated

at \$36,152,308, and the value of the finished products \$70,433,551. The principal industries were: Lumber in all forms, which yielded a return of \$13,029,198; flouring and grist mill products, \$9,903,455; masonry (brick and stone), \$4,036,762; oil, cottonseed and cake, \$3,262,596; and cars and general shop construction, \$2,860,235. Other industries of importance were brick and tile, cotton-ginning, foundry and machine-shop products, malt liquors, and blacksmithing and wheelwrighting, all of which exceeded \$1,000,000 in the value of their respective products.

The following facts are from the report of the state treasurer of the date of Sept. 1, 1895, covering the fiscal year then ending:

Number of acres of land taxed	133,265,147
Acres remaining untaxed	34,600,453
Valuation of lands	\$412,311,585
Valuation of town lots	186,815,838
Valuation of live-stock	75,418,674
Valuation of railways	70,420,925
Valuation of all other property	115,943,545
Total state tax assessed	4,585,278
Receipts for the year	2,086,578
Poll-tax assessed	711,168
Ad valorem tax assessed	3,874,070
Occupation tax assessed	792,770
Warrants issued during the year	2,329,414
State debt	3,992,030

The school population of Texas in 1895 was 574,900 white children and 170,900 negro children, —an increase of 25,148 over the count of 1894. Of the \$3,504,357 expended during the year for the maintenance of the schools, \$2,892,296 were wages paid to teachers, whose number was reported at 12,460. The number of high schools was 70, the number of endowed academies, seminaries and other secondary schools 42, in which there were 3,570 students, under 180 instructors. There were 4 colleges for women, attending which there were 630 students with 42 instructors. The universities and colleges of advanced education numbered 11, the number of students attending was 3,513, the number of instructors 165, and the libraries contained 27,438 volumes. The total income of the State University was \$70,000, the interest-bearing funds \$580,000, over 13,000 volumes were in its libraries, the number of students in attendance was 700, and there were 46 instructors. The State Agricultural and Mechanical College had 24 instructors, 293 students, farm-lands valued with their improvements at \$77,000; the receipts for the year were \$102,700, the expenditures \$107,200. At Prairie View there is located the State Normal School, where instruction similar to that imparted at the Agricultural and Mechanical College is given to colored youths. There were 184 students in attendance, under 20 instructors. The property is valued at \$18,000, and the receipts and expenditures for the year were \$28,133. The number of private academies and secondary schools was 67, and these had an equipment value at \$1,615,100, and the total number of volumes in their libraries was 33,000. The majority are under non-sectarian control. The denominational educational institutions of Texas are given in the following table with the place of location and the denomination controlling.

LOCATION.	INSTITUTION.	RELIGIOUS DENOMINATION.
Austin -----	St. Edward's College----	Roman Catholic.
Brenham ----	Evan. Lutheran College----	Lutheran.
Brownwood--	Howard Payne College--	Baptist.
Fort Worth --	Fort Worth University --	Meth. Episcopal.
Georgetown--	Southwestern University	Meth. Epis. South.
Marshall----	Wiley University -----	Meth. Episcopal.
Sherman-----	Austin College -----	Presbyterian.
Tehuacana---	Trinity University-----	C. Presbyterian.
Thorp Spring	Add-Ran Christian Univ.	Christian.
Waco-----	Baylor University -----	Baptist.
Waco-----	Paul Quinn College-----	African M. E.

The University of Texas at Austin, and Henry College, at Campbell are non-sectarian.

Texas maintains a large military force known as the Texas Volunteer Guard. The authorized strength is 3,000. The actual organization consisted, in 1895, of one division of two brigades, each brigade consisting of three regiments of infantry. The general and staff officers numbered 32, the other officers 252, the infantry 2,250, the cavalry 290, and the artillery 110. In addition to the above, there are, unattached, one regiment of cavalry, a battalion of artillery and a battalion of colored infantry. The appropriation from the state for the expenses of 1895 amounted to \$20,000, and from the Federal government \$12,939 was received.

On Jan. 1, 1899, there were published, in Texas, 823 newspapers, of which 76 were daily, 1 triweekly, 9 semiweekly, 692 weekly, 8 semimonthly, 36 monthly, and 1 quarterly. Papers were published in 207 of the 246 counties, and in 424 of the cities, towns, and villages, of which 208 were county seats.

There were, in 1890, in Texas, 8,766 church organizations, 5,638 edifices, 677,151 members, constituting 30.29 per cent of the population, and church property of the value of \$8,682,337. There were 24 Adventists, 4,061 Baptists (all bodies), 263 Roman Catholics, 536 Disciples of Christ, 2,716 Methodists (all bodies), 816 Presbyterians (all bodies), and 139 Protestant Episcopalians.

At the close of 1895 there were 214 national banks in operation in Texas, whose combined capital amounted to \$22,523,090; their loans and discounts were \$45,205,987; their reserve reached \$9,035,447, and the individual deposits aggregated \$32,979,037. There were 8 state banks, whose capital stock amounted to \$885,150, their total resources were \$2,219,132, and their individual deposits \$1,034,021. There were also 22 private banks and 3 savings banks which did not render full reports at the date above given.

The railroad property in Texas, while only assessed for purposes of taxation at \$70,420,925 in 1895, were estimated to be of the aggregate value of \$375,000,000. The total mileage at the beginning of 1896 was 9,290. The counties of the state without railroads within their boundaries numbered 81. There was an average of 36 miles each in 125 counties, and 41 had a total mileage of 4,669. The state has about 500 miles of Gulf coast, with many well-protected harbors. The great bulk of the shipping is done from Galveston (q.v., in these Supplements). The Rio Grande, Colorado, Brazos, Trinity

and Sabine rivers are all navigable to a certain extent, as will be seen by reference to each, in these Supplements.

The public institutions of Texas, charitable and correctional, were reported in 1895 as follows: The Deaf and Dumb Asylum, for whites, and the Deaf, Dumb and Blind Asylum, for colored youths, both located in the city of Austin, had a total of 265 inmates, instructed by 18 teachers; the grounds and buildings were valued at \$257,000, and the receipts of the year, \$58,000, were \$10,000 in excess of the expenditures. The Institution for the Education of the Blind, for whites, also located at Austin, had 171 inmates, 15 instructors; the grounds and buildings were of the value of \$135,000, and the receipts and expenditures amounted to \$42,000. The State House of Correction and Reformatory, located near Gatesville, receives convicts under the age of 16, sentenced for a period not exceeding 5 years. The inmates numbered 204, there were 21 attendant officials, the grounds and buildings were valued at \$75,000, and the receipts and expenditures were \$34,250. Other institutions were the State Insane Asylum, near Austin; North Texas Insane Asylum, at Terrell; Southwestern Insane Asylum, near San Antonio; State Orphan Asylum, at Corsicana, and the state penitentiaries, one at Huntsville and one at Rusk. The convicts in both numbered 4,125, of whom 2,358 were employed outside the walls. The state farm of 2,778 acres yielded \$80,205 from hay alone in 1894. The convicts employed on railroads earned \$71,462 net for the same year.

The following is a list of the principal cities and towns of Texas, with the populations in 1900: Dallas, 42,638; San Antonio, 53,321; Galveston, 37,789; Houston, 44,633; Fort Worth, 26,688; Austin, 22,258; Waco, 20,686; Laredo, 13,429; Denison, 11,807; El Paso, 15,906; Paris, 9,358; Sherman, 10,243; Marshall, 7,855; Tyler, 8,069; Gainesville, 7,874; Corsicana, 9,313; Brownsville, 6,305; Palestine, 8,297; Brenham, 5,968; Corpus Christi, 4,703; Greenville, 6,860; and Temple, 7,065.

The following is a list of the governors of Texas since 1845, the date of admission into the Union, together with their respective terms of office: J. P. Henderson, 1846-47; George T. Wood, 1847-49; P. Hansboro Bell, 1849-53; E. M. Pease, 1853-57; H. R. Runnels, 1857-59; Sam Houston, 1859-61; Edward Clark, 1861; F. R. Lubbock, 1861-63; P. Murray, 1863-65; A. J. Hamilton, 1865-66; J. W. Throckmorton, 1866-67; E. M. Pease, 1867-70; E. J. Davis, 1870-74; Richard Coke, 1874-77; R. B. Hubbard, 1877-79; Oren M. Roberts, 1879-83; John Ireland, 1883-87; Lawrence S. Ross, 1887-91; James S. Hogg, 1891-95; Charles A. Culberson, 1895-99; Joseph D. Sayers, 1899. See also TEXAS, Vol. XXIII, pp. 202-06.

TEXAS, UNIVERSITY OF, a state educational institution, located at Austin, Galveston, and College Station. While Texas was a republic its Congress gave 40 acres of land in Austin for the seat of a university, and later donated about 221,000 acres of land for the establishment of two universities, to which in 1858 the state added \$100,000 in United States bonds, and set apart about 3,200,000 acres

of land. This last land grant was given to the free schools in 1876, and replaced with about 2,000,000 acres of less valuable land. In 1898 the interest-bearing endowment amounted to \$626,716; and the total income was \$155,503. The academic and law departments, located at Austin, were opened in 1883; and the medical department at Galveston in 1891. The Agricultural School and Mechanical College, at College Station, organized in 1862, was united with the university in 1876. In 1898 there were 71 instructors and 800 students (100 being females); and the library had 35,000 volumes.

TEXCOCO. See TEZCUCO, below.

TEXEL, an island of Holland, the first of the chain which stretches northwest from North Holland, and the largest of the chain, $2\frac{1}{2}$ miles from the mainland, 13 miles long and 6 miles at its greatest breadth. The northern portion is known as Eyerland. Population about 6,000, most of whom are engaged in fishing. In the near vicinity of Texel the Dutch admiral, De Winter, was defeated and captured by the English under Admiral Duncan, Oct. 11, 1797.

TEZCUCO OR TEXCOCO, the name of a town and lake of Mexico. The lake lies about $2\frac{1}{2}$ miles east of the city of Mexico, the largest of the five lakes which were once the pride of Mexico. A canal connects the city with the lake, which is 15 miles long and 9 miles wide, and the waters of which are strongly salt. The town of Tezcucoco lies 16 miles N.E. of the city of Mexico on the shore of the lake. It was one of the most important cities in the kingdom before the Spanish conquest, and contained some of the chief temples and a palace of Montezuma. But its importance has vastly decreased, and on the ruins of the ancient city has grown the modern Tezcucoco. Its inhabitants are engaged chiefly in the manufacture of cotton and woolen goods. Population of commune in 1889, 15,865. See also MEXICO, Vol. XII, p. 209.

THACKERAY, ANNE ISABELLA. See RITCHIE, ANNE ISABELLA THACKERAY, in these Supplements.

THAIS, a courtesan of the court of Alexander the Great; said to have had great influence over that monarch, and to have persuaded him to order the destruction of the palaces at Persepolis—a story denied by some historians. She became a member of the court of Ptolemy Lagi, by whom she was the mother of a daughter, Irene, and two sons, Lagus and Leontiscus.

THALER, a silver coin-unit of German money, worth three marks, or 72 cents, and displaced in 1875 by the mark in the new decimal system of coinage. See also NUMISMATICS, Vol. XVII, p. 655.

THALIA. See MUSES, Vol. XVII, p. 74.

THALLOME. See BOTANY, Vol. IV, p. 108.

THALLOPHYTES, the lowest grand division of plants, characterized, in general, by the simple plant-body, such organs as roots, stem and leaf not being differentiated, though in certain seaweeds these organs are apparent. As a rule, they do not stand erect, but either float in the water or lie prostrate upon some substratum. They are best defined as not possessing the characteristic features of the higher grand divisions. Although their classifi-

cation is still in a condition of great uncertainty, they are generally presented in two great parallel series: (1) the Algæ, the thallophytes which contain chlorophyll; and (2) the Fungi, the thallophytes which do not contain chlorophyll. See also VEGETABLE KINGDOM, Vol. XXIV, pp. 125-128; CLASSIFICATION, and MORPHOLOGY, in these Supplements.

THAMES, the name of three rivers, at least, in addition to the principal English waterway; one in the province of Auckland, New Zealand, flows into the Firth of Thames, a part of Hauraki Gulf; the second flows through eastern Connecticut, and is formed by the union of the Yantic and Quinebaug at Norwich, and is navigable from Norwich to New London, a distance of 14 miles, where it enters the Atlantic; the third rises in Perth County, Ontario, Canada, and flows southward to Lake St. Clair, past Chatham and London.

THANES or THEGNS. See NOBILITY, Vol. XVII, p. 529.

THANET, ISLE OF. See ENGLAND, Vol. VIII, p. 216.

THANET, OCTAVE. See FRENCH, ALICE, in these Supplements.

THANKSGIVING DAY, an annual festival of thanksgiving for the mercies of the closing year. Practically, it is a national harvest festival, fixed by proclamation of the President and the governors of states, and ranks as a legal holiday. In 1789 the Episcopal Church formally recognized the civil government's authority to appoint such a feast, and in 1888 the Roman Catholic Church also decided to honor a festival which had long been nearly universally observed—though nowhere with such zest as in the New England states, where it ranks as the great annual family festival, taking the place which in England is accorded to Christmas. The earliest harvest thanksgiving in America was kept by the Pilgrim Fathers at Plymouth in 1621, and was repeated often during that and the ensuing century. It became customary, in fact, for the governors of the colonies to appoint a fast day in the spring and a day of thanksgiving in the autumn. Congress recommended days of thanksgiving annually during the Revolution, and in 1784 for the return of peace—as did President Madison in 1815. Washington appointed such a day in 1789 after the adoption of the constitution, and in 1795 for the general benefit and welfare of the nation. Since 1817 the festival has been observed annually in New York, and since 1863, when Lincoln set the example, the Presidents have always issued proclamations recommending the observance of the last Thursday of November as Thanksgiving day. This is always followed by proclamations of the various governors, who alone have legal authority to declare a holiday in their respective states.

THATCHER, HENRY KNOX, an American naval officer, was born in Thomaston, Maine, May 26, 1806. His grandfather was General Henry Knox. He was admitted to the United States Military Academy in 1822; changed his cadetship for an appointment in the navy, and entered that service as a midshipman on March 4, 1823. He rose gradually until Sept. 14, 1855, when he became a

commander. On July 16th he was made a commodore. Commodore Thatcher served in various parts of the world during his early days in the navy, and his continued service abroad prevented him from taking an active part in the early years of the Civil War. In July, 1863, he was ordered home from the Mediterranean, and after serving under Commodore Porter on the North Atlantic blockade, he was appointed rear-admiral in advance of the regular promotion, and was ordered to succeed Vice-Admiral Farragut in command of the Western Gulf squadron at Mobile. It was in this command that Admiral Thatcher did the Union great service, and caused the Navy Department to send him congratulations upon his success in capturing Mobile and the Confederate fleet after its flight up the Tombigbee River. On June 2, 1865, he occupied Galveston, Texas, and soon had the entire Gulf coast restored to the Union. In 1886 he received his regular commission as rear-admiral, and was placed on the retired list, May 26, 1868. Upon his return home he was port admiral at Portsmouth, New Hampshire, from 1869 to 1871, after which he was unemployed until his death, in Boston, Massachusetts, April 5, 1880.

THAUMATROPE. See STROBOSCOPE, in these Supplements.

THAXTER, CELIA, an American poetess; born in Portsmouth, New Hampshire, June 29, 1836. She was the daughter of Thomas B. Leighton, an old resident of the Isles of Shoals, where, at Apple-dore, Celia spent most of her life. In 1851 she married Levi Lincoln Thaxter of Watertown, Massachusetts. She published *Among the Isles of Shoals* (1873); *Driftweed* (1878); *Poems for Children*; *The Cruise of the Mystery* (1886); *An Island Garden* (1894); and many other works of more or less note. She died at Isles of Shoals, Aug. 26, 1894.

THAYER, ABBOTT HENDERSON, an American artist; born in Boston, Mass., Aug. 12, 1849; studied in the Brooklyn Academy of Design and the National Academy, under Lemuel E. Wilmarth; spent three years with Jean L. Gérôme in Paris, and also studied with Charles E. R. H. Lehman at the École des Beaux-Arts. He painted animals chiefly, until his studies abroad, when he devoted his attention, with much success, to figure-painting. At the Paris Salon of 1877 he exhibited *Le Sommeil*, and in 1878 sent a portrait. His works include *Child and Cats*; *Woman and the Swan*; *An Angel*; *Shamming Sick*; *Virgin Enthroned*; *Caritas*, in the Boston Museum of Fine Arts; and *Florence*, a mural decoration in the Walker Art Building, Bowdoin College.

THAYER, ALEXANDER WHEELLOCK, an American musical critic and writer; born at South Natick, Massachusetts, Oct. 22, 1817. In 1843 he was a graduate of Harvard Law School, and after graduating traveled in Europe, frequently returning there in search of material for his *Life of Beethoven* (3 vols., 1866-87). He was United States consul at Trieste from 1859 to 1882, and resided in Europe after 1862. Much from his pen appeared in American and foreign magazines. Died in Trieste, July 15, 1897.

THAYER, EUGENE, an American organist and

composer; born at Mendon, Massachusetts, Dec. 11, 1838. For nearly twenty years he was resident in Boston, and at the dedication of the organ in Music Hall in 1862, he was one of the performers. He studied in Europe in 1865-66; returned to Boston, where he remained until 1881, when he was chosen organist of the Fifth Avenue Presbyterian Church in New York. His compositions included organ and vocal music, a mass in E flat and a festival cantata. He died at Burlington, Vermont, June 27, 1888.

THAYER, JOHN MILTON, an American soldier and statesman; born in Bellingham, Massachusetts, Jan. 24, 1820. Graduating at Brown in 1841, he studied and practiced law. In 1854 he went to Nebraska. He was here made a brigadier-general of militia, and organized several expeditions against the Indians. He was colonel of the First Nebraska Infantry, and led a brigade at Fort Donelson and at Shiloh. He resigned July 19, 1865, and served as United States Senator from 1867 to 1871. General Grant appointed him territorial governor of Wyoming. Returning to Nebraska, he was elected governor in 1886. Governor Thayer has been department commander of the Grand Army of the Republic in Nebraska.

THAYER, JOSEPH HENRY, an American Biblical scholar; born at Boston, Massachusetts, Nov. 7, 1828. He is a graduate of Harvard and of the Andover Theological Seminary; was a preacher at Salem and Quincy until 1862, when he became an army chaplain; in 1864 resigned and became associate professor of sacred literature in Andover; removed to Cambridge in 1882, and in 1884 was made professor of New Testament criticism in the Divinity School. By far his most important work is *A Greek-English Lexicon of the New Testament* (1886).

THAYER, SYLVANUS, an American soldier and military engineer; was born at Braintree, Massachusetts, June 9, 1785. After graduating at Dartmouth in 1807, and at the United States Military Academy in 1808, Thayer was assigned to the corps of engineers. For four years he served as engineer and as instructor in mathematics at the academy, and was promoted first lieutenant, July 1, 1812. During the War of 1812 he served with General Henry Dearborn on the Niagara frontier, and with General Wade Hampton on Lake Champlain in 1813. In 1814 he was sent to Europe to study the operations of the allied armies before Paris, and to examine military works. He was recalled, however, in 1817, and made superintendent of the academy at West Point. (See MILITARY ACADEMY OF THE UNITED STATES, AND WEST POINT, in these Supplements.) The present efficient condition of this military school is due, in a great measure, to the labors and abilities of Colonel Thayer, and his monument there bears the inscription, "Colonel Thayer Father of the United States Military Academy." He was relieved from duty at West Point in 1833, and for thirty years was engaged in the construction of defenses in and about Boston harbor, being also president of the Board of En-

gineers for Permanent Fortifications for several years. On June 1, 1863, he was retired from active service, and received the brevet of brigadier-general. He bequeathed \$300,000 for an academy at Braintree, gave \$10,000 for a library there, and gave \$70,000 to found the Thayer School of Civil Engineering at Dartmouth. General Thayer was also a writer, and his papers on practical engineering are considered valuable. He died in South Braintree, Massachusetts, Sept. 7, 1872.

THEATERS, LAW OF. See THEATRES, Vol. XXIII, pp. 226-229.

THEATINES, a religious order who were opposed to Protestantism. They were founded by the Bishop of Theati in 1524 and spread in many countries, but at present are found mostly in Italy. See also MONACHISM, Vol. XVI, p. 711.

THÉÂTRE FRANÇAIS OR COMÉDIE FRANÇAISE, the theater in the Palais Royal, Paris, in which the classical drama of France receives its most perfect and artistic representation, dates from 1680, when Louis XIV combined the actors of the Hotel Bourgogne and Molière's company, and gave them a special organization and a yearly subvention of twelve thousand francs. In 1770 the theater was established in the Tuileries, in 1782 was removed to a new building, where the Odéon now is, and after the troublous times of the Revolution was finally established in the Palais Royal. The present constitution dates from 1803. The committee of six, presided over by government officials, names the *sociétaires* (the actors and actresses who belong to the staff) and the less permanent *pensionnaires*, superintends all financial arrangements, makes a point of reproducing, from time to time, the really great French plays, and sits in judgment on new plays submitted. The subvention is now two hundred and forty thousand francs. The Théâtre Français is remarkable for perfect study, artistic dignity and harmonious *ensemble*. Its bicentenary was celebrated with great *éclat* in 1880.

THEATROPHONE, a system by which theaters are telephonically connected with subscribers, who may hear all that is going on upon the stage of any one of the theaters in the system. A theatrophone company was formed in Paris in 1881, and now most of the theaters of the city are connected with pay-stations or private residences. Several transmitters are placed upon each side, so that the sounds can be taken from all parts of the stage, and there is no difficulty in hearing all that goes on. Double wires lead from each theater to the central office, and radiating lines lead from the central to the hotels, restaurants, dwellings, etc., where there are subscribers. A small room is set aside in each theater for the use of an employee of the theatrophone company, whose business it is to watch the transmitters and see that they are in order. The receiving-telephones are arranged like ordinary telephonic receivers, or with large, bell-mouthed funnels, so that several persons can hear at once. Young women are employed at the central to connect subscribers with whatever theater they may desire, and when noth-

ing is going on at a theater they connect patrons with a musical performance managed by the theatrophone company to fill up interludes.

THEBAID OR THEBAIS, a district of Egypt. See EGYPT, Vol. VII, p. 701.

"THE BEGGARS." See HOLLAND, Vol. XII, pp. 74, 75; and GUEUX, in these Supplements.

THEBES. See EGYPT, Vol. VII, pp. 776-782.

THECOSOMATA. See MOLLUSCA, Vol. XVI, p. 666.

THE DALLES, a city of Oregon. See DALLES CITY, in these Supplements.

THEEBAW, ex-king of Ava. See BURMAH, in these Supplements.

THEED, WILLIAM, an English sculptor (son of William Theed, a well-known sculptor, and an R.A.), was born at Trentham, Staffordshire, England, in 1804. For some years of his early life he was a pupil of Bailey, the sculptor of the Nelson Monument in Trafalgar Square. In 1826 Mr. Theed went to Rome, where he studied under the celebrated Thorwaldsen, Gibson, Wyatt and Tenerani. In 1844 Mr. Gibson was commissioned by the late Prince Consort to send over designs by the best English artists in Rome for four marble statues to be placed in Osborne. Mr. Theed received a commission to execute two of them, his *Narcissus at the Fountain* and *Psyche Lamenting the Loss of Cupid*. Mr. Theed designed and executed the colossal marble group representing Africa on the Albert memorial in Hyde Park. His 12 bronze alto-relievos from English history are in the princes' chamber, House of Lords. Among his other works are marble life-size statues of Mr. Gladstone and Mr. Bright.

THE FLEET. See FLEET PRISON, in these Supplements.

THEGN OR THANE. See NOBILITY, Vol. XVII, p. 529.

THEINE, an alkaloid. See TEA, Vol. XXIII, p. 100.

THEINER, AUGUSTIN; born at Breslau, Silesia, April 11, 1804. He was educated at Breslau and at the University of Halle; after traveling, with government help, through Austria, France and England, settled in Rome; was appointed keeper of the secret archives of the Vatican; but was charged by the Jesuits with having furnished documents to the bishop, opposed to infallibility, at the council of the Vatican, and was removed from office in 1870. His very numerous works include *Disquisitiones in Præcipuas Canonum et Decretalium Collectiones* (1836); *Le cinque Piaghe della S. chiesa* (1849); *Documents inédits relatifs aux affaires religieuses de la France, 1750-1800* (1858); *Vetera Monumenta Slavorum meridionalium Historiam illustrantia* (1863); *Vetera Monumenta Poloniæ Gentiumque Finitimarum Historiam illustrantia* (1860-64); and *Acta genuina ss. oecumenici concilii Tridentini* (1874). He died at Cività Vecchia, Italy, Aug. 10, 1874.—His brother, JOHANN ANTON THEINER, author; born at Breslau, Dec. 15, 1799. He was for a while professor of Scriptural exegesis at Breslau; then

preached from 1830 to 1845, when he joined the German Catholics; was appointed secretary of the library at Breslau in 1855. He has written *Die reformatorischen Bestrebungen in der katholischen Kirche* (1845); *Enthüllungen über Lehren und Leben der katholischen Geistlichkeit* (1862); and with his brother, *Die Einführung der erzwungenen Ehelosigkeit bei den christlichen Geistlichen und ihre Folgen* (1828). He died at Breslau, May 15, 1862.

THEISS, a river. See HUNGARY, Vol. XII, p. 362.

THENARD'S BLUE. See COBALT, Vol. VI, p. 82.

THEOBROMA. See COCOA, Vol. VI, p. 100.

THEOBROMINE, a white crystalline substance having a bitter taste, extracted from cacao (from *Theobroma cacao*). Its composition is represented by the formula $C^7H^8N^4O^2$. It is chemically closely related, on the one hand, to caffeine, and on the other, to certain animal products, such as uric acid, guanine and adenine. Called also dimethylxanthine.

THEOCRACIES. See POLITICAL ECONOMY, Vol. XIX, pp. 347, 348.

THEODOLITE. See GEODESY, Vol. X, pp. 164, 165; and SURVEYING, Vol. XXII, pp. 719, 720.

THEODORE, emperor. See ABYSSINIA, Vol. I, pp. 66, 67.

THEODOSIA, a port situated on the eastern coast of the Crimean peninsula, having a jetty 2,044 feet long, quays within the port 3,000 feet long, with 24 feet of water, and a superficial area of 2,500,000 square feet, over one fifth of which is paved. It also has some reputation as a watering-place.

THEOLOGICAL EDUCATION. All mediæval education was ecclesiastical. From the rude cathedral or parish school, where boys were taught but little more than choral-singing for church services, to the universities of the schoolmen, all instruction was in clerical hands for the service of the church. If there were courses in medicine, mathematics and jurisprudence, as well as in philosophy and theology, it must be remembered that medicine was then empirical, mathematics was still rudimentary, and the courts were largely ecclesiastical and the law canonical. (For this hold of the church upon higher education, see UNIVERSITIES, Vol. XXIII, pp. 831, et seq.) The settlers of the American colonies were under strong religious impressions, and in most of the states paid attention to schools from the start. Their purpose was to obtain an educated clergy and not to depend on Great Britain for a clerical supply. It is interesting to note that both William and Mary College, in Virginia, and Dartmouth, in New Hampshire, began as schools for the evangelization of Indians. The college curriculum of colonial days was arranged as a preparation for reading in divinity. Until after the Revolutionary War there was not what is now understood as a theological school in the country. Harvard had a chair of divinity almost from the commencement; a like professorship was established in

1701 at Yale, and all the colleges existing at the time independence was declared aimed, in part, at providing candidates for the ministry. But most of these students gained their special preparation by reading with some learned minister in private. Thus, Nathaniel Emmons of Franklin, Massachusetts, is known to have trained 57 young men for the pulpit during his long pastorate there, which began in 1773. Still earlier than he were John Cotton and Edwards of Northampton, to whom pious youth resorted for instruction in theology. It was also the colonial practice to choose, for college presidents and professors, ministers of eminence, and the graduates who sought to enter the ministry were wont to linger in the college town for guidance in prescribed courses by these venerated men.

A profound change came with the Revolutionary War. On severing their relations with England the colonies found it necessary to constitute new states, and they were at once confronted with the relation the state should maintain toward education. The New England states assumed the full responsibility, but in doing so only perpetuated an earlier practice. A few other states took the same position. It is clear that freedom of conscience in worship must have long had a firm hold on men who could put into the fundamental law of the land, the compact of their union, the decree that "Congress shall make no law respecting an establishment of religion or prohibiting a free exercise thereof." Here was the germ of a secularized education, and it was inevitable that it should eventually work a separation between ecclesiastical and non-sectarian instruction. A notable illustration of the spirit then at work may be seen in the history of Princeton University (q. v., in these Supplements). The founding of that institution was avowedly to teach theology; its supporters were Presbyterians; but the founders purposely kept it clear of denominational control.

Again, the War of Independence forced all the denominations, except the Catholics and the Congregationalists, among whom each church had always been a law unto itself, to reorganize. With the breaking of political came the rupture of ecclesiastical bonds with foreign lands. In reconstructing themselves the churches could no longer look for state support, and there is no indication that they desired it. Hereafter they must make their own institutions, support them voluntarily, and especially undertake the whole charge of theological training. So cheerfully and sufficiently has this been done that in 1894 the United States Commissioner of Education in Washington had learned of no divinity school attached to any state university, and of only two such schools to be enrolled as "non-sectarian." These were the Divinity School of Harvard University and the theological department of Howard University for colored persons in Washington, District of Columbia. All other known theological schools were under denominational control. The system of the United States differs, there-

fore, vastly from the theological training given in Germany, where exegesis is an art, theology an ultimate philosophy, and history of opinions and events a story of development capable of scientific handling. Whether the studies of Hebrew and Hellenistic Greek, of interpretation, of dogma and of church history can be handled with thoroughness and fidelity to truth in an institution created for the defense of a particular phase of denominationalism, is a matter of observation, and will be determined by the bias of the observer. Two other objections may be brought against denominational divinity schools. As they are essentially propagandist and managed for the dissemination of predetermined views, the ablest and most independent minds of a denomination seldom get into the professorships. The enthusiasm of sect will send to the teaching function of such a school the safest men; that is, those who are most polemic for the cause and most conservative of the sect traditions. Again, each denomination multiplies its schools to suit the urgencies of its propagandism. The institutions are too often small and weak, inadequately equipped with professors or library, restricted to a narrow range of inquiry. In 1894 there was an average of 6.5 instructors to each of 147 seminaries, and an average attendance of 54 students. More than half of the institutions had 4 or fewer instructors, 14 of them had but 1 each, 59 had from 2 to 25 students in attendance. Of course these foundations are made in the hope of future renown; they are pre-emptions of new territory.

The largest divinity schools in America are that of Chicago, under Congregational control, with 16 professors and 202 students; the Southern Baptist Seminary at Louisville, Kentucky, with 11 professors and 268 students; and the Presbyterian Seminary at Princeton, with 11 professors and 233 students. Such are the reports for 1894. The richest of the seminaries are the Protestant Episcopal General Seminary of New York, with property valued at \$1,887,859; and Princeton, with property valued at \$1,824,097. But these are unequaled foundations in America. Most of the seminaries are poor and the pay of professors small. There can be no liberal equipment for the great majority of them. Hardly one of them has a chair of metaphysics, philology, sociology, psychology, and few provide for homiletics. They are institutions, not for general culture, but for just a decent professional equipment, to suit the requirements of a denomination.

A larger proportion of theological students probably have received a preliminary collegiate training than those of any other profession. This matter cannot be determined exactly, but it is estimated that 46.5 per cent of the divinity students have come to the seminaries from colleges. There are no tuition fees for divinity-training, and, if dormitories are built, no charges for room-rent and attendance. Provisions are made for even a freer education than this. In many denominational colleges there are scholarships es-

pecially available for persons properly authenticated who intend to enter the ministry. But far more liberal are the operations of the denominational educative societies. Scarcely a denomination in the land is without such an association to aid a youth in his preparation for the ministry. Occasionally they will pay the entire expense of a young man through a preparatory, a collegiate and a seminary course.

It is not known, and cannot be known, what proportion of theological students are helped through a divinity school by such means. The minutes of the Presbyterian General Assembly for 1896 show that there were in the preceding year, 921 students in the seminaries under its control, while the Board of Education reported having aided 1037 candidates for the ministry during the same year. Of course, this excess must be accounted for by the number of pupils helped in preparatory schools. From such a basis as this, and it is scarcely exceptional, it may be inferred that half of the candidates for the ministry are beneficiaries. No well-accredited man who wishes to study theology need be hindered by lack of means to do so. But there is by no means an agreement of opinion as to this facilitating of entrance to the ministry. Like all over-stimulation, it has its reactions.

The Union and Princeton Theological Seminaries have endowments estimated at about \$100,000 to each professor. All the Presbyterian seminaries, taken as a group, have \$40,000 to each professor. The next best showing is that of the Congregational and Protestant Episcopal denominations, where the average is \$35,000 to each professor. The Southern states have noticeably few divinity schools, although they have some of the largest. An explanation may be found in part in the comparative want of wealth in those states, but more probably in the fact that the Southern youth come to the older and better endowed institutions of the North, and to communities where life is more varied and complex.

Of recent years the names of women have begun to appear on the registers of some divinity schools. There are regularly ordained women in the Universalist and Unitarian ministries. Tufts Divinity School (Universalist) near Boston; Newton Theological School (Baptist), Massachusetts; and Hartford Theological Seminary (Congregational), Connecticut, have women among their students.

To no cause are Christian people in the United States more disposed to be generous than to the cause of theological education. How great their gifts are in aid of necessitous students there are no means of estimating, but they must be very large, since in 1894 there were 7,658 students in such institutions, of whom a majority probably were beneficiaries of some charitable fund. In that year, \$1,152,116 was added to the endowments of thirty-six schools. Of the 147 seminaries enrolled in the reports of the Commissioner of Education in 1894, that of the Catholics and six minor sects made no returns; but 133 others had

grounds and buildings valued at \$9,130,504 and productive endowments worth \$20,192,521.

The following table gives the distribution of theological schools by denominations.

	INSTRUCT- ORS.	STU- DENTS.
<i>Baptists.</i>		
Atlanta, Georgia	2	13
Chester, Pennsylvania	8	36
Chicago, Illinois	18	179
Columbia, South Carolina	1	29
Hamilton, New York	11	61
Liberty, Missouri	3	87
Newton Center, Massachusetts	16	75
Raleigh, North Carolina	2	29
Richmond, Virginia	4	52
Rochester, New York	18	124
Upper Alton, Illinois	5	11
Washington, District of Columbia, no report.		
<i>Baptists—Free.</i>		
Lewiston, Maine	5	15
<i>Baptists—Free-Will.</i>		
Hillsdale, Michigan	4	69
<i>Baptists—Seventh-Day.</i>		
Alfred Center, New York	3	3
<i>Baptists—Southern.</i>		
Louisville, Kentucky	11	268
	111	1,051
<i>Congregational.</i>		
Andover, Massachusetts	12	71
Bangor, Maine	7	50
Chicago, Illinois	20	202
El Paso, Texas	4	12
Hartford, Connecticut	23	54
Nashville, Tennessee	6	6
New Haven, Connecticut	17	119
New Orleans, Louisiana	1	10
Oakland, California	7	7
Oberlin, Ohio	14	73
Santee Agency, Nebraska	3	10
Talladega, Alabama	2	12
	116	626
<i>Christian.</i>		
Des Moines, Iowa	6	98
Merom, Indiana	3	27
Stanfordville, New York	6	19
	15	144
<i>Disciples of Christ.</i>		
Eureka, Illinois	2	70
Lexington, Kentucky	3	143
Oskaloosa, Iowa	3	9
	8	222
<i>Evangelical Association.</i>		
Naperville, Illinois	3	20
<i>German Evangelical.</i>		
St. Louis, Missouri	3	77
<i>Hebrew.</i>		
Cincinnati, Ohio	14	58
<i>Lutheran.</i>		
Hartwick, New York	3	5
Milwaukee, Wisconsin	3	31
Minneapolis, Minnesota	2	28
Robbinsdale, Minnesota	6	45
St. Louis, Missouri	5	130
St. Paul, Minnesota	2	30
<i>Evangelical Lutheran.</i>		
Chicago, Illinois	8	91
Columbus, Ohio	3	34
Dubuque, Iowa	3	47
Gettysburg, Pennsylvania	5	74
Hickory, North Carolina	2	23

<i>Evangelical Lutheran—Continued.</i>		INSTRUCT- ORS.	STU- DENTS.	<i>Presbyterian—Reformed.</i>		INSTRUCT- ORS.	STU- DENTS.
Newberry, South Carolina	-----	1	6	Allegheny, Pennsylvania	-----	3	11
Philadelphia, Pennsylvania	-----	5	112	<i>Presbyterian—Associated Reformed.</i>			
Rock Island, Illinois	-----	4	66	Due West, South Carolina	-----	3	9
Selins Grove, Pennsylvania	-----	3	7	<i>Presbyterian—United.</i>			
Springfield, Ohio	-----	3	39	Allegheny, Pennsylvania	-----	11	76
<i>Lutheran—German.</i>				Xenia, Ohio	-----	4	33
Springfield, Illinois	-----	3	179	<hr/>			
Buffalo, New York	-----	3	4	183			
<i>Lutheran—Norwegian Evangelical.</i>				<i>Protestant Episcopal.</i>			
Red Wing, Minnesota	-----	2	22	Cambridge, Massachusetts	-----	6	52
<hr/>				Chicago, Illinois	-----	8	25
66				Denver, Colorado	-----	4	5
<i>Methodist Episcopal.</i>				Faribault, Minnesota	-----	7	20
Athens, Tennessee	-----	4	4	Gambier, Ohio	-----	8	17
Atlanta, Georgia	-----	9	80	Middletown, Connecticut	-----	7	25
Baltimore, Maryland	-----	7	6	Nashotah, Wisconsin	-----	5	40
Berea, Ohio	-----	--	25	New York, New York	-----	10	140
Boston, Massachusetts	-----	24	151	Philadelphia, Pennsylvania	-----	9	33
Charles City, Iowa	-----	1	8	San Mateo, California	-----	4	4
Denver, Colorado	-----	6	25	Sewanee, Tennessee	-----	8	16
Evanston, Illinois	-----	17	120	Theological Seminary, Virginia	-----	6	58
Evanston, Illinois	-----	2	24	Washington, District of Columbia	-----	4	9
Evanston, Illinois	-----	3	22	<hr/>			
Greencastle, Indiana	-----	5	79	86			
Los Angeles, California	-----	6	--	<i>Reformed Church.</i>			
Madison, New Jersey	-----	13	140	Collegeville, Pennsylvania	-----	9	18
Mount Pleasant, Iowa	-----	2	13	Franklin, Wisconsin	-----	3	18
Nashville, Tennessee	-----	2	25	<hr/>			
Salem, Oregon	-----	6	4	12			
Warrenton, Missouri	-----	2	26	<i>Reformed Church in America.</i>			
<i>Methodist Episcopal—African.</i>				Holland, Michigan	-----	5	18
Wilberforce, Ohio	-----	4	7	New Brunswick, New Jersey	-----	6	39
<i>Methodist—Protestant.</i>				<hr/>			
Westminster, Maryland	-----	4	36	11			
Adrian, Michigan	-----	3	31	<i>Reformed Church in United States.</i>			
<i>Methodist Episcopal South.</i>				Lancaster, Pennsylvania	-----	6	62
Nashville, Tennessee	-----	6	62	Tiffin, Ohio	-----	5	28
<hr/>				<hr/>			
126				11			
<i>Moravian.</i>				<i>Roman Catholic.</i>			
Bethlehem, Pennsylvania	-----	6	9	Allegheny, New York	-----	9	63
<i>New Jerusalem.</i>				Baltimore, Maryland	-----	11	260
Cambridge, Massachusetts	-----	5	4	Beatty, Pennsylvania	-----	5	38
<i>Non-Sectarian.</i>				Carthagen, Ohio	-----	4	18
Harvard, Massachusetts	-----	9	51	Cleveland, Ohio	-----	4	34
Washington, District of Columbia	-----	9	45	Collegeville, Minnesota	-----	4	38
<hr/>				Germantown, Pennsylvania	-----	6	34
18				Ilchester, Maryland	-----	8	64
<i>Presbyterian.</i>				Mount St. Marys, Maryland	-----	7	24
Allegheny, Pennsylvania	-----	6	98	Overbrook, Pennsylvania	-----	12	144
Auburn, New York	-----	12	94	Rochester, New York	-----	8	39
Bloomfield, New Jersey	-----	4	22	St. Francis, Wisconsin	-----	12	225
Charlotte, North Carolina	-----	5	18	St. Louis, Missouri	-----	5	28
Chicago, Illinois	-----	13	212	St. Meinrad, Indiana	-----	6	42
Cincinnati, Ohio	-----	18	23	South Orange, New Jersey	-----	3	32
Clarksville, Tennessee	-----	6	34	Troy, New York	-----	7	128
Columbia, South Carolina	-----	5	53	Villanova, Pennsylvania	-----	4	10
Danville, Kentucky	-----	5	23	Washington, District of Columbia	-----	13	29
Hampden Sidney, Virginia	-----	5	74	<hr/>			
Lincoln University, Pennsylvania	-----	--	18	128			
Louisville, Kentucky	-----	13	31	<i>Universalist.</i>			
New York, New York	-----	14	143	Canton, New York	-----	8	32
Omaha, Nebraska	-----	9	21	Galesburg, Illinois	-----	9	24
Princeton, New Jersey	-----	14	233	Tufts College, Massachusetts	-----	10	40
Tuscaloosa, Alabama	-----	2	26	<hr/>			
San Anselmo, California	-----	7	20	27			
<i>Presbyterian—Cumberland.</i>				<i>Unitarian.</i>			
Lebanon, Tennessee	-----	13	40	Meadville, Pennsylvania	-----	9	42
Tehuacana, Texas	-----	4	29	<i>United Brethren.</i>			
<i>Presbyterian—German.</i>				Dayton, Ohio	-----	5	49
Dubuque, Iowa	-----	7	34	<hr/>			

THEOPHILUS, Byzantine Emperor (829-42).
See GREECE, Vol. XI, p. 116; MOHAMMEDANISM,
Vol. XVI, p. 585.

THEOPHILUS OF ANTIOCH. See CANON,
Vol. V, p. 8.

THEOPHYLACT SIMOCATTA. See BYZANTINE HISTORIANS, Vol. IV, p. 613.

THEOPHYLLINE, a new base discovered in tea. It forms a well-crystallized series of salts with the mineral acids. It has the same formula as theobromine, to which it is closely related.

THEOSOPHY, as a mystic speculation of devout minds, has been described in Vol. XXIII, pp. 278, 279, of this ENCYCLOPÆDIA. A modern phase of occult religion, based on Asiatic traditions and psychic phenomenalism, came into existence in Great Britain and America, under the leadership of Helen Blavatsky (q.v., in these Supplements). It is the purpose of this article to record the history and nature of this movement.

The present Theosophical Society is due ostensibly to an effort to stem the torrent of the materialism which characterizes this civilization by imparting some knowledge of wisdom-religion. Madame H. P. Blavatsky, with Col. H. S. Olcott, Mr. W. Q. Judge and others, founded the society in New York in 1875. The headquarters were in 1879 transferred to Madras, and much arduous but successful work was accomplished in India. In 1887, the movement received a fresh stimulus from the presence of Madame Blavatsky in London, from which epoch dates the great literary activity that characterizes it at the present day. There are now over three hundred branches in Europe, India, America and the colonies, and a large literature, and there was a claimed membership of 100,000 in the United States alone in 1895. The society has three declared objects, viz.: 1. To form the nucleus of a universal brotherhood of humanity, without any distinction whatever. 2. To promote the study of Aryan and other eastern literatures, religions, philosophies and sciences, and to demonstrate the importance of their study. 3. To investigate unexplained laws of nature and the psychic powers latent in man. The society is, therefore, quite unsectarian, and no articles of faith need be subscribed to by an adherent, the only condition of membership being an assent to the first object. No dogmas are forced upon members, as is the case with religions, and the teachings which are promulgated are merely propositions which can be verified by the student in the course of his progress in the study of occultism. Any individual member has a right to make any declaration of personal belief he pleases, on the understanding that no one will take it upon his authority.

From what has been said, it will be obvious that the teachings of theosophy are too extensive to be effectively summarized, and the inquirer must therefore be referred to the now plentiful books on the subject. Some of the more important teachings held by members of the society are as follows: 1. As to God: The system traces all manifestation back to emanative powers or Logoi, and still farther back to "an Omnipresent, Eternal, Boundless and Immutable Principle, on which all speculation is impossible." For further exposition and a comparison of this philosophy

with modern Pantheism and Indian cosmogony, the reader must be referred to Madame Blavatsky's "Secret Doctrine," from which the above quotation is taken. 2. As to man: He is the product of a two-fold evolution—from above downward and from below upward. While Darwinists hold that man was evolved in his entirety from the lower kingdoms, Theosophy teaches that evolution in this direction reaches its limit in the highest animal forms, when it was supplemented by a corresponding downward development of spiritual entities, which, coalescing with the animal forms, produced the compound being known as man. Man is therefore immortal as to his higher part and mortal as to his lower. 3. Reincarnation: The higher part of man, called the ego, incarnates again and again in human bodies on this earth, acquiring during a long cycle of successive incarnations an ever-increasing knowledge of and power over the lower kingdoms of nature. 4. Karma: The law which ordains that every man shall incur the full consequence of all his actions, good or bad, either in this or a future incarnation, his circumstances in this life being conditioned by his actions in former lives; so that the facts of life are shown to be consistent with the law of justice. 5. Masters, or perfected men: Men who have proceeded in their evolution so far as to have acquired a power over, and knowledge of, the forces of nature beyond that possessed by a majority of the race. Having left behind all selfish motives, masters are occupied in trying to raise others to the same level of attainment as themselves, and this they can most effectually do by teaching their wisdom. 6. Psychic powers: The true road to knowledge is, not through external research, but through the cultivation of the higher faculties latent in all men, by which they are put into communication with the higher planes of nature, which thereby become items of actual experience. Before psychic powers can be developed, a severe and prolonged moral probation is necessary, both to fit the candidate to undergo the attendant hardships, and to insure the safe employment of such powers.

Considerable interest was aroused during 1894 over various charges of fraud preferred against Mr. Judge in connection with supposed communications from the "Mahatmas," or masters. An investigation into these charges was made by Annie Besant, and resulted in upholding Mr. Judge by the American section of the society, and in its taking the leadership of the movement throughout the world.

The chief books on Theosophy are: *The Secret Doctrine*; *Isis Unveiled*; *The Key to Theosophy*, by H. P. Blavatsky; *Esoteric Buddhism*, and *The Occult World*, by A. P. Sinnett; *Echoes from the Orient*, and *The Ocean of Theosophy*, by W. Q. Judge; *Theosophical Manuals*, Nos. I, II, III, by Annie Besant. The society has headquarters at 62 Queen Anne street, London, W.; at 144 Madison Avenue, New York City, New York; and in India, at Adyar, Madras.

THERAPEUTÆ, a Judaic society. See MONACHISM, Vol. XVI, p. 698.

THERESA, a post village in Theresa township, Jefferson County, New York, situated on Indian River and surrounded by several beautiful lakes. The Rome, Watertown and Ogdensburg railroad runs through the village; and it also is the junction of the Clayton branch of the same road. The village has three churches, flour-mills, foundries and numerous manufactories. Its population is 917; that of Theresa town is 2,130.

THERESIANSTADT. See SZABADKA, Vol. XXII, p. 856. Population 1890, 72,683.

THERIANTHROPIC POLYTHEISM. See RELIGION, Vol. XX, p. 368.

THERMÆ. See BATHS, Vol. III, pp. 434, et seq.

THERMAL OR HOT SPRINGS. See GEOLOGY, Vol. X, pp. 223, 270.

THERMIC FEVER. See PATHOLOGY, Vol. XVIII, p. 394.

THERMIDOR, name of a month in the calendar of the first French republic. It extended from July 19 to August 17.

THERMO-CHEMISTRY. In all chemical changes heat is either given out or absorbed. The department of the science which deals with the study of these heat-effects—the measurement of the quantities of heat, etc.—is called thermochemistry.

THERMO-ELECTRICITY. See ELECTRICITY, Vol. VIII, pp. 94-99.

THERMOGRAPH. A device for recording temperature. Bartlett's thermograph is designed to give at a central point a record of the temperature of the several rooms of a building, greenhouse, factory, etc. It comprises a cabinet, having an electric switch-board, dials and push-buttons. The dials are electrically connected with registering thermometers in the different apartments under surveillance. Incidentally, the apparatus serves as a fire-alarm, being made to sound a gong if the temperature in any apartment rises over 100° F. See Vol. XXIII, p. 293.

THERMOPHONE. An instrument for obtaining the temperature at a distant or inaccessible place, as the bottom of a lake. It is the invention of Henry E. Warren and George C. Whipple, and may be called an electric telethermometer of the resistance type. It is a modification of the Wheatstone's bridge, being based upon the principle that the resistance of a conductor to the passage of a current of electricity depends upon its temperature, and that different metals have different electric temperature coefficients. As alloys have much lower coefficients than pure metals, German silver and copper wire were selected for use in the instrument. The electrical resistance of copper increases 1 per cent. with each 5° F. of temperature, while German silver requires a rise in temperature of about 50° F. to increase its resistance a like amount. The arms of the bridge are therefore formed of coils of these two metals, and the coils are electrically connected at the distant place where the

temperature is to be read. Brass tubes, hermetically sealed, inclose the coils, to protect them from outside interference. A movable contact is then provided on a slide-wire, and connected by a leading wire with the central point between the coils. In place of the galvanometer used with the Wheatstone's bridge a telephone and current interrupter are used with the portable form of the thermophone. When the bridge is balanced the contact assumes a different position with every change of temperature at the distant point to which the wires lead, and a dial scale being provided, this temperature may be read from the pointer. The method of operation is to move the dial pointer until no buzzing sound can be heard in the telephone, when the zero or balancing-point of the bridge is known to have been reached, and the scale on the dial at which the pointer is thus left indicates the temperature of the distant point.

C. H. COCHRANE.

THERMOPILE. See ELECTRO-METALLURGY, Vol. VIII, p. 116.

THERMOPYLÆ, a narrow pass in Greece leading from Thessaly into Locris, between Mount Veta on the south and the Malaic gulf on the north. For its defense against the Persians, see LEONIDAS, Vol. XIV, p. 462.

THERMOSTAT. A device or apparatus for utilizing the expansive force of heat for operating or regulating dampers, fire-alarms, pressure-gauges, etc. Some of them make use of the expansion of a gas, others of mercury, steel, etc. Many of them open or close electric circuits, and are thus made to serve some useful purpose. A common practical form for regulating the temperature of apartments, through the medium of dampers applied to a furnace, depends upon the expansibility of a metal spring. This spring is fixed at one end, while the other forms a circle and pointer. The tip of the pointer is set between contact-posts, and an increase of temperature causes the spring to expand and slightly uncoil the circle, moving the pointer until it touches one of the contact-posts. This makes an electric connection with a stout spring near the furnace, and the spring closes the damper. This reduces the temperature, and as the spring cools it shrinks, and after a time brings the pointer against the other contact-post, when another spring mechanism throws the damper open once more. This thermostat is furnished with a knob, which sets the contact-posts within any reasonable range, so that the heat can be kept as high as 80 or as low as 60 degrees.

C. H. COCHRANE.

THEROPODA, an order of fossils. See REPTILES, Vol. XX, p. 443.

THESIS. See ARSIS, in these Supplements.

THESPIS, an actor. See DRAMA, Vol. VII, p. 404.

THESSALONICA, city. See SALONICA, Vol. XXI, p. 227.

THETIS, a Greek myth. See ACHILLES, Vol. I, p. 95.

THEURIET, ANDRÉ, poet and novelist; born in Marly-le-Roi, France, Oct. 8, 1833. He studied law in Paris, and in 1857 entered the office of the Ministry of Finances. His works, which are popular among his countrymen and have been translated into German and English, include *Le Chemin des Bois* (1867); *Le Bleu et le Noir* (1873); *La Ronde des Saisons et des Mois* (1891), poetry; *Mlle. Guignon* (1874); *Raymonde* (1887); *Le Fils Maugars*; *Charme Dangereux* (1891); and other novels, several plays and frequent contributions to periodical literature.

THIAN-SHAN, mountains. See ASIA, Vol. II, p. 686.

THIBAudeau, ANTOINE CLAIRE, COUNT DE, a French historian and politician; born at Poitiers, France, March 23, 1765; was a deputy to the convention of 1792, a member of the Mountain, and President of the Council of Five Hundred in 1796; was ennobled by Napoleon I; exiled by the Bourbons, and made a senator by Napoleon III. He wrote *Memoirs of the Convention and of the Directory* (1824); *Memoirs of the Consulate and General History of Napoleon Bonaparte* (1827-28); and after his death *Ma Biographie: mes Mémoires* were published (1875). He died at Paris, March 8, 1854.

THIBAUT IV, King of Navarre. See FRANCE, Vol. IX, p. 644.

THIBODEAUX, a village and the capital of La Fourche Parish, southeastern Louisiana, located on Bayou La Fourche and on the Southern Pacific railroad, 55 miles from New Orleans. There are two newspapers, seven churches, a convent, two seminaries and several factories in the village, rice and sugar-cane being the products of the neighborhood. Population 1900, 3,253.

THICK-KNEE. See CURLEW, Vol. VI, p. 712.

THIERSCH, FRIEDRICH WILHELM (1784-1860), a Saxon philologist, professor of classical languages in Munich, reorganizer of Bavarian state schools. See ARCHAEOLOGY, Vol. II, p. 345.

THINO-CORIDÆ, a family of birds. See SHEATHBILL, Vol. XXI, p. 782, note.

THIN PLATES, COLORS OF. See WAVE THEORY, Vol. XXIV, pp. 426-428.

THIRD ESTATE. See FRANCE, Vol. IX, pp. 597, 598.

THIRST. See NUTRITION, Vol. XVII, p. 668.

THIRTY-NINE ARTICLES. See ARTICLES, Vol. II, pp. 653, 654.

THIRTY TYRANTS, a magistracy of aristocrats imposed on Athens in 404 by Sparta, at the close of the Peloponnesian War. See THRASYBULUS, Vol. XXIII, p. 319.

THIRTY YEARS' WAR. See GERMANY, Vol. X, pp. 497, 498.

THLINKEETS. See INDIANS, Vol. XII, p. 826.

THOM, JAMES CRAWFORD, an American artist; born in New York, March 22, 1835; studied at the National Academy, and in 1859 went to Europe, studying with Frère, Corot and Picou. His works were exhibited in London, where he gained several medals and other honors at various times. He

returned to the United States in 1872. Among his best-known paintings, executed while abroad, are *By the Riverside*; *Returning from the Wood*; *Tired of Waiting*; *Going to School*; and *The Monk's Walk*, last three last named having been exhibited at the Royal Academy, London. More recently Mr. Thom has exhibited at the Academy of Design, New York, *Forgotten Cares* (1877); *Song of the Sea* (1881); *The Old Farm House* (1884); and *The Pets* (1885).

THOMAS, ANNIE. See CUDLIP, ANNIE THOMAS, in these Supplements.

THOMAS, ARTHUR GORING, an English musical composer; born at Ratton, Sussex, England, Nov. 21, 1851. He did not take up the study of music seriously until after he became of age; studied for two years in Paris (1875-76), and, after his return, for three years at the Royal Academy, and twice gained the annual prize for composition. He composed the music for the opera founded on Moore's *The Light of the Harem*; for *Esmeralda* (1883); and *Nadeshda* (1885); also a cantata, *The Sun-Worshippers*, for the Norwich Festival of 1881; an orchestral *Suite de Ballet*, and many smaller pieces of music, including orchestral, church music, and songs. Died in London, by suicide, March 20, 1892.

THOMAS, CHARLES LOUIS AMBROISE, a French musical composer; born at Metz, Aug. 5, 1811; was the son of a distinguished professor of music. He entered the Conservatoire in 1828, and there gained many prizes, including the grand prize of Rome at the competition of 1832. After his return from Italy he produced many works, including *Mignon* (1866); *Le Carnaval de Venise*; *Françoise de Rimini*, *Le Caïd*; *Psyche*; and *Hamlet* (1868). He became professor of composition at the Conservatoire in 1852, and director in 1871; was chosen a member of the French Institute in 1851, and made a grand officer of the Legion of Honor in 1881. His other works are *La Double Échelle* (1837); *Le Perruquier de la Régence* (1838); *Le Panier Fleuri* (1839); and *La Gypsy*, written in collaboration with Besnoit. The last-named, and *Mignon* and *Hamlet*, have been produced in the United States. Died in Paris, Feb. 12, 1896.

THOMAS, CYRUS, an American entomologist and archæologist; born in Kingsport, Tennessee, July 27, 1825. He practiced law until 1865, when he entered the ministry of the Evangelical Lutheran Church. He interested himself much in the study of geology and geography, and in 1869 joined Prof. F. V. Hayden in the survey of the territories. He was elected professor of natural sciences in the year 1873, in the Southern Illinois Normal University, and in 1876 was appointed state entomologist of Illinois. A year later he became a member of the United States entomological commission, and after 1882 was archæologist to the United States Bureau of Ethnology. Professor Thomas has written many valuable works on these subjects. He studied the Mayan hieroglyphs of Central America, and claimed to have made out enough of them to form a key. Some of his important publications are *Acrididae of North America* (1873); *The Noxious*

and *Beneficial Insects of Illinois* (1876-80); *Notes on Certain Mayan and Mexican Manuscripts* (1884); and *Mound Explorations of the Bureau of Ethnology*.

THOMAS, EDITH MATILDA, an American poetess; born at Chatham, Ohio, Aug. 12, 1854. She was educated at the Geneva Normal School, and devoted her life to poetry, much of which has been published in periodicals and magazines and in 1888 took up her residence in New York. Some of her works are published under the following titles: *A New Year's Masque* (1885); *The Round Year* (1886); *Babes of the Year* (1888); and *The Inverted Torch* (1890).

THOMAS, GEORGE HENRY, an American soldier; was born in Southampton County, Virginia,



GEN. G. H. THOMAS.

July 31, 1816, and died in San Francisco, California, March 28, 1870. At the age of twenty years he received an appointment to the West Point Military Academy, from which institution he graduated in 1840. He was commissioned lieutenant in the Third artillery in the same year, and was first assigned to duty in New York, but was soon sent to Florida, to take part in the Indian war, where his gallantry gained him a brevet in 1841. After various transfers, he was sent to Texas, and at the outbreak of the Mexican War he accompanied General Taylor's army, distinguishing himself at Monterey and Buena Vista, being brevetted captain for gallantry. In the latter battle, the success of the American arms was, in great measure, due to the artillery, under the command of Thomas, and the young officer was highly complimented by his superiors. He remained in Texas and Mexico till 1849, when he was again sent to Florida. In 1851 he was detailed as instructor of artillery and cavalry at the West Point Military Academy, remaining there four years. On the formation of the new cavalry regiments, Thomas was made junior major of one of them, the historic Second. He was again ordered to Texas, and remained there until 1861, when he obtained leave of absence. Before his leave had expired, his regiment, which had been surrendered in Texas, arrived in New York, and he was ordered to rejoin it and conduct it to the barracks at Carlisle, Pennsylvania. At the outbreak of the Civil War Thomas was solicited to go with his state, but remained loyal to the Union. He was given command of a brigade, at the head of which he crossed the Potomac into Virginia, where he put to flight a militia force under T. J. ("Stonewall") Jackson, on July 2.

He led Paterson's column in the Bull Run campaign, and in August, 1861, was made brigadier-general of volunteers, and assigned to duty in Kentucky. Here, for a few months, he was engaged in drilling raw recruits, his material afterward forming the First Brigade of the Army of

the Cumberland. Early in January, 1862, he entered East Tennessee and fought the battle of Mill Springs, defeating the Confederates under Gen. Felix K. Zollicoffer, who was killed in the engagement. He took part in the Shiloh campaign, and in April, 1862, was made major-general. On Sept. 29 the chief command of the Army of the Ohio was tendered Thomas, but was declined by him, and in October he was placed in command of the five central divisions of the army. In December he took part in the battle of Stone River, and it was due to his fighting qualities that the national army was saved from defeat. At Chickamauga he bore the brunt of the attack, and, though the result was a tactical defeat for the Union army, the victory was a barren one for the South. Here he won the soldiers' sobriquet of "The Rock of Chickamauga." Immediately after this, Thomas was placed in command of the Army of the Cumberland, and, although his position was critical in the extreme, he held his own till the battle of Chattanooga released his army from its peril. In the spring of 1864 he entered the Atlanta campaign at the head of 65,000 men, and took the greater share of the continuous fighting of that memorable series of battles. After the Atlanta campaign Thomas was sent to Nashville, to guard the river during Sherman's march to the sea. Here he found himself confronted by Hood, whom he repulsed at Franklin, Tennessee, inflicting heavy loss on the Confederates. The Union army was concentrated at Nashville, where the difficulties attending his position prevented Thomas's moving as promptly as it was thought he should, and he was summarily removed from command by General Grant. This action of Grant's has caused much controversy, but Thomas was afterward restored to his command, although General Grant himself set out for the scene of operations. On Dec. 16 Thomas again gave Hood battle, and succeeded in thoroughly annihilating his army. This battle of Nashville substantially ended the war in that quarter. On the first anniversary of the battle he received a gold medal from the state of Tennessee. After the campaign had closed Thomas remained in command of his department, and it was a raiding party which he had sent out that captured Jefferson Davis. After the war had ceased General Thomas was placed in command of the military district of the Tennessee, in which position he remained till 1867, when he was assigned to the third military district. While in this position he declined the promotion to lieutenant-general, which was tendered him. In 1869 he was transferred to the military district of the Pacific, with headquarters at San Francisco, where his death occurred.

THOMAS, GEORGE HOUSMAN, an Anglo-American illustrator; born in London, Dec. 7, 1824. He was apprenticed to a wood-engraver, and afterward went to Paris, where he gave his attention to illustrating books. He was called to New York as a newspaper-illustrator in 1846, but re-

turned to England the next year on account of ill-health. During his stay he designed several bank-notes. He was a leading draftsman on *The Illustrated London News*; prepared the illustrations to Thomson's *Seasons* in 1884, and for *Uncle Tom's Cabin*. Some of his best pictures were *The Queen Giving the Medals to the Crimean Heroes* and *The Queen and Prince Albert at Aldershot*. He died at Boulogne, France, July 21, 1868.

THOMAS, ISAIAH, an American journalist; born in Boston, Massachusetts, Jan. 19, 1749. About the year 1770 he entered into partnership with his former employer in publishing the *Massachusetts Spy*. When the Tories of Boston loudly opposed Thomas's Whig principles he transplanted his types and press to Worcester, Massachusetts, where the newspaper is still being published. He established a publishing-house at Boston in 1788, which issued the *Massachusetts Magazine*. He also printed *The Farmers' Magazine*, and established the *New England Almanac* in 1775, which he conducted for 26 years. In 1801 Mr. Thomas retired from the conduct of the paper. In 1812 he founded the *Worcester Antiquarian Society*, donating to it his large and valuable library, besides giving land, and building its hall, with a provision of about \$24,000 for its maintenance. In 1818 Alleghany College gave him the degree of LL.D. He was the author of a *History of Printing*, and was the first to introduce music-type in America. He died in Worcester, Massachusetts, April 4, 1831.

THOMAS, JOHN. See CHRISTADELPHIANS, in these Supplements.

THOMAS, JOHN J., an American agriculturist; born near Aurora, Cayuga County, New York, Jan. 8, 1810. He studied botany in the neighborhood, and, while yet a boy, collected an herbarium of thirteen hundred specimens. He became associate-editor in 1834 of the *The Genesee Farmer*, which was merged into the *Country Gentleman* in 1853, and published at Albany. He was horticultural editor of the *Albany Cultivator* (1841-53), and edited the *Illustrated Annual Register of Rural Affairs*. He also published *The Fruit Culturist* (1846); and *Farm Implements and the Principles of their Construction and Use* (1859). He died Feb. 22, 1895.

THOMAS, JOSEPH, an American lexicographer, brother of John J.; born in Cayuga County, New York, Sept. 23, 1811. He was educated at the Rensselaer Polytechnic Institute, at Yale University, and graduated from a medical school in Philadelphia; traveled in India and Egypt for about three years, studying Oriental languages; on his return became professor of Latin and Greek at Haverford College, Pennsylvania. His most important works are a *Pronouncing Gazetteer and Geographical Dictionary of the World*, on which he was co-editor with Thomas Baldwin (1845); *Travels in Egypt and Palestine* (1853); *Universal Pronouncing Dictionary of Biography and Mythology* (1870, 1871); and a *Comprehensive Medical Dictionary* (1864). He also contributed the geographical and biographical pronouncing vocabularies to

Webster's Dictionary. He died in Philadelphia Dec. 24, 1891.

THOMAS, LORENZO, an American soldier, was born at New Castle, Delaware, Oct. 26, 1804, and graduated at West Point in 1823. He participated in the Florida and Mexican wars, and was brevetted lieutenant-colonel for gallantry at Monterey. He was chief of staff to General Winfield Scott from 1853 to 1861, being made adjutant-general of the army, August 3d of the latter year, with the rank of brigadier-general. In 1863 he began to organize colored troops, continuing the work until the close of the war. Upon the removal of Edwin M. Stanton as Secretary of War by President Johnson, General Thomas was appointed Secretary *ad interim*, but Secretary Stanton would not surrender his office. He was brevetted major-general March 13, 1865, retired Feb. 22, 1869, and died at Washington, March 2, 1875.

THOMAS, MARTHA CAREY, an American educator; born in Baltimore, Jan. 2, 1857; daughter of James Carey Thomas, M.D., and of Mary Whitall, of Philadelphia. She was graduated with honor at Cornell University, New York, in 1877; studied Greek with Dr. Gildersleeve of Johns Hopkins University (1877-78), but was not admitted to the university class-rooms; passed three years of classical study in Leipsic, where degrees were refused to women, but in 1882 obtained Ph.D. at Zurich, with highest honor, being the first woman to obtain that distinction there; studied the next year at the Sorbonne and the Collège de France in Paris; Dean of the Faculty and professor of English at Bryn Mawr College, Bryn Mawr, Pa., in 1885; president of that institution in 1894, retaining her professional duties.

THOMAS, PHILIP FRANCIS, an American public man; born at Easton, in Talbot County, Maryland, Sept. 12, 1810; educated at Dickinson College, and was admitted to the bar in 1831. He served in the state legislature, and one term as member of Congress, from 1839 to 1841, declining a renomination, and from 1848 to 1851 was governor of the state. In December, 1860, he became Secretary of the Treasury for a few weeks in the Buchanan Cabinet, *vice* Howeli Cobb, resigned; and in 1866, being at that time a member of the Maryland house of delegates, was chosen United States Senator, but was refused his seat "because of having given aid and comfort to the Rebellion." In 1875 he began six years' service as a Representative in Congress; in 1878 was in the legislature, afterwards practicing law in Easton, Maryland. He died Oct. 2, 1890.

THOMAS, THEODORE, an American musician; born at Esens, Hanover, Germany, Oct. 11, 1835. He received his musical education mostly from his father, and first played in public at the age of six. In 1845 his family removed to the United States, and for two years he played violin solos at concerts in New York. He then traveled for a time in the South, and, returning to New York in 1851, played at concerts and at the opera, at first as one of the principal violinists, and

afterward as orchestra-leader until 1861. In connection with others, in 1855 he began a series of chamber concerts, which were continued until 1869. His first symphony concerts were given in 1864-65, and extended (excepting from 1869 to 1872) until he left New York, in 1878, to take the direction of the College of Music at Cincinnati. He remained in Cincinnati until 1880, when he resigned this position



THEODORE THOMAS.

and returned to New York. With brief intervals he was conductor of the Brooklyn Philharmonic Society from 1862, and of the New York Philharmonic Society from 1878 to 1891. From 1866 to 1878 he gave summer concerts annually in various cities; and in 1869 he made his first concert tour in the Eastern and Western states. He conducted five music festivals in Cincinnati (1873, 1875, 1878, 1880, 1882), one in Chicago (1882), and one in New York (1882). In 1885-86 he organized a series of popular concerts in New York, and became the conductor of the American opera. In June, 1890, he married Miss Amy Fay, of Chicago; in 1891 he established his orchestra permanently at the Auditorium in that city, and in 1893 was musical director at the World's Fair there. Mr. Thomas has probably done more than any other person to raise the standard of music in America.

THOMAS, WILLIAM CAVE, an English artist; born in London in 1820. He studied for two years at the Royal Academy, and in 1840 went to Munich, where he studied drawing. After his return to England, in 1843, he devoted himself to oil-painting, and later to water-color. Among his best works may be named *Alfred Giving His Last Loaf to the Pilgrims*; *Petrarch's First Sight of Laura*; *The Heir Cast Out of the Vineyard*, in oil; *The Lord of the Harvest*; *Morning*; *Dante and Beatrice*, in water-color; and a cartoon of Westminster Hall; *St. Augustine Preaching to the Saxons*. He also wrote some works on art, and contributed the articles on CORNELIUS and on ENCAUSTIC PAINTING to this ENCYCLOPÆDIA.

THOMAS, CHRISTIANS OF ST. See Vol. XXIII, p. 308.

THOMAS AQUINAS. See AQUINAS, Vol. II, pp. 231-233.

THOMASTON, a town of Litchfield County, northwestern Connecticut, on the Naugatuck River, and on the New York, New Haven and Hartford railroad, nine and a half miles N. of Waterbury. It has brass-rolling, cutlery, scissors and shears factories, the Seth Thomas Clock Works, Laura Andrews Free Library, banks, and one newspaper. Population 1880 (including village), 3,225; 1890, 3,278; 1900, 3,300.

THOMASTON, a town and the capital of Upson County, west central Georgia, on the Central of Georgia and the Macon and Birmingham railroads, 76 miles S. of Atlanta. It is in a farming

district, with timber and iron-ore, has iron-works, sawmills, carriage, shoe and furniture works, a state bank and a weekly newspaper. Population 1880, 570; 1890, 1,181; 1900, 1,714.

THOMASTON, a town and port of Knox County, southern Maine, on the St. George's River, and on the Maine Central railroad, 80 miles N. E. of Portland, and 12 miles N. of the Atlantic Ocean. Its extensive granite quarries are worked by the convicts of the state prison; three hundred thousand casks of lime are exported annually. It has five churches, two public libraries, three banks and a weekly newspaper. It is connected with Rockland, the county seat, by an electric railway. Ship-building is an important industry. Population 1890, 3,009; 1900, 2,688.

THOMASVILLE, a town and the capital of Thomas County, southwestern Georgia, at the junction of the Albany division of the Atlantic and Gulf railroad with the main line, 200 miles W. by S. W. of Savannah, 50 miles S. of Albany. It is in one of the most productive and otherwise desirable sections of the state, producing cotton, grain, fruits, sugar-cane, etc. It contains a courthouse, two weekly newspapers, four churches, several schools, both public and private—including among the latter a female seminary and Fletcher's Institute for boys—three banks with a combined capital of \$350,000, a number of hotels, and several public buildings. In the way of manufactures, there are saw and grist mills, cottonseed-oil works, fertilizer works, furniture factories and a foundry. Population 1880, 2,555; 1890, 5,514; 1900, 5,322.

THOMISTS, a school. See SCHOLASTICISM, Vol. XXI, pp. 429, 430.

THOMPSON, a town of Windham County, Connecticut, on the New York and New England railroad containing the villages of Thompson, East Thompson, West Thompson, Grosvenor Dale, North Grosvenor Dale, Mechanicsville, Wilsonville, New Boston and Quinebaug. The town is engaged in agriculture, cotton and woolen manufactures. Population 1880, 5,051; 1890, 5,580; 1900, 6,442.

THOMPSON, CEPHAS G., an American artist; born in Middleboro, Massachusetts, 1809. His earlier efforts were made in Boston and New York, but in 1852 he visited Europe, and studied in Rome for the next seven years. His most celebrated work was *Beatrice Cenci*. He returned to America in 1860 and settled in New York, where he became a member of the National Academy. He painted a large number of portraits, including Nathaniel Hawthorne, William Cullen Bryant and others. He died in New York, 1888.—His brother, JEROME THOMPSON, was born in Middleboro, Massachusetts, 1814. He began his career as a sign-painter; went to New York in 1831, where he studied and practiced art. He never attended any art school or had any teacher; went to Europe in 1852, where he spent two years. He lived a retired life in New York, and very few of his pictures have been exhibited to the public. Some of his best-known

works are *The Old Oaken Bucket; Home, Sweet Home; Woodman, Spare That Tree; Hiawatha's Homeward Journey with Minnehaha; The Home of My Childhood*, and *Coming Thro' the Rye*.

THOMPSON, DANIEL PIERCE, an American author; born at Charlestown, Massachusetts, Oct. 1, 1793; was graduated at Middlebury College in 1820, studied law, and in 1823 engaged in the practice of his profession at Montpelier, Vermont, where he held numerous local offices, among them being county judge of probate court. He was clerk of the supreme court, and afterward secretary of state from 1853 to 1855, and contributed to magazines and the press, besides publishing volumes of romance and poetry descriptive of New England life, including *The Green Mountain Boys* (1840); *The Rangers* (1851); *Gant Garley* (1857); and a *History of Montpelier* (1860). He also compiled the laws of Vermont (1824-34). He died at Montpelier, June 6, 1868.

THOMPSON, SIR EDWARD MAUNDE, an English librarian and author; born May 4, 1840, in Jamaica; was educated at Rugby. He was appointed an assistant in the British Museum in May, 1861, became assistant keeper of the manuscripts in 1871, and was appointed keeper of the manuscripts and secretary in succession to Mr. Bond in 1878. He was joint editor of the publications of the Palæographical Society; also of the *Diary of Richard Cocks in Japan* for the Hakluyt Society (1883). He contributed a *Handbook of Greek and Latin Palæography* (1893); and contributed the articles on MINIATURE, PALÆOGRAPHY, PAPER and PAPYRUS to this ENCYCLOPEDIA.

THOMPSON, SIR HENRY, an English surgeon; born at Framlingham, Suffolk, England, Aug. 6, 1820, and educated at University College, London; was appointed assistant surgeon of University College Hospital, London, in 1853, surgeon in 1863, professor of clinical surgery in 1866 and consulting surgeon in 1874. In 1884 he held the post of professor of surgery and pathology to the Royal College of Surgeons, London. He gained the Jacksonian prize of the Royal College of Surgeons in 1852, with an essay on *The Pathology and Treatment of Stricture of the Urethra*, and the same prize in 1860, with an essay on a kindred subject. He was appointed surgeon-extraordinary to the late King of the Belgians in 1863 and to the present King in 1866. He was knighted in 1867, and was a member of numerous societies both in England and on the Continent. An article written by him in the *Contemporary Review*, in 1873, drew public attention to the subject of cremation. Sir Henry Thompson studied painting under Mr. Elmore and Mr. Alma Tadema, and he has frequently exhibited pictures at the Royal Academy, in the Salon of Paris and elsewhere. He has published *Practical Lithotomy and Lithotrity* (1863); *Modern Cremation* (1890); clinical Lectures on *Diseases of the Urinary Organs* (1868); and the novels *Charley Kingston's Aunt* and *All But*, under the pseudonym of Pen Oliver.

THOMPSON, HUGH MILLER, an American Episcopal bishop, was born in County Derry, Ireland, June 5, 1830. Coming to the United States, he attended the Nashotah Seminary, in Wisconsin, from which he graduated D.D. in 1852. He entered the Episcopal ministry; was a minister in several places in Wisconsin; was professor of ecclesiastical history at Nashotah; rector of St. James Church, Chicago, in 1871; of Christ Church in New York till 1875; of Trinity Church, New Orleans, 1876; in 1883 was consecrated assistant bishop of Mississippi, and in 1887 became bishop. He attended the third Pan-Anglican conference in London in 1888, and preached the funeral sermon of Bishop Harris of Michigan, in Westminster Abbey. Bishop Thompson has written a number of books. Among his works are *Unity and Its Restoration* (1860); *First Principles* (1868); and *Is Romanism the Best Religion For the Republic?* (1873). He was editor of *The American Churchman* in Chicago (1860) and *The Church Journal and Gospel Messenger*, New York (1872-75).



BISHOP H. M. THOMPSON.

THOMPSON, JACOB, an American public man, was born in Caswell County, North Carolina, 1810. He was graduated at the University of North Carolina in 1831, and afterward practiced law in the Chickasaw country, Mississippi. He represented his district in Congress from 1839 until 1857, when he was appointed Secretary of the Interior by President Buchanan. He resigned that office in 1861, because, as he claimed, troops had been ordered to re-enforce Fort Sumter without the consent of the cabinet. He was elected governor of Mississippi in 1862, and in 1864 was sent to Canada as a Confederate commissioner. He was chief promoter of the plot to release the Confederate prisoners at Camp Douglas, near Chicago, and to seize that city, and was charged with attempts to organize other such movements in the North. He died in Memphis, Tennessee, 1885.

THOMPSON, SIR JOHN SPARROW DAVID, a Canadian jurist, was a native of Nova Scotia; born at Halifax, Nov. 10, 1844, and educated at the Free Church Academy there. In 1865 he was admitted to the bar, and became prominent in the practice of his profession. He was a member of the House of Assembly of Nova Scotia, 1877-82; a member of the executive council, and attorney-general of Nova Scotia 1878-82; judge of the supreme court; Attorney-General of Canada and Minister of Justice (1885), was elected to the Parliament of Canada three times; arranged the fishery treaty between England and the United States, in 1885, for which he was knighted in 1888; was one of the British representatives at the Bering Sea arbitration, in

Paris, 1893; became Premier of Canada in the same year; and was made a member of the Queen's Privy Council, 1894. He died at Windsor Castle, Dec. 12, 1894.

THOMPSON, JOHN REUBEN, an American author, was born in Richmond, Virginia, Oct. 23, 1823. He was graduated at the University of Virginia in 1844, and afterward began the practice of law in Richmond, but soon abandoned that profession for literature. In 1847 he became editor of the *Southern Literary Messenger*, and continued to conduct that magazine until 1859. In Augusta, Georgia, he edited the *Southern Field and Fireside*; went to Europe in 1863, and became connected with the staff of the *London Index*, at the same time contributing to *Blackwood's Magazine*; returned to America after several years, and became literary editor of the *New York Evening Post*. He wrote some poems, the best of which are *The Burial of Latane*; *The Death of Stuart*; and *The Battle Rainbow*. He died in New York City, April 30, 1873.

THOMPSON, JOSEPH PARRISH, an American author, was born at Philadelphia, Aug. 7, 1819. He was a graduate of Yale and the Andover Theological Seminary; was for many years pastor of the Broadway Tabernacle Church, New York, and aided in establishing the *Brooklyn Independent*, *New Englander*, and other journals, to which he was a frequent contributor. He was the author of Biblical works, and wrote for the *North American Review*, and several other secular periodicals. In 1852-53 he traveled in Egypt, Palestine, and other oriental countries, studying especially Egyptology; became a resident of Berlin, Germany, in 1872. Among his publications are *Lectures to Young Men* (1846); *Egypt, Past and Present* (1856); *Christianity and Emancipation* (1863); *Man in Genesis and Geology* (1869); *Church and State in the United States* (1870); and *The Workman: His False Friends and His True Friends* (1879). He died in Berlin, Sept. 20, 1879.

THOMPSON, LAUNT, an American sculptor, was born in Abbeyleix, Queen's County, Ireland, Feb. 8, 1833. He studied anatomy in Albany, New York, at the age of 14, and later entered a medical college, but abandoned medicine for art, and worked for nine years in the studio of Erastus D. Palmer, the sculptor. He removed to New York in 1858, and his talent for medallion portraits secured him remunerative employment. The following year he became an associate of the Academy of Design, and in 1862 was elected an academician. He went to Italy in 1868, and again in 1875, and in 1874 he became vice-president of the National Academy. In the latter year Yale conferred on him the honorary degree of M.A. Among his works are *Elaine*, a bust; *Morning Glory*, a medallion; statues of *Abraham Pierson*; *Napoleon I*; *Gen. John Sedgwick*; *Winfield Scott*, at the Soldiers' Home, Washington, District of Columbia; *Charles Morgan*; and *General Burnside*, an equestrian statue (1887). His portrait bust of *William C. Bryant* is in the Metropolitan Museum of Art, New York. In all his work he evinced a

talent for portraiture equaled by few of our sculptors. Died in Middletown, N. Y., Sept. 26, 1894.

THOMPSON, MAURICE, an American author; born at Fairfield, Ind., Sept. 9, 1844. His parents removed first to Kentucky and thence to northern Georgia, and the son was educated by private tutors. He served in the Confederate army; at the close of the War went to Indiana as civil engineer on a railroad, of which he later became chief engineer; studied law; was elected to the legislature in 1879; and was state geologist from 1885 to 1889. He wrote *Hoosier Mosaics* (1875); *The Witchery of Archery* (1878); *A Tallahassee Girl* (1882); *Songs of Fair Weather* (1883); *Byways and Bird Notes* (1885); *The Boy's Book of Sports* (1886); *Sylvan Secrets* (1887); *A Fortnight of Folly* (1888); *Stories of the Cherokee Hills* (1898).

THOMPSON, MORTIMER, an American humorist; born at Riga, New York, Sept. 2, 1832. He was educated at the University of Michigan, but left before graduating and went traveling with a theatrical company; went to New York; wrote some humorous letters for the *Detroit Advertiser*; secured employment on the New York papers; wrote several volumes of humorous articles which had a wide circulation at the time; and was a popular lecturer. He took the pen-name "Q. K. Philander Doesticks, P.B.," and wrote *Doesticks—What He Says* (1855); *History and Records of the Elephant Club* (1857); and *Nothing to Say* (1857). He died in New York, June 25, 1875.

THOMPSON, RICHARD WIGGINTON, an American public man, was born in Culpeper County, Virginia, June 9, 1809. He removed to Kentucky in 1831, thence to southern Indiana, where he studied law and was admitted to the bar in 1834. He settled at Bedford, Indiana; was elected to the lower house of the legislature in 1834, and to the upper house in 1836; served in Congress from 1841 until 1843, and again from 1847 until 1849. He was offered the Austrian mission by President Taylor, the recordership of the land office by President Fillmore, and a seat on the bench of the court of claims by President Lincoln, but he declined all these offices. In 1867-69 he was judge of the eighteenth circuit of Indiana. Mr. Thompson entered President Hayes's Cabinet as Secretary of the Navy, March 12, 1877, resigning in 1881 to become chairman of the American Committee of the Panama Canal Company. He is the author of *The Papacy and the Civil Power* and a *History of the Tariff*.

THOMPSON, ROBERT ELLIS, an American educator; born at Lurgan, Ireland, April 5, 1844. Removed to America in his thirteenth year; settled in Philadelphia, and was educated at the University of Pennsylvania, where he graduated in 1865; was ordained by the Reformed Presbyterian Church in 1868, and in the same year became professor of Latin and mathematics in the University of Pennsylvania; in 1871 became professor of social science; in 1881 professor of history and English literature, which position he has held ever since. He lectured on protection and the tariff at Harvard in 1884-85, and at Yale in 1886-

87; and was Stone lecturer at Princeton in 1891. In 1870-80 he was editor of the *Penn Monthly*, and afterward was editor of the *American*; edited the first two volumes of the *Encyclopædia Americana*, a Supplement to the ninth edition of the *ENCYCLOPÆDIA BRITANNICA*. He also wrote *Social Science and National Economy* (1875); *Relief of Local and State Taxation Through Distribution of National Surplus* (1883); *Protection to Home Industry* (1886); *The Divine Order of Human Society* (1891); and *Political Economy for High Schools and Academies* (1896).

THOMPSON, SILVANUS PHILLIPS, an English electrical engineer; born at York, England, June 19, 1851. He was educated at the Royal School of Mines; became professor of experimental physics at University College, Bristol, in 1878, after having lectured there two years; and in 1885 was appointed to the chair of electrical engineering in the Finsbury Technical College, London. He is a member of the council of the Institution of Electrical Engineers and a fellow of the Royal Astronomical Society. Among his published works are *Elementary Lessons in Electricity and Magnetism* (1881); *Dynamo-Electric Machinery* (1885); and in 1891 he delivered the operatives' lecture before the British Association on *Electricity in Mining*.

THOMPSON, WORDSWORTH, an American artist; born May 26, 1840, in Baltimore; studied in Paris under Gleyres and Passini; sketched in Morocco, Algeria and Spain; fond of interior and *genre* work; academician in New York (1875); first exhibited *Moorlands of Au-Fargi*, Paris (1865); settled in New York (1868); best works: *Port of Menaggio*; *Lake Como*; *Desolation*; *Steamboat Landing*; *Moorish Hunters*; *By the Sea*, *Menton*; *Schoolhouse on the Hill*; *Port of Algiers*. Died Aug. 28, 1896, at Summit, New Jersey.

THOMPSON, ZADOC, an American naturalist; born in Bridgewater, Vermont, May 23, 1796. He was a graduate of the University of Vermont, and became a tutor there in 1825. After some editorial experiences with literary papers in Vermont, he removed to Canada; studied theology at Sherbrooke, and in 1835 was made a deacon in the Protestant Episcopal Church. Returning to Burlington, Vermont, he was for a time a professor in the Vermont Episcopal Seminary, and in 1845 he became state geologist, which office he held until 1848. He accepted the chair of chemistry and natural history in the University of Vermont in 1851, and in the same year was sent as a commissioner to the World's Fair in London to exhibit a collection of American woods, for which he received a bronze medal. Professor Thompson published several works on the natural, civil and statistical history of Vermont, and the geography and geology of that state, including *The History of Vermont, Natural, Civil and Statistical* (1841-43); and *The Geography and Geology of Vermont* (1848). For thirty-four years he made the astronomical calculations for *Walton's Registers*. He died in Burlington, Vermont, Jan. 19, 1856.

THOMPSONVILLE, a village of Hartford County, northern Connecticut, on the Connecticut River, and on the New York, New Haven

and Hartford railroad, 17 miles N. by E. of Hartford. It has a carpet factory, five churches, schools on the consolidated system, high-school, private bank, trust company, and two weekly newspapers. Population 1880, 3,794; 1890, 4,673.

THOMSEN, WILHELM LUDWIG PETER, a Danish philologist; born at Copenhagen, Jan. 25, 1842; educated at the leading German and Danish universities, and in 1871 was appointed to the philological chair of the university in his native city. He was a frequent contributor of articles on philology, ancient and modern, and has published *The Relations Between Ancient Russia and Scandinavia* (1877) and *Ryska Rikets Grundläggning*.

THOMSON, a town and the capital of McDuffie County, eastern Georgia, on the Georgia railroad, 37 miles W. of Augusta. It is in the center of a productive region, growing cotton, grain and sweet-potatoes; ships large quantities of cotton and fruit, and publishes two weekly newspapers. Population 1890, 836; 1900, 1,154.

THOMSON, CHARLES, an American patriot; born in Maghera, Ireland, Nov. 29, 1729. He came to this country in 1740, studied at a seminary in New London, Pennsylvania, and, after his education, conducted a Quaker school at New-castle; removed to Philadelphia, where he became a teacher, and also carried on negotiations with the Iroquois and Delaware Indians. Like many other Irishmen, he favored resistance to the oppressive exactions of Great Britain, and in September, 1774, he went with his bride, a sister of Benjamin Harrison, the Signer, to Philadelphia, where he had been chosen secretary of the first Continental Congress, and continued in that office until 1789. He was the official representative chosen to inform Washington of his election to the Presidency, and lived in Lower Merriam, Montgomery County, Pennsylvania, until his death. As an author he wrote *An Enquiry into the Causes of the Alienation of the Delaware and Shawnee Indians* (1759) and *A Synopsis of the Four Evangelists, in Their Own Words* (1815). He died in 1824.

THOMSON, ELIHU, an American electrician; born in Manchester, England, March 29, 1853;

came to the United States in 1858; studied electricity in Philadelphia, and had charge of the chemical department in the high-school there until 1880, when he became electrician of the American Electric Company at New Britain Connecticut. He invented the system of electric welding; took out over two hundred patents for incandescent lighting, motor work, induction systems and other inventions, and organized the Thomson-Houston Electric company, at Lynn, Massachusetts, supplying branch electric-lighting companies in hundreds of cities. He was once president of the American



PROF. THOMSON.

Institute of Electrical Engineers, and has contributed various papers to this and other societies.

THOMSON, JAMES, an English physicist, brother of Lord Kelvin (q.v., in these Supplements); born in Belfast, Ireland, Feb. 16, 1822. In 1832 his father removed to Glasgow, where he had been appointed professor of mathematics in the university. James graduated there, at the age of 17, having paid special attention to mathematics and philosophy. He then turned his attention to civil-engineering, and invented, at different times, a number of appliances in hydraulics and pneumatics; in 1853 became professor of civil-engineering and surveying in Queen's College, Belfast, where he remained until 1873, when he went to Glasgow as professor of engineering. Here he remained until 1889, when he resigned on account of blindness. He devoted much study to theoretical physics, and in 1849 read before the Royal Society of Edinburgh a paper on *Theoretical Considerations on the Effect of Pressure in Lowering the Freezing-Point of Water*, which led to the solution, by his brother, of the problem of glacial movement. He also wrote *On the Continuity of the Liquid and Gaseous States of Matter*; *On the Flow of Water in Rivers and Open Channels*; and *On the Grand Currents of Atmospheric Circulation*. He died in Glasgow, May 8, 1892.

THOMSON, JOHN EDGAR, an American civil engineer, was born at Springfield, Pennsylvania, Feb. 10, 1808. He was educated by his father, and his first professional work was the survey of the Philadelphia and Columbia railroad in 1827. Five years later he was appointed chief engineer of the Georgia railroad, becoming chief engineer of the Pennsylvania Central in 1847, and its president in 1852, in which position he was retained until his death. He was also a director of several other railroads in the country, and died in Philadelphia, May 27, 1874.

THOMSON, THOMAS, a Scotch chemist; born at Perthshire, Scotland, April 12, 1773. He was educated at St. Andrews University, and studied medicine at the University of Edinburgh. In 1802 he became editor of Mill's *Literary Journal*; was a teacher and editor for a number of years; and in 1818 became professor of chemistry in the University of Edinburgh; edited *Annals of Philosophy* (1813-22); and wrote *The Elements of Chemistry* (1810); *Travels in Sweden and Lapland* (1813); *An Attempt to Establish the First Principles of Chemistry by Experiment* (1825); and *Outlines of Mineralogy, Geology, and Mineral Analysis* (1836). He died at Kilmun, Argyleshire, July 2, 1852.

THOMSON, WILLIAM, an English prelate; born at Whitehaven, Cumberland, England, Feb. 11, 1819. He was educated in Shrewsbury School and at Queen's College, Oxford, where he graduated in 1840. He was ordained priest in 1843, and after having charge of parishes in Guilford and Cuddisden, became rector of All Souls, Marylebone, London (1855); preacher of Lincoln's Inn from 1858 to 1861; was appointed chaplain to the Queen (1859); bishop of Gloucester and Bristol (1861), and archbishop of York (1863). He was select

preacher at Oxford in 1848 and in 1856; delivered the Bampton lectures on *The Atoning Work of Christ, Viewed in Relation to Some Current Theories* (1853); was president of the Palestine Exploration Fund, and was governor of King's College, London. He was always in favor of ecclesiastical reform and church extensions and worked for educational reforms at Oxford. He wrote, besides many articles contributed to magazines, *An Outline of the Necessary Laws of Thought* (1842). He died at York, Dec. 25, 1890.

THOMSON, SIR WILLIAM. See KELVIN, WILLIAM THOMSON, BARON, in these Supplements.

THOMSON, WILLIAM MCCLURE, an American missionary; born in Springdale, near Cincinnati, Ohio, Dec. 31, 1806; educated at Miami University and Princeton Theological Seminary; was sent as a missionary to Palestine in 1833, where he remained till 1849; again in 1850; and a third time in 1859, remaining seven years each time. His most important works are *The Land and The Book* (2 vols., 1859-60), and *The Land of Promise* (1865); but he also contributed articles on travels to various magazines. He afterward lived in New York. Died at Denver, Colo., April 8, 1894.

THOR, a myth. See ÆSIR, Vol. I, p. 210.

THORACIC DUCT. See NUTRITION, Vol. XVII, p. 669.

THORACIPODA, a subclass. See CRUSTACEA, Vol. VI, pp. 653, 655-662.

THORAX. See RESPIRATION, Vol. XX, pp. 478, 479.

THORESEN, ANNA MAGDALENA (KRAGH), a Norwegian novelist; born in Fredericia, June 3, 1819. She wrote many novels and tales, and married, in 1844, a country parson. Her best works are *Tales* (1863); *Sigur's History* (1864); *Pictures from the West Coast of Norway* (1872); *Huluf Nordal, a Tale from the Last Century* (1879); and *Short Tales* (1891).

THORILD, TOMAS, a critic. See SWEDEN, Vol. XXII, p. 757.

THORN-APPLE OR STRAMONIUM. See NARCOTICS, Vol. XVII, p. 231.

THORNBURY, GEORGE WALTER, an English author; born in London in 1828. He devoted his whole life to literature, and besides contributing to magazines, published *Shakespeare's England* (1856); *Songs of Cavaliers and Roundheads* (1857); *Life in Spain* (1859); *Turkish Life and Character* (1860); *British Artists from Hogarth to Turner* (1860); *Haunted London* (1865); and *Historical and Legendary Ballads* (1876.) He died in London, June 11, 1876.

THORNE TYPE-SETTING MACHINE. See TYPE-SETTING MACHINERY, in these Supplements.

THORN HEDGE. See AGRICULTURE, Vol. I, p. 310.

THORNTON, SIR EDWARD, an English diplomat, son of Sir Edward Thornton, who was for some time envoy extraordinary and minister plenipotentiary in Portugal, and upon whom the title of Count de Cassilhas, in that kingdom, was conferred by King John VI of Portugal. Sir Edward Thornton, who succeeded to the title of Count de

Cassilhas (in the kingdom of Portugal) on the death of his father, about 1850, was born in London, July 17, 1817. He was educated at Cambridge, entered the diplomatic service in 1842, and was attached to various missions, in different parts of the world, Portugal, Mexico, South American states, and the United States, taking the place of Sir Frederick Bruce in 1867, and remaining till 1881. He was a member of the commission on the *Alabama* claims (1871), and arbitrator of the Mexican-United States claims commission (1873); was British ambassador to Russia in 1881, and to Turkey (1884), and retired in 1886.

THORNTON, MATTHEW, a signer of the Declaration of Independence, was born in Ireland in 1714, but when three years of age came with his father to America. He was educated at Worcester, Massachusetts, and as a physician attained prominence and wealth. A resident of New Hampshire, he joined in the opposition then manifested toward the royal prerogatives; was president of the convention in 1775 which undertook the government of New Hampshire, and upon being chosen a delegate to the Continental Congress, affixed his name to the Declaration, though not present at the date of its passage. He was later a member of both houses of the state legislature, and a judge of the state supreme court. He died at Newburyport, Massachusetts, June 24, 1803.

THORNTON, WILLIAM THOMAS, an English publicist and author; born at Burnham, Buckinghamshire, Feb. 14, 1813. He was educated at the Moravian settlement near Derby; was secretary to the English consul-general at Constantinople (1830-35); a clerk in the India House, London (1836-56); was placed in charge of their public works department in 1858, and in 1858 was appointed secretary of public works in the India Office. He wrote *Over-Population and Its Remedy* (1845); *A Plea for Peasant Proprietors* (1848); *Zohrab, and Other Poems* (1856); *On Labor, Its Rightful Dues and Wrongful Claims, Its Actual Present and Possible Future* (1869); a translation of the *Odes of Horace* (1878); and contributed to this ENCYCLOPÆDIA the articles on AGRICULTURE and LARGE AND SMALL FARMING. He died June 17, 1880.

THORNTOWN, a town of Boone County, central Indiana, on the Rock River, and on the Cleveland, Cincinnati, Chicago and St. Louis railroad, 38 miles N. of Indianapolis. It is in an agricultural region; has several brickyards, saw-mills, a machine-shop and other industries; has a high school, a state bank and one weekly newspaper. Population 1890, 1,530; 1900, 1,511.

THORNWELL, JAMES HENLEY, an American clergyman; born in Marlboro district, South Carolina, in 1812. He was educated at South Carolina College; studied law, but entering the ministry, became a pastor in Lancaster, South Carolina, 1835; professor of logic and belles-lettres in South Carolina College, but resigned to accept a pastorate in Columbia; in 1841 was professor of sacred literature and evidences of Christianity, remaining

till 1851, when he became pastor in Charleston; returned to the College as president in 1852; and finally, in 1855, became professor of didactic and polemic theology in the Columbia Theological Seminary. He was an oldschool Presbyterian, and in politics an extreme Southerner. He wrote *Arguments of Romanists Discussed and Refuted* (1845); *Rights and Duties of Masters* (1861); and *The State of the Country* (1861). He died at Charlotte, North Carolina, Aug. 1, 1862.

THORNYCROFT, MARY, an English artist; born at Thornham, in Norfolk, in 1814. She was the daughter of the sculptor John Francis, received her training from him, and at an early age exhibited at the Royal Academy. In 1840 she became the wife of Thomas Thornycroft, one of her father's pupils, and together they went to Rome in 1842, where they studied for a year. She had always shown decided taste in modeling busts, and developed into a fine modeler of statues, and was commissioned by the Queen to execute statues of the children of the royal family. Among her works are *Four Seasons; A Girl Skipping; The Flower-Girl; A Young Cricketer; and Melpomene*. Died in London, Feb. 1, 1895.—Her son, JOHN ISAAC THORNYCROFT, an English builder of torpedo-boats; born Feb. 1, 1843, in the Via Felice, Rome. His mechanical training was commenced at an early age by his father. The cylinders, the closed stokehole and fan, by means of which air can be forced through the fire, and the relatively large size and low position of the propeller, and one or two other details to which the success of the modern torpedo-boat is due, are ideas which he obtained from his father. In 1863, he designed the *Ariel*, which was built at Chiswick, where he started as an amateur boat-builder. After building the *Ariel*, Mr. Thornycroft studied for nine months as a draftsman to Palmer's Ship-Building Company, on the Tyne; then went to Glasgow to go through the engineering course at that university, and on leaving the university spent nine months at John Elder's, of Govan, studying the method of ship-building on the Clyde. He then returned to Chiswick, and became a builder of torpedo-boats. In this profession he rapidly took the first place, and constructed a very large number of such boats for the British and other governments.—Another son, WALTER HAMO THORNYCROFT, an English sculptor, was born in London, March 9, 1850. After being educated at University College, London, he began the study of art at the Royal Academy and exhibited first in 1871. He gained the gold medal of the Royal Academy in 1875, and in 1880 scored a success with his statue of *Artemis*. After 1871 he studied for some time in Italy. Among his most noted works are *Teucer* (1881); *The Sower* (1886); a bust of Samuel Taylor Coleridge for Westminster Abbey (1885); the national memorial to General Gordon in Trafalgar Square (1895); *Science* (1891); *Summer* (1893); and *The Mower* (1894). In 1888 he was elected Royal Academician.

THOROLD, a town of Welland County, southern Ontario, on the Welland canal and on the Grand

Trunk and St. Catharines and Niagara railroads, 4 miles S. of St. Catharines and 7 miles S. of Lake Ontario. It has cement-works, flour, knitting and saw mills, foundries and machine-shops. Extensive quarries of good building-stone are in its vicinity. Population 1891, 2,273.

THOROUGH-BASS, in music, an instrumental bass part. It is continued throughout a whole piece of music without interruption, and is accompanied by figures indicating the general harmony. In English, the term has wrongly come into use as a synonym for harmony.

THOROUGHWORT, the common name of *Eupatorium perfoliatum*, a very common species belonging to the family *Compositæ*. It is a tall, hairy herb, with large, wrinkled and veiny leaves united at base around the stem in pairs, and numerous small heads of white flowers crowded in a dense corymb. The bitter infusion is used as a domestic remedy.

THORPE, BENJAMIN, an English philologist; born in England in 1782. He devoted his life to a study of the Anglo-Saxon and Scandinavian languages, and received a pension from the British government. Among his works are a translation of Rask's *Grammar of the Anglo-Saxon Tongue* (1830); Caedmon's *Metrical Paraphrase of Parts of the Holy Scriptures in Anglo-Saxon, With an English Translation, Notes, and a Verbal Index* (1832); *Ancient Laws and Institutes of England Enacted Under the Anglo-Saxon Kings from Ethelbert to Canute, With an English Translation of the Saxon* (1840); *Florentii Wigomiensis Chronicon* (1848-49); *Yule-Tide Stories, A Collection of Scandinavian Tales and Traditions* (1853); *Anglo-Saxon Chronicle, According to the Several Original Authorities* (1861); and numerous other works of the same nature. He died at Chiswick, July 19, 1870.

THORPE, THOMAS BANGS, an American editor; born in Westfield, Massachusetts, March 1, 1815. He studied three years at Wesleyan University, and made a tour through the Southwestern states, settling at Louisville, Kentucky, in 1836. For a time he edited a Whig newspaper in New Orleans; in 1844 he edited the *Concordia Intelligencer*; in 1846 established the *Baton Rouge Conservator*; and in 1859 published and edited, in New York City, the *Spirit of the Times*. In the Mexican War he attained the rank of colonel. He died in New York City in October, 1878.

THORPE, THOMAS EDWARD, an English chemist; born near Manchester, England, Dec. 8, 1845, being the son of a Manchester merchant; educated at the Universities of Heidelberg and Bonn; appointed demonstrator of chemistry at Owens College in 1869; professor of chemistry in Anderson's College, Glasgow (1870); professor of chemistry at Yorkshire College, Leeds (1874); and professor of chemistry at the Royal College of Science, South Kensington (1885). He was elected a member of numerous societies and associations, and became a fellow of the Royal Society. He wrote over a hundred memoirs on chemistry and physical chemistry, many articles in *Watt's Dictionary of Chemistry*, and in *Nature* and other

periodicals. He was a member of the solar eclipse expeditions of 1870, 1878, 1886 and 1893, having charge of the expedition to West Africa in 1893. He was the author of *Dictionary of Applied Chemistry; Inorganic Chemistry; Chemical Problems; Coal, Its History and Uses; and Essays in Historical Chemistry*.

THOTH, a myth. See EGYPT, Vol. VII, p. 718.

THOTHMES, the name of four Egyptian kings. See EGYPT, Vol. VII, pp. 737, 738.

THOUGHT. See *Intellection*, under *Psychology*, Vol. XX, pp. 75-83; and *THEISM*, Vol. XXIII, p. 248.

THOUGHT TRANSFERENCE. See TELEPATHY, in these Supplements.

THOUSAND ISLANDS. See LAKE OF THE THOUSAND ISLANDS, in these Supplements.

THRALE, HESTER LYNCH. See PIOZZI, Vol. XIX, p. 110.

THRASHER OR THRESHER. A name given to several species of birds which resemble the thrushes, and are members of the genus *Harporhynchus*. They are allied to the mocking-bird (*Mimus*). Several species occur in the United States, and many, as *Harufus* (the brown thrush), are called thrushes, incorrectly.

THREAD-WORM. See NEMATOIDEA Vol. XVII, pp. 324-326.

THREATS, in law, are declarations of intent to injure or destroy the life, reputation or property of another. A mere threat, unattended by any act of violence or any damage, is not actionable; but when, by threats, one is prevented from giving proper attention to his business, or otherwise sustains actual damages, he may maintain an action of trespass to recover the damages sustained, and in extreme cases, a court of equity will restrain the menacing party from committing the threatened acts of violence. When, by threat, one is constrained, through fear of personal injury, or other calamity, to pay money, enter into a contract, or do any other act which, under ordinary circumstances, would be lawful, such act is said to be done under duress, and the injured person may obtain relief from the consequences of his act. A confession obtained from one held under a criminal charge, by means of threats, by one who has authority over the prisoner, cannot be given in evidence against the accused. The offense of extorting money by means of threats is defined by statute in most states, and is made punishable according to the enormity of the crime. One who threatens to take the life of another, or to do him great bodily injury, or to destroy property, may be required to give bond to keep the peace. Sending threatening letters for the purpose of extorting money is an offense under the common law, and is now made punishable by statutory enactment in most states. Such letters, if placed in the mail, bring the offender also under the jurisdiction of the Federal courts.

THREE BODIES, PROBLEM OF. See GRAVITATION, Vol. XI, pp. 72, 73.

THREE CHAPTERS CONTROVERSY. See JUSTINIAN, Vol. XIII, p. 796.

THREE F'S, THE, Fair rent, Free sale and Fixity of tenure. See HOME RULE, in these Supplements.

THREE RIVERS, a village of St. Joseph County, in the southern part of the southern peninsula of Michigan, 25 miles S. of Kalamazoo, at the junction of the St. Joseph, Rocky and Portage rivers, and on the Lake Shore and Michigan Southern and the Michigan Central railroads. It has excellent water-power; is an important shipping-point for manufactures, grain and live-stock, and contains flour, saw and planing mills, foundries, patent medicine and peppermint-oil works, agricultural-implement works and a paper-mill. Population 1890, 3,131; 1900, 3,550.

THREE RIVERS, a city of Quebec. Population 1891, 8,334. See THREE RIVERS, Vol. XXIII, p. 319.

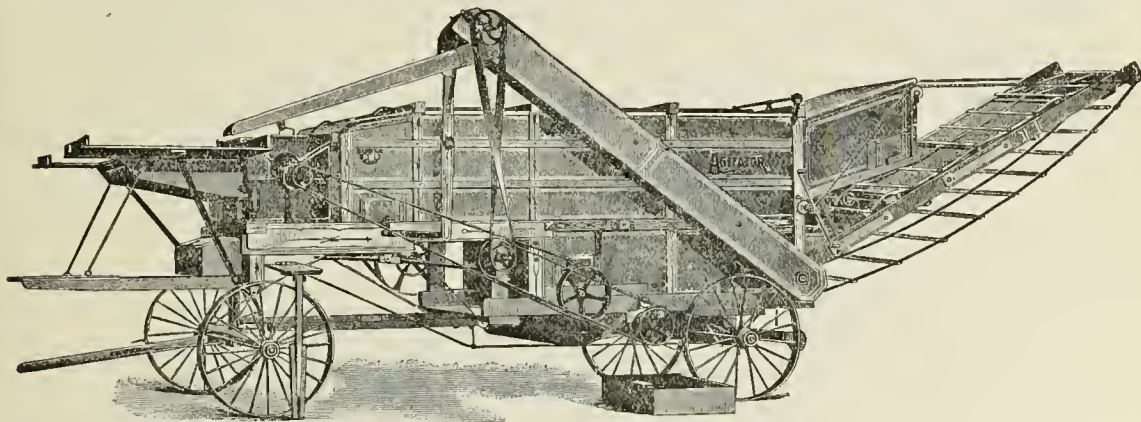
THRESHER. See SHARK, Vol. XXI, p. 777.

condition, without the necessity of passing it through a separate cleaner.

The threshing-machine of modern construction known as the "Agitator," a distinct type of the "Vibrator" class, holds a high place in America, as well as in foreign countries, for rapid work in thrashing, separating and cleaning all kinds of grain and seeds. A sectional view of this is given in the illustration below. In design and construction it is simple and accurate, and came into quite general use in 1880-81, since which time about thirty thousand have been turned out.

The "Agitator," in its latest and most improved form, with three great labor-saving devices,—a band-cutter and self-feeder, a blower straw-stacker and a grain-weigher and bagger attached, comprises an outfit into which the unthreshed sheaves are fed, the threshing, separating, cleaning, sacking and the stacking of the straw being accomplished by steam-power alone.

The capacity of this outfit varies according to



A MODERN THRESHING-MACHINE—THE AGITATOR.

THRESHING-MACHINERY. While the threshing-machines now made have attained to a very high operative perfection, with immense capacity for threshing and cleaning all kinds of grain and seeds, some of the features found in the construction of the machines made in the early fifties are retained by some of the manufacturers at the present time. To this class belongs that styled the "Apron" machine, which separates the grain and seed from the straw, after passing through the cylinder, by the use of canvas, aprons, rattle-rakes, etc.

This machine is still extensively used in America, and with apparent success, though its capacity for work in separating and cleaning is somewhat inferior to the later models. The machines of modern make are built on the "Agitator" or "Vibrator" plan, dispensing altogether with the "Apron" principle. Not only is the capacity of these machines much greater, but their arrangement for separating the grain from the straw is far better and surer.

The grain is very well cleaned as it passes over the sieves in the shoe, and is subjected to the fan-blast, from which it is delivered in a marketable

condition. They are built in sizes from 24 to 44-inch cylinders.

The threshing of from 1,000 to 3,500 bushels would be an ordinary day's work, but it is no unusual performance for the largest machines to turn out 4,000 to 4,500 bushels under favorable circumstances, when driven by an engine of 15 or 20 horse-power.

The cylinder is held in position and completely cased in an iron frame which forms the front part of the machine. It is entirely of iron, with twelve double bars fixed parallel with its axis, secured to the heads by the teeth and square iron bands. In the bars are steel teeth placed four inches apart, projecting three inches, and pass between the stationary teeth of similar length in the concaves underneath.

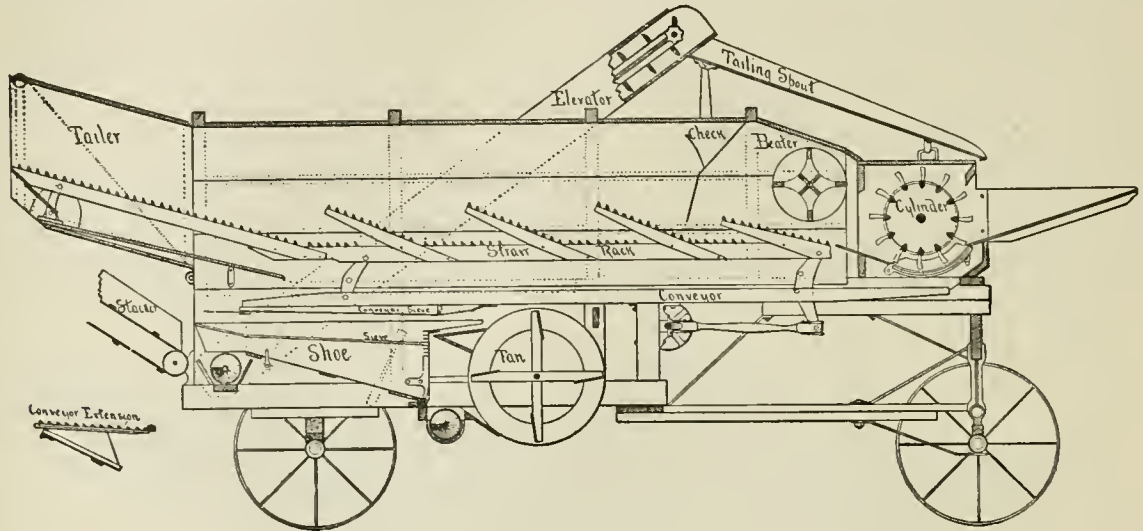
The rear of the machine, being 18 or 22 inches wider than the cylinder, affords great separating-capacity. Immediately back of the cylinder is a beater with four narrow wings constructed of wood and covered with sheet-steel. Back of this is placed an adjustable check-board to prevent the threshed kernels of grain from flying through the machine. Back of the con-

caves, and directly under the beater, is placed an iron grating 12 inches wide, and extending parallel with the cylinder the entire length of the machine, to allow the thrashed grain to pass through upon the conveyer, which extends the full width and length of the machine. Directly above the conveyer, and extending, like it, the full width and length of the machine, is the straw-rack, furnished with raisers, made of slats, attached at an

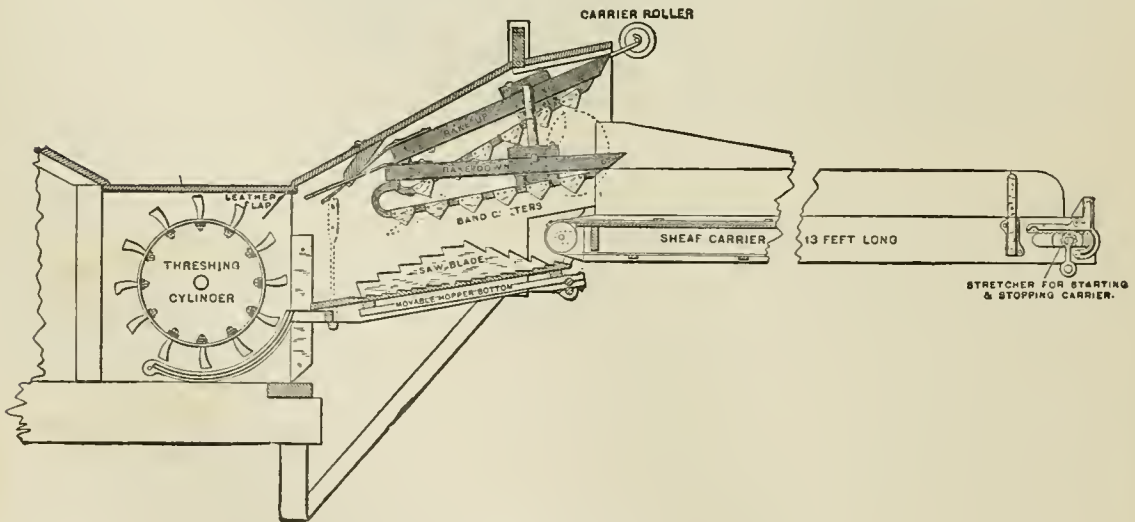
the shoe, in which are the sieves for cleaning the different kinds of seed and grain.

The bottom of the shoe is of galvanized iron, slanting from the rear end at an angle of 40 degrees to the grain-trough, vibrating rapidly with an end-shake motion received from the fan-shaft.

When in operation, the sheaves enter the cylinder, making 1,125 revolutions per minute, fed either automatically or by hand, and a large por-



SECTIONAL VIEW OF THE AGITATOR THRESHER.



BAND-CUTTER AND SELF-FEEDER—SECTIONAL VIEW.

angle of 45 degrees toward the rear end, by which the straw is expelled.

Both the grain-conveyer and straw-rack are hung on the same rocker-arms with wood boxes, and while they are parallel with each other they oscillate in opposite directions, and keep the machine well balanced. They derive motion from the large crank-shaft attached to the frame of the machine underneath, driven directly from the cylinder-shaft. Under the rear end of the grain-conveyer, and back of the fan-house, is located

tion of the thrashed grain falls at once through the grate upon the conveyer. The straw passes under the slowly revolving beater to the straw-rack, where it is violently agitated by the oscillating motion, and all the grain is shaken from it as it is forced through the machine onto the stacking attachment at the end. The grain, chaff and short straws which fall through the straw-rack upon the grain-conveyer are carried back by its oscillating motion to the sieves in the shoe, where it is cleaned by the fan-blast, and falls into

the grain-trough, from which it is taken by spiral conveyer and deposited in an attached bagger, elevator or weigher, as the case may be.

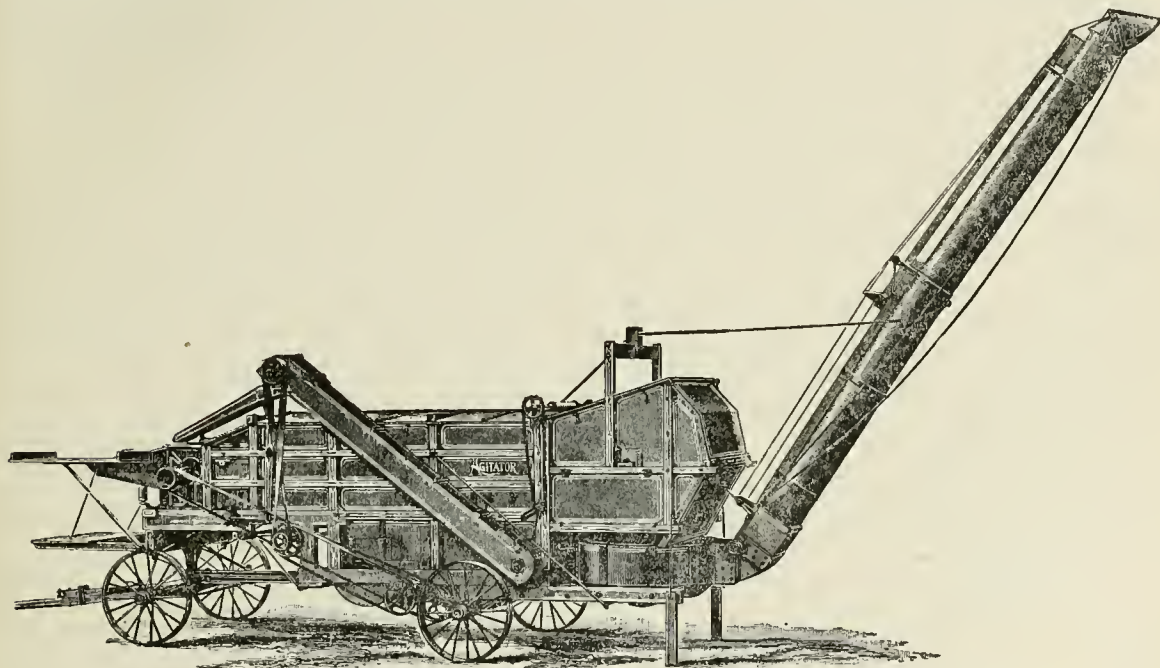
The tailings that pass over the sieves contain more or less grain; they fall into a trough, from which they are taken by a spiral conveyer to the tailings-elevator, and again deposited into the cylinder for complete separation. This tailings-elevator is a long box divided in the center, with a shaft and sprocket-wheel at each end, upon which an endless sprocket-chain revolves, with wood blocks or cups attached for elevating the tailings.

The band-cutter and self-feeder is one of the late devices which materially reduce the cost of grain-threshing, dispensing, as they do, with the extra hands for each of these purposes. Not

is attached to the rake-shaft, and will not start until the cylinder has attained its proper threshing speed, and will stop if the cylinder-motion runs down. The carrier-frame is easily rolled on top of the separator when the moving of the machine is necessary.

The last labor-saving attachment in threshing-machinery is the blower straw-stacker connected to the rear end of the machine. Into this the threshed straw falls by gravitation, or is drawn in by suction, and is then blown through the telescoping pipe and deposited on the strawstack. There are now two styles of blower-stackers in general use,—the Nethery, with horizontal fan, and the Uncle Tom, with vertical fan.

The Nethery is the latest improvement. It has a horizontal fan-drum of heavy sheet-steel, with



NETHERY BLOWER STRAW-STACKER.

alone this, but the feeding is done more evenly and faster, as there are no intervals and no clogging. Of several styles of feeders, one operating very successfully is a device called the single crank-feeder, placed upon the market by the J. I. Case Threshing-Machine Company. It is simple in design. The head is bolted to the cylinder-frame, and contains one crank-shaft, with six independent rakes so placed that no two are at the low point at the same time. Each rake has six band-cutting knives, to insure the cutting of the band and the proper spreading of the sheaves.

A movable hopper under the rakes is set with upright saw-blades, and this feeds the straw evenly to the cylinder by its oscillating motion. A carrier-frame thirteen feet long allows the pitching of sheaves onto it from the four ordinary stacks, and can be raised and lowered to accommodate the pitchers. By means of a governor, a steady feed to the cylinder is maintained. This governor

wooden heads covered with sheet-steel; inside are heavy wrought-iron fan-wings and arms bolted to a cast-iron hub. This hub is keyed on an upright shaft, which receives its motion from miter-gear below. The discharging-pipe is of sheet-steel, and can be easily telescoped into a small compass by hand from the ground.

A hood at the end of the pipe guides the straw onto the stack. Under the fan-drum is a reversing-gear which swings the drum and discharging-pipe either way in a half-circle. This makes a much larger and better stack than the old way, and without the aid of pitchers and levelers on the stack.

Grain weighers, measurers, elevators and baggers have come into general use, and one or another of these attachments is adopted in operating every threshing-machine.

THRIFT OR ARMERIA. See HORTICULTURE, Vol. XII, p. 250.

THRING, EDWARD, an English educator; born in England, Nov. 21, 1821. He was educated at Eton and Cambridge, after which he was a curate until 1853, when he became head master at Uppingham School, Rutland, where he remained till his death, and was one of the most successful teachers in England. Among his publications are *Thoughts on Life Science* (1869); *Education and School*; *Theory and Practice of Teaching* (1886); *Uppingham Sermons* (1886); and *Addresses* (1887). He died Oct. 22, 1887.

THRIPS, an insect. See WHEAT, Vol. XXIV, pp. 534, 535.

THROMBOSIS, a disease. See PATHOLOGY, Vol. XVIII, p. 401.

THROMBUS, a disease of the veins. See SURGERY, Vol. XXII, p. 684.

THRUSH, a hoof-disease. See HORSE, Vol. XII, p. 195.

THRUSH, a mouth-disease. See PARASITISM, Vol. XVIII, p. 270.

THUMBSCREW OR THUMBKIN, an instrument of torture applied to the thumb, the thumb being compressed by means of a screw, as the name signifies. It was used in various parts of Europe, but mostly in Spain and Scotland.

THUN, a lake. See Switzerland, Vol. XXII, p. 777.

THURBER, CHARLES HERBERT, an American educator; born at Owego, New York, March 24, 1864. He was educated at Cornell University, and was registrar there (1886-88), after which he taught in Haverford until 1890, when he went to France and Germany for study. He was principal of Colgate Academy and professor of pedagogy in Colgate University in 1894, but had been instructor of German and French at Cornell for two years before. In 1895 he became dean of Morgan Park Academy and associate professor of pedagogy at Chicago University. His works include *The Higher Schools of Prussia and The School Conference of 1890*, his report as special agent of the United States Bureau of Education (1890). He edited *The School Review* since 1893, and *Gherardi del Testa's L'Oro e L'Orpello* (1893).

THURINGIAN FOREST. See THURINGIA, Vol. XXIII, p. 332.

THURMAN, ALLEN GRANBERY, an American jurist and statesman, was born at Lynchburg, Virginia, Nov. 13, 1813, a descendant of Joseph Hewes, one of the signers of the Declaration of Independence. When six years of age he accompanied his parents to Chillicothe, Ohio, and was educated at the academy in that city. He began life as a surveyor, but studied law in the office of Governor William Allen, and was admitted to the bar in 1835. In 1844 he was elected a representative in Congress, and served one



ALLEN G. THURMAN.

term, declining a renomination. In 1851 he was elevated to the supreme bench of Ohio, and for two years was chief justice of that tribunal. He was the Democratic candidate for governor of Ohio against Rutherford B. Hayes in 1866, but was defeated. He became United States Senator March 4, 1869, and was re-elected in 1874. As Senator he formulated what is known as the "Thurman Act," to compel the execution, by the Pacific roads, of their contracts with the government, and secured its passage. At the national Democratic conventions of 1876, 1880 and 1884, he was a candidate for the Presidential nomination, and at the convention of his party in 1888 was made the candidate for Vice-President, but was defeated at the polls. He lived at Columbus, Ohio, until his death, Dec. 12, 1895.

THURN AND TAXIS, PRINCES OF, a noble family of the German Empire, having vast possessions in Austria, Bavaria, Württemberg, Prussia and Belgium, with the heads of the two main branches of the family resident at Ratisbon and at Laucin, in Bohemia. They are descended from the Della Torre (whence Thurn, a German translation), one of whom took the latter part of the name from the castle of Tasso. They were formerly noted for their monopoly of the postal service. One of them established posts in Tyrol in 1460; another, Franz von Thurn, was ennobled in 1512, and established the first post between Vienna and Brussels, in 1576. In 1595 his descendant became grand postmaster of the Holy Roman Empire, and secured for himself and heirs the privilege of carrying the mails throughout the empire. In 1681 the principality of Thurn and Taxis, in the Netherlands, was conferred on the head of the house, and in 1698, the princely rank and title became hereditary in the family. The postal privileges were gradually curtailed by the different countries, and tracts of land granted as a compensation. Finally, in 1867, Prussia, by treaty with the family, secured the abolition of the privilege.

THURSDAY, EMMA, an American singer, was born at Brooklyn, New York, Feb. 21, 1857, and studied her art under the direction of Meyer, Rudesdorff, and others; and in Italy, whither she went in 1873. On her return, she sang in the Broadway Tabernacle and other New York churches, and made repeated concert tours of the United States and Europe, being well received everywhere. She steadily declined to appear in opera, and made a specialty of sacred music. Her voice, though not large, is rich and has remarkable compass.

THURSDAY, The fifth day of the week, in the Roman calendar known as *Jovis dies*, or Jove's day. For its origin see *ÆSIR*, Vol. I, p. 211.

THURSTON, JOHN MELLEN, an American public man; born in Montpelier, Vermont, Aug. 21, 1847; removed with his parents to Madison, Wisconsin, in 1854; educated at Wayland College, Wisconsin, and was admitted to the bar in 1869. He settled in Omaha, Nebraska, and began the practice of his profession. He entered

politics and was elected a member of the legislature in 1875, a Presidential elector on the Republican ticket in 1880, and was chairman of the Republican national convention of 1896. He was appointed general solicitor of the Union Pacific railroad in 1888, a position he retained until his election to the United States Senate in 1896.

THURSTON, ROBERT HENRY, an American mechanical engineer; born in Providence, Rhode



PROF. R. H. THURSTON.

Island, Oct. 25, 1839, and upon his graduation at the scientific school of Brown University in 1859, entered his father's shops, taking up mechanical-engineering as a profession. He served in the navy during the Civil War, and participated in the attacks upon Port Royal and Charleston. In 1865 he became assistant professor of experimental philosophy at the Annapolis Naval Academy, and in 1870 visited Europe. After being at Annapolis six years, he accepted the position of professor of engineering in Stevens Institute of Technology, and finally, in 1885, took charge of the Sibley College at Cornell, which he entirely reorganized and improved until it became one of the best schools of engineering in America. He organized, in 1872, what was probably the first mechanical laboratory for research in engineering that was ever founded, and was constantly employed in the investigation of problems of practical importance. He was on the United States commission to investigate the cause of boiler-explosions (1875); on the commission to test iron, steel and other metals (1875-78), the board to report on the best construction of the iron-clad *Puritan*, and the commission on safe and bank-vault construction (1891). His investigations while on the commission of 1875-78 of the laws of friction, and of properties of the alloys of copper, tin and zinc, which resulted in the determination, by a new and ingenious method, of the relative value of all combinations of those elements, were strikingly original. Mr. Thurston was made a member of nearly all the national civil-engineering societies, and was first president of the American Society of Mechanical Engineers, besides being a member of numerous scientific societies and associations. Among his published works are *History of the Steam-Engine* (1878); *Friction and Lost Work*; *Materials of Engineering* (1882-86); *Materials of Construction* (1885); *A Manual of Steam-Boilers* (1888); *Manual of the Steam-Engine* (1890-91); a translation of Carnot's *Réflexions sur la Puissance Motrice du Feu*; contributed the third volume to and edited the reports of the United States Science Commission to the Vienna International Exhibition (1874-75). He contributed the articles on STRENGTH OF MATERIALS; MARINE ENGINES; and LOCOMOTIVES, in these Supplements.

THYATIRA. See AKHISSAR, Vol. I, p. 436.

THYLACINEDÆ OR DASYURIDÆ. See MAMMALIA, Vol. XV, pp. 380, 381.

THYLACINUS. See MAMMALIA, Vol. XV, p. 380.

THYMOL, a substance allied to carbolic acid, having the formula $C^{10}H^{13}OH$, found in oil of thyme, and possessing valuable antiseptic properties.

THYMUS GLAND. See ANATOMY, Vol. I, p. 907.

THYROID GLAND, a vascular body situated at the front and sides of the wind-pipe in the neck. See also PATHOLOGY, Vol. XVIII, pp. 384, 385.

THYSANOPTERA, an order. See INSECTS, Vol. XIII, p. 152.

THYSANURA. See INSECTS, Vol. XIII, p. 153, 154.

TI, the native name of a species of *Cordyline*, of eastern Asia, a tree of the dragon-tree group of the lily family, whose leaves and sap and root are all extensively utilized for food and in manufactures.

TIARA OR PAPAL CROWN. See CROWN, Vol. VI, p. 619.

TIBER, a river. See ITALY, Vol. XIII, pp. 438, 439.

TIBERIAS, LAKE OF. See GALILEE, Vol. X, pp. 29, 30.

TIBESTI, an African country. See TIBBUS, Vol. XXIII, p. 334.

TIBETAN LANGUAGE. See TIBET, Vol. XXIII, pp. 346-348.

TIBUR, a city. See TIVOLI, Vol. XXIII, p. 421.

TIC-DOULOUREUX. See NEURALGIA, Vol. XVII, pp. 363, 364.

TICHBORNE, an estate in Hampshire, England, 2 miles S.S.W. of Alresford station and 6½ miles E. by N. of Winchester, famous for a curious and obsolete custom, but more noted for Arthur Orton's fraudulent claim to its rents and revenues. The property is said to have been in the possession of the Tichborne family before the Norman conquest of 1066. In feudal days arose the custom known



THE TICHBORNE CLAIMANT.

there as "the Tichborne Dole." Local folk-lore avers that the Lady Mabella Tichborne lay at death's door and asked of her husband a dole, or charitable bequest, for the poor, to keep her memory green. Her lord, as a brutal jest, is said to have offered her as much land as she could walk over before her dissolution. To the present day a field of 23 acres, known as "The Crawls," is shown to the credulous as the extent of her miraculous pilgrimage in the interests of charity. Certain it is that until 1796, when it was abolished by the local magistracy, as productive of disorder and attracting vagabonds, an annual festival was held on this

estate, whereat fourteen hundred loaves of bread were distributed to all comers, and twopence to every applicant in excess of that number. A curious painting of the Tichborne dole-distribution is preserved in the family mansion.

Catholics in 1626, the head of the house received a baronetcy for his promptitude, as high sheriff of Hampshire, in proclaiming the accession of King James I. In succession nine Tichbornes held the estates, and the tenth baronet, Sir James Francis Tichborne, born Oct. 3, 1784, married, Aug. 1, 1827, Henriette Felicité, the natural daughter of Henry Seymour. By her he had, among other issue, Roger Charles Tichborne, born June 5, 1829, and Alfred Joseph Tichborne, born Sept. 4, 1839. Sir James Tichborne succeeded to the title and family estates, March 5, 1853, on the death of his brother Edward, the ninth baronet. The son, Roger, was educated in France, and at the Jesuit College, at Stonhurst, Lancashire, England. He spoke French better than he did English, and was congenitally malformed, melancholy, and deficient in virility. In 1849 he entered the English army as a cornet of the Carbineers (the Sixth Dragoon Guards). He served three years, until, piqued at being unable to proceed on foreign service, and mentally perturbed at his rejection by his cousin, Katharine Doughty, he sold his commission in the army and sailed from Havre de Grace, France, for Valparaiso, Chile, where he arrived, June 19, 1853. After traveling in South America, he set sail in the ship *Bella* from Rio de Janeiro on April 20, 1854, bound for New York and Mexico. A few days afterward he perished in the foundering of the ship, with every soul on board. Sir James Tichborne, his father, died June 11, 1862, and was succeeded in the title and estates by his second son, Roger's younger brother, Alfred Joseph Tichborne, who married a daughter of Lord Arundell of Wardour, and died Feb. 22, 1862, leaving an infant son, Henry A. J. Tichborne, as the twelfth baronet, and owner of the estates. In 1865 the dowager Lady Tichborne, who had hoped against hope for her eldest son's return, advertised for him. The advertisement was read by an illiterate but crafty English butcher named Arthur Orton, then passing under the *alias* of Thomas Castro, and residing at Wagga-Wagga, New South Wales. His cupidity was excited, and he commenced to plan "a series of crimes," as his own counsel said, "as black and foul as justice ever raised her sword to strike."

Compared with Orton, Roger Tichborne was as Hyperion to a satyr: The one a delicately nurtured gentleman; the other a coarse mountain of flesh; one educated beyond the average; the other unable to spell the most simple words. Roger Tichborne went abroad vowing fidelity to his cousin. The impostor married a servant-girl soon after arriving in Australia. The man who claimed to have been educated at Stonhurst, when asked about Euclid, thought the *Pons Asinorum* a geographical locality, and hazarded the opinion that Virgil was written in Greek. The pseudo-army officer, in his

evidence, thought the Sixtieth Rifles were cavalry, and, unable to distinguish between a troop and a squadron, trebled the maximum strength of Roger Tichborne's regiment. The claimant's memorandum-book, kept in 1865, which was produced in evidence against him at the trial, demonstrated the fact that he did not know the county in which the Tichborne estates were situate, and a celebrated but ungrammatical paraphrase therein of a passage in Miss Braddon's *Aurora Floyd*, "Some men has plenty money and no brains, and some men has plenty brains and no money. Surely, men with plenty money and no brains were made for men with plenty brains and no money. R. C. Tichborne, Bart," in close conjunction with Orton's signature of his Australian *alias*, Thomas Castro, ultimately did much to shatter his case and convict him. The fraud was slow in incubation. At the instance of an Australian attorney, the dowager Lady Tichborne, was duped into sending money for her long-lost son to return. The impostor set sail for England and was able to persuade Roger Tichborne's mother of his identity with her long-lost son. The day he landed in England, as was proved later upon his trial, he visited the Ortons in squalid Wapping and exhibited such a knowledge of these persons as only Arthur Orton could have had. He visited Tichborne, in Hampshire, and was roundly denounced as a rank impostor by all Roger Tichborne's surviving relations except the dowager Lady Tichborne and Sir Clifford Constable. Procuring many papers and memoranda of the man he personated, he commenced to prepare for legal proceedings. Old servants of the Tichborne family were purchased. Unscrupulous attorneys, dazzled with prospects of fat and champertous bargains, copied records of the real Roger Tichborne's military career and "coached" the coarse upstart in occurrences entirely foreign to his uneducated intellect. In 1870 he commenced suit in chancery to recover the estates, valued at over \$120,000 per year, from the trustees of the infant baronet. Commissions were sent to South America and Australia to trace his movements, and though the claimant undertook to be present for identification, he returned by the next vessel from South America on a frivolous pretext. The trial of the ejectment issue commenced May 11, 1871, in the then Court of Common Pleas, before Chief Justice Bovill and a special jury. Sergeant Ballantine, one of the most brilliant advocates at the English bar, represented the claimant as leading counsel. The then Solicitor-General, Sir John Duke Coleridge (afterward Lord Coleridge and Lord Chief Justice of England), led the defense for Sir Henry Tichborne's trustees. For 22 days Coleridge plied the defendant with an exhaustive and merciless cross-examination. His "Would you be surprised to hear?" became proverbial, and the pitfalls into which he led the illiterate plaintiff were palpable and profound. Then the jury, disgusted at the fraud, stopped the case, March 6, 1872, on the one hundred and third day of the trial. Sergeant Ballantine elected to be nonsuited, and

Chief Justice Bovill ordered the defendant into instant arrest for perjury. His crime was of the blackest kind. Not content with falsely claiming to be Roger Charles Tichborne, he gratuitously traveled outside the issue to defame Roger's cousin, Katharine Doughty, whom the impostor swore he had seduced. Indicted April 9, 1872, Orton was brought to trial at bar, April 23, 1873, before Lord Chief Justice Cockburn, Justices Mellor and Lush and a special jury. He was prosecuted by the government, whose interests were represented by Mr. Hawkins, Q.C. (afterward Sir Henry Hawkins; q.v., in these Supplements), and Mr. Serjeant Parry. The claimant's defense was in the hands of Dr. Kenealy, Q.C. (q.v., in these Supplements), and other counsel. For 188 days the trial lasted. Hosts of witnesses from all quarters of the globe exposed the fraud in all its fullness, and the defense was as bitter and vindictive as it was ill-conceived. On Feb. 28, 1874, the Lord Chief Justice concluded a charge to the jury of twenty days' duration, and in 29 minutes a verdict of guilty on each and every of the 33 assignments of perjury contained in an indictment of two counts was returned. Orton was sentenced to two separate and consecutive terms of seven years' penal servitude, one on each count, and Parliament at once passed a special private act, confirming the estates absolutely to the infant baronet. The trial cost the government the enormous sum of \$276,575. At the conclusion of seven years of the claimant's sentence a writ of error was carried to the House of Lords by Judah Philip Benjamin, Q.C., raising the technical question as to the legality of the sentence. The court decided adversely to Orton, ruling that the maximum sentence of seven years allowed by statute could be passed on each count of an indictment for perjury, and the prisoner served until released on license. Then he came to the United States, acted as a bartender in Nottingham, England, and in 1895 sold to *The People* newspaper of London a full and absolute confession of his fraud. Dr. Kenealy, his counsel, was disbarred for his misconduct and abusive language used in the trial, and died believing, with hundreds of other dupes, in the justice of his client's cause. Thus ended the most stupendous imposture and the longest trial known to the annals of English jurisprudence.

Orton died in London, March 31, 1898.

The literature of the trial was extensive and voluminous. The principal books were *The Tichborne Romance* (1871); *The Tichborne Trial: The Summing-up of the Lord Chief Justice of England* (1874); *The Charge of the Lord Chief Justice of England in the Case of the Queen against Thomas Castro* (2 vols., 1874); and Morse's *Famous Trials* (1874).

TICK, a name given to several parasites which infest the skin of certain vertebrate animals. The true ticks (*Ixodes*) are mites (*Acarina*) in the class *Arachnida*. The sheep-tick (*Melophagus*), the horse-tick (*Hippobosca*) and the bird-tick (*Ornithomyia*) are degenerated *Diptera*, or flies, of the family *Hippoboscidae*. See ARACHNIDA, Vol. II, p. 276; and MITE, Vol. XVI, p. 529.

TICKET OF LEAVE. See PRISON DISCIPLINE, Vol. XIX, p. 756.

TICONDEROGA, a village of Essex County, northeastern New York, 100 miles N. of Albany, on the Central Vermont and the Delaware and Hudson railroads. The township of Ticonderoga contains deposits of graphite, which furnish the entire commercial product of this mineral for the United States, the output for a single year reaching as much as 1,500,000 pounds. Besides the graphite industry there are foundries, machine-shops, pulp and paper mills and important lumber interests. Population 1900, township, 5,048; village, 1,911.

TIDAL MOTORS. Various forms of tidal motors have been invented and tested and laid aside. This form of power was one of the first that suggested itself, but has never been developed into practical use. In tide rivers large rafts have been moored, with a shaft and paddle-wheels to drive machinery on shore. As the speed varied with the hour, and the mechanism stopped altogether at slack water, it was found to be too irregular for any manufacturing purpose. Other motors have been built for utilizing the rise and fall of the water, as in elevating a great float. This method was open to the same objections, with the added difficulties of giving out less power with greater expense of construction. The plan of using the power of the tide at its best to pump water into a high reservoir, and then to use the water descending from the reservoir in some perfected form of water-wheel, which would give a steady power, has proved equally fruitless, because the waste friction incidental to such a cumbersome method entailed such a cost for maintenance, added to the high cost of the plant, that the power so obtained was more expensive than that to be had by coal-consumption.

TIDE-DAMS. See COFFER-DAMS, Vol. VI, p. 114.

TIDIOUTE, a borough of Warren County, northwestern Pennsylvania, 35 miles N.E. of Oil City, on the Allegheny River, and on the Western New York and Pennsylvania railroad. It is in a region rich in coal, lumber and petroleum, and has important industries, including several saw-mills, stave, planing and shingle mills, a foundry, chair and hub factories. Population 1890, 1,328; 1900, 1,237.

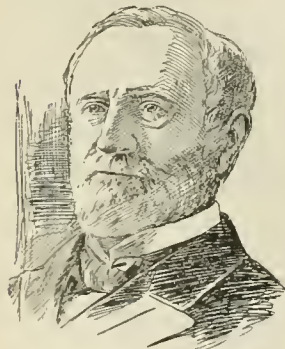
TIELE, CORNELIS PETRIS, a Dutch theologian; born at Leyden, Holland, Dec. 16, 1830. He studied at the university and prepared for the ministry at Amsterdam; became Remonstrant pastor at Rotterdam (1856), professor in a seminary at Leyden (1873), and professor of history of religion, at the University of Leyden (1877). He was one of the editors of *Theologisch Tijdschrift*. The following of his works have been translated into English: *Comparative History of the Egyptian and Mesopotamian Religions* (1869-72); *Outlines of the History of Religion to the Spread of Universal Religions* (1876). Another work was the article on RELIGIONS in this ENCYCLOPEDIA.

TIEN-TIAN OR THIAN-SHAN, mountains. See ASIA, Vol. II, p. 686.

TIEPOLO, GIOVANNI BATTISTA, the last of the great Venetian school of painters; born at Venice in 1696. He was a student of Gregorio Lazzarini, but modeled himself on Paul Veronese. Most of his life was spent around Venice, in the adornment of churches and palaces, among them being the great series of frescoes in the archiepiscopal palace at Würzburg, but in 1760 he went to Madrid on the invitation of the King of Spain and executed several frescoes in the Royal Palace. He died there, March 27, 1770. His paintings were rich in color, and clear, though sometimes incorrect, in drawing, but fresco was his greatest field. Among his works are the *Majesty of Spain*, in the throne-room; *History of Cleopatra*, a series in the Palace Lobia, Venice; *Invention of the Cross*, in the Venice Academy, from a church in Venice; *Cleopatra Feasting*, at the hermitage in St. Petersburg; *St. Joseph and Christ with Saints*; *St. Lucy*; a *Last Supper*, at present in the Louvre; in the same place, a banner with *St. Martin* and a *Virgin and Child*.

TIETJENS OR TITIENS, TERESA, an operatic singer, was born at Hamburg, of Hungarian parents, July 18, 1831, and made her appearance in that city, in the character of Lucretia Borgia, in 1849, taking at once a high position on the lyric stage; at Frankfurt and Vienna she was even more warmly received, and her first appearance in London, in 1858, was a triumph. She sang in London the greater part of the time for the rest of her life, but visited the United States in 1876. She had a rich and very high soprano voice, which was also well suited to sacred music. Some of her rôles were Valentine in *The Huguenots*, *Semiramide* and *Fides*. She died Oct. 3, 1877.

TIFFANY FAMILY, THE, which has become identified with the production of high-art silver and gold ware, glass-decorative work, etc., is descended from Squire Humphrey Tiffany of England, who was killed by lightning near Boston, Massachusetts, July 15, 1685.—COMFORT TIFFANY, the fifth in descent from Squire Humphrey, was born at Attleboro, Massachusetts, and removed, after his marriage, to Danielsonville, Connecticut, where he em-



CHARLES L. TIFFANY.

barked in the manufacture of cotton goods, and, after twenty years in the business, formed a new company for the same purpose, the Brooklyn Manufacturing Company, he buying out the interest of the other partners later, and continued the business under the name of C. Tiffany and Son.—CHARLES LEWIS TIFFANY, eldest son of Comfort, was born at Killingly, Connecticut, Feb. 12, 1812; educated at Plainfield Academy, Connecticut, and later at the Brooklyn School. The father opened a small store

in Danielsonville and put his son Charles, then 15 years old, in charge. The store grew so rapidly that a more commodious one was erected. In 1837 the son made up his mind that there was no future in the manufacture of cotton, and boldly launched out in New York City, with his companion, John B. Young, in the fancy goods and stationery business, the father starting them with a capital of one thousand dollars in a store located at 259 Broadway. The partners endeavored to secure exclusive novelties in *bric-à-brac*, Chinese and Japanese goods, and curiosities of every description. On Jan. 1, 1839, thieves entered the store and carried off everything that was portable. Fortunately, the cash had been removed the night previously, but the loss was four thousand dollars. The firm quickly recovered, and in 1841 larger premises were secured by adding the adjoining store, which gave them a front on Broadway and Warren street. Bohemian glassware, French and Dresden porcelain, clocks and fancy Parisian jewelry were successively added. In the spring of this year a new partner, J. L. Ellis, was admitted to the firm, which became Tiffany, Young and Ellis. It was also decided to send the new partner to Europe to make selections of the choicest articles that the foreign stores could produce. On Nov. 30, 1841, Charles Tiffany married Miss Harriet Olivia Avery Young, sister of his partner, and daughter of Judge Ebenezer Young of Killingly, Connecticut. Four of the six children of this union survive. They are Annie Olivia (Mrs. Alfred Mitchell), Louis Comfort, Louise Harriet and Burnett Young. In 1847 the firm removed to 271 Broadway, corner of Chambers Street, and began to manufacture its own gold jewelry. An annual catalogue was started, and it was complete in articles of luxury of all kinds. In the panic in Europe that followed the revolution of 1848, diamonds having declined fifty per cent, the firm decided to invest all they could in these gems. This departure put them in the front rank as diamond merchants, and they became the possessors of many historic gems, among them being the diamond zone of Marie Antoinette.

In 1850 Gideon F. T. Reed, formerly of the great Boston jewelry firm, was admitted a partner, and he was made manager of the Paris branch opened that year, and which has prospered marvelously. The Tiffanys introduced the English standard of sterling silver, $\frac{92.5}{1000}$ fine, for all their silver productions. The firm secured the services of John C. Moore, who had made silverware for Marquand and Company and their successors, and this aided materially, with the liberality and determination of the Tiffanys, to place the firm in the lead in art metal-work. In this department they were soon employing over five hundred men. In 1853, J. B. Young and J. L. Ellis retired from the firm, which became known since then as Tiffany and Company. New quarters were erected in 1854 at 550 Broadway, to which was added, in 1861, 552 Broadway. In 1858, upon the completion of the first Atlantic cable, Tiffany and Company secured the remaining cable and made quite a hit by using it for producing fancy articles of all kinds as souvenirs. On the outbreak of the Civil War the firm's prem-

ises were converted into a depot for military stores, Mr. Tiffany being the first to submit to the quartermaster general a complete model of the equipments of the French army. Orders for all manner of supplies came in from all parts of the Northern states. In 1867 the firm made a display at the Paris Exposition, the character of which may be gathered from the following comment that appeared in the London *Spectator*: "We confess we were surprised and ashamed to find at the Paris Exposition that a New York firm—Tiffany and Company—had beaten the old country and the Old World in domestic silver plate." Next year, 1868, the firm was incorporated as a manufacturing company under the laws of the state of New York, with Charles Lewis Tiffany as president. In the same year a London branch was established. In 1870 the site at the corner of Union Square and Fifteenth street, where had stood the Church of the Puritans, rendered famous by Dr. Cheever, was offered to the firm, and they accepted it with the church and fittings, which they removed, and immediately erected in place of the church the present commodious premises. With the removal to Union Square, many new departments were added, and their place became more than ever one of the sights of the town. Since then the manufacture of electro silver-plated ware has been added to the operations of the firm. New works replaced the old at Forest Hill, Newark, New Jersey, occupying 45,000 square feet, and capable of further extension. At the Centennial Exhibition in 1876 the firm's exhibit left them without competitors. At Paris, in 1878, the firm obtained a *grand prix* for silverware, and many medals, while Charles L. Tiffany received the decoration of the Legion of Honor, and the gold medal *præmia digno* from the Russian Emperor. At the exposition of 1889 the *grand prix* for silverware was again awarded the firm, and E. C. Moore was made a chevalier of the Legion of Honor. At the World's Columbian Exposition the exhibit made by the firm made a deep impression upon all visitors. *The Art Journal* of London, in a review of the exhibit, said, among other things: "Judging by the productions exhibited, one may well be in doubt whether our much-boasted European pre-eminence in these things is to last much longer, and whether, after all, we shall not, in the near future, be compelled to regard the firms of New York as at least our equals, if not our superiors, in the production of high-class gold and silver work." Charles L. Tiffany was one of the founders of the New York Society of Fine Arts, and of the Union League Club of New York. He is a trustee of the American Museum of Natural History, a fellow of the Royal Geographical Society of London, and a fellow of the National Academy of Design of New York.—LOUIS COMFORT TIFFANY, son of the preceding, was born in New York City, Feb. 18, 1848. He adopted art as his profession, and was a pupil of George Inness, N.A., and studied in Paris under Léon Belly; traveled extensively in Europe, Africa and the East; elected a member of the Water-Color Society of New York (1870); associate of the National Academy (1871), and full Academician (1880), and treas-

urer of the Society of American Artists (1878). Among his works in oil are *A Dock Scene, Yonkers* (1869); *Fruit-Vender Under the Sea-Wall at Nassau* (1870); *Hunter's Dinner and Street Scene in Tangiers* (1872); *Clouds on the Hudson* (1874); *Study at Quimper and Ceramic Wares* (1877); *A Laborious Rest* (1878); *Duane Street, New York* (1878). His water-colors are equally numerous. He has given special attention to art decorative work, and furnished many designs for windows for the Tiffany Glass Company, which he founded in 1879, and which, in 1885, was formed into the Tiffany Glass Company, with a capital stock of \$90,000. In 1890 the Tiffany Glass and Decorating Company was formed, with a capital stock of \$400,000, having bought out the old company for \$250,000. Louis C. Tiffany is president and art-designer of the company.

TIFFIN, a city and the capital of Seneca County, northern Ohio, on the Sandusky River, and on the Baltimore and Ohio, the Cleveland, Cincinnati, Chicago and St. Louis and the Pennsylvania railroads, 42 miles S.E. of Toledo and 34 miles S.W. of Sandusky. It is the center and shipping-point for a rich agricultural district, has numerous churches, good public schools and other educational institutions, including Heidelberg University (Reformed), a co-educational institution established in 1850, and in 1895 having 20 instructors, 288 students and a library of 10,500 volumes. The city also contains a public library, an orphan asylum, several banks, daily, weekly and monthly periodicals, woolen-mills, foundries, stone and tile works, straw-board, emery-wheel, pottery and glass works, machine-shops and agricultural-implement works. Population 1890, 10,801; 1900, 10,989. See also TIFFIN, Vol. XXIII, p. 385.

TIFFIN, EDWARD, an American statesman; born in Carlisle, England, June 19, 1766. He was partly educated in England, where he also studied medicine, and finished his education at the University of Pennsylvania after his removal to America. He became a preacher in the Methodist Church; removed to Chillicothe, Ohio (1796), where he continued to preach and practice medicine; was a member of the territorial legislature; in 1802 was president of the convention which drew up the constitution of Ohio; and in 1803, when the territory was admitted, became the state's first governor; was elected United States Senator in 1807, but resigned in 1809, when his wife died; was commissioner of the United States land-office (1812-15), and then surveyor-general of the Northwest territory. He died Aug. 9, 1829.

TIGER-CAT. See OCELOT, Vol. XVII, p. 719.

TIGER-FLOWER, a name given to *Tigridia pavonia*, a Mexican plant of the iris family, common in cultivation. It is a bulbous plant, with large lanceolate leaves, and sends up a flowering stem a foot or two high, which bears a few very large yellow or orange flowers, whose dark center is spotted with crimson or purple.

TIGLATH-PILESER, a king. See BABYLONIA, Vol. III, p. 186.

TIGRÉ, province. See ABYSSINIA, Vol. I, p. 64.

TILDEN LIBRARY. Samuel J. Tilden (see Vol. XXIII, p. 387), at his death, Aug. 4, 1886, left \$4,000,000 as a trust for the foundation of a free library in the city of New York, with his splendid private library of fifteen thousand volumes as a nucleus. Although he was one of the first lawyers of his time and drew up the will himself, the courts held that the bequest was defective, and litigation on the part of the heirs dragged through several years, and was finally settled by compromise in 1894, the value of the trust being reduced to about \$2,250,000. Arrangements were then made by the trustees with the trustees of the Astor and Lenox libraries for the consolidation of the three libraries, which was effected in 1895. The new library is styled "The New York Public Library, and Astor, Lenox and Tilden Foundations." The institution has the magnificent endowment and collection of books valued at \$5,000,000.

TILES, AMERICAN. See CERAMIC ART, in these Supplements.

TILLANDSIA, a genus of plants of the family *Bromeliaceae*, or pine-apple family. They are chiefly epiphytes, and almost entirely tropical or subtropical. *T. usneoides*, the long moss, or black moss, or Spanish moss, grows in the southern United States, its gray, thread-shaped, branching stems hanging in clumps or festoons from the trees.

TILLET, WILBUR FISK, an American clergyman; born at Henderson, North Carolina, Aug. 25, 1854. He was educated at Trinity College, Randolph-Macon College and Princeton Theological Seminary; entered the ministry of the Methodist Episcopal Church South, and accepted a pastorate at Danville, where he remained two years. In 1882 he became professor of systematic theology, dean of the theological faculty and vice-chancellor of Vanderbilt University. Besides contributions to both religious and secular magazines, he published *Our Hymns and Their Authors* (1889) and *Discussions in Theology* (1890).

TILLET, BENJAMIN, an English labor leader; born in Bristol, England, in 1859. He spent his boyhood in a brickyard, as a boy on a fishing-smack and as apprentice to a bootmaker, finally running away and joining the navy, after which he was sailor on several merchant-vessels. He afterward settled in London, where he formed the Dockers' Union, and during the great strike worked energetically as an organizer of the union. In 1892 he stood for West Bradford, but was defeated; was tried in Bristol on the charge of inciting riots, but was acquitted. He gave important evidence before the Commission on Pauper Immigration and before the Lords' Committee on Sweating. He was elected an alderman of the London County Council, but failed again for Parliament in 1895.

TILLEY, SIR SAMUEL LEONARD, a Canadian statesman; born in Gagetown, New Brunswick, May 8, 1818; died at St. John, N.B., June 25, 1896. He entered public life in 1850-51 as representative of St. John, N.B. in the Legislative Council of the province. Later on he was a member of the Executive Council, holding the office of Provincial Secretary, and was for a time leader

of the government. He was prominent in promoting the confederation of the Dominion, and had a seat in the Dominion Parliament 1867-73, and 1878-85. During the latter period he was Minister of Finance. In 1873-78 and in 1885-93 was lieutenant-governor of New Brunswick. He was knighted in 1879. He took an active interest in temperance, and was versed in financial topics.

TILLMAN, BENJAMIN RYAN, an American public man; born in Edgefield, South Carolina, Aug. 11, 1847. He was educated at Bethany Academy, and then worked on a farm. He fought during the latter part of the Civil War in the Confederate army. His first political office was that of governor, to which he was elected in 1890, and again in 1892; while governor, assumed for the state a monopoly of alcoholic beverages, and strictly enforced the dispensary laws; and in 1895 was chosen to the United States Senate.

TILLMAN, SAMUEL ESCUE, an American soldier and educator; born near Shelbyville, Tennessee, Oct. 2, 1847. He was educated at the United States Military Academy; entered the army as second lieutenant of the Fourth Artillery; was transferred to the Corps of Engineers in 1872; became assistant professor of chemistry at West Point in 1870; assistant astronomer on the expedition to Tasmania, 1874-75; was assistant engineer on several survey commissions; and in 1880 was appointed professor of geology, mineralogy and chemistry in West Point. He published *Elementary Lessons in Heat*, and *Essential Principles of Chemistry*.

TILSONBURG, a village of Oxford County, southwestern Ontario, on Big Otter Creek, 16 miles N. of Port Burwell, on the Grand Trunk and Michigan Central railroad. The center of an agricultural and stock-raising district, it also has planing, flour and woolen mills, besides other manufacturing industries. Population 1891, 2,163.

TILT-HAMMER. A form of hammering or forging machine in which the hammer-head is mounted on a lever that is raised by a cam or wiper and descends by gravity, the force being usually augmented by the spring of the lever, also called trip-hammer. Recent forms are made with cushions, to avoid jarring the mechanism. The Jenkins upright tilt-hammer has a wooden helve, actuated by a cam. The four cushions are all placed near the fulcrum. The Bradley tilt-hammers are made with wooden helve, and also with a metal strap and steel helve. The helve is mounted on a saddle or oscillator. In operation the work is placed on an anvil under the head and the operator puts his foot on a treadle, which tightens a belt, throwing into operation an eccentric that tilts the helve. The blows of the hammer continue until the pressure is removed from the treadle, when a brake is automatically applied. The whole machine rests on one large solid bed-plate.

TILTON, a town of Belknap County, southern central New Hampshire, on the Merrimac and Winnepesaukee Rivers, 18 miles N. of Concord, on the Concord and Montreal railroad, consisting of the village of Tilton and East Tilton, with their tributary agricultural districts; manufactures

woolen goods and pulp, and has fine churches, a bank, and the New Hampshire Conference Seminary and Female College. Pop. 1900, 1,926.

TILTON, THEODORE, an American writer and author, was born in New York city, Oct. 2, 1825; graduated at the Free Academy of New York in 1855, and after a year's service on the *New York Observer*, became editor of the *Independent*, and remained in that position for 15 years. He was connected editorially with the *Brooklyn Union* and the *Golden Age*, and was prominent as a lecturer. In 1883 he settled in Paris. He wrote, in verse, *The King's Ring*; *The Sexton's Tale*; *Thou and I*; in prose, *Sancta Sanctorum*; a *Life of Victoria Woodhull*; and *Tempest-Tossed*, a novel. His wife, ELIZABETH R. TILTON, the subject of the Beecher scandal, died in Brooklyn, N. Y. April 13, 1897.

TIMÆUS OR TINAIOS OF TAUROMENION. See SICILY, Vol. XXII, p. 20.

TIMBER-TREES. See ARBORICULTURE, Vol. II, pp. 315-19; FORESTS, Vol. IX, pp. 405-06.

TIMBRE, quality. See ACOUSTICS, Vol. I, p. 107.

TIMBY, THEODORE RUGGLES, an American inventor; born at Dover, New York, April 5, 1822; received a common-school education, and early in life evinced the possession of inventive talents of a high order. In 1841 he exhibited to army officers at Washington his plans for a revolving tower, and in 1862 procured letters-patent upon the design, the same year contracting with the constructors of the *Monitor* for the use of his "revolving tower" upon that vessel, for a consideration of \$5,000 royalty. He also invented the American pattern of the turbine water-wheel, the system of firing guns by electricity, and other designs and improvements of value, including the mole and town system (1880); the subterranean system (1881); the town and shield system of defense (1884); and the hemispheroidal system (1889). He founded in Washington, in 1880, *Congress*, a monthly journal.

TIME, in music, a term used to express the duration of musical sounds and of the interval between them, as also the speed with which one follows another. Musical sounds are represented by signs called *notes*, and the various forms of the notes have each a different time value. Thus, if a whole note (Ex. 1) is sounded during a certain length of time,

	Whole	Half	Quarter	Eighth	Sixteenth	Thirty-second	Sixty-fourth
Notes							
(Ex. 1)							
Rests							

the half-note is sounded in half the time, the quarter-note in one fourth the time, etc. Notes are written on parallel lines called the *staff*, which is divided by perpendicular lines called *bars*, into groups of notes called *measures*, and equal times are given to the measures of any particular piece of music. There would be no more pleasure or expression in notes sounded in a continued series without division into groups than in words spoken without division into phrases. Certain notes in each measure are accented, as certain syllables in a

word are accented. The regular recurrence of accented notes constitutes the rhythm of music, as that of accented syllables does of poetry.

At the beginning of every piece of music is written on the staff a fraction which indicates the number and kind of notes used in the measures. The numerator shows how many; the denominator, what kind. Thus (Ex. 2), $\frac{3}{4}$ means that there are three quarter-notes or their equivalent in the measure; $\frac{6}{8}$, that there are six eighth-notes in the measure.

(Ex. 2)

Duple	Triple	Common
Compound Duple	Compound Triple	

The time of the measures is determined by beats or counts. There are naturally two kinds of time for measures, *duple* and *triple* (Ex. 2). The common or quadruple time is only another form of duple time, the rhythm of both being essentially the same. The simplest duple time has two beats or counts to the measure; the common, four counts; and the triple, three. Compound time (Ex. 2) is a modification of the simple times, as when the notes in $\frac{2}{4}$ time are turned into two groups, each having three eighth-notes, or in $\frac{3}{4}$ time three groups each having three eighth-notes. The forms of compound duple time in general use are $\frac{6}{8}$, and of compound triple time $\frac{9}{8}$ (Ex. 2). The old masters often wrote in other forms, as $\frac{2}{1}$, $\frac{3}{1}$, $\frac{1}{6}$, $\frac{1}{4}$, etc. The principle governing compounding is that groups of short-duration notes may be substituted for any one note in simple time, which groups may be performed in the same time as the notes for which they stand. The numerator also indicates the number of counts to each measure. Thus $\frac{3}{4}$ means that while sounding the notes of the measure three is to be counted, and in $\frac{6}{8}$, six is to be counted. But instead of counting six in $\frac{6}{8}$ time, the count may be | 1 and 2 and 3 and |, the "and" being equivalent to one count; or the count may be | one, two |, three notes being sounded at each count. The time of measures is also marked by their rhythm. A dot placed after a note increases its time-value one half; thus, a dotted whole-note is equal in time to a whole-note and a half-note.

Rests (Ex. 1) are signs which denote silence. There are as many kinds of rests as of notes. The rests are counted the same as if they were notes, and receive the same time as the notes for which they stand.

The duration of the various notes and rests is not absolute, but relative, the time depending on the speed or movement of the piece of music. Any musical composition may be performed slowly or rapidly; if slowly, more time is given to each note; if rapidly, less time. The time should never be so slow that connection between notes is lost, nor so fast that notes are heard indistinctly. The general speed of a piece of music is technically called its *tempo*. Certain Italian words are in common use to indicate tempo. Thus, slow movement is expressed

by the terms *largo*, *grave*, *adagio*, *larghetto*, etc.; moderately fast by *moderato*, *andante*, *andantino*, *allegretto*, etc.; fast by *allegro*, *vivace*, *presto*, *prestissimo*, etc. It is well to remember that the tempo of the compositions of the old masters was slower than the speed with which they are performed at the present day. It should always be kept in mind that the form of the notes used does not necessarily indicate the tempo. For certain reasons, composers write duple, common or triple time in different modes, and measures written with quarter-notes may be performed in the same time as when written in eighth-notes. For the purpose of proper expression, certain measures or parts of a composition have their tempo retarded, indicated by the terms *ritardando*, *rallentando*, etc., or accelerated, indicated by the terms *accelerando*, *stringendo*, etc. If a change in the original tempo is made in any part of a piece and a return to it is to be made, the terms *a tempo* or *tempo primo* are used.

TIME-DETECTOR, an apparatus or system of mechanism, including a timepiece, arranged to preserve a record of the rounds made by a watchman. There are two types, one of which is called a time-watch or portable time-detector. This instrument has a recording-dial, driven by the watch-mechanism. In order to make a record on it, say once in ten minutes from six different floors of a building, the watchman is required to use keys which are chained to certain places on each floor. The dial will show in the morning at what time he has wound the watch with the respective keys. This system has been objected to on the ground that a watchman has only to secure duplicate keys and he can sit in an arm-chair all night and do his winding without making any rounds of the building. The other type, sometimes called a time-clock system, employs a large clock-mechanism, bearing a dial of paper, which is renewed daily. It records the pushing of buttons or winding of keys from a number of fixed stations. This time-detector is locked up where the watchman has no access to it. It is connected to the stations by wires so insulated and arranged in cables that to meddle with them is to insure detection. The record is made on the dial usually by needles, which punch a hole, whose location on the ruled surface shows the time at which it was made and the station from which it was worked. A record of one or of several watchmen may be kept on one instrument, and there is no way of tampering with the apparatus without putting it out of order. So long as the clock is locked out of the watchman's reach, so long must he do his work properly or the fact will become known. The use of the time-detector in large factories is constantly increasing.

C. H. COCHRANE.

TIMOTHY, EPISTLES TO. See PASTORAL EPISTLES, Vol. XVIII, pp. 348-351.

TIMOTHY-GRASS, the common name of *Phleum pratense*, a grass introduced from Europe, and one of the most valuable of meadow-grasses. It is recognized by its flowers being crowded together in a seeming spike, rather than disposed in the usual open panicle of most grasses. It is also called cat-tail grass and herd's-grass.

TIMROD, HENRY, an American poet, born in Charleston, South Carolina, Dec. 8, 1829. He entered the University of Georgia, but did not finish the college course; studied law, and tutored to support himself; at the outbreak of the Civil War became correspondent for the Charleston *Mercury*; in 1864 became assistant editor of the *South Carolinian*. From 1849 to 1853 he contributed poetry to several magazines, and in 1850 a small volume of his poems was published. At the beginning of the Civil War he wrote a number of impassioned war lyrics that spread his name among the Southern people. The war destroyed his property and he died impoverished, in Columbia, South Carolina, Oct. 6, 1867.

TIMSAH, lake. See CANAL, Vol. IV, pp. 791, 792.

TIMUCUAS. See *Appalachians*, under INDIANS, Vol. XII, p. 828.

TINAMI, family. See TINAMOU, Vol. XXIII, pp. 402, 403.

TINCAL. See BORAX, Vol. IV, p. 50.

TINCTURES. See ALCOHOL, Vol. I, p. 469. Heraldic. See HERALDRY, Vol. XI, pp. 691, 692.

TINDER. See MATCHES, Vol. XV, p. 625.

TINEA, a disease. See SKIN DISEASES, Vol. XXII, p. 124.

TINEIDÆ. See INSECTS, Vol. XIII, p. 151.

TINGHÆ, city. See CHUSAN, Vol. V, p. 767.

TINOCERAS, fossil. See MAMMALIA, Vol. XV, p. 426.

TIN-PLATE MANUFACTURE IN THE UNITED STATES. The history of tin-plate is much mixed with the tariff and politics of the United States. For several years previous to 1873 the tariff was 25 per cent. In that year it was lowered to 15 per cent, and two years later it was made 15 per cent and $1\frac{1}{10}$ cents per pound. From 1876 to 1883 the $1\frac{1}{10}$ cents tariff held, when it was further reduced to 1 cent a pound. From 1891 to 1894 the McKinley tariff of $2\frac{2}{10}$ cents per pound prevailed, and it was during this period that the industry had its greatest development. In 1894 the tariff was reduced to $1\frac{2}{10}$ cents per pound, and this, with other causes, brought the price down somewhat, but the decline has not crippled the industry, which appears not to have suffered more than other lines of manufacture from the financial depression of 1894-96.

A little more than half of the tin-plate made in the United States is now made from American black plate—that is, more than half the iron-plate which is tinned here is made in this country, as the following table shows:

TIN-PLATE AND TERNE-PLATE PRODUCTION IN THE UNITED STATES.

YEAR.	PER CENT MADE FROM AMERICAN BLACK PLATE.	TIN-PLATE, POUNDS.	TERNE-PLATE, POUNDS.
1891-92 -	68.12	4,539,590	9,107,129
1892-93 -	43.68	45,743,107	54,076,095
1893-94 -	61.54	81,609,765	57,613,702
	Average, 57.78	Total, 131,892,462	120,796,926

In April, 1895, there were 65 firms engaged in making tin-plate, controlling a total of 177 black-plate mills, with 58 more mills in course of erection or projected, and 277 tinning-sets in operation, with 221 building or projected. From this it may be inferred that the greater part of the black plates for tinning will hereafter be made in this country. The mills and tinning-sets in operation and building are estimated to be sufficient to supply the present home demand for tin-plate. The consumption in this country is estimated at 6,000,000 to 7,000,000 boxes annually, of which 1,500,000 to 2,000,000 will continue to be imported as long as the Standard Oil Company and beef-packing companies enjoy a rebate of 99 per cent of tariff. The demands of the home market are therefore now somewhere in the vicinity of 5,000,000 boxes annually. One hundred and twelve plates constitute a box.

The equipment of a tin-plate mill includes boilers and engines, cold rolls, hot rolls, heating-furnaces, annealing-furnaces, pickling-machines, tinning-pots, shearing-machines, doublers, elevators, conveyors, tramways and minor machinery. Nearly all of that in use is of American design, our engineers having improved materially on the mechanism in use in Wales.

The process of manufacture, as carried on here, begins with the steel billet, which is placed in the furnace and heated to a welding temperature, when it is removed and rolled into a bar about 7 inches wide, and from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in thickness, according to the size of plate that is to be produced. This bar is then cut into lengths of $21\frac{1}{2}$ inches, being designed to make a plate that will be 20 inches long after trimming. After reheating, the bar is rolled in the hot mill until its length reaches about 56 inches. Two pieces are then matched together, doubled hot, trimmed in doubling-shears and put back in the heating-furnace. Again they are rolled to 56 inches and doubled, so that there are then eight thicknesses. They are placed in a machine together and trimmed, as a rule, to 14×20 inches. The black plate is then complete. The rolls used in its manufacture are of ordinary construction, as found in any steel mill. For trimming the plates, ordinary alligator shears may be used, but most of the makers use machines specially designed for the work. The best of them combine the doubling and shearing in one operation. The doubling is effected by a powerful toggle-clamp, and the shears are preferably vertical, so as not to draw or skew the sheets in trimming. Several forms of squaring-shears are made for giving the final trim.

Preparatory to tinning, the black plates have to be pickled to remove the scale. For this purpose they are immersed in hot dilute sulphuric acid and washed in clean water. The Mesta or Leechburg pickling-machine, introduced for this work, is the most ingenious of the new machinery used in manufacturing tin-plate. It has a stout tubular vertical column, which is used as a steam-cylinder, and contains a piston which can be raised or lowered by admitting or withdrawing steam from below. To the top of the piston are attached three stout cross-arms, arranged radially. These arms are for use as

cranes, and may be swung to any point within their radii. On three sides of this column are placed a railway track, a pickling-vat and a swilling-vat. In operation, a crate of tin-plate is run up on the track and hung to one of the arms of the machine. Steam is then admitted and the piston hoists the plates several feet, and the crane is swung over the pickling-vat. The piston then lowers the plates into the vat, and agitates them with an up-and-down motion of about 12 inches. The plates are next hoisted out and swung into the swilling-vat, where they are thoroughly washed. The three operations are carried on continuously, there being a crate of tin-plate hung on each cross-arm as it comes around, and a crate on each of the other arms all the time the machine is in operation. As a result, the performance of the machine is very rapid. The steam does all the work, the attendants simply hooking on the plates and releasing them, and operating the valves to move the piston.

Pickling by the electric current has also been tried with some success, effecting a saving in both acid and iron.

Annealing is the next process, and the pickled plates have to be packed in iron boxes, which have flaring, pan-like tops and bottoms, between which sand is packed to exclude the air. The annealing-furnace is made in a great variety of forms, each factory appearing to have different notions as to construction and arrangement. The plates are heated to a dull-red temperature for a period of from 10 to 24 hours. When removed, the boxes are allowed to cool gradually, and in this way are made to last several months.

Cold-rolling of the plates follows, the object being to give a high finish to the plate. Hard-chilled rolls are used, about 22 inches in diameter and 30 inches long. The housings weigh about fourteen thousand pounds each, and have double screws. A second annealing is then required, followed by another pickling in a weaker acid solution. This is called white-pickling. The plates are then scoured with sand and water by means of hemp pads, after which another thorough washing makes them ready for the tinning.

There are two processes of tinning, differing as to the use of palm-oil or a solution of chloride of zinc and muriatic acid. The palm-oil process is considered much better than the other, which is termed the acid process. The first step in the former process is to grease the plates in a pot of palm-oil, after which they are dipped in the tinning-pot, which contains melted tin covered with palm-oil. A second dipping follows, and after a good brushing a third dipping. A finish is given by rolling in a bath of palm-oil, after which the plates are placed in racks to cool. A cleaning-machine is next used, in which the plates are rubbed with bran to absorb the grease. In the Record cleaning-machine a traveling bed is provided for the plates, which are fed in from a table under a drum arranged to rub them with bran. Hand-polishing, or dusting by machine, is the final process, after which the plates are ready for market.

The 1896 wholesale price of a good grade of tin-

plate was 7 to 8 cents a pound. The regulation size of plate weighs very nearly one pound. Workmen are paid about the same prices that maintain in other lines of manufacturing. The average wage is double that paid for the same work in Wales. See TIN, Vol. XXIII, p. 401.

C. H. COCHRANE.

TINTOMETER. Lovibond's tintometer was patented in 1886 and improved in 1887, and again in 1890. It is used to determine the color of lubricating-oils, as an increase in depth of color reduces the value of many oils. It has two channels leading from an eye-piece. One of these channels contains a rectangular glass cell in which there is placed two inches of oil. In the other cell is placed any one of a set of slips of stained glass, graduated as to tint, and the user tries the slips until he finds one that matches the tint of the oil. The marking on the slip then tells him the exact grade of the tint. Compare chronometer.

TINTORETTO, painter. Same as ROBUSTI, Vol. XX, p. 608-611.

TIOGA, the name of a river rising near the western border of Bradford County, Pennsylvania, flowing northerly through Tioga County, into the Conhocton River in Steuben County, New York, and thus forming the Chemung River.

TIONESTA, a town and capital of Forest County, northwestern Pennsylvania, on the Allegheny River, 20 miles E. of Oil City, on the Western New York and Pennsylvania railroad. The center of a region of extensive forests yielding large quantities of lumber, it has saw and stave mills. There is also some coal and petroleum in the vicinity. Population 1900, 815.

TIPITAPA, a river of Nicaragua, flowing from the Lake of Leon, about 18 miles into Lake Nicaragua. Its navigation is obstructed by falls near the upper lake, but is possible for 12 miles below them.

TIPPECANOE, a river rising near the west border of Noble County, Indiana, and flowing for 200 miles in a southwesterly direction through the state, and emptying into the Wabash 10 miles above Lafayette. It was on the banks of this river that General William Henry Harrison defeated a large body of Indians under Tecumseh, though surprised in the middle of the night and losing 60 killed and 120 wounded. The Indians left but 40 dead on the field, but retired and burned their village.

TIPPECANOE CITY, a village of Miami County, southwestern Ohio, on the Great Miami River, midway between Dayton and Piqua, on the Cincinnati, Hamilton and Dayton railroad. It has several manufacturing industries, including flour and paper mills. There is one national bank, with a capital of \$60,000. Population 1890, 1,465; 1900, 1,703.

TIPTON, a city and capital of Tipton County, central Indiana, on Cicero Creek, 38 miles N. of Indianapolis, on the Lake Erie and Western railroad. It is the center of an agricultural district, and has flour-mills, a canning factory, and lumber-finishing mills. There is also a fine courthouse and a jail, which cost respectively \$190,000 and \$35,000. Population 1890, 2,697; 1900, 3,764.

TIPTON, a town and the capital of Cedar County, central eastern Iowa, 40 miles N.W. of Davenport and 42 miles S.E. of Cedar Rapids, on the Burlington, Cedar Rapids and Northern and the Chicago and North-Western railroads. It is the center of an agricultural district, and has carriage and machine shops, a creamery and poultry-packing establishment, and three banks, with an aggregate capital of \$125,000. Population 1900, 2,513.

TIPTON, a town of Moniteau County, central Missouri, 25 miles S. of Boonville and 27 miles E. of Sedalia, on the Missouri Pacific railway. The center of an agricultural and mining district, producing coal, lead and zinc; it has several manufacturing industries, two banks and a good school system. Population 1890, 1,253; 1900, 1,337.

TIPTONVILLE, a town and the capital of Lake County, northwestern Tennessee, about 70 miles below Cairo, Illinois, and 100 N. of Memphis, on the Mississippi River. Population 1890, 363.

TIRCE, island. See MARBLE, Vol. XV, p. 529.

TIRHAKAH, a King of Ethiopia who at first was united with Sleabataka, King of Egypt, against Sennacherib. He later killed Sleabataka, and ascended the throne himself as the last king of the twenty-fifth dynasty. He was born about 702 B. C., and, after being driven into Ethiopia by Esarhadon and Asurbanifal as a punishment for leaguering himself with the Judeans and other Syrians, he died about 664 B. C.

TIRNOVA, a town of central northern Bulgaria; capital of the province of the same name, at the northern base of the Balkans and 45 miles N. of Stara Zagara, on the River Jantra. It is a walled town, and was formerly the capital of Bulgaria and one of its chief cities. Silk and woolen cloth are manufactured, and large dyeing-works give employment to a large proportion of the working population. Population, about 12,000.

TIRSO DE MOLINA. Same as TELLEZ, GABRIEL, Vol. XXIII, p. 157.

TISRI, a Hebrew month. See CALENDAR, Vol. IV, p. 678.

TISSAPHERNES, a satrap. See PERSIA, Vol. XVIII, pp. 575-577.

TISSOT, JAMES JOSEPH JACQUES, French painter; born in Nantes, France, Oct. 15, 1836; studied under Lamothe and Landrin; in 1866, won a medal at the Salon, and in 1889 a first-class medal at the Paris Exposition. He removed to England early in the seventies, and resided there for a time. His works include *A Young Woman in Church* (1866); *Confidence* (1867); *The Retreat in the Garden of the Tuileries* (1868); *A Widow* (1869); *A Young Girl in a Boat* (1870); *The Meeting of Faust with Marguerite* (1861); *An Interesting Story* (1872); *The Captain's Daughter* (1873); *The Thames* (1876); and a series of pictures representing the *Life of Christ*, painted during a ten years' visit to the Holy Land.

TISSUES. See HISTOLOGY, Vol. XII, pp. 4-18.

TISZA, KOLOMAN VON, a Hungarian statesman; was born at Geszt, Dec. 16, 1830, and educated for the civil service, but his career was blocked at the outset by the revolution of 1848. In 1859 he first became known as an opponent of the government

policy of religious intolerance. In 1860 his party gained some independence; he then obtained a seat in the Hungarian Parliament, and succeeded Count Teleki as a leader of the Moderate Radicals. In 1875, carrying over this branch to the United Liberals under Deák, he became Minister of the Interior, and subsequently Prime Minister of the Hungarian Cabinet. In the critical period of 1876-78 he opposed Russia and Panslavism, being less vacillating than Count Andrassy, who had kept hesitating between Russia and Germany in their views of the Eastern question. He resigned with his co-ministers when Austrian finances were insufficient to meet the expenses of the Bosnian occupation, but returned to his position as Premier in 1879. He resigned in 1890, retaining his seat in the Parliament.

TITANIC BINOXIDE. See TITANIUM, Vol. XXIII, p. 410.

TITANIFEROUS ORES. See IRON AND STEEL, in these Supplements.

TITANOTHERIUM, a genus of extinct mammals whose remains were found in the Bad Lands of Dakota in Miocene strata. The animal was closely allied to the immense *Brontotherium*, whose remains are found in Colorado and Nebraska.

TITE, SIR WILLIAM, a British architect; born in London, England, in 1802. He studied architecture under Laing; first became noted through building the Church of St. Dunstan's-in-the-East, in which he introduced the Gothic style, then becoming popular. He was president of the Architectural Society and of the Royal Institute of Architects; was governor of the London and Westminster Bank; of the Bank of Egypt; was elected Member of Parliament from Bath (1855), and held his seat for twenty years; was on the parliamentary committees of banking, and was knighted (1869). He built many public and private edifices, notable among them being the Royal Exchange, in 1840. He also published a descriptive catalogue of the antiquities found in the excavations at the new Royal Exchange. He died April 20, 1873.

TITICACA, a lake. See BOLIVIA, Vol. IV, p. 11.

TITLARK, a bird. See PIPIT, Vol. XIX, p. 112.

TITLE, ROMAN CATHOLIC, has various meanings, but usually signifies the church in Rome to which a cardinal is assigned. There are 53 cardinalial titles. In a broad sense, *title* in Roman Catholic usage means also patriarchal, archiepiscopal and episcopal sees. Considered in this sense, there are 1,059 hierarchical titles in the church throughout the world. The incumbents of these titles are dignitaries, and as such have the legal right to be honored. Hence by metonymy the word *title* means also the designation or appellation of honor to which a person is legally entitled in consequence of possessing a particular dignity or office. This article may be divided into two parts; the first treating ecclesiastical titles and forms of address, the second treating scholastic titles recognized in the Roman Catholic Church. Secular and social titles and forms of address are treated in another article.

1. Arranged according to the order of precedence to which dignitaries in the church are entitled, which is always strictly observed, following are the eccle-

siastical titles in use in the Catholic Church and the forms of address proper to the several dignitaries.

The Pope, the head of the church, is called "His Holiness," and addressed "Most Holy Father" or "Your Holiness."

A Cardinal is entitled "His Eminence," and addressed in letters, "Most Eminent and Most Reverend Sir." If a cardinal is also bishop of some residential see, the address may be, "To His Eminence, Cardinal —, Bishop of —," or "To the Most Eminent and Most Reverend John, Cardinal Kemp, Bishop of York." Such an expression as "To His Eminence, the Cardinal Archbishop of Baltimore," is absurd. The following may be used, however, but is uncommon except in official documents: "To His Eminence, John Kemp, Cardinal of the Holy Roman Church, Bishop of York." A cardinal's signature is formed by inserting the word *Cardinal* between his given and his family name, as "John, Cardinal Kemp."

A Patriarch is entitled "His Excellency," and addressed "His Excellency, the Most Reverend A— B—, Patriarch of —." The Vice-Chamberlain of the Holy Roman Church, the Auditor of the Camera and the Major-Domo of His Holiness have the same title and address. Custom has sanctioned a similar form for Papal Nuncios and Delegates Apostolic, though in the practice of the Roman court they are addressed like an archbishop or bishop, the words used being "*Amplittudo Tua*," "Your Grandeur," "Your Lordship," "Your Grace." A letter to them is begun "Most Illustrious and Most Reverend Sir" or "Your Excellency."

An Archbishop, or Bishop, is entitled "His Grandeur," "His Lordship," "His Grace," in Latin "*Amplittudo*," and is addressed "The Most Illustrious and Most Reverend A— B—, Archbishop (or Bishop) of —." Making a distinction in the title and form of address used for bishops and archbishops is diametrically opposed to the practice of the Roman Court, which rules precedence in the universal church. The addition of Archbishop of —, or Bishop of —, is the only distinction made in church usage. A letter addressed to a bishop or archbishop may be begun, "Most Illustrious and Most Reverend Sir" or "Monsignor." "My Lord" is used in England and Ireland, but is considered of doubtful propriety in America. "Your Lordship" for a bishop and "Your Grace" for an archbishop are forms used in the Anglican Church, but the distinction thus made is not recognized in the Roman Catholic Church, especially in the United States. "Your Lordship" and "Your Grace" may be used for either. In the United States the abuse is quite common of addressing a bishop "Right Reverend." There is no authority for such a practice. It originated in ignorance of the relative positions of bishops and archbishops. Both a bishop and an archbishop are addressed "The Most Reverend." Archbishops precede bishops, and among archbishops seniority of promotion determines their relative positions; among bishops, the date of the consecration. No distinction is now made between titular bishops and those of residential sees. The title of S.T.D. or D.D. (Doctor of Sacred Theology,

Doctor of Divinity) sometimes is written after the name of a bishop; but this is not only against Roman practice and condemned by the best authorities, but is, moreover, redundant, for the reason that a bishop is *ex officio* a teacher of divinity. Other scholastic titles likewise are dropped when a person is made a bishop, and thereafter used only when the bishop's name appears on the title-page of a book of which he is the author, or when he is connected with a university as rector or professor, the scholastic position being more prominent than the episcopal. In these cases taste and practice vary.

Abbots or *inferior prelates* having jurisdiction from their office, are called "Most Reverend Father Abbot." The Latin is "*Reverendissimus*" (without "*Illustrissimus*"), which word by custom has been rendered "Right Reverend" in English.

Roman prelates, consisting of protonotaries apostolic, domestic prelates of the Pope, private chamberlains of the Pope, are entitled "Monsignor." Protonotaries and domestic prelates were entitled "*Illustrissimus et Reverendissimus*" in the Roman Court in the past, but today their title is "Monsignor," and "*Illustrissimus*" seems reserved to bishops. In English-Roman, prelates may be addressed "Right Reverend," (*Reverendissimus*) and private chamberlains "Very Reverend" (*Admodum Reverendus*); with the addition of the respective office which the person holds. Protonotaries and domestic prelates hold office for life; private chamberlains lose their tenure by the death of the Pope, and, to serve under the new Pope, must be reappointed.

Diocesan dignitaries and other inferior dignitaries are entitled "Very Reverend" (*Admodum Reverendus*), and addressed, "Very Reverend Father" or "Very Reverend Sir." These inferior dignitaries are acknowledged such by the law, and therefore have a legal right to the appellation "Very Reverend." Such dignitaries are the administrator of a vacant diocese, the vicar-general of a bishop, provosts, archpriests, canons of cathedral chapters, heads and provincials of religious orders, and priors. By courtesy, but without sanction in law, some others, such as priors of monasteries over which abbots preside, and rectors or heads of theological seminaries, are addressed "Very Reverend."

Doctors of divinity or of law, vicars forane or rural deans, presidents of colleges, diocesan consultants, examiners of the clergy, chancellors or secretaries of a diocese, fiscal procurators and others, along with simple priests, have no claim to be styled "Very Reverend." These and all others in priest's or deacon's orders should be styled simply "Reverend." The abuse of entitling rural deans "Very Reverend" has been officially reprobated by church authority.

A *priest* is entitled to "Father" or "His Reverence" and addressed "Reverend Sir" or "Reverend Father." If he has received the doctorate or licentiate in theology or canon law he may be addressed "Reverend Doctor." Precedence among the priests of a diocese is regulated by the time of their ordination or incardination into the diocese; but the vicar-general of the bishop always ranks first, then Roman prelates, if any, then the diocesan consultants and

the irremovable rectors. After these come the rural deans, if any, and the other rectors, followed by chaplains and assistants, precedence among these different classes being regulated by the date of ordination.

2. Scholastic titles recognized by the Roman Catholic Church are degrees given by Catholic universities—that is, such as have a pontifical charter and confer degrees by papal authority. Universities which are Catholic in name, but confer degrees only by state or civil authority, cannot give their laureates any canonical privileges, for their degrees are not recognized by the church. This distinction is important, for doctors and licentiates of Catholic universities have many privileges specifically recognized in church law. Some of these privileges are the following: 1. They are placed in dignity, and therefore may receive papal letters, ordinarily not sent to the lower clergy. 2. They rank with nobles, and by their degrees obtain true nobility and all its privileges. This is an important social consideration, especially in Europe. 3. They are exempt from both real and personal taxes according to the Roman civil law. 4. There is always a strong presumption in their favor, and when found guilty of any crime, according to the same law, they are to receive lighter punishment than others. This holds in ecclesiastical law even at the present day. 5. In conferring ecclesiastical dignities and benefices, other things being equal, doctors and licentiates must be preferred. In fact, the law specifically provides that the cathedral chapter must choose a doctor or licentiate of law or theology to act as administrator of the diocese when vacant; and if the chapter should choose some one else not a laureate, their act would be invalid. In a similar way there is an obligation to choose a doctor or licentiate for bishop, provided he has the other necessary qualities. One of the questions to be answered in the process prepared for filling an episcopal see is, "What degrees has the candidate received, and in what university?" The degrees here meant are those of theology and canon law. The honorary degree of LL.D., granted by any and every secular "college," is not recognized in ecclesiastical law at all. The degree recognized is Doctor of Both Laws, canon and civil, J.U.D., *Juris Utriusque Doctor*.

The institutions in the United States which confer degrees by pontifical authority are the Catholic University of America, in Washington, District of Columbia, chartered March 7, 1889; Georgetown University, in charge of the Jesuits, also in Washington, chartered March 30, 1833; St. Mary's University, in Baltimore, Maryland, in charge of the Sulpician Fathers, chartered April 18, 1822, by Pope Pius VIII. In Canada, Ottawa and Laval universities have pontifical charters. At present England and Australia have no Catholic universities. The bishops of Ireland have a charter for a university, but it has never been fully developed. In 1896 Pope Leo XIII granted Maynooth College authority to confer degrees in theology and philosophy. Belgium, France, Spain, Germany, Switzerland, Austria and especially Italy have universities which confer degrees by papal authority.

Doctors or masters are they who have obtained the highest grade and insignia in theology, law, medicine or philosophy. The titles of master and doctor are interchangeable; but custom, as well as the statutes of certain universities, such as the Sorbonne, Louvain, Salamanca, and the practice of the Roman court, have brought it about that they who obtain the highest degree in theology are called masters of theology, but they who obtain a similar degree in law or in other sciences are called doctors.

Licentiates also come under the name of masters or doctors, and participate in all their privileges. Licentiates are they who have the license or faculty of taking whenever they wish the highest grade, and the public insignia thereof, in theology, law or medicine, because after examination they were not only found worthy, but were solemnly and lawfully given these rights. This degree is not given by secular universities, except at Cambridge, England, and there only in medicine. Bachelors are they who have obtained the first testimony of their progress and the first degree in any science of faculty. The requirements for this degree vary considerably in different universities. Bachelors obtain no canonical or ecclesiastical privileges. The insignia of the doctorate are the four-cornered cap, and a gold ring, with a single stone setting, which is to be worn on the right hand. Some universities have also special insignia, particularly in the hoods or capes worn by their laureates.

Universities which confer degrees by pontifical authority can give them only to such candidates as are found worthy through examination, and are sound in the Catholic faith as well as conspicuous for morality. During the ceremony of conferring the degree, especially in theology, the candidate is required to make a profession of faith, and to swear assent to the following articles: 1. That he will never teach or write intentionally anything that is repugnant to Holy Scripture, tradition, the definitions of general councils or the decrees of the supreme pontiffs. 2. That he will be watchful in doing his share to preserve the unity of the church and not let the seamless garment of Christ be rent by divisions; also that he will be studious in seeing due honor paid to the sovereign pontiff, and obedience and reverence to his own bishop. 3. Under the same oath he promises to defend the Christian, Catholic and Apostolic faith, even to the effusion of his blood. See also TITLES OF HONOR, Vol. XXIII, pp. 417, 418.

P. A. BAART.

TITUS, EPISTLE TO. See PASTORAL EPISTLES, Vol. XVIII, pp. 348-351.

TITUSVILLE, a village and capital of Brevard County, eastern Florida, 150 miles S. of St. Augustine, on Indian River, and on the Jacksonville, Tampa and Key West railroad. The village has two banks, express and telegraph office, and the products of the surrounding region are corn, sweet-potatoes, rice and sub-tropical fruits. The most important industry is stock-raising. Population 1900, 756.

TITUSVILLE, a city of Crawford County, north-western Pennsylvania, 18 miles N. of Oil City, on Oil Creek, and on the Western New York and Penn-

sylvania and the Dunkirk, Allegheny Valley and Pittsburg railroads. It is the shipping, oil-refining and trading center for a considerable area of country which contains a number of oil-wells. It has important manufactures, consisting of chemical works, foundries, machine-shops, four stove factories, bark-extract works, oil-well-supply works and other industries. There are also several pipe-line systems for the transmission of crude and refined petroleum in various directions. The city has one daily and four weekly newspapers. Population 1900, 8,244. See also TITUSVILLE, Vol. XXIII, p. 420.

TIUMEN, a town. See TYUMEN, Vol. XXIII, 714.

TIXTLA, same as GUERRERO, Vol. XI, p. 248.

TIZIUZU, a town in Algeria, 60 miles E. of Algiers; has vines, olives, etc. Pop. 1896, 27,106.

TOAD-FISH, a name generally applied to any fish of the family *Batrachidæ*, because of their hideous, toad-like aspect. These fishes live near the bottom in warm or temperate seas. *Batrachus tau* is the common toad-fish of the Atlantic coast of the United States.

TOADSTOOLS, a common name for those basidiomycetes which have the characteristic umbrella form. The popular impression that there is any structural difference between toadstools and mushrooms is erroneous. In common usage, the former name is applied to those species which are poisonous, the latter to those which are edible. In the common forms the plant-body consists of a stalk bearing an expanded disk, upon the under surface of which are the radiating gills which bear the spores.

TOBACCO CROP IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

TOBACCO-WORM, the common name for the caterpillar of a large brownish-gray moth known to entomologists as *Phlegethontius Carolina*. The caterpillars feed on the leaves of the tobacco and tomato plants, and when numerous, do great damage. The moth is peculiar to America.

TOCANTINS, river. See BRAZIL, Vol. IV, 221-22.

TOCCUS. See HORNBILL, Vol. XII, p. 169.

TOCUYO, a town of Lara, Venezuela, 40 miles S.W. of Barquisimeto, at an elevation of two thousand feet above the sea, on the Tocuyo River, a stream about two hundred miles long, which empties into the Caribbean, by the Gulf of Triste. The town is the center of one of the richest agricultural districts of the country, exports sugar, coffee and hides, and contains a tannery and wool-spinning-mill. Population about 13,500.

TODAS, a race. See NILGIRI HILLS, Vol. XVII, p. 509.

TODD, SIR CHARLES, an English astronomer; born at Islington, England, July 7, 1826. He entered the government service at the Royal Observatory, Greenwich (1841); in 1848 became assistant astronomer at Cambridge; in 1854, assistant astronomer at Greenwich, and the next year accepted the position of government astronomer and superintendent of telegraph in New South Wales, Australia, where he introduced the electric-telegraph system. In 1870, Mr. Todd was also made postmaster-general, and under his supervision several thousand miles of telegraph were put in operation. As government

astronomer he carried out an extensive series of astronomical and meteorological observations, affording much valuable information on the climate of Australia, and determined the eastern boundary line of the colony. In 1889 he was made a Fellow of the Royal Society; was chosen a member of the council at Adelaide University, and was knighted in 1893.

TODD, DAVID PECK, an American astronomer; born at Lake Ridge, New York, March 19, 1855; graduated at Amherst College in 1875; had charge of the government expedition to Texas to observe the eclipse of the sun in 1878, and has been connected with expeditions to all parts of the world for the purpose of making meteorological and astronomical observations, besides acting as professor of astronomy at Amherst, and of astronomy and higher mathematics at Smith's College. He was a member of a large number of scientific societies, and his works, published mostly in scientific magazines and journals, are numerous.

TODD, JOHN, an American clergyman and educator; born in Rutland, Vermont, Oct. 9, 1800. He was educated at Yale and Andover Theological Seminary; was a Congregational pastor at Groton, Northampton and Pittsfield, Massachusetts, and at Philadelphia, Pennsylvania; was a founder of Mount Holyoke Female Seminary; and was a president of the board of trustees of the Young Ladies' Institute at Pittsfield. Among his published works are *Lectures to Children* (1834); *Truth Made Simple* (1839); *The Young Man* (1843); *The Daughter at School* (1854); *Woman's Rights* (1867); *Sunset Land: or, the Great Pacific Slope* (1869); *Old-fashioned Lives* (1870); and the *Student's Manual* (1835). He died at Pittsfield, Aug. 24, 1873.

TODD, MARGARET (pen-name GRAHAM TRAVERS), physician and novelist; born in Scotland in 1859; graduated M.D. in 1894; became assistant physician to the Edinburgh Hospital for Women and Children. She wrote *Mona Maclean* (1892); *Fellow Travelers* (1896); and *Windyhaugh* (1898).

TODHUNTER, ISAAC, English mathematician; born at Rye, England, in 1820; educated at the University College, London, and at Cambridge, where he graduated as senior wrangler in 1848. He later became a fellow at St. John's College there, and lecturer in mathematics. He became widely known through his text-books on *Algebra*; *Geometry*; *Conic Sections*; *Trigonometry*; *Mensuration*; *Mechanics*; *Differential and Integral Calculus*; *Analytic Statics*; and *Analytic Geometry*. Died March 1, 1884.

TODIDÆ. See TODY, Vol. XXIII, p. 432.

TOFANA. See AQUA TOFANA, *ante*, p. 211.

TOGHRUL BEG. See SÉLJUKS, Vol. XXI, 634.

TOK, a bird. See HORNBILL, Vol. XII, p. 169.

TÔKAIDÔ, a circuit and road. See JAPAN, Vol. XIII, pp. 569-76.

TOKAY WINE. See WINE, Vol. XXIV, p. 610.

TOKUGAWA, a dynasty. See JAPAN, Vol. XIII, pp. 583-84.

TOLEDO, a town, the capital of Cumberland Co., Ill., 55 miles S.E. of Decatur, in a rich farming, stock-raising, and lumbering district; has several sawmills. Population 1890, 676; 1900, 818.

TOLEDO, a town and the capital of Tama County, eastern central Iowa, 50 miles W. of Cedar Rapids, on the Chicago and North-Western railroad and the Toledo and Tama Electric railway. It is the trade-center of a farming and stock-raising district. It has 6 churches, 2 public-school buildings, 2 state banks, 2 weekly newspapers, scale factory, brick and tile works, and other manufactories. Toledo is the seat of Western College (United Brethren), having 25 instructors, 400 students, library of 5,000 volumes, and property valued at \$100,000. Population 1890, 1,836; 1900, 1,941.

TOLEDO, a city of Ohio. For general description, see TOLEDO, Vol. XXIII, p. 436. Toledo has 23 railroads and 2 canals, a fine harbor, and 25 miles of dock-front. The city now extends for almost 8 miles on both sides of Maumee River, and covers an area of nearly 28 square miles. In 1890, the domestic exports were, in value, \$1,608,296; including corn, 2,528,342 bushels; oats, 20,050 bushels; wheat, 357,251 bushels; bituminous coal, 23,287 tons; hewn lumber, 1,208,500 cubic feet. In manufactures, Toledo has very large wagon-works, planing-mills, sash-and-blind factories, ship-building and bridge-building establishments, carriage factories, car-wheel manufactories, furniture, steam-engines, boilers, iron-work, beer, wines and agricultural implements. The manufacturing industries are greatly facilitated by the use of contiguous natural gas and petroleum reservoirs. Toledo has over 90 miles of electric street railways, extensive water-works and natural-gas companies, electric belt-line connecting the villages of Perrysburg and Maumee, 6 handsome parks, 4 libraries, including a new public library building which cost \$69,000, besides 36 public and 23 private and parochial schools, and a thoroughly equipped manual-training school in connection with the Central High School. Population by the Census of 1890, 81,434; by that of 1900 (12th Census), 131,822.

TOLEDO, DON FRANCISCO DE, VICEROY. See PERU, Vol. XVIII, pp. 677, 678.

TOLERATION. See TEST ACTS, Vol. XXIII, p. 199.

TOLIMA, a department of southern Colombia, having an area of 18,069 square miles. It embraces the upper portion of the Magdalena valley, which lies between the central and eastern Cordilleras, both of which ranges contain peaks rising above the snow-line, the highest mountain being the volcano of Tolima in the central Cordillera, attaining an elevation of 18,325 feet. It has shown signs of activity at long intervals, and is of interest to geologists as one of the volcanoes at a considerable distance from the sea. The climate of the department varies from tropical in the river valleys, to cold and bleak in the mountains; and the products are chiefly agricultural, although gold, silver, and copper are mined to some extent. Capital, Ibagué; pop. 18,000. Population 1884, 305,185.

TOLLENS, HENDRIK, a poet. See HOLLAND, Vol. XII, p. 97.

TOLL EXPEDITION. See POLAR EXPLORATIONS, in these Supplements.

TOLSTOÏ, ALEXEÏ KONSTANTINOVICH, a Russian dramatist and author; born in St. Peters-

burg, Aug. 24, 1817. He was for a short time in the diplomatic service, after which he served in the Crimean War as a volunteer. He traveled widely, and after 1857 visited at court, where he held a high office. He wrote *Kniaz Subrianyi*, translated into English *The Death of Ivan the Terrible* (1865); *Tsar Ivanovitch* (1868); *Tsar Boris* (1878); and *Don Juan*. He died near St. Petersburg, Sept. 28, 1875.

TOLSTOY, LVOF NIKOLAIEVITCH, COUNT, a Russian novelist and social reformer; was born at Yasnaia Poliana, in the province of Tula, Aug. 28 (o. s.), 1828. He descended from Count Peter Tolstoy, comrade of Peter the Great. He was educated at the University of Kazan, and entered the Russian army in 1851, serving throughout the Crimean War as an officer of engineers. In 1856 he resigned his commission and devoted himself to literature, publishing in 1865-68



COUNT LEO TOLSTOY.

his great novel, *War and Peace*, a tale of the invasion of Russia by Napoleon. This was followed, in 1875-78, by *Anna Karénina*, a powerfully written tale of guilty passion and an elaborate portrayal of female character in a trying situation. The author then devoted himself to the earnest working out of the problems of modern social life and to the dissemination of a higher religious and moral philosophy. The key to the latter is his literal interpretation of the Sermon on the Mount, and the rule of his conduct is non-resistance to evil. This phase of his character he illustrated in a work entitled *My Religion* (1889). His rule of Christian life is to place himself on a level with the poorest, to toil with his hands, to own nothing save what he can share with the humblest, and to live the life of a Christian socialist. His extreme views led him at times into extraordinary utterances, and to often questionable arraignments of society, as in his *Kreutzer Sonata* (1888), with its peculiar views on the social question and strange theory of marriage. In his latest novel, *Resurrection*, he denies some of the fundamental dogmas not only of the Russian Church, but of Christianity. So unpalatable have his views been to the Greek Orthodox Church in Russia that the Holy Synod of the body, in 1900, virtually excommunicated him, or rather deprived him, until he recants, of the privileges of its communion. His other writings include *Sebastopol* (1890); *War* (1892); *The Kingdom of God Within Us* (1893); *Patriotism and Christianity* (1894); and *Master and Man* (1895). In addition to these works, Tolstoy has published several of an autobiographical character, explanatory of his ethical and religious views and those on the subject of social duties. The latter embrace *Childhood, Boyhood, and Youth* (1889); *My Life* (1889); *My Confession* (1889); *What to Do* (1889); *Two Pilgrims: What Men Live by, Where Love Is, There God Is* (1889); *Art* (1898); and *The Christian Teaching* (1898)

TOLUIDINE, a name given to three substances, which are homologues of aniline and are much used in the manufacture of dyes.

TOMAH, a city of Monroe County, west central Wisconsin, on the Chicago, Milwaukee and St. Paul railroad, 17 miles N.E. of Sparta. It is in a farming, stock and cranberry-raising region; has the railroad-bridge works; some manufactures; ten churches, United States school for the Winnebago Indians; one bank and two weekly newspapers. Population 1890, 2,199; 1900, 2,840.

TOMAHAWK, a light war-hatchet of the North American Indians. The early ones were rudely made of stone, ingeniously fastened to their handles by animal sinews or cords of skin. European traders supplied hatchets of steel, the heads of which were made hollow, for a tobacco-pipe, the handle of ash, with the pith removed, being the stem. These hatchets were used in the chase and in battle, not only in close combat, but by being thrown with a wonderful skill, so as always to strike the object aimed at with the edge of the instrument. The handles were curiously ornamented. In the figurative language of the Indians, to make peace, was to bury the tomahawk; to make war, was to dig it up. In recent years the superiority of the rifle as a weapon of war and the ease with which Indians could obtain rifles from unscrupulous traders or Indian agents led to the gradual disuse of the tomahawk in their wars.

TOMATO. See HORTICULTURE, Vol. XII, p. 288.

TOMBS. In its widest sense, the word *tomb* is taken to mean any place for receiving the dead, and would include the ordinary excavated grave. But generally, it is used in the sense of an artificial building or repository for preserving the bodies of the dead. All nations seem to have revered the dead for one reason or another, and to have taken means to preserve, or at least to protect, their bodies. This, in most cases, was a result of their religious beliefs, but in some it was merely an outcome of their affections. The most common danger would lie in wild beasts, so it was natural to seek some place strongly guarded by nature. This would lead to the use of caves or excavations in rocks which could easily be closed. As these became crowded and civilization advanced, buildings would take the place of caves. At first the building was a plain affair, formed from roughly-hewn rock, generally consisting of a vault sunk in the earth and covered with some structure. This structure varied in different places and different times, the barrows of England and Denmark, the towers of South America and many early styles in eastern countries being of this kind. But gradually the cast of these was improved. They were constructed on a larger scale, to hold whole families; later, the repository for the bodies was placed above-ground and several chambers constructed, and finally reaching a stage when all the wealth and art available were lavished upon them. Sometimes, as with the Pyramids, kings wasted the wealth of a nation and the energies of thousands and thousands of men in constructing a resting-place for their bodies when they should be dead. But in modern times they have begun to

repay some of this vast outlay, for it is here more than anywhere else that the archæologist reads the history of the past. They have acted as the preservers of antiquity rather than the graves of mortals. This, of course, is owing to the custom of prehistoric and ancient people, who buried with the dead those things which were dear to them in life. In other cases, but especially in the tombs of rulers, we have written accounts of their doings, embellished with pictures and carvings; while among the Egyptians even the body of the deceased was preserved. It is very largely from these that we are enabled to study the different people of the ancient world. Here are records of their religious beliefs, their habits of life, their relation to other peoples, and the very looks of the people. Here their art displays itself, and the development of their science can be seen, for in the pyramid itself is a record of sciences long since lost. Although these tombs were undoubtedly an outcome of the desire to preserve the human body and were always strongly built with an eye to safety, nevertheless, in many cases, they were built with an eye to preserve, or even exaggerate, the glory of their occupant, that posterity might read.

Tombs were in some cases merely a repository for the body, and often consisted of a hollow, carved out for a single person, but in many countries they were used as resting-places for sarcophagi, this being the case with royal tombs or those of rich persons. Egypt, perhaps, represents the extreme length to which tomb-building has been carried. Here, aside from the Pyramids (q.v.), are other forms of tombs scattered here and there. They were all built pre-eminently for safety, being for the most part massive and gloomy. But the most common tomb was the one cut out in the face of cliffs, and these are found near the sites of all the ancient cities. The bodies were placed in sarcophagi, or, more properly, mummy-cases, which, as a general rule, were covered with hieroglyphics, and sometimes a roll of manuscript was placed inside.

In Persia, not as much attention was paid to the burial ceremony, and even the kings were buried in cliffs for the most part; although a few instances have been found where large tombs have been built. The same is more or less true of the Babylonians, the Assyrians and Israelites. Only a few large tombs have been found in the land of Phœnicians and Syrians, but they all preserved, in some form, either the dead or their ashes. In India, some of the finest buildings were erected as mausoleums, but only a few survive, the largest one known being at Bijapur. Among the Greeks a most simple style was the custom, and their tombs are small affairs, but in some of the Grecian provinces, rulers built large resting-places for their bodies. Rome, on the other hand, built large tombs and built many. Nearly every street leading into a Roman town was lined with these structures, many of which were magnificent affairs. Their style varied a great deal, but the inclination seemed to be toward a round building. But it is not alone to those above-ground that we must refer, for by far the greater number of people were interred in the catacombs (q.v.). In mediæval Europe, tombs were built to honor the

dead rather than to preserve their bodies, and many magnificent edifices were erected by the nobility for this purpose. The Mohammedans also had this idea, but among both Christians and Moslems we find tombs that are objects of veneration. For instance, the burial-place of Mohammed has been, and is today, worshiped among his followers; while the tomb of Christ was the cause of the Crusades, and an object of veneration all during the Middle Ages.

In England, St. Paul's and Westminster contain the remains of English royalty and men and women who have won fame; while noble families preserve their dead in chapels and vaults built for the purpose. Likewise in Paris, Venice, Rome and other European cities we find chapels containing the remains of illustrious dead.

In modern times less attention was for some time paid to the dead, especially in the New World, but during the present century a reaction seems to have set in. Rich men sometimes build tombs before their deaths which cost fortunes, and the family vault is becoming a common thing in all cemeteries. It has also grown into a custom to honor the memory of great men in this way. Thus, in England, Westminster receives the illustrious, while in America the public can point to such tombs as those of Washington, Lincoln and Grant, and France has her tomb of Napoleon.

The prehistoric tombs of America are not numerous, and are mostly mounds, several of which have been found in different sections of the country. These seem to have been general burying-places for tribes, or perhaps towns. They are usually conical or pyramidal in shape and built of stone or earth, or a combination, with generally a path or steps leading to the top.

TOMBAC, any of several alloys of copper and zinc in which the proportion of copper is eighty per cent or a little over. One alloy, white copper or white tombac, has about 75 parts copper and 25 of zinc. The metal is usually a fine color, and is much used in manufacturing buttons and such articles.

TOMBIGBEE RIVER. See ALABAMA, Vol. I, p. 438.

TOMBSTONE, a city and the capital of Cochise County, southeastern Arizona, 65 miles S.E. of Tucson. The nearest railroad station is Fairbank (10 miles west), on the Atchison, Topeka and Santa Fé and Arizona and South-Eastern railroads. The surrounding mountain valleys are fertile where irrigated, and produce fine fruits and other agricultural crops. The chief industry is mining, gold, silver, copper and lead being produced. Tombstone has ore-milling and smelting-works. There is one daily newspaper. Population 1890, 1,875; 1900, 646.

TOMCOD (*Microgadus*), a small fish of the cod family (*Gadidae*). The characters are essentially the same as the large cod. Two species are found in American waters, *M. tomcodus* on the Eastern and *M. proximus* on the Western coast. The tomcod is a familiar fish in Eastern markets.

TOMLINS, WILLIAM L., an American chorus-instructor, was born in London, Feb. 4, 1844. He belonged to a music-loving family, and received his first instruction as a choir-boy, but, being of an ex-

trremely nervous temperament, his music-lessons had to be abandoned. He, however, continued to practice on the school organ alone, and it was during this period he believes he thought out the rudimentary principles of his afterward-developed system of child-training. In 1866 he became one of the board of managers of the London Tonic-Sol-Fa College, and in 1870 he went to New York City, where he served five years as organist in various churches, and in traveling for two years with the Richings-Bernard Old Folks Company. During a visit to Chicago he was appointed leader of the Apollo Club. He formed a class of two hundred children in Milwaukee, and other large classes in Chicago, with which he had marvelous success, his work receiving the highest commendation from Theodore Thomas, Christine Nilsson and many others. The Board of Education of Chicago issued a request to the school teachers to select the best singers over nine years old from among their scholars, for the purpose of being trained by Mr. Tomlins for a children's choir at the World's Columbian Exposition. A class of twelve hundred was formed, which was trained for three years, and gave twenty rehearsals and concerts at the World's Fair. After the close of the Fair Mr. Tomlins's work was among the children taken care of by the "Social Settlements," six classes in three divisions being formed, besides another class of six hundred which met in Handel Hall, and was called the Central Class. Tuition at all of these was free. Mr. Tomlins's first requisite was complete relaxation of all the muscles of the body. To accomplish this, slow exercises to music were given. He appealed to the heels as well as to the heart and the head. New songs were written for Mr. Tomlins's classes by Whittier, Holmes, Julia Ward Howe, Whitman, Gilder, Stedman, Richard H. Stoddard, Celia Thaxter and Margaret Deland, and composed by Joseph Barnby, Dr. Parry, Dr. McKenzie, Dr. Stanford, George Henschel, Randegger, Tours, Foote, Chadwick, Nevin, and Myles Birkett Foster. In his work he had the assistance of Miss Elizabeth Nash. Through all this work Mr. Tomlins attended to his duties as leader of the Apollo Club, going once a week to Milwaukee to conduct children's classes. He was the author of *Children's Souvenir Song Book* (1893), and *The Child's Garland of Song* (1895), with illustrations by Ella Ricketts.

TOMLINSON, CHARLES, an English scientist and author; born in London, Nov. 27, 1808. He was not educated at any school, having to work from his twelfth year, but was fond of reading, and so prepared himself that in 1830 he became assistant in a classical school and afterward started a school with his brother near Salisbury, where he introduced scientific lectures, then a novelty, and even carried on some original investigations. He became connected with the *Saturday Magazine* and moved to London; became scientific lecturer at King's College, London, and contributed much work to magazines and journals, mostly publications of various societies, to many of which he belonged. His works include *Student's Manual of Natural Philosophy* (1838); a translation of Goethe's *Hermann and Dorothea*

(1849); a volume on *The Sonnet* (1844); a translation of Dante's *Inferno* (1877); *Essays, Old and New* (1887); *Amusements in Chess*; and *Essays by an Octogenarian* (1888). His theory is that the culture of a scientific man is very imperfect, unless combined with a literary taste.

TOMLINSON, HERBERT, an English physicist; born at York, England, Nov. 18, 1845. He was educated at Christ College, Oxford, where he paid particular attention to mathematics and science. In 1870 he became demonstrator of natural philosophy at King's College, London, and in 1889 was chosen a fellow of the Royal Society. Among his most important articles may be mentioned *Effect of Magnetization on the Electrical Conductivity of Iron* (1875); *Alteration of Thermal Conductivity of Iron and Steel Caused by Magnetism* (1878); *Moduli of Elasticity* (1883); *Electrical Conductivity* (1885); *Internal Friction of Metals* (1886); and others on torsional vibrations, viscosity of air, electrical effects, etc.

TOMMASEO, NICCOLÁ, an Italian author and critic; born at Libenica, Dalmatia, Oct. 9, 1802. He studied law in Milan, Padua, and finally in Florence. Here certain articles were wrongfully ascribed to him and he had to leave; went to France, 1834; to Corsica in 1838; and then to Venice, where he remained ten years. In 1848 he was imprisoned; was liberated by the people; became minister of instruction, and later envoy to Paris under the provisional government, but on the return of the Austrians in 1849 retired to Corfu. In 1850 he went to Turin, where he was elected a deputy in 1860, but resigned; and in 1861 removed to Florence, where he remained, busied with literary works, in spite of his blindness, until his death, May 1, 1874. Among his works are *Dizionario dei Sinonimi* (1830); *Commento a Dante* (1837); the novel *Il duca d'Atene* (1837); *Canti Popolari Toscani, Corsi, Illirici, Greci* (1841-42); *Rome et le Monde* (1841); *Le Lettere di Santa Catarina de Siena* (1860); *Nuovi Studi su Dante* (1865); *Storia Civile nello Letteraria* (1872).

TOMPKINS, DANIEL D., an American statesman; born at Scarsdale, New York, June 21, 1774. He was educated at Columbia College, studied law, but turned his attention to politics; was successively a member of the legislature, a member of Congress, judge of the state supreme court, and governor of the state from 1807 to 1817. He was bitterly opposed to the Bank of America, and went so far as to dissolve the legislature to defeat it; was a staunch supporter of the war policy in 1812, and did much toward calling out and equipping troops. It was in connection with this work that he kept such loose accounts that before his death he was charged with a deficit of \$110,000, although it was afterward shown that \$92,000 were owed to him. One of his last acts as governor was to recommend the abolition of slavery in the state. He was Vice-President of the United States from 1817 to 1825, and died at Staten Island, June 11, 1825.

TOMPKINSVILLE, a town and the capital of Monroe County, southern Kentucky, about 50 miles E.S.E. of Bowling Green, the nearest railway station being Glasgow, on the Louisville and Nashville

railroad. It is in a stock-raising and agricultural section. Population 1900, 366.

TOMS RIVER, a village and the capital of Ocean County, eastern New Jersey, on Toms River, 4 miles inland from Barnegat Bay and 52 miles E. of Philadelphia, on the Pennsylvania and Jersey Central railroads. It is a popular summer resort, produces cranberries, and ships much sea produce. Gaining a reputation as a retreat for privateers in the Revolutionary War, it was burned by the British in 1782. Population 1890, 1,147.

TON, a measure of weight and capacity used in England and the United States. It contains twenty hundredweight, commonly estimated at two thousand pounds in the United States, and so fixed by statute in some states. But in other places, unless specially stipulated, and in the custom-house and in England, it is 2,240 pounds. These are sometimes designated as long ton and short ton. In ships, forty cubic feet of space is reckoned as a ton, and in this way a ship's tonnage is estimated, but what is known as the register ton is one hundred cubic feet. In timber, a certain number of cubic feet hewn and a different number of feet of rough or round timber are used to designate a ton. Another but partially obsolete form of the word is tun, now used only in liquid measure. The old English tun contained four hogsheads, or 252 gallons. The great tun of Heidelberg, constructed in 1751, but not used since 1769, contained eight hundred hogsheads. A tun of water weighed a little over two thousand two hundred pounds; so, perhaps, the ton weight was derived from its rough equivalent, the tun measure.

TONAWANDA, a village of Erie County, western New York, 11 miles N. of Buffalo, on the Niagara River and the Erie canal, and on the New York Central and Hudson River, New York, Lake Erie and Western, Michigan Central, West Shore and Lehigh Valley railroads. Tonawanda, with North Tonawanda adjoining (which lies within Niagara County), are compressed within, practically, one town, and have one post-office. It has lumber, shingle and flour mills, iron-smelting works and other manufacturing. It has 2 banks with a combined capital of \$300,000; 1 weekly and 2 daily newspapers. Total population 1900, 16,490; Tonawanda, 7,421; North Tonawanda, 9,069.

TONE, in music, a sound made by a vibrating string or other sonorous body, as a reed, tuning-fork, column of air, etc. Slow vibrations produce low tones, or tones of low pitch; rapid vibrations, tones of high pitch. The same pitch of tone, when made by different instruments, as the violin, piano, flute, vocal cords, etc., has different qualities, or, as the Germans call it, *ton-farben*, tone-colors. Thus, tones are said to be rich, mellow, harsh, sweet, smooth, etc. When one tone is produced by a certain number of vibrations per second, and another by double that number of vibrations, the two tones are said to be an octave apart, or one is the octave-tone of the other. From one octave-tone to another there are many different tones, but only twelve are used in music. The difference in pitch from one of these twelve tones to the next, upward or downward,

is called a half-tone, or, for reasons stated farther on, a half-step. There are about ninety available tones in music, and to give each a separate name would make it difficult to remember them. Separate names are given to only seven of the twelve tones of an octave, and these names are repeated in each of the other octaves, the first tone of each having the same name. To illustrate, let the figures in (1) represent the tones of an octave; (2) shows the

(1)

1	2	3	4	5	6	7	8	9	10	11	12
(1)	2	3	4	5	6	7	8	9	10	11	12

(2)

1	3	5	6	8	10	12	
(2)	ut	re	mi	fa	so	la	si
	C	D	E	F	G	A	B

tones that have each a separate name. The names ut, re, mi, etc., are often used when singing the tones; the names C, D, E, etc., when produced by

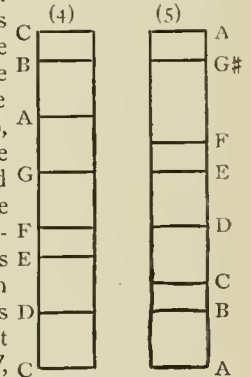
(3)

2	4	7	9	11	
(3)	C#	D#	F#	G#	A#
	or	or	or	or	or
	Db	Eb	Gb	Ab	Bb

instruments. In (3) are shown the tones that have no individual names, being called the sharps (#) or flats (b) of the tones above or below them in pitch. The white keys of the piano sound the tones that have names of their own; the black keys sound the sharps and flats.

The seven tones that have individual names may be represented as a tone-ladder (4), the tones ascending like the steps of a ladder.

The succession of these tones is thus properly called a scale (Latin *scala*, a ladder). The step from C to D (4) is a whole step; from E to F a half-step, etc. Two modes of scales are in use, the *major* scale (4) and the *minor* scale, one of whose forms is seen in (5). The difference between any two tones in respect to pitch is called an interval, and the interval is counted at both extremes; that is, from C to D is a *second*, C from C to E a *third*, etc. Upon



inspection it will be seen that in the major scale there are four half-tones from C to E, the third above, while in the minor scale there are only three half-tones from A to C, the third above. From this distinction the terms *major* and *minor* arise. The major intervals always contain one half-tone more than the minor.

Many other scales of tone are in use by various nations. The Chinese and other Eastern nations have a scale of but 5 tones; the Arabs, one of 17; and the Hindus, one of 20. See also ACOUSTICS, Vol. I, p. 107; VOICE, Vol. XXIV, p. 275; and MUSIC, Vol. XVII, p. 78.

TONE, THEOBALD WOLF, an Irish patriot; born in Dublin, Ireland, June 20, 1763. He was educated at Trinity College, Dublin, and studied law in London, where he was called to the bar in 1789. He became mixed up in political intrigues; was for some time secretary of the Catholic Commit-

tee, and was one of the founders of the United Irishmen. In 1795 he had to leave Ireland on account of his intrigues; went to America, and then to France, where he was associated with the highest officers of the Revolution. He always indulged in the dream of an outside invasion for restoration of Irish independence, and was adjutant-general in Hoche's ill-starred expedition against Ireland. After this he fought in the French army, and was captured on board a small squadron of French ships going to Ireland. He was taken to Dublin, tried and condemned to death for treason, but committed suicide in prison by cutting his throat, Nov. 19, 1798.

TONGA, an island. See FRIENDLY ISLANDS, Vol. IX, p. 779.

TONGALAND. See AFRICA, p. 80, in these Supplements.

TONGUE. See ANATOMY, Vol. I, pp. 895-897.

TONIC, in music, the primary tone, the keynote of a musical scale.

TONICS, in medicine, are therapeutic agents which impart vigor to the body or its parts. Among the typical tonics are iron, nux vomica, quinine and the vegetable bitters. Of the blood-tonics may be named cod-liver oil and other fats, and iron and its salts, to which may be added phosphate of lime and the salts of potassium and sodium. Nux-vomica, strychnia and digitalis are used as vascular tonics. Among the stomach or digestive tonics are the vegetable bitters, rhubarb, columbo, cinchona, chamomile, bitter-beer, arsenic and small doses of sulphuric and muriatic acids. Nerve-tonics include nux-vomica, strychnia, phosphorus, coca, arsenic, the salts of iron, etc. The exact mode of tonic-action is not well known, but it probably increases, by stimulation, the functions of the different tissues, furnishes nutriment to them, or promotes the rapid removal of waste products. In the use of tonics care should always be taken that the tonic employed is suitable to the indications of the case, as it often happens that nutrition is not needed, but the removal of waste products.

TONIC-SOL-FA. See MUSIC, Vol. XVII, p. 100.

TONKA BEAN. See TONQUA BEAN, Vol. XXIII, p. 443.

TONQUIN. See TONG-KING, Vol. XXIII, pp. 439-443.

TONSILITIS. See THROAT DISEASES, Vol. XXIII, p. 320.

TONSILS. See DIGESTIVE ORGANS, Vol. VII, p. 222.

TONTINE PLANS. See LIFE INSURANCE, in these Supplements.

TOOELE, a town and the capital of Tooele County, western Utah, 30 miles S.W. of Salt Lake City, on a branch of the Union Pacific railroad. Tooele County is mostly a barren desert, but has some agricultural products and live-stock from the hills near the town. Population 1900, 1,200.

TOOKE, THOMAS (1774-1858), a British economist; born in St. Petersburg, for whom the Tooke professorship of economics in King's College,

London, was named. See also FINANCE, Vol. IX, p. 188.

TOOLE, JOHN LAWRENCE, an English comedian, was born in London, March 12, 1832. He began his professional career at the Queen's Theatre, Dublin, in 1852; made his first appearance in London, at the St. James Theatre, in 1854, and played afterward at the Lyceum with Charles Dillon, at the Adelphi, and at the Queen's Theatre in Long Acre. In 1874-75 he played in the United States, and in 1890 in Australia. In 1879 he became lessee of the Folly Theatre, which he enlarged, changing the name to Toole's Theatre. He made a striking success as Walker in J. M. Barrie's play of *Walker, London*, in 1894. Some of his other successful characters were Caleb Plummer in *Cricket on the Hearth*, Joe Bright in *Through Fire and Water*, and in *A Fool and His Money*.

TOOL-MAKING. The almost infinite number of small tools manufactured renders it impossible to deal with this subject comprehensively. Only the general principles involved can be discussed, and these principally with relation to the smaller and more familiar forms of tools. Hammers, sledges, axes, picks, and that class of striking-tools, are very commonly made of cast-steel, which has the merit of being cheap. Better grades are made with faces or blades of high-grade steel, while the body parts are of softer metal. The best are made of forged tool-steel, and tempered according to the use for which they are designed. Picks, mattocks, hoes, and the like, are commonly made from drop or pressed forgings of refined iron with incorporated steel blades.

Common gimlets, and some cheap boring-tools, are made of cast-steel, but augurs, bits, drills, etc., are properly made of tool-steel, shaped while soft, and tempered when finished. Augurs with expansive bits are much used, the adjustable cutter having a gauge by which it may be set to any diameter of hole within its capacity.

Files and rifflers are made of tool-steel, stamped or pressed into blanks, which are fed while soft under a reciprocating-cutter with a progressive motion, so that angular cuts are made along the length of the blank at regular intervals, the coarseness or fineness depending upon the character of the feed. One passage under the cutter gives a smooth cut, and a second passage at an angle to the first gives a cross cut, forming cutting-teeth, which, when the file is tempered, serve to cut small chips from the metal treated. This cutting-action of the file is only obtained on the forward motion. The surface of a rasp has projections formed by indenting with a triangular punch, and thus crowding up a pyramid which serves to abrade, but not to cut, a surface.

Saws are made from spring-steel. The teeth are cut, filed or punched, except in some large circular saws, which have inserted teeth. Where the teeth are large, a machine called a saw-doctor, or saw-gummer, is frequently employed to cut out the spaces between the teeth. When

It is desired to secure a spread-set to the teeth, a saw-swage is used on them. A frame called a saw-jointer is provided for making the teeth of uniform length. For setting the teeth, that is, giving them a twist so that they will cut a kerf wider than the saw-blade, a setting-block is used, against the face of which the teeth are struck with a hammer. Combination tools are made which serve to assist all the operations of setting, jointing, gauging and swaging saw-teeth.

Spades and shovels are very generally made of cast-steel; rakes are made of cast-steel and malleable iron; manure-forks, potato-forks, weed-cutters, etc., of cast-steel or malleable iron; pitch-forks and the best manure-forks are made of machinery steel.

Knives, shears and cutting-blades generally are properly made only of a grade of steel that will admit of tempering, though many cheap articles are made of stamped metal or even cast-iron.

Anvils are made of cast-steel with tempered face, of wrought-iron with steel face, and of hand-forged steel, the last-named being much the best and most costly.

Wrenches are made of drop-forged steel, of iron, and of cast-steel. Many cheap wrenches are made of exceedingly soft iron. A very good wrench is made from bar-steel, drop-forged and case-hardened.

Wire-gauges are made of iron or steel, in circular and oblong form, with a series of graduated holes, marked according to some standard of sizes. Exceedingly accurate drilling is required for the holes.

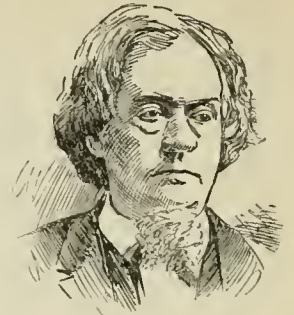
All small cutting-tools, such as those used by engravers, and in various other trades, are properly made of high-grade tool-steel, carefully ground while soft, and then tempered.

In the manufacture of tools having several or numerous parts, in large quantities, so that the parts may be interchangeable, it is customary to provide jigs for securing uniformity of parts. The design of a tool having been fully determined and mapped out, patterns are made for the parts that are to be cast, and dies for those which are to be stamped. The parts so formed are then put in drilling-jigs, which locate all the holes accurately, and in filing-jigs, that all excrescent metal may be reduced to uniform shape. By such means, though there may be minute differences between the individual parts, they are practically uniform at all the points which fit together. The manufacture of a simple tool, with only eight or ten parts, sometimes involves an outlay of hundreds of dollars for jigs and patterns before it can be produced at low cost.

C. H. COCHRANE.

TOOMBS, ROBERT, an American public man; born in Wilkes County, Georgia, July 2, 1810. He graduated at Union College in 1828, studied law at the University of Virginia; was sent to Congress in 1844, and in 1850 contributed to the passage of the compromise measures. From 1853 to 1861 he was a member of the United

States Senate, a Southern extremist, ardently favored disunion, and in March, 1861, was formally expelled from the Senate. He was a member of the Confederate Congress, and its second choice for the Presidency, became Secretary of State, but resigned to accept the commission of brigadier-general. After the war he traveled for a couple of years in Europe, but on his return he refused to take the oath of allegiance to the United States government, and was debarred from the rights of citizenship. He was a member of the state constitutional convention, however, and was the author of the provisions by which the practical disfranchisement of irresponsible negroes was made legally possible. He always denounced the reconstruction measures of Congress as strongly as he was able. He died in Washington, Georgia, Dec. 15, 1885.



ROBERT TOOMBS.

TOOTH-LEGGED BEETLE. See HOP-FLEA, in these Supplements.

TOPAZOLITE. See GARNET, Vol. X, p. 82.

TOPE, a fish. See SHARK, Vol. XXI, p. 774.

TOPEKA, a city and the capital of Shawnee County and of the state of Kansas, is on both banks of the Kansas River, 67 miles W. of Kansas City by four great railways. It is well built, with wide, shady streets, and possesses a handsome capitol building, a Congregational college, a Roman Catholic seminary and an Episcopal college for women, the State Asylum for the Insane and the Reform School, Orphans' Home and Home for Friendless Women. It has 66 church organizations, and is the seat of an Episcopal bishop. It has electric light, electric street-railways, sewerage system, gas and water works. It has eight banks, eight investment and loan companies. It has nearly a dozen flour-mills, large railway shops, several foundries and packing-houses, and manufactories of carriages, pottery, bricks, biscuits, starch, vinegar, tents, wind-mills, etc. Founded in 1854, it became the state capital in 1861. Population 1890, 31,007; 1900, 33,608. See also TOPEKA, Vol. XXIII, p. 446.

TOPELIUS, ZACHRIS, a Finnish poet, historian and romancer; born in Kuddnäs, near Nykarleby, Finland, Jan. 14, 1818; educated at the University of Helsingfors, where in 1854-78 he was professor of Finnish history. In 1842-60 he was editor of the Helsingfors *Tidningar*. Among his best works are *Ljung Blommor* (1845-54); *Sångar* (1861); *Nya Blad* (1870); the dramas, *Fifty Years Later* (1851) and *Regina of Emmertz* (1854); and his best-known work, *The Surgeon's Tales* (6 vols., 1872-74). Died in Helsingfors, March 12, 1898.

TOPHET, a ravine. See MOLOCH, Vol. XVI, p. 696.

TOPHI, chalk-stones. See GOVT, Vol. XI, p. 6.

TOPKNOT, those flat-fishes of the family

Pleuronectidæ, which have a peculiar filament on the head. The name seems to be of local usage only.

TOPLADY, AUGUSTUS MONTAGUE (1740-78), an English clergyman and hymnodist. See HYMNS, Vol. XII, p. 594.

TOPLITZ. See TEPLITZ, Vol. XXIII, p. 183.

TOPOGRAPHICAL DRAWING. See *Representation of Ground*, under SURVEYING, Vol. XXII, pp. 709-712.

TOP-SHELLS, a name given by collectors to the shells of gasteropodous mollusks of the family *Trochidæ* (*Turbinidæ*). The shells are conical, and many resemble in form the well-known toy. They are widely distributed. The flesh of some species is eaten in Eastern lands.

TORBANITE. See MINERALOGY, Vol. XVI, p. 429; and BOGHEAD COAL, in these Supplements.

TORBAY, a town on the bay of the same name, on the east coast of Newfoundland, 7 miles N. of St. John's. Its anchorage is poor. It is engaged in fishing, and has a population of 1,270.

TORBERT, ALFRED THOMAS ARCHIMEDES, an American soldier; born at Georgetown, Delaware, July 1, 1833. He graduated at West Point in 1855, entered the army, and did frontier duty in Florida, Texas and Utah until the outbreak of the Civil War. During the war he served in the East, and in 1862 was made brigadier-general of volunteers; was chief of cavalry in the middle division, and during April and July, 1865, was in command of the Army of the Shenandoah. He was mustered out of the volunteer service early in 1866, and resigned his commission as captain in the regular army late in the same year; was United States minister to the Central American States (1869-71); consul-general in Havana (1871-73); consul-general in Paris (1873-78); and was lost at sea, off the coast of Florida, Aug. 29, 1880.

TORCH-WOOD, the common name of *Amyris Floridana*, a tree of southern Florida, belonging to the tropical family *Burseraceæ*, a family rich in aromatic resins and balsams, and yielding myrrh, frankincense, various resins, etc.

TORFÆUS, THORMOD. See ICELAND, Vol. XII, p. 626.

TORNADO. See METEOROLOGY, Vol. XVI, pp. 129-132.

TORNEÅ ELF, a river. See SWEDEN, Vol. XXII, p. 736.

TORONTO, a village of Jefferson County, eastern Ohio, on the Ohio River, and on the Pennsylvania railroad, nine miles N. of Steubenville. Its manufactures consist of fire-brick, sewer-pipe, terra-cotta, artificial stone and pottery. It has one bank and a daily and a weekly newspaper. Population 1890, 2,536; 1900, 3,526.

TORONTO, the second city of Canada. As Montreal is the metropolis of the East, and of so much of the West as its great railway facilities enable it to control for business purposes, so Toronto aims to be the metropolis of the West, including the newly opened regions of the Northwest. The commerce of the city has grown rapidly. In 1870 the total imports amounted to \$7,126,953; the exports were \$1,067,268. In 1890 the imports

amounted to \$20,519,797, and the exports to \$2,945,390. The lake commerce is also very large in lumber, fruit, grain, coal and cattle. The lake-shipment entering Toronto in 1890 amounted to 303,571 tons, the vessels running only during the season, and connecting the city with railway lines east, west and south. The Grand Trunk and Canadian Pacific railways, which have amalgamated the smaller lines, afford every facility for the business of the community. In the year ending Dec. 30, 1890, the total receipts from civic taxes amounted to \$2,242,951; total expenditure on public and separate schools, \$547,391; disbursements of all kinds, \$1,198,896. The net debenture debt of the city amounts to \$12,769,508. In 1890 the supply of water amounted to 5,240,760,226 gallons. Population 1891, 181,220. See also TORONTO, Vol. XXIII, pp. 447-449.

TORONTO, UNIVERSITY OF. See UNIVERSITIES, Vol. XXIII, p. 856.

TORPEDINIDÆ. See ICHTHYOLOGY, Vol. XII, p. 686.

TORPEDOES. The cigar-shaped torpedo, for naval warfare, has received much attention from inventors since 1885, and, as a result, there are a number of ingenious and improved forms. The Sims-Edison has attracted much attention. It is steered and controlled wholly from the shore or vessel, but carries its own motor, which is supplied with a current through the controlling-cable. The torpedo proper is surmounted by a long boat-shaped float, which is filled with buoyant ballast, so as to render it unsinkable. From this float rise very short masts or sticks, bearing balls on the top, to render the position of the torpedo more plain to the steersman who is operating it from a distance. These masts are hinged, so that they bend to allow the torpedo and its float, which have a common sharp nose, to pass under logs or other obstructions. The torpedo-case is built of copper, and contains the dynamite in its front compartment. Next is the case in which the controlling-cable is coiled, and which is paid out as the torpedo progresses from the point of departure. The electric motor is located in the center compartment, and furnishes the power for the steering-mechanism and propeller at the stern. The controlling-cable is protected by a tube so that it cannot become fouled with the propeller or rudders. Its insulation is necessarily exceedingly high, to prevent loss of current in passing through the water. The rudder is located in front of the propeller, and on top of the torpedo. The steering-mechanism on shore includes a powerful electro magnet and pole-changing keys, whose alteration is made to affect the rudder. The explosion is not caused by concussion, the dynamite charge being set off from the shore by an electric fuse, when the desired point is reached.

The Hall torpedo is driven by the force of compressed air, which is carried in a flask eight feet in length. The depth of immersion is regulated by means of a telescopic tube in which the water rises with the increased pressure if the torpedo sinks. The imprisoned air in the tube then oper-

ates a righting-valve, which is connected with an arm and float so adjusted as to bring the torpedo back to a proper immersion.

The Patrick torpedo is one of the heaviest, weighing 7,300 pounds. The motive power is furnished by carbonic acid, stored in the torpedo. The length is 40 feet, and the diameter 18 inches. It is surmounted by a float, like the Sims-Edison, the torpedo proper being three feet under water.

The Nordenfeldt torpedo is operated by storage-battery accumulators, and carries 120 cells. The immersion of six feet below the surface is maintained by means of two floats.

The Victoria torpedo has vertical rudders for steering and horizontal rudders for controlling the depth. The motor, which is located aft, controls the steering, while a pendulum mechanism preserves the balance and regulates the depth in connection with the horizontal rudders.

The Howell torpedo is novel, in that it carries no motor, but is discharged by powder from a firing-tube. It is designed to be fired below the water-line, through a port that opens for the purpose and closes almost instantaneously. Its initial speed is 35 knots. It has the usual devices for steering and controlling the submersion. See *...SO TORPEDO*, Vol. XXIII, pp. 449-451; and *MARINE ENGINE; NAVY; and SUBMARINE BOATS*, in these Supplements. C. H. COCHRANE.

TORQUATUS. See *MANLIUS, TITUS*, Vol. XV, p. 492.

TORQUEMADA, TOMAS DE (died 1498). See *INQUISITION*, Vol. XIII, pp. 93, 94.

TORQUES, bracelets. See *COSTUME*, Vol. VI, p. 465.

TORRENS, ROBERT, an Irish Parliamentarian and East Indian general. See *POLITICAL ECONOMY*, Vol. XIX, p. 377.

TORRENS SYSTEM OF REGISTRATION OF LAND TITLES. See *CONVEYANCING*, in these Supplements.

TORRES STRAITS. See *NEW GUINEA*, Vol. XVII, p. 386.

TORRES VEDRAS, LINES OF. See *FORTIFICATION*, Vol. IX, pp. 431, 432.

TORREYA, an interesting genus of coniferous trees, represented by three species, one growing in Florida, another in California and the third in Japan. It has leaves like the yew (*Taxus*), but the wood and foliage have an unpleasant odor. It differs from *Taxus* in having no fleshy cup about the seed, which is as large as a nutmeg, and with a similar convoluted internal structure.

TORRINGTON, a borough of Litchfield County, extreme northwestern Connecticut, on the Naugatuck River, and on the New York, New Haven and Hartford railroad, 28 miles N.W. of Hartford. It has important manufactories of woolen goods, plated goods, hardware, machinery, needles, brass goods and bicycles. Torrington has the distinction of being the birth-place of John Brown the abolitionist, and of Samuel Mills, a pioneer of American missions. Pop. town and borough, 1900, 12,453.

TORSION. See *ELASTICITY*, Vol. VII, pp. 810-813.

TORSION BALANCE. See *BALANCE*, Vol. III, p. 267.

TORSION MACHINES. See *STRENGTH OF MATERIALS*, in these Supplements.

TORSK, a fish of the cod family, the cusk (*Bros-mius*) of northern European coasts and Atlantic coasts of North America. Also, the name is given to a cod (*Gadus callarius*) common in the Baltic Sea. Both are food-fishes.

TORTOISE-PLANT, a common name for *Testudinaria elephantipes*. See *ELEPHANT'S FOOT*, in these Supplements.

TORTRICIDÆ. See *INSECTS*, Vol. XIII, p. 151.

TORTRICIDÆ. See *SNAKES*, Vol. XXII, p. 192.

TORTUGA, an island. See *BUCCANEERS*, Vol. IV, p. 409.

TORTUGAS. See *FLORIDA*, Vol. IX, p. 338.

TORY, a political party. See *WHIG AND TORY*, Vol. XXIV, p. 540.

TOTAL ABSTINENCE. See *TEMPERANCE SOCIETIES*, Vol. XXIII, p. 159.

TOTILA, a Gothic king. See *JUSTINIAN*, Vol. XIII, p. 797.

TOTTEN, JOSEPH GILBERT, an American military engineer; born in New Haven, Connecticut, Aug. 23, 1788; died April 22, 1864. He graduated at the United States Military Academy at West Point in 1805, and entered the department of engineering in the United States army; in 1806 resigned his commission and became secretary to his uncle, Jared Mansfield, who was engaged upon the first official survey of Ohio and the Western territories; rejoined the army two years later, and was employed upon the construction of Castle Williams and Fort Clinton, in New York harbor; during the second war with England served as chief engineer of the army under General Van Rensselaer in the Niagara campaign, and subsequently in the armies of Generals Dearborn and Macomb, gaining the brevet of lieutenant-colonel in the battle of Plattsburg. After the war he supervised the construction of Fort Adams, at Newport, Rhode Island, and was raised to the rank of colonel and chief engineer of the United States army in 1838. At the beginning of the war with Mexico he took charge of the engineering operations of the invading army, and directed the siege of Vera Cruz, for which he received the brevet of brigadier. Returning to Washington, he became a member of the Lighthouse Board, and was chosen state commissioner for the preservation of New York harbor. In 1859-61 he made a trip to the Pacific coast in the interest of its fortification and defense, and in 1863 was raised to the rank of brigadier-general, receiving in the following year the brevet of major-general. General Totten was a regent of the Smithsonian Institution, one of the founders of the National Academy of Sciences, and until his death a member of the Lighthouse Board. He was especially interested in conchology, the *Gemma Tottenii* and the *Succinea Tottenii* being named in his honor. He invented an em-

brasure for casemated batteries, which was used by the government for a long time.

TOTTENVILLE, a village of Richmond County, or Staten Island, southeastern New York, on Staten Island Sound, Prince's Bay and Raritan Bay, and on the Staten Island Rapid Transit railroad, 20 miles S.W. of New York. It is a favorite residence-place for many New York business men, and has shipyards, fire-brick and retort works, saw and planing mills, ultramarine factory, printing, electrotyping and bookbinding establishment, and a manufactory of dental goods. One of the objects of interest in Tottenville, a landmark, is the Billopp mansion, built long before the Revolution. In this mansion a conference was held between Lord Howe on one hand and John Adams, Benjamin Franklin and Edward Rutledge on the other, relative to the possibility of the return of the colonies to British allegiance. Population, together with Westfield town, 1890, 8,258; population of village 1894 (estimated), 2,500.

TOUCEY, ISAAC, an American statesman; born in Newtown, Connecticut, Nov. 5, 1796. He was admitted to the bar in Hartford in 1818; member of Congress from Connecticut (1835-39); governor of the state (1846-47); United States Attorney-General (1848-49); elected to the United States Senate, as a Democrat, in 1852; appointed Secretary of the Navy by President Buchanan (1857), and retained the office until 1861. He was charged with having purposely dispersed the navy to different parts of the world while Secretary, in the interest of the seceding states, and although this accusation has been denied, it is clear that he at least strongly sympathized with the South. After retiring from the Navy Department he resumed the practice of law in Hartford. He died July 30, 1869.

TOUCH. See **TOUCH**, Vol. XXIII, pp. 478-483; and **SENSE-ORGANS**, in these Supplements.

TOUCHSTONE, a fine-grained, dark stone, usually schist or jasper, used to test the purity of gold. The method is to rub the metal on the stone, the color of the streak remaining indicating the relative purity of the metal. This sort of assaying is no longer used to any extent. In a figurative sense, the word is used as a synonym of criterion.

TOUCHWOOD OR **PUNK**, a name commonly applied to the "rot" caused in various trees by the attacks of some fungus of the genus *Polyporus*, notably *P. fomentarius* and *P. igniarius*. This rotten wood is used for tinder and as a styptic.

TOUGALOO UNIVERSITY, an institution of learning for colored people of both sexes, founded in 1869 by the American Missionary Association in Tougaloo, Mississippi, and chartered by the state two years later. The institution aims to give instruction, both manual and intellectual. There are eight departments: Manual-training, agricultural, nurse-training, grammar, normal, theological, college preparatory and musical. It has no endowment, but receives its support from the American Missionary Associa-

tion. In 1895 there were 379 students and 23 instructors.

TOULMIN, JOSHUA, an English theologian; born in London, May 11, 1740. He was educated at St. Paul's School and Dr. Savage's Academy; was pastor of a dissenting church at Colyton, Devonshire; of a Baptist church at Taunton; became a convert of Unitarianism and the pastor of Dr. Priestley's church in Birmingham in 1804. Among others, he published *Memoirs of Faustus Socinus* (1777); *The Internal Evidences of Christianity* (1785); and *An Historical View of the State of Protestant Dissenters in England under King William* (1814), the latter being supplementary to Neal's *History of the Puritans*, a new edition of which he published in 1797. He died in London, July 23, 1815.—His son, **HARRY**, born in Taunton, England, in 1767. He was pastor, for a time, of a dissenting church in Chowbent, Lancashire; in 1793 he came to Norfolk, Virginia, and two years later was chosen president of Transylvania University, which office he retained until 1796; was secretary of state for Kentucky (1796-1804); appointed United States district judge in Mississippi in 1804; moved to Alabama and assisted in framing the constitution of that state. He wrote *Description of Kentucky* (1792); *Collection of the Acts of Kentucky* (1802); and *Digest of the Laws of the State of Alabama* (1823). He died Nov. 11, 1823.

TOULON, a town and the capital of Stark County, northwestern central Illinois, 37 miles N.N.W. of Peoria, on the Rock Island and Peoria railroad. It is in an agricultural district, is an important grain-shipping point, and has a woolen-mill and cheese factory. Population 1900, 1,057.

TOURBILLIONS. See **PYROTECHNY**, Vol. XX, p. 135.

TOURGEE, ALBION WINEGAR, an American journalist and author; born in Williamsfield, Ohio, May 2, 1838. He studied at Rochester University (1859-61), and served in the Union army (1861-65). After the war he went to Greensboro, North Carolina, began the practice of law, entered politics and published the *Union Register*; was a member of the state constitutional conventions of 1868 and 1875. In 1868 was elected judge of the North Carolina superior court; in 1876 appointed pension agent. His views on the subject of Southern reconstruction and his interference in Southern affairs caused several attempts to be made for his capture by the Ku-klux Klan, which was especially strong in his judicial district; but they all proved failures. In 1879 he published *A Fool's Errand, by One of the Fools*, a novel drawn from his own experience in endeavoring to assist a Southern community to a better political life, of which 135,000 copies



A. W. TOURGEE.

were sold. He edited the *Continent*, a New York weekly (1882-84), and in 1889 was chosen professor in the Buffalo Law School. He published several law books, *The Code, with Notes* (1877); *A Digest of Cited Cases* (1879); *Statutory Decisions of the North Carolina Reports* (1879), and is the author of a number of more popular works, mostly novels, among which are *Toinette* (1874); *Figs and Thistles* (1879); *Bricks without Straw* (1880); *Hot Ploughshares* (1883); *Pactolus Prime* (1890); *Out of the Sunset Sea* (1894); and *The Battle of the Standards*, a treatise on the coinage question (1896). He was appointed consul to Bordeaux, France, in 1897.

TOURJEE, EBEN, the founder of the conservatory system of musical instruction in America; born in Warwick, Rhode Island, June 1, 1834. He worked in a calico-mill in his childhood, and sang in the choir of the Methodist Church. At 13 he became the organist of the church, although he had had no instruction on the instrument; in 1851 opened a music-store in Fall River, Massachusetts, and two years later began teaching music in the public schools and organizing private classes. This was the beginning of class-teaching in America. In 1869 he established a conservatory of music in East Greenwich, Rhode Island; in 1863 studied in Europe, and, returning, founded, in the following year, a conservatory in Providence, Rhode Island. The school was removed to Boston in 1867, and became the New England Conservatory of Music. In 1869 he organized the chorus of the Peace Jubilee; in 1872 became the dean of the new College of Music of Boston University. He died in Boston, Massachusetts, April 12, 1891.

TOURMALINE. See MINERALOGY, Vol. XVI, p. 409.

TOURNIQUET, a device for stanching traumatic hæmorrhages by pressure. See SURGERY, Vol. XXII, p. 676.

TOURO, JUDAH, a Jewish-American philanthropist; born in Newport, Rhode Island, June 16, 1775. He went into business in Boston, and later moved to New Orleans, where he amassed a fortune in mercantile pursuits. He was a volunteer in General Jackson's army during the attack on New Orleans by the British, and was wounded Jan. 1, 1815. He gave his wealth during his life and by will to found or aid various charitable institutions in New Orleans and elsewhere, among which is the New Orleans almshouse. He gave ten thousand dollars toward the building of Bunker Hill Monument. He died June 18, 1854.

TOURS, BERTHOLD, a Dutch musician; born in Rotterdam, Holland, Dec. 17, 1838. He received his musical education from his father, who was the organist of St. Lawrence Church, and at the conservatories of Brussels and Leipsic. He accompanied Prince Galitzin to Russia, and in 1861 settled in London and became a musician in the orchestra of the Royal Italian Opera, and musical adviser for the firm of Novello, Ewer and Company. He composed several hymn-tunes and services for the English Church, among the best known of which are his *Service in F.* and the

anthem, *God Hath Appointed a Day*, and also a large number of popular songs.

TOURVILLE, ANNE HILARION DE COTENTIN, COMTE DE (1642-1701), a French admiral who rose to high rank through his fights with Algerine pirates. See also FRANCE, Vol. IX, p. 579.

TOW. See FLAX, Vol. IX, p. 298.

TOWANDA, a borough and the capital of Bradford County, northeastern Pennsylvania, 86 miles N. E. of Wilkesbarre, on the Susquehanna River, and on the Lehigh Valley and the Barclay railroads. It is in an agricultural and dairying region, has gas and electric lights, water-works, banks, daily and weekly newspapers, is the seat of the Susquehanna Collegiate Institute (Presbyterian), and contains foundries, paper-mills, piano, carriage and furniture factories and an extensive toy factory. Population 1890, 4,169; 1900, 4,663.

TOWER. See ARCHITECTURE, Vol. II, p. 474.

TOWER CITY, a city of Schuylkill County, eastern Pennsylvania, 24 miles W.S.W. of the county capital, Pottsville, on the Williams Valley railroad. It is situated in an agricultural and coal-mining region, and is a shipping-point for its products. Population 1900, 2,167.

TOWER OF LONDON. See LONDON, Vol. XIV, p. 839.

TOWERS OF SILENCE. See PARSIS, Vol. XVIII, p. 326; and ДОКМЕР, in these Supplements.

TOWLE, GEORGE MAKEPEACE, an American author; born in Washington, D. C., Aug. 27, 1841; died in Brookline, Mass., Aug. 8, 1893. He graduated at Yale in 1861, studied law at Harvard and practiced in Boston. He served as consul to European cities, was managing editor of the *Boston Commercial Bulletin* (1870-71) and edited the foreign department of the *Post* (1871-76). He wrote *The Eastern Question*; *American Society*; *Beaconsfield*; *Heroes of History*; *Modern France*; *Certain Men of Mark*; and other works on history and literature.

TOWN. (The definition and particulars in relation to English towns are to be found under MUNICIPALITY, Vol. XVII, pp. 27-31; and PARSIS, Vol. XVIII, pp. 295-297.) In some of the separate states of America, municipalities consist of cities, towns and villages, towns being usually defined as those having less than 2,000 but more than 500 population; but the rule is far from invariable. Occasionally, the term is used to designate the territorial subdivisions constituting a unit of local administration, and here the word *township* seems to have been used interchangeably with the word *town*. In New Jersey, Pennsylvania and some other states, as also in Canada, the word *township* is used exclusively in reference to the primary divisions of the state. In the Federal public land statutes, and in the divisions of the newer and Western states, a township is a territorial subdivision bounded by the intersection of meridians and parallels six miles apart and contain an area of 36 square miles, but it is not a political subdivision, and has no functions of local government.

TOWNLEY, CHARLES, an English archæologist; born at Townley Hall, Lancashire, Oct. 1, 1737. He was educated abroad, and lived in Rome from 1765 to 1772, where he engaged in the study of archæology, and became acquainted with Winckelmann and other noted students of antiquities. After having made, at great expense, fine collections of specimens of ancient art, he returned to England and arranged them in his two houses in Westminster, and also became a trustee of the British Museum. His collections of marbles, bronzes, medals, coins and gems were purchased by the museum at the cost of £28,200. He was the author of *Antiquities Discovered at Ribchester* (1800). He died Jan. 3, 1805.

TOWNSEND, a town of Middlesex County, north-eastern Massachusetts, 22 miles W. of Lowell and 44 miles W.N.W. of Boston, on the Squanacook River, and on the Fitchburg railroad. In the town are the villages of Townsend, West Townsend and Townsend Harbor. The principal industries are in the cooper trade and manufacture of furniture. The town has an assessment valuation of over \$1,000,000. Population 1890, 1,750; 1900, 1,804.

TOWNSEND, EDWARD W., an American humorist, was born Feb. 10, 1855, in Cleveland, Ohio; began journalism at 15 years of age; was engaged on the San Francisco *Argonaut*; Washington correspondent of the San Francisco *Examiner*; joined the staff of the New York *Sun* in 1892; author of *Chimmie Fadden* (1894); of *Chimmie Fadden Explains* (1895); and of *A Daughter of the Tenements* (1895). These books are highly amusing accounts of life in the Bowery or on the East Side of New York, in which the peculiar speech of that locality is conspicuous.

TOWNSEND, GEORGE ALFRED, an American journalist, was born in Georgetown, Delaware, Jan. 30, 1841. After acquiring an education in Philadelphia, he began writing for the press of that city. In 1862 he became a war correspondent of the New York *Herald*, reporting for that paper the operations of the Army of the Potomac in the peninsula, and Pope's campaign in northern Virginia. Before the close of that year he went to Europe, and there delivered a number of lectures on the Civil War in America. Returning to the United States, he was engaged by the New York *World* as war correspondent in 1864, and in this capacity speedily gained a reputation as a descriptive writer. After the war he divided his time between lecturing and writing for the press, and in 1866 he was in Europe describing the events of the Austro-Prussian War. He adopted the pen-name of "Gath" in 1868, when a correspondent of the Chicago *Tribune*. He published, among others, *Campaigns of a Non-Combatant* (1865); *Poems* (1870); *Washington Outside and Inside* (1871); *Katy of Catoctin* (1886); and *Mrs. Reynolds and Hamilton* (1890).

TOWNSEND, VIRGINIA FRANCES, an American authoress; born in New Haven, Connecticut, in 1836. She edited, for a time, *Arthur's Home Magazine*, and has spent all her life in literary work. Among her books are *Living and Loving* (1859); *Amy Deane* (1862); *Temptation and Triumph* (1863); *The Battle-*

fields of Our Fathers (1864); *Elizabeth Tudor, the Queen and Woman* (1874); *Lenox Dare* (1881); and *Our Presidents* (1888). Many of her juvenile stories have been republished as the Breakwater Series.

TOWNSHIP. See *Surveys of Public Lands of the United States* (1), under UNITED STATES, in these Supplements.

TOWNSVILLE, a town and port of Elphinstone County, on the east coast of Queensland, and on Cleveland Bay, at the mouth of Ross Creek, which is spanned by a swing-bridge 550 feet in length. It is 100 miles N.W. by W. of Bowen. It is the see of an Anglican bishop, and the terminus of a railroad which extends southwest to Hughenden. It has immigration barracks on Ross Island, large shipping trade, and exports meat, etc. Population, 8,600.

TOXICOLOGY. See POISONS, Vol. XIX, pp. 275-279.

TOXIGLOSS. See MOLLUSCA, Vol. XVI, p. 649.

TOXODON. See MAMMALIA, Vol. XV, p. 427.

TOXOTIDÆ, the family of archer-fishes, those East Indian fishes said to project drops of water at the insects which constitute their food. See ARCHER-FISH, in these Supplements.

TOY, CRAWFORD HOWELL, an American Biblical scholar; born in Norfolk, Virginia, March 23, 1836; graduated at the University of Virginia in 1856, and, ten years later, entered upon a two years' course of study at the University of Berlin. In 1869 he became professor of Hebrew in the Southern Baptist Theological Seminary at Greenville, South Carolina, and Louisville, Kentucky. There he remained until 1879, and since 1880 he has been professor of Hebrew at Harvard. He is the author of *History of the Religion of Israel* (1882); *Quotations in the New Testament* (1884); *Judaism and Christianity* (1890); and edited the volume on Samuel in Lange's *Commentary* and Murray's *Origin of the Psalms*.

TOYNBEE, ARNOLD. See POLITICAL ECONOMY, Vol. XIX, p. 399.

TRACADIE, a town of Gloucester County, situated on the east coast of the Canadian province of New Brunswick, 35 miles E. of Bathurst. It has excellent fisheries. Here is a Trappist monastery, a convent, and a hospital for lepers—the chief lazaretto of Canada. Population, 1,500.

TRACERY. See ARCHITECTURE, Vol. II, p. 475.

TRACHEA. See RESPIRATION, Vol. XX, p. 475.

TRACHEAL TISSUE. See HISTOLOGY, Vol. XII, p. 16.

TRACHEATA, a class. See MYRIAPODA, Vol. XVII, pp. 115, 116.

TRACHEOTOMY, a surgical operation in which the trachea, or windpipe, is opened for the purpose of removing some foreign body, tumor, etc., which interferes with breathing, or of treating some disease of the trachea. There are chiefly two forms of operation. 1. High tracheotomy, in which the opening is made as high as possible, and very near the larynx; and 2. Low tracheotomy, in which the opening is made lower down, and at some distance from the larynx. The operation requires an intimate acquaintance with the anatomy of the parts on the part of the surgeon, and the complete unconscious

ness of the patient by means of anæsthetics. Frequently, a tracheotomy tube is inserted in the opening, and left there for a longer or shorter time, for the purpose of affording an uninterrupted passage of air to and from the lungs. *Laryngotomy* is a similar operation performed on the larynx. The principal morbid affections demanding either of these operations are defects in the development of the trachea in newly born infants; inflammation, simple, specific, or diphtheritic; ulceration and perforation of the walls of the trachea from an aneurism or abscess; syphilis; tuberculosis; tumors, malignant, as cancer, or non-malignant, as polypi; stricture of the trachea from various causes.

TRACHINIDÆ. See ICHTHYOLOGY, Vol. XII, p. 690.

TRACHONITIS, a district. See BASHAN, Vol. III, p. 410.

TRACHYPTERIDÆ. See RIBBON-FISH, Vol. XX, p. 531.

TRACHYSTOMATA. See SIREN, Vol. XXII, p. 97.

TRACHYTE. See GEOLOGY, Vol. X, p. 234.

TRACKS. See TROTting AND PACING, in these Supplements.

TRACTARIANISM. See OXFORD MOVEMENT AND RITUALISM, in these Supplements.

TRACY, a city of Lyon County, southwestern Minnesota, on the Chicago and North-Western railroad, 91 miles W. of St. Peter. The region around is famed for its wheat and corn. The city has electric-light and water works, seven churches, excellent public school, two banks and two weekly newspapers. Population 1890, 1,400; 1900, 1,911.

TRACY, BENJAMIN FRANKLIN, an American statesman; born in Oswego, New York, April 26,



B. F. TRACY.

1830. He studied law, began practice, and in 1853 was elected district attorney for Tioga County, New York; in 1862 to the state legislature; was appointed by Governor Morgan member of a recruiting committee, and organized the One Hundred and Thirty-seventh and the One Hundred and Ninth New York regiments, taking command

of the latter; fought in the battles of the Wilderness and Spottsylvania; was put in charge of a prison-camp at Elmira; at the close of the war received the brevet of brigadier-general of volunteers; settled in Brooklyn; was United States district attorney (1866-73); filled a vacancy on the supreme bench of New York (1881-83); was Secretary of the Navy in President Harrison's Cabinet (1889-93); and thereafter resumed his practice in New York. He was counsel for the defense in the Titon-Beecher case.

TRACY CITY, a village of Grundy County, south-central Tennessee, on the Nashville, Chattanooga and St. Louis railroad, 40 miles W.N.W. of Chattanooga. It is on the summit of the Cumberland Mountains, where there are valuable coal-mines.

The city has numerous coking-ovens, railway car and repair shops, a foundry, etc., and one weekly newspaper. Population 1890, 1,936.

TRADESCANT, JOHN, a Dutch botanist; born in Holland in 1570. He traveled in Europe, America and Asia, making collections of specimens of natural history, and finally settled in Kent, England, where he pursued the calling of landscape-gardener; later established a botanical garden at South Lambeth, and in 1629 was appointed gardener to Charles I. He died in 1638. The American perennial herb, *Tradescantia* (spiderwort), is named for him.—His son, JOHN, born in Meopham, Kent, in 1608, also traveled and collected curiosities, a detailed description of which he published under the title *Museum Tradescantium; or, A Collection of Rarities Preserved at South Lambeth* (1656). This collection he gave to Elias Ashmole, and it became the nucleus of the collections in the Ashmolean Museum at Oxford, the first public museum in Great Britain, which was founded by the man whose name it commemorates in 1683. Tradescant the younger died April 22, 1662.

TRADE-UNIONS. See Vol. XXIII, pp. 499-502; and LABOR ORGANIZATIONS, in these Supplements.

TRADE WINDS. See METEOROLOGY, Vol. XVI, pp. 143, 144.

TRAFALGAR, BATTLE OF CAPE. See NELSON, Vol. XVII, pp. 323, 324.

TRAGACANTH. See GUM, Vol. XI, pp. 275, 276.

TRAGEDY. See DRAMA, Vol. VII, p. 395; *Greek*, pp. 403-407; *Roman*, pp. 410, 411; *Italian*, pp. 416, 417; *French*, pp. 423-425; *English*, pp. 432, 434, 435, 437.

TRAGOPAN. See HORNBILL, Vol. XII, p. 169.

TRAGULINA. See MAMMALIA, Vol. XV, p. 430.

TRAILL, HENRY DUFF, an English author; born at Blackheath, England, Aug. 14, 1842, and educated at Merchant Taylors' School, whence he proceeded, as probationary fellow, to St. John's College, Oxford, where he graduated in 1864. He was called to the bar by the Society of the Inner Temple in 1868. He adopted the journalistic and literary profession in 1871, and was an extensive contributor to the *Pall Mall Gazette* (under the original management), the *St. James's Gazette*, the *Daily Telegraph*, the *Saturday Review*, etc. He published, in 1881, *Central Government*; in 1882, *Sterne and Recaptured Rhymes*; in 1884, *The New Lucian*, a series of dialogues of the dead, and *Coleridge*; in 1886, *Shaftesbury*, a monograph contributed to the series called English Worthies; *William III* (1888); *Strafford* (1889); *Saturday Songs*, a reprint of verse contributed to the *Saturday Review* (1890); *Marquis of Salisbury* (1891); *Social England* (1893); and *Lord Cromer* (1897). Was editor of *Literature*. He died Feb. 21, 1900.

TRAILL, THOMAS STEWART. See Vol. VIII, p. 202.

TRAIN, GEORGE FRANCIS, an American author; born in Boston, March 24, 1829. He engaged in business in Boston, and in 1853 went to Australia, where he founded the house of Caldwell, Train and Company. He traveled, and at one time endeavored

to promote street-railroading in Liverpool and Birkenhead, England, but failed; began lecturing and writing, and became well known on account of his sarcastic criticisms of English society and his personal eccentricities, one of which was, for a time, to refuse to speak to any one. In 1862 he returned to America and made his home in New York. Among his books are *An American Merchant in Europe, Asia and Australia* (1857); *Young America Abroad* (1857); *Young America in Wall Street* (1858); *Spread Eagleism*, a collection of his public speeches (1859); *Young America on Slavery* (1860); *Downfall of England* (1865); *Championship of Woman* (1868).

TRAINING, a test. See **HEREDITY**, in these Supplements.

TRAJAN'S COLUMN AND TEMPLE. See **ROME**, Vol. XX, pp. 826, 827.

TRAJECTORY. See **GUNNERY**, Vol. XI, pp. 301-304.

TRANCE, a sleep-like state from which the sleeper cannot be roused. The predisposing causes are the so-called hysterical or nervous disposition, anæmia, exhausting diseases, etc. The immediate cause is usually some emotional disturbance. The voluntary induction of the state is possible, or it may be artificially induced by hypnotic methods. Hypnotism is really induced trance. Trance occurs chiefly in females between the ages of twelve and thirty. The beginning of a trance is usually sudden. The countenance becomes pale; the limbs relaxed, though occasionally rigid; eyeballs look upward, pupils dilated, responding feebly to light. Irritating substances blown into the nose cause no sneezing; the prick of a needle is apparently not felt; no consciousness is observed, but in some cases volition only is lost, the patient being conscious of what is happening around her; in some cases the senses are very acute, as in hypnotism, and actions are performed in accordance with suggestions made to the patient, but the usual condition manifests no mental activity. The breathing may be quicker or slower than normal, and sometimes so feeble as not to be disclosed by a mirror held over the mouth. The sounds of the heart are weakened, and are occasionally inaudible. In extreme cases the patient appears dead,—a condition termed "death-trance." The duration of a trance varies from a few hours to several weeks, months, or even a year. Recovery may be sudden or gradual. The trance is usually followed by nervous prostration, inability to speak distinctly or mental dullness. In the same individual repeated attacks may recur at regular intervals. *Post-mortem* examinations reveal no pathological state of the brain or other organs which satisfactorily explains the condition. Trance is sometimes mistaken for apoplexy or catalepsy; but catalepsy is a variety of trance characterized by a strong rigidity of the whole muscular system, a rigidity which yields slowly to pressure or gravity.—The skillful physician has little difficulty in diagnosing the case. Trance rarely terminates in death. The treatment should always be under the direction of a physician.

TRANSANDINE RAILWAY. See **PERU**, in these Supplements.

TRANSCENDENTALISM, a term applied to Kantian philosophy, because Kant used it in a new sense, and to denote a fundamental classification of knowledge in his system. Knowledge that comes to man by experience he classed as *a posteriori*, but behind that are necessary and universal terms of thinking not gained by experience. They are elementary, and underlie all experience. Without them there is no philosophy. These Kant classed as *a priori*. They are intuitions, in the dialectic of some metaphysicians, and among them are the ideas of self or soul, of time, of space, of relation. These Kant discussed as the *categories* of reason (see Vol. XIII, p. 852), and they are transcendental; that is, they transcend experience. For him the test of these cognitions are their necessity and universality.

The term came into use in the United States in connection with Emerson's teachings and the "Concord philosophy," which was rather a religious sense than a philosophy. It undoubtedly had a connection with German thought and its infiltrations through Coleridge into speculative literature. Emerson taught that the revelations God made to man were made within the soul; that the soul was God's temple,—a thing of infinite dignity and capacity. It is an experience founded on the doctrine of the immanence of God, and hence it was called a transcendental philosophy; which Margaret Fuller described as "a vague, yet exalting conception of the god-like nature of the human spirit."

TRANSFORMERS. See **ELECTRICITY**, §§ 76, 77, in these Supplements.

TRANSFUSION OF BLOOD, a surgical operation by which blood from a healthy person or animal is injected into the veins of a feeble patient. See **SURGERY**, Vol. XXII, p. 681.

TRANSSIBERIAN RAILROAD. See **SIBERIA**, in these Supplements.

TRANSKEI, a part of Cape Colony, lying between the Great Kei river (the boundary of British Kaffraria) and Tembuland. Formerly including most of Kaffraria proper, it is now separated from Griqualand East, Tembuland, and Pondoland. It has an area of 2,552 square miles, and a population (1891) of 153,563, of which 1,019 were Europeans. The territories comprised under the title are grouped under two chief magistrates, and are subject to the Native Territories Penal Code.

TRANSMIGRATION OF SOUL. See **METEMPSYCHOSIS**, Vol. XVI, pp. 106, 107; and **VEDANTA**, Vol. XXIV, pp. 117-120.

TRANSMITTERS. See **TELEPHONE**, Vol. XXIII, pp. 131, 132.

TRANSPIRATION, in botany a name applied to the process by which water is given off from the plant surfaces, notably the leaf surfaces; hence the leaves are often spoken of as organs of transpiration. The current of water which supplies material for transpiration is known as the transpiration current, and is popularly spoken of as the ascending sap.

TRANSPORTATION. See **CANALS**, Vol. IV, pp. 782-794, and in these Supplements; **RAILWAYS**, Vol. XX, pp. 249-255, and in these Supplements;

ROADS AND STREETS, Vol. XX, pp. 582-588; and SHIPPING, Vol. XXI, pp. 826-829.

TRANSPORTATION OR DEPORTATION. See PRISON DISCIPLINE, Vol. XIX, pp. 747, 748, 750-752; in France, 760; in Russia, 762.

TRANSPPOSITION, in music, a change in the composition of a piece, either in the writing or the performance, by which the whole is removed to another key. It often happens that a piece written for the piano in a certain key is better rendered on the violin or some other instrument when written in a different key. A composition in any major key may be transposed into any other major key; the same rule holds true of compositions in minor keys. As a rule, pieces of music written in a major key cannot be transposed into the corresponding minor key. The transposition of a piece from C major to G major may be effected in this way: Instead of starting at C, the start is made at G, five tones higher. The scale beginning at G has one sharp, namely on F. If the signature or sign of one sharp be placed at the beginning of the piece on F, it is understood that it sharps all the Fs in the entire piece, and thus the signature of one sharp on F denotes the key of G, and that the whole piece is transposed from the key of C to the key of G. Transpositions downward are made in a similar manner.

TRANSUBSTANTIATION. See EUCHARIST, Vol. VIII, p. 653.

TRANSVAAL. See TRANSVAAL, Vol. XXIII, pp. 516-519; also AFRICA, and SOUTH AFRICAN REPUBLIC, in these Supplements. Also see BOER WAR.

TRAPEZUNTIOS, GEORGIOS, scholar. See GREECE, Vol. XI, p. 149.

TRAP-ROCK, a term loosely applied to various crystalline igneous rocks, generally varieties of basalt. It often enters into the formation of hill, being in layers interspersed with a softer material. This latter being carried away leaves the rock standing out like a rude flight of stairs, and hence its name from the Swedish word *trappa*. The term is no longer used when accuracy is desired.

TRASIMENE OR TRASIMENO, a lake in Umbria, central Italy, 10 miles west of Perugia. Its length is 11 miles, breadth 3 miles, greatest depth 25 feet, altitude 845 feet. In the vicinity Hannibal obtained a great victory over the Romans under Flaminius, 217 B. C. See ITALY, Vol. XIII, p. 440; and HANNIBAL, Vol. XI, p. 442.

TRAUMATICUM. See DELIRIUM NERVOSUM, in these Supplements.

TRAUTWINE, JOHN CRESSON, an American surveyor and civil engineer; born at Philadelphia, Pennsylvania, March 30, 1810. He served in the office of City Engineer William Strickland, of Philadelphia, and was employed in the erection of the mint and other structures in Philadelphia. Between 1831 and 1844 he served in the several capacities of assistant engineer of the Philadelphia, Wilmington and Baltimore road, chief engineer of the Philadelphia and Trenton, and in a similar capacity on the Hiawasse, later known as the Tennessee and Georgia road. In 1858 he was in the service of the leading railway systems of the country, and in that

year arranged the dock system which is now employed at Montreal, Canada. He retired from active work in 1864, but up to his death, Sept. 14, 1883, his services and counsel were in constant requisition. He published *Method of Calculating Cubic Contents of Excavations and Embankments* (1851); *Field Practice of Laying Out Circular Curves for Railroads* (1851); and *Civil Engineer's Pocket Book* (1872).

TRAVELERS, LEGAL RIGHTS OF. The rights and privileges conferred by law on those using highways, railways or other methods of transportation.

As a general principle of law—and purely statutory law, for no such liability exists in common law—a state or city is liable for defective highways or footpaths. Contributory negligence will disentitle a traveler to recover for injuries, as also will an improper use of the highway or method of conveyance. Many and various legal questions have been raised by passengers upon steam railroads, street-cars and steamships as to their legal rights in respect to injuries, and the reciprocal duties of carriers and passengers. Many and voluminous are the law-books and treatises upon such subjects, and as a general principle such law is case-law as distinguished from statutory enactment.

In many states a statutory limit of \$5,000 is placed upon the damages which can be recovered by the relatives of a person killed. The provision restricting the amount of damages was abolished on the revision of the New York constitution, leaving the amount unlimited. The disposition of many states is to follow the policy of New York in this regard.

It would be impossible to detail within the limits of an encyclopædia article one tenth of the legal decisions upon the duties of carriers and passengers. Custom, usage, local regulations, rules of the carrier and express legislation have direct and potent influence upon the rights of the person carried.

TRAVELERS' INSURANCE. See ACCIDENT AND CASUALTY INSURANCE, in these Supplements.

TRAVERSE, LAKE, forms part of the boundary between Dakota and Minnesota. It is about 20 miles by 3 miles in dimensions. The Sioux Wood River issues from its north end. It is 960 feet above sea-level.

TRAVERSE BAY, GRAND, an arm of Lake Michigan, extending thirty miles into the northwestern coast of the southern peninsula of Michigan, and dividing Leelanaw and Antrim counties. Its length is 30 miles, width 10 to 12, general direction, south. It is divided, in its southern part, by Preogenese Point, a narrow tongue of land 15 miles long, into the eastern and western arms.

TRAVERSE BAY, LITTLE, an arm of Lake Michigan, just north of Grand Traverse Bay, extending eastward into Emmet County, Michigan. Length, 12 miles; width, 3.

TRAVERSE CITY, a city and the capital of Grand Traverse County, northwestern Michigan. It is at the south end of the west branch of Grand Traverse Bay, and is, on account of its location and the beauty of its surroundings, much frequented as a summer-resort. Located on the Grand Rapids and

Indiana and the Chicago and West Michigan railroads, it is in a productive farming and fruit-growing region; has lumber, planing and shingle mills, foundries and machine-shops, chair stock, hame, basket and woodenware factories, etc. It has an excellent harbor; the Northern Michigan Asylum for the Insane, electric light, two banks, a library, an evening and three weekly newspapers. Population 1890, 4,833; 1900, 9,407.

TRAVERSE PROCESS. See SURVEYING, Vol. XXII, p. 709.

TRAVERSE TABLE. See NAVIGATION, Vol. XVII, p. 264.

TRAVERSE PLATFORM OR SLIDES. See GUNNERY, Vol. XI, p. 312.

TRAVNIK, a town of European Turkey, capital of the province of the same name, once the capital of the province of Bosnia, on the Lasva River, 45 miles northwest of Bosnia Serai. Its altitude is 1,655 feet. Its numerous mosques and the castle, which dates from the middle ages, are the principal edifices. It contains 5,933 inhabitants, almost all Mohammedans. The principal branch of industry is the manufacture of sword-blades. It has a government horse-breeding establishment.

TRAWLING. See FISHERIES, Vol. IX, pp. 245-250.

TREASURY DEPARTMENT OF THE UNITED STATES. This department was established by act of Congress, Sept. 2, 1789, the bill being drawn by Alexander Hamilton, to which several amendments have been subsequently made. It is presided over by a Secretary, who is nominated by the President and confirmed by the Senate. This officer has the duty of managing the United States revenues under the laws of Congress. Three assistant secretaries of the treasury are also appointed by the President and confirmed by the Senate. There are also in the office of the Secretary a chief clerk and eight division chiefs, upon whom devolves the general direction of the routine business and operations of the office.

In addition to the officers connected with the Secretary's office proper, there are in the treasury department the following officers:

The First Comptroller examines all accounts settled by the first auditor, except those relating to receipts from customs. He also countersigns all warrants drawn by the Secretary of the Treasury.

The Second Comptroller examines all accounts settled by the second, third and fourth auditors. He also countersigns all requisitions drawn on the Secretary of the Treasury by the Secretaries of War and of the Navy.

The Commissioner of Customs examines all accounts settled by the first auditor relating to receipts from customs, and certifies to balances arising thereon to the register of the treasury.

The First Auditor examines all accounts accruing in the Treasury Department (except those arising under the internal revenue laws), certifies the balance, and transmits the accounts to the first comptroller, or to the commissioner of customs.

The Second and Third auditors examine the army accounts.

The Fourth Auditor, all accounts relating to the naval service.

The Fifth Auditor, all accounts relating to the diplomatic and consular service, accounts relating to the census, the National Museum and the contingent expenses of the Patent Office.

The Sixth Auditor examines all accounts relating to the postal service.

The Treasurer of the United States receives and disburses all public moneys that may be deposited in the treasury at Washington and the sub-treasuries at New York, Boston, Philadelphia, Baltimore, New Orleans, San Francisco, St. Louis, Chicago and Cincinnati, and in the national bank United States depositories.

The Register of the Treasury is the official book-keeper of the United States. He prepares a yearly statement which shows every receipt and disbursement of the public money; signs and issues all the United States bonds; registers all warrants drawn by the Secretary of the Treasury upon the United States Treasurer; and transmits statements of balances due to individuals after the settlement of their accounts by the first comptroller, or the commissioner of customs, upon which payment is made.

The Comptroller of the Currency has the control of the national banks.

The Director of the Mint has general supervision of all the mints and assay offices of the United States.

The Solicitor of the Treasury is the law officer of the department.

The Commissioner of Internal Revenue has superintendence of the collection of all internal revenue taxes.

The Superintendent of the Coast and Geodetic Survey is charged with the survey of the Atlantic, Gulf and Pacific coasts of the United States, including the coasts of Alaska; the survey of rivers to the head of tide-water or ship-navigation; deep-sea soundings; temperature and current observations along the said coasts; magnetic observations and gravity research; determination of heights by geodetic leveling, and of geographical position by lines of transcontinental triangulation.

The Supervising Inspector-General of Steam Vessels superintends the administration of the steam-boat inspection laws.

The Supervising Surgeon-General supervises the marine hospitals and other relief stations of the service.

The General Superintendent of the Life-Saving Service supervises the organization and government of that service, and compiles statistics of marine disasters.

The Chief of the Bureau of Statistics collects and publishes the statistics of our foreign commerce; makes monthly statements of imports and exports; makes annual reports on navigation and monthly reports on immigration, and the total values of foreign commerce.

The Chief of the Bureau of Engraving and Printing designs, engraves, prints and finishes all the securities and other similar work of the government printed from steel plates (except postage-stamps and

postal-notes), embracing United States notes, bonds and certificates, national bank-notes, internal revenue and customs stamps, treasury drafts and checks, disbursing officers' checks, licenses, commissions, patent and pension certificates, and portraits of deceased members of Congress and other public officers authorized by law.

The Lighthouse Board is also included in the Treasury Department; for a description of which, see LIGHTHOUSE BOARD, in these Supplements.

Many of these departments are independent of the Secretary of the Treasury, their chiefs being appointed by the President.

The following is a list of the men who have held the office of Secretary of the Treasury:

PRESIDENTS.	SECRETARIES OF THE TREASURY.	RESIDENCES.	DATES OF APPOINTMENT.
Washington	Alexander Hamilton	New York	1789
Washington	Oliver Wolcott	Connecticut	1795
Adams	Oliver Wolcott	Connecticut	1797
Adams	Samuel Dexter	Massachusetts	1801
Jefferson	Samuel Dexter	Massachusetts	1801
Jefferson	Albert Gallatin	Pennsylvania	1801
Madison	Albert Gallatin	Pennsylvania	1809
Madison	George W. Campbell	Tennessee	1814
Madison	Alexander J. Dallas	Pennsylvania	1814
Madison	William H. Crawford	Georgia	1816
Monroe	William H. Crawford	Georgia	1817
J. Q. Adams	Richard Rush	Pennsylvania	1822
Jackson	Samuel D. Ingham	Pennsylvania	1825
Jackson	Louis McLane	Delaware	1831
Jackson	William J. Duane	Pennsylvania	1832
Jackson	Roger B. Taney	Maryland	1832
Jackson	Levi Woodbury	New Hampshire	1834
Van Buren	Levi Woodbury	New Hampshire	1837
Harrison	Thomas Ewing	Ohio	1841
Tyler	Thomas Ewing	Ohio	1841
Tyler	Walter Forward	Pennsylvania	1841
Tyler	John C. Spencer	New York	1843
Tyler	George M. Bibb	Kentucky	1844
Polk	Robert J. Walker	Mississippi	1845
Taylor	William M. Meredith	Pennsylvania	1849
Fillmore	Thomas Corwin	Ohio	1850
Pierce	James Guthrie	Kentucky	1853
Buchanan	Howell Cobb	Georgia	1857
Buchanan	Philip F. Thomas	Maryland	1860
Buchanan	John A. Dix	New York	1861
Lincoln	Salmon P. Chase	Ohio	1861
Lincoln	William P. Fessenden	Maine	1864
Lincoln	Hugh McCulloch	Indiana	1865
Johnson	Hugh McCulloch	Indiana	1865
Grant	George S. Boutwell	Massachusetts	1869
Grant	William A. Richardson	Massachusetts	1873
Grant	Benjamin H. Bristow	Kentucky	1874
Grant	Lot M. Morrill	Maine	1876
Hayes	John Sherman	Ohio	1877
Garfield	William Windom	Minnesota	1881
Arthur	Charles J. Folger	New York	1881
Arthur	Walter Q. Gresham	Indiana	1884
Arthur	Hugh McCulloch	Indiana	1884
Cleveland	Daniel Manning	New York	1885
Cleveland	Charles S. Fairchild	New York	1887
Harrison	William Windom	Minnesota	1889
Harrison	Charles Foster	Ohio	1891
Cleveland	John G. Carlisle	Kentucky	1893
McKinley	Lyman J. Gage	Illinois	1897

TREASURY NOTES. See FINANCES OF THE UNITED STATES, in these Supplements.

TREAT, ROBERT, a colonial governor of Connecticut; born in England, in 1622; died in Mil-

ford, Connecticut, July 12, 1710. He came to Wethersfield, Connecticut, and in 1638 moved to Milford, in the New Haven Colony, and served as deputy from 1653 to 1659, and in 1665. He opposed the consolidation of Connecticut and New Haven, and was one of the colonists who left Connecticut and founded Newark, New Jersey, whence he returned to Milford in 1672; was made major of Connecticut troops in 1673, and two years later was chosen commander-in-chief in the war with King Philip. He drove the Indians from Northfield and Springfield, defeated their attack on Hadley, and took part in the battle at Narragansett Fort in December, 1675; served as deputy-governor (1676-83 and 1698-1708); as governor (1683-98), except during the two years (1687-89) when the colony was under the royal governor, Andros. At this time Treat refused on one pretext or another to surrender the colonial charter to Andros, upon the latter's demand for it. This incident has given rise to the story that the charter was hidden in the "Charter Oak," to prevent Andros from getting it, which has been doubted. According to other accounts, the royal governor, upon the refusal of Treat and council to surrender the charter, came to Hartford and seized it. At any rate, Treat, whatever part he had in the transaction, was made one of the new governor's council. In May, 1689, after the rebellion against Andros, he returned to his old office.

TREBBIA, a river of Italy, a southern tributary of the Po, rising in the Apennines in Liguria, and flowing N. N. E. and N. through Emilia to the Po, which it joins on the right bank, just above Piacenza. Here Hannibal obtained a victory over the Romans (218 B. C.). The length of the river is 71 miles, and the area of its basin, 392 square miles.

TREBELLI, ZELIA, an European opera-singer; was born of German parents, called Gilbert, at Paris, in 1838, and made her debut at Madrid under the name of Trebelli, an anagram of Gillebert, in 1859. The next year she entered on a series of triumphs at Berlin, and in 1862 passed to London, where her success was also immediate. In the years that followed, marked by tours in Scandinavia, Russia and the United States (1884), she held the position which she had at once assumed, of one of the greatest mezzo-contraltos of her day, winning applause equally on the stage and in the concert-room for her rich, brilliant voice and wonderful executive power, and for the marvelous range of expression. Died in Etretat, Aug. 18, 1892.

TREBELLIIUS, POLLIO, an author. See AUGUSTAN HISTORY, Vol. III, p. 74.

TREDIAKOVSKI, BASIL, a poet. See RUSSIA, Vol. XXI, p. 106.

TREE, HERBERT BEERBOHM, an English actor; born in London, in 1853. He was educated in England and Germany, and at 17 entered the office of his father, who was a grain-merchant. He became interested in amateur dramatics, and finally decided to make acting his profession, appearing for the first time as Grimaldi at the Globe Theatre, London, in 1878. In 1884 he made a great

hit as the Curate in *The Private Secretary*, given at the Prince of Wales Theatre. In 1887 he took the management of the Comedy Theatre, and later in the same year of the Haymarket. In 1894-95 he made a professional tour in America. As an actor, he was remarkable for his versatility. In his repertory are *Beau Austin*; *The Merry Wives of Windsor*; *The Pompadour*; *The Dancing Girl*; *Hamlet*; *Hypatia*; *A Woman of No Importance*; *The Tempter*; and *John-a-Dreams*. He was supported by his wife, who was an accomplished actress. He published *Fallacies of the Modern Stage*; *The Imaginative Faculty*; and other papers.

TREE-CLAIM. See HOMESTEAD, Vol. XII, pp. 123, 124.

TREE-DUCK, the members of the genus *Dendrocygna* in the sub-family *Anatina*. These ducks nest in hollow trees, away from the water. The species are mostly found in tropical countries, but *D. pulva* and *D. autumnalis* occur in the United States. *D. viduata* occurs both in Africa and in South America.

TREE-FROGS. See FROG, Vol. IX, p. 767.

TREES. See ARBORICULTURE, Vol. II, pp. 314-324; and FORESTS, Vol. IX, pp. 397-410.

TREE-SNAKES. See SNAKES, Vol. XXII, p. 195.

TREES OF LIBERTY, the trees or green boughs set up as symbols of liberty. The idea came from America. In 1790 the Jacobins planted a tree of liberty in Paris, and soon every village in France had its tree, crowned with the cap of liberty, round which the people danced, singing revolutionary songs as English villagers used to sing and dance round the May-pole. During the empire the trees were suppressed, but in July, 1830, they were again set up, and again in 1848. These trees were adorned with *rings* as symbols of unity, with *triangles* as symbols of equality, with tricolored ribbons as the revolutionary badge, and a cap of liberty. The last was rooted up in 1872. In Italy, during the revolution of 1848-49, numerous trees of liberty were planted.

TREFOIL, one of the common names applied to the various species of clover.

TREITSCHKE, HEINRICH GOTTHARDT VON, a German historian; born in Dresden, Saxony, Sept. 15, 1834. He studied at various German universities, and was a tutor in the academy at Lutzschena; in 1863 became professor at Freiburg, in Breisgau. Leaving here in 1866, at the beginning of the Prussian-Austrian war, he went to Berlin and became editor of the *Preussischen Jahrbücher*; was chosen professor at Heidelberg (1867); at Berlin (1874); elected to the Reichstag as a national-liberal in 1871, and retained his seat till 1888; succeeded Ranke in 1887 as Prussian historiographer. He wrote *The Science of History* (1859); *Ten Years of German Battles* (1865-74); *Socialism and its Patrons* (1875); *Socialism and Assassination* (1878); *History of Germany in the Nineteenth Century* (5 vols., 1879-94); *Two Emperors* (1888); *Biographical and Historical Discussions* (1897). Died in Berlin, April 28, 1896.

TRELAWNEY, EDWARD JOHN, an English

author and adventurer; born March 10, 1792, of a Cornish family; entered the navy, 1803; but deserted on account of the harsh treatment he received; became a privateersman in the Indian and Malayan seas; returned to London, wrote for the magazines, and made the acquaintance of Byron and Shelley at Pisa, 1822; took the chief part in the necessary cremation of Shelley's body, recovered after drowning in July of the same year, near Via Reggio, Byron and Leigh Hunt being also present. He accompanied Byron to Greece in 1823, fought with the Greek leader Odysseus, in opposition to the government; was treacherously shot in the jaw, while being sheltered in the cave of Odysseus, by an Englishman whom he protected from the vengeance of the Greeks. He subsequently traveled in North and South America, visited Italy, was prominent in London literary circles, and died at his home at Sompting, near Worthing, Aug. 13, 1881. His body was cremated and the ashes taken to Rome and laid beside that of Shelley and Keats. He was a splendid type of physical development and had a striking personality, on which account he was selected by Millais as the model for the old Arctic voyager in *The Northwest Passage*. He wrote *The Adventures of a Younger Son*, a vivid narrative based upon his own experiences (1830; new edition, 1890); and *Recollections of the Last Days of Shelley and Byron* (1858), which was republished twenty years later as *Records of Shelley, Byron and the Author*, in which considerable changes appeared, and which revealed great penetration into character.

TREMBLES, cattle disease. See PATHOLOGY, Vol. XVIII, p. 407.

TREMONT, a town of Hancock County, Maine, on the Atlantic Coast, a portion of Mt. Desert Island; separated from Mt. Desert town, and incorporated as Manset in 1848, its name being subsequently changed. It contains the villages of Tremont, Southeast Harbor, Seal Cove, West Tremont, Sea Wall, Tremont Center and Manset. It has five churches, high-school, public library, a savings bank and several hotels. Population 1890, 2,036; 1900, 2,010.

TREMONT, a borough of Schuylkill County, east central Pennsylvania, on the Philadelphia and Reading railroad, 31 miles N. of Lebanon. It is in a coal-mining region; has iron-works and electric light, water-works, eight churches, a bank and two weekly newspapers. Population 1890, 2,064; 1900, 1,947.

TRENCHARD, STEPHEN DECATUR, an American naval officer; born in Brooklyn, New York, July 10, 1818. He entered the service as midshipman in October, 1834. He was made lieutenant in 1847, and in that year was attached to the *Saratoga*, blockading the Mexican ports. Between 1853 and 1857 he was engaged on the coast survey, and during the latter year was with the *Powhatan* on a diplomatic mission to China, as aide to Commodore Josiah Tatnall. At the engagement on Peiho River, Trenchard was slightly wounded. Upon the breaking out of the Civil

War he was assigned to the *Keystone State*, and subsequently to the command of the *Rhode Island*. He served in the West India waters on the lookout for the *Alabama* and *Florida*, also making a number of valuable captures and taking an active part in the assault and bombardment of Fort Fisher. He was promoted captain in July, 1866, and commodore in 1871. He was in command of the North Atlantic squadron, consisting of 21 vessels, in 1876, as rear-admiral, to which position he had been advanced in August, 1875, and was retired July 10, 1880. He died Nov. 15, 1883.

TRENHOLM, GEORGE A., an American public man; born in South Carolina in 1806, and for some time prior to the Civil War was head of a large cotton house, with headquarters at Charleston. During the progress of hostilities he was engaged in "running the blockade," but in 1864, upon the resignation of Secretary Memminger, he was appointed secretary of the treasury of the Confederacy, remaining in that position until the war closed, after which he was imprisoned until pardoned by President Andrew Johnson, in October, 1865. He died in Charleston, South Carolina, Dec. 10, 1876.

TRENT, the name of a river of England and of one of Ontario: (1) rises north of Burslem, in Staffordshire, on Biddulph moor; flows through the counties of Derby, Nottingham and Lincoln, and with the Ouse, which it joins near Burton-on-Stather, forms the Humber estuary. It is navigable 117 miles to Burton-on-Trent; total length 170 miles. (2) Rises in Northumberland County, southern Ontario, in Rice Lake, and after a course of 150 miles flows into Lake Ontario at the Bay of Quinté. It is navigable for light-draft vessels for the greater part of its course.

TRENT AFFAIR. See UNITED STATES, Vol. XXIII, p. 777.

TRENTON, a town and the capital of Dade County, northwestern Georgia, 18 miles S.S.W. of Chattanooga, Tennessee, on the Alabama Great Southern railroad. It is in a mountainous section, and ships a limited amount of agricultural and dairy produce and live-stock. Iron, coal and other minerals are also found in this region. Population 1900, 349.

TRENTON, a city and the capital of Grundy County, central northern Missouri; is situated on what is known as the Crooked Fork of Grand River, and on the Chicago, Rock Island and Pacific railroad, 100 miles from St. Joseph and 103 miles from Kansas City. Trenton is also the terminus of the Quincy, Omaha and Kansas City road, and by reason of its location, transportation advantages and in other particulars has become an important commercial and manufacturing center. It contains a well-built courthouse, a high-school, two daily and two weekly papers, five churches, several hotels, and other improvements of a substantial and diverse character. The machine-shops of the Chicago, Rock Island and Pacific railroad system are located at Trenton, and are in constant operation; besides which

there are grist, woolen and saw mills, manufactories of tobacco, brooms, cigars, etc., foundries, iron-works, electric-light works, etc. The city has a fine system of water-supply, is lighted by gas and has a street-railway. Although it is located in a district that is chiefly agricultural, there are coal shafts here, producing in 1894 thirty-five thousand tons. Here is also located Avalon College (United Brethren), founded in 1869, and having an attendance of 170 students under 18 instructors. Population 1900, 5,396.

TRENTON, the capital of New Jersey, and one of the most important manufacturing centers of the East; is situated on the Delaware River, at the head of navigation, 33 miles N.E. of Philadelphia, 28 miles from Camden and 57 miles from New York. It is also a leading receiving and distributing point on the main line of the Pennsylvania and Philadelphia and Reading railroads, by which, and their several branches, the Delaware and Raritan Canal, and by river steamboats, unsurpassed facilities for rapid transit between Trenton and all parts of the world are available. The city is one of the most attractive localities for residence purposes in the state, being handsomely laid out with broad, well-paved and brilliantly-lighted streets, along which luxurious homes have been erected and are maintained. In the business and manufacturing portions of the city the buildings are massive, substantial and well adapted for the uses to which they are devoted. In all other particulars Trenton is a progressive and enterprising city. It contains the State House, a large and finely-appointed edifice, the State Asylum for the Insane, State Penitentiary, State Normal School, State Arsenal, Post-Office, County Courthouse, City Hall, between thirty and forty church edifices, a high-school, and twelve or more grammar and graded schools, with a number of parochial and private schools, benevolent institutions and public and private libraries. The city also contains three national banks, with a combined capital of \$1,250,000, four private banks, four daily and ten weekly newspapers, also one magazine issued monthly, several well-managed hotels and public halls, the latter having a total seating-capacity of between 7,000 and 10,000. As already stated, Trenton derives its chief importance as a manufacturing center. Its proximity to the coal-fields of Pennsylvania, as also to the markets of supply and the unrivaled water-power furnished by the Delaware River, render the city a specially favored locality for the conduct of industrial enterprises. They at present embrace potteries employing from 10,000 to 12,000 hands, iron and steel works representing an investment of many millions and employing between three and five thousand operatives, also India-rubber factories, grist, saw and planing mills; box, paper-bag, cigar, clothing, furniture, wood and willow-ware, broom, soap and carriage factories; agricultural implements, electric-light works, etc., all told, 885 establishments, according to the census of 1890, representing a net investment of \$19,278,041, paying annually to 14,984 employees \$7,968,-

894, and producing goods valued at \$25,628,223, from materials costing \$12,625,400. The city is provided with fire and police departments, street-railways and other modern conveniences. It is connected with South Trenton, located on the opposite bank of the river, by bridges, and its population in 1890 was returned at 57,458, being an increase of over 27,000 within the previous ten years. Population 1900, 73,307.

Trenton was the scene of an important engagement in the Revolutionary War. After retreating across the Delaware, Washington received reinforcements and determined to strike a blow upon the British center at Trenton. Crossing the river with only two thousand five hundred men, in spite of floating ice, he marched nine miles in a blinding snow-storm, and on December 26, 1776, took Trenton by surprise. Attacking the Hessians, who were occupying the town, the continental troops killed Rall, their commander, and seventeen of his men, and took a thousand Hessians prisoners. The American loss was insignificant, two soldiers being killed in action and two frozen to death.

A handsome battle monument was erected at the junction of Warren and Green streets and of Brunswick, Princeton and Pen-

nington avenues—the exact spot where Captain Alexander Hamilton, of New York, opened fire with his battery of the New York state company of artillery on the retreating Hessians. The monument was dedicated October 19, 1893. The column is in the Roman-Doric style, the base of the pedestal being 29 feet 8 inches square, and surmounted by a hollow, fluted column, the cap of which forms an observatory. The entire height of the monument is 150 feet. On the top of the column is a bronze statue of General Washington in the full uniform of a Continental general officer. At the base of the monument, guarding the entrance to the column, stand bronze statues of a Continental soldier and a Philadelphia light-horseman. A bronze tablet, presented by the Society of the Cincinnati of New Jersey, and three reliefs representing the Continental army crossing the Delaware river, the opening of the fight and the surrender of the Hessians, adorn the pedestal. Thirteen electric lights, representing the thirteen original states of the Union, surmount the column. The entire cost of the monument exceeded \$100,000.

TRENTON, a town and the capital of Jones County, southeastern North Carolina, on the Trent, a tributary of the Neuse River, 15 miles W. of Newbern. It is the center of a level and

marshy district, producing corn, sweet-potatoes, and some cotton. The population in 1900 was 3,338.

TRENTON, a port of entry in the County of Hastings, Province of Ontario, Canada; is situated on the Trent River, at its entrance into the Bay of Quinté, 100 miles E. of Toronto, on the Grand Trunk and Central Ontario railroads. It is extensively engaged in shipping timber, that is rafted down the Trent River to this place, and in ship-building and the industries connected therewith. The city contains two banks, five churches, excellent educational advantages, a town-hall, two weekly papers, several hotels, a number of stores, two grist-mills and other lines of manufacture of importance and large capacity. Population 1880, 2,000; 1891, 4,364.

TRENTON, a town and the capital of Gibson County, western Tennessee, on the North Fork of the Deer River, 32 miles N.W. of Jackson and 59 miles S. of Columbus, Kentucky, on the Mobile and Ohio railroad; situated in an extensive agricultural region; it has cotton, flour and cottonseed-oil mills, a box factory, and several foundries. It has eight churches, good schools, and two state banks with a combined capital of \$83,000. Population 1890, 1,693; 1900, 2,328.

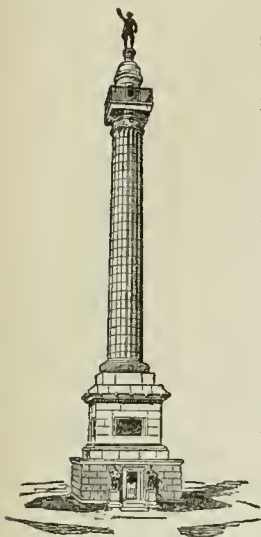
TRENTON FALLS, a village of Oneida County, central New York, on West Canada Creek, a branch of the Mohawk River, 17 miles by rail N.W. of Utica, on the New York Central and Hudson River and the Rome, Watertown and Ogdensburg railroads; and is celebrated for its beautiful cascades (five, within a deep, narrow limestone ravine, with an aggregate fall of nearly 400 feet in two miles), and for the general beauty and wildness of the surrounding scenery, making it a very popular resort. Population 1900, 298.

TRENTON FORMATION. See GEOLOGY, Vol. X, p. 340.

TREPANG. Same as BÊCHE-DE-MER. See Vol. III, p. 477.

TREPHINE, the name generally applied to the modern form of trepan. It is a cylindrical or crown-saw, having teeth in the form of a ring, so that a circular disk may be cut from the skull by using it with a boring-handle. A central point or trocar is usually provided to guide the saw and prevent its slipping. The saws are made with straight sides, and also coned, narrowing toward the center. Gimlet-like handles are provided for ordinary use. Large sizes are made for use in veterinary surgery, and a small size, mounted on a tube with a bevel-gear and crank attachment, is used in the operation of craniotomy in obstetrical practice.

TRESCOT, WILLIAM HENRY, an American diplomatist; born in Charleston, South Carolina, Nov. 10, 1822. He graduated at the College of Charleston in 1822; studied law, but after being admitted to the bar engaged in planting on one of the islands near Beaufort. He was made secretary of the American legation in London in 1852; Assistant Secretary of State in 1860, but resigned upon the secession of South Carolina; elected to the state legislature in 1862, 1864 and 1866; at the



BATTLE MONUMENT,
TRENTON.

close of the war represented the state at Washington in regard to reconstruction matters; was one of the plenipotentiaries to China to revise treaties in 1880, and to Mexico in 1882 to negotiate a commercial treaty; after that time practiced law in Washington. He is the author of, *Foreign Policy of the United States* (1849); *Diplomacy of the Revolution* (1852); *An American View of the Eastern Question* (1854); *Diplomatic History of the Administrations of Washington and Adams* (1857); and a *Memoir of General Johnson Pettigrew* (1870). Died in Pendleton, S. C., May 4, 1898.

TREVELYAN, SIR CHARLES EDWARD, an English statesman; born April 2, 1807, the fourth son of the Archdeacon of Taunton; educated at the Charterhouse and Haileybury College. He entered the East India Company's service, and became Assistant Secretary to the Treasury (1840-59), governor of Madras (1859-60, recalled for his protest against proposed new taxes), and Indian finance minister (1862-65). He was created a K.C.B. in 1848, and a baronet in 1874; wrote *Christianity and Hinduism Contrasted* (1881), etc. Died in London, June 19, 1886.

TREVELYAN, SIR GEORGE OTTO, son of the above and Hannah More Macaulay, the sister of Lord Macaulay; born July, 1838, at Rothley Temple, Leicestershire, England. He was educated at Harrow School and Trinity College, Cambridge. He was elected member for Tynemouth in the Liberal interest in 1865, and for the Border Burghs in 1868. He was appointed civil lord of the admiralty, in Mr. Gladstone's government, in December, 1868, but resigned office in July, 1870. He succeeded Mr. Shaw-Lefevre as Parliamentary secretary to the admiralty in November, 1880, and held that office until his appointment, after the murder of Lord Frederick Cavendish, as chief secretary to the lord-lieutenant of Ireland (May 9, 1882). This arduous post he held through two most trying years, and in October, 1884, he joined the cabinet as chancellor of the duchy of Lancaster. On the formation of Mr. Gladstone's third government, in 1885, he was appointed to the new post of secretary for Scotland, but resigned on March 27, 1886. In 1887 he was re-elected to Parliament, and in 1892 became secretary for Scotland in Gladstone's administration, and retained the office until 1895; was returned to Parliament again in that year. He is the author of *Letters of a Competition Wallah* (1864); *Cawnpore* (1865); *The Life and Letters of Lord Macaulay* (1876); and *The Early History of Charles James Fox* (1880).

TRIACANTHIDÆ. See under *Plectognathi*, in ICHTHYOLOGY, Vol. XII, p. 694.

TRIAD, with mistuned third. See MUSIC, Vol. XVII, p. 106.

TRIANGLE. See GEOMETRY, Vol. X, pp. 377, 378, 381, 382; and TRIGONOMETRY, Vol. XXIII, pp. 563-573.

TRIANGLE OF VELOCITIES. See MECHANICS, Vol. XV, p. 681.

TRIANGULATION. See GEODESY, Vol. X, pp. 167-170; SURVEYING, Vol. XXII, pp. 696, 697.

TRIASSIC PERIOD. See GEOLOGY, Vol. X, pp. 352-354.

TRIBES, ROMAN. See ROME, Vol. XX, p. 732; and SAVAGE, see TOTEMISM, Vol. XXIII, pp. 472-476.

TRICHECHIDÆ, family. See MAMMALIA, Vol. XV, p. 443.

TRICHINA. See NEMATOIDEA, Vol. XVII, pp. 325, 326.

TRICHIURIDÆ, a family. See ICHTHYOLOGY, Vol. XII, p. 689.

TRICHOMES. See BOTANY, Vol. IV, p. 90.

TRICHOPTERA. See INSECTS, Vol. XIII, p. 151.

TRICOLOR. See FLAG, Vol. IX, p. 279.

TRICOUPIS, SPIRIDION, Greek statesman; born at Missolonghi, April 20, 1788. He took part with the patriots in the War of Independence, and was afterward envoy-extraordinary to England thrice and to France once; minister of foreign affairs and of public instruction. He published *History of the Greek Revolution* (1853-57). He died Feb. 24, 1873.—His son, CHARILAOS, born at Nauplia, July 23, 1832; educated in England, and in Paris and Athens; served in the Greek legation in London (1852-63); chosen deputy to the Boule or Greek Legislature from Missolonghi in 1863; Minister of Foreign Affairs in 1866; Premier of Greece (1875-95), alternately with his rivals, Coumoundouros and Delyannis. He was recognized as the foremost statesman of the kingdom. Died in Cannes, France, Apr. 11, 1896.

TRIDACNIDÆ, a family of bivalve mollusks from the East Indian seas. *Tridacna gigas* is the largest known bivalve. The shells often weigh two hundred pounds per pair, and specimens of over five hundred pounds are in museums. The fleshy parts weigh over twenty pounds. In some European cathedrals the shells are used to hold the holy water. The natives use these mollusks for food.

TRIDENT, in classic mythology, the symbol of Neptune's sovereignty over the sea. It consisted of a staff, armed at one end with three short prongs, with double barbs at the points, resembling the *fuscina* used by the Italians in catching large fish, particularly the sword-fish, from which we may perhaps infer that Neptunus was originally the god of fishermen. The conventional figure of Britannia bears the trident as the symbol of her vaunted sovereignty of the seas.

TRIDENTINE CONFESSION. See CREEDS, Vol. VI, p. 564.

TRIDYMITE. See MINERALOGY, Vol. XVI, p. 389.

TRIFORIUM. See ARCHITECTURE, Vol. II, p. 475.



SIR GEORGE O. TREVELYAN.

TRIGEMINAL NERVE. See PHYSIOLOGY, Vol. XIX, pp. 42, 43.

TRIGLIDÆ, a family of fishes including the gurnards and sea-robins. The family is distributed through all seas. The gurnards (*Trigla*) are peculiar to European seas. The sea-robins (*Trionotus*) are represented on the American coast by five species. All are said to be excellent food-fishes, but few are eaten in America.

TRIGONOCARPON, a common fruit in the coal-measures, occurring in all the strata except the underclays and limestones. Some six or eight species have been established, which differ from one another in size and shape, some being as small as a pea, and others as large as a walnut. They are marked with three longitudinal ridges, and from this character the name was derived. They have never been found attached to any plant. It was at first thought that they were palm fruits, but Dr. Hooker, from the examination of several specimens which exhibit structure, has shown that they are not unlike the structure of *Salisburia*, a drupe-bearing coniferous tree of China and Japan.

TRIKHALA OR TRIKALA, a town of Europe, in Greece, 33 miles S.W. of Larissa. It manufactures cotton and woolen stuffs, and has a large transit trade with Epirus and Albania. The neighboring plains, which are watered by the Salembria (ancient *Peneus*), are rich in all sorts of fruits. Trikhala is the *Trikka* of Homer, and was celebrated in the classic ages for its temple of Æsculapius. Population 1889, 5,600.

TRIKOUPIS. See TRICOUPI, *ante*, p. 2942.

TRILBY. See DU MAURIER, *ante*, p. 1092.

TRILLIUM, a genus of herbaceous plants belonging to the lily family, whose species are variously known as three-leaved night-shade, wake-robin and birth-root. The low stem, arising from a short root-stock in early spring, bears a whorl of three large and net-veined leaves and a single terminal purple to white flower. The species all grow in rich woods or bogs.

TRILOBITA. See CRUSTACEA, Vol. VI, p. 659-661.

TRIOLOGY. See DRAMA, Vol. VII, p. 406.

TRIMEN, HENRY, an English botanist; born in London, Oct. 26, 1843. He was educated at King's College and at the University of London; was curator of the Anatomical Museum of King's College (1866-67); lecturer on botany at St. Mary's Hospital (1867-72); senior assistant in the botanical department of the British Museum (1869-79); in 1880 director of the Royal Botanic Gardens in Ceylon. He interested himself particularly in the practical aspects of botany, especially medical botany, and introduced into Ceylon many useful plants. He edited (1872-79) the *Journal of Botany*, and is the author of *The Flora of Middlesex* (with Thiselton-Dyer, 1869); *Systematic Catalogue of the Plants of Ceylon* (1885); *Handbook to the Flora of Ceylon* (1893); and assisted in the preparation of *Medicinal Plants* (1875-80). He contributed the article on GRASSES to this ENCYCLOPÆDIA.

TRIMMER, a politician who endeavors to steer a middle course between two opposite political parties. The American political equivalent is "a straddler," or the politician is said to be "on the fence." See also HALIFAX, GEORGE SAVILE, Vol. XI, p. 387.

TRIMMER, SARAH, an English authoress; born at Ipswich, Jan. 6, 1741. Her father was Joshua Kirby, a man of intelligence and piety, who in 1755 removed to London, where he became a tutor of the Prince of Wales (George III). Here his daughter met Dr. Johnson, with whom she speedily became a favorite. In 1759 her father was appointed clerk of the works at Kew Palace, and here she became acquainted with Mr. Trimmer (1738-92), whom she married in 1762. It was not until 1780 that she came before the world as an authoress, with her *Easy Introduction to the Knowledge of Nature*, the first of nearly 30 works for the young, which, though now forgotten, except *The History of the Robins*, were well adapted for their purpose. Died suddenly, Dec. 15, 1810. See her *Life and Writings* (1814).

TRIMURTI, doctrine. See SANSKRIT, Vol. XXI, p. 283.

TRINIDAD, an uninhabited island in the South Atlantic, in 20° 30' 32" S. lat., and 29° 28' 42" W. long. On Jan. 25, 1895, it was occupied by an English company for a cable station, but on a protest by Brazil the question of ownership was submitted to the arbitration of the King of Portugal, who decided, Aug., 1896, that the island belongs to Brazil.

TRINIDAD, an island near the mouth of the Orinoco river. See Vol. XXIII, pp. 573-74.

TRINIDAD, a city, the capital of Las Animas Co., Colo., 90 miles S. of Pueblo, on Las Animas river, and on the Denver and Rio Grande, the Atchison, Topeka and Santa Fé, and the Denver and Gulf railroads, in a farming and grazing district; good bituminous coal is abundant; has 2 national and 2 savings banks, 3 daily and 4 weekly newspapers, 9 churches, 4 public-school buildings, a business college, an academy, large railway shops, and coking furnaces; is lighted with electric light and gas. Pop. 1890, 5,523; 1900, 5,345.

TRINIDAD, a town and part of central southern Cuba, in the province of Santa Clara, 192 miles S.E. of Havana, in long. 79° 48' W. It has a railroad connecting it with the interior of the island, and was once a large coffee-shipping port. Its harbor facilities are excellent. Population of district, about 30,000.

TRINITROCELLULOSE. See GUN-COTTON, Vol. XI, p. 277.

TRINITY, a river which rises in the county of the same name, in northwestern California. It rises in the Shasta mountains, traverses a rough and mountainous district which contains numerous gold-mines, and flows into Klamath River.

TRINITY, a town and port of entry of Newfoundland, 61 miles N.W. of St. Johns, on Trinity Bay. It possesses a good harbor, and is one of the principal ports of the island. Population, about 500.

TRINITY, a river of Texas, formed by the

union of two streams, West Fork and Elm Fork, which rise near the northern boundary of the state, and unite 150 miles S.E., the main stream flowing thence 550 miles in the same general direction to Galveston Bay, about 40 miles N. of the city of Galveston. It is navigable 300 to 500 miles.

TRINITY, a doctrine. See THEISM, Vol. XXIII, pp. 239, 240.

TRINITY COLLEGE, a Protestant Episcopal institution of higher learning, founded at Hart-



MAIN BUILDINGS, TRINITY COLLEGE.

ford, Conn., in 1824, and until 1845 named Washington College. It offers four courses of study leading to the degree of bachelor. There are numerous scholarships, some competitive, others awarded to deserving and needy students, especially those who are preparing for the Protestant Episcopal ministry. In 1898 there were 20 instructors and 135 students. The library contains 40,000 volumes. In 1898 the productive funds were \$660,000, and the total income was \$63,000. The college was situated originally where the state capitol now stands, but this land was sold in 1872 and new buildings in the Gothic style were erected on a campus of 70 acres about a mile south of the old site. Dr. G. W. Smith was chosen president in 1883.

TRINITY UNIVERSITY, Toronto, Canada, was founded in 1851 under an act of the old



TRINITY UNIVERSITY, TORONTO.

Province of Canada; its founder, the late Bishop Strachan, designing it for an Anglican Church university and college. By the provisions of the royal charter (July 15, 1852), the government of the university is vested in a corporation, composed of (1) the bishops of the five dioceses of the province (Toronto, Huron, Ontario, Algoma and Niagara), (2) the trustees, three in number, and (3) the council, consisting of the chancellor, the provost and the professors. The degrees of the university are open to all without religious test, except in the case of degrees in divinity. Trinity received from its inception many generous benefactions, and since 1882 has largely increased its endowment and extended the pile of its buildings. Instruction is given in arts, theology and medicine. The medical faculty of Trinity is an independent corporation. Affiliated to the university,

besides the Medical College, are St. Hilda's Residential College for Women and Trinity College for Boys, at Port Hope.

TRIONYCHIDÆ. See TORTOISE, Vol. XXIII, pp. 459, 460.

TRIBE DE ROCHE. See LICHENS, Vol. XIV, p. 560.

TRIPITAKA, the Buddhist Bible. See CEYLON, Vol. V, p. 366.

TRIPLE ALLIANCE, of 1668. See FRANCE, Vol. IX, p. 576. Of 1717. See SPAIN, Vol. XXII, p. 337. Of 1879. See DREIBUND, in these Supplements.

TRIPLE-EXPANSION ENGINES. See MARINE ENGINES, in these Supplements.

TRIPOS. See EXAMINATIONS, Vol. VIII, p. 778.

TRIPTYCH. See DIPTYCH, Vol. VII, p. 257.

TRIQUETI, HENRI DE, a French painter and sculptor; born at Conflans, department of Loiret, in 1802. He studied art in the Beaux-Arts, and made his début in the Paris Salon of 1831 with four paintings and the group of statuary, *Death of Charles the Bold*, the success of which decided him to turn his attention mainly toward sculpture, and gained him the commission for the doors of the Madeleine from Thiers, who was then Minister of the Interior. He subsequently was commissioned by Queen Victoria to ornament the chapel at Windsor and the tomb of Prince Albert, in which artistic work he employed both sculpture and painting. Among the best of his works are *Resurrection of Lazarus*, for the tomb of the only son of the sculptor; *Dante*; *The Holy Family*; and *Jesus Feeding the Birds*. He published *The Three Muses of London*. He died in Paris, May 11, 1874.

TRIRÈME, GREEK. See SHIP, Vol. XXI, p. 806.

TRISMEGISTUS. See HERMES TRISMEGISTUS, Vol. XI, pp. 750, 751.

TRISSINO, GIAN GIORGIO (1478-1550), poet. See ITALY, Vol. XIII, p. 509.

TRISTRAM, HENRY BAKER, an English traveler and author; born May 11, 1822, and educated at Lincoln College, Oxford. He was a curate in Devonshire and later rector in Durham, but was obliged to give up pastoral work on account of ill-health. The winter of 1855 he spent in the city and neighborhood of Algiers, making several excursions into the northern Sahara. The second winter of his stay was occupied in traversing the Sahara beyond the range of the Atlas Mountains. The third winter, spent in the Mediterranean, afforded him his first opportunity of visiting Palestine. On the conclusion of his tour through Palestine he returned to England, being appointed, in 1860, master of Greatham Hospital and vicar of Greatham, Durham. In 1863 he again visited the Holy Land, directing his attention particularly to the basin of the Dead Sea and to the districts east of the Jordan. In 1872 he made a tour in Moab; in 1881 in Mesopotamia and Armenia; in 1874 he was made a canon of Durham, and in 1879 the Earl of Beaconsfield offered him the bishopric of Jerusalem, which he declined. In 1891 he made a tour around the world, and spent some months in Japan. Among his works are *The Great Sahara* (1860); *The Land of Israel* (1865);

Natural History of the Bible; Ornithology of Palestine (1867); *Daughters of Syria* (1874); *Topography of the Holy Land* (1871); and *Fauna and Flora of the Holy Land* (1884).

TRIUMVIRATES. See ROME, Vol. XX, pp. 765, 768.

TROCHAIC METRE. See ALLITERATION, Vol. I, p. 586.

TROCHILIDÆ. See HUMMING-BIRD, Vol. XII, pp. 357-359.

TROCHU, LOUIS JULES, a French general and military writer; born near Belleisle, in Bretagne, March 12, 1815; educated in the Military Academy of St. Cyr. In 1837 he entered an artillery regiment as lieutenant. His talents soon attracted the attention of Marshal Bugeaud, who, in recognition of his bravery displayed in the battles of Sidi-Yussuf and Isly, made him his adjutant. In the Crimean War he gained the rank of general of division. In this capacity he received a command in the Italian campaign of 1859, and at the death of Niel would have succeeded him as Minister of War had he not lost the favor of the Emperor by the publication of an essay on the French army, which advocated the adoption of Prussian methods. Before the war of 1870-71, General Trochu held command of the army division in Toulouse, which Niel and Lebœuf had held before him. In the crisis which followed the battle of Sedan he was made governor of Paris and commander-in-chief of all the forces destined for the defense of the capital, which he held until the city surrendered to the German hosts. He was chosen to the Assembly in 1871, but retired in 1873. He published a work entitled *Pour la Vérité et Pour la Justice*, in justification of the government of the national defense, and two pamphlets, *The French Army in 1867* and *The French Army in 1879*. He died at Tours, Oct. 7, 1896.

TROEZEN, now Dhamala, the capital of Trœzenia, a district in the southeast of Argolis, on the Saronic Gulf, and opposite the island of Aegina. The town was situated at some little distance from the coast, on which it possessed a harbor called Pogon. Trœzen was a very ancient city, and is said to have been originally called Poseidonia, on account of its worship of Poseidon (Neptune). It received its name from Trœzen, one of the sons of Pelops; and it is celebrated in mythology as the place where Pitheus, the maternal grandfather of Theseus, lived, and where Theseus himself was born. It was a city of some importance, as it sent five ships of war to Salamis and one thousand heavy-armed men to Plataea. See also ORESTES, Vol. XVII, p. 827.

TROGLODYTIDÆ. See WREN, Vol. XXIV, p. 688.

TROGONIDÆ. See TROGON, Vol. XXIII, pp. 583, 584.

TROIS PISTOLES, a river and town of Temiscouata County, Quebec, Canada. The river is a southern branch of the St. Lawrence, drains several lakes, is very rapid, has good water-power, and is over forty miles long. The town, not far from its mouth, on the Intercolonial railway, is 140 miles N.E. of Quebec, and does some business in stone-quarrying, fire-wood and fishing. Population, 2,500.

TROLLEY-CARS. See CAR-CONSTRUCTION, in these Supplements.

TROLLEY-RAILWAYS. Almost all the electric railways of the world are operated on the single-wire trolley system. The double-wire system was tried in a few places, but was not satisfactory. The storage-battery cars have proved too heavy and too costly in practice for general introduction. The underground or conduit systems are just making a beginning, and as yet cut little figure. The same is true of the third-rail with sliding contact, tried on some elevated roads. All these systems may have their good points, but the trolley is used on a hundred roads for every one that prefers some other system of electrical propulsion. In October, 1895, one of the railway journals made a detailed estimate of the street-railways of the United States, from the latest sources, the figures being 976 street-railways, with 13,588 miles of road, of which 10,363 miles were operated by electricity. An estimate made from the latest and best reports obtainable in June, 1896, of the trolley-service, exclusive of all other forms of street-railway in the United States follows: Alabama, 10 trolley-roads, with 81 $\frac{3}{8}$ miles of track; Arizona, 1 road, 10 miles; Arkansas, 5 roads, 58 $\frac{1}{2}$ miles; California, 24 roads, 360 $\frac{1}{2}$ miles; Colorado, 8 roads, 262 $\frac{1}{4}$ miles; Connecticut, 19 roads, 296 $\frac{1}{2}$ miles; Delaware, 2 roads, 27 miles; District of Columbia, 9 roads, 89 $\frac{1}{2}$ miles; Florida, 3 roads, 35 $\frac{1}{2}$ miles; Georgia, 11 roads, 205 $\frac{3}{4}$ miles; Idaho, 1 road, 3 miles; Illinois, 43 roads, 653 miles; Indiana, 26 roads, 333 $\frac{1}{2}$ miles; Iowa, 24 roads, 436 $\frac{1}{2}$ miles; Kansas, 7 roads, 108 $\frac{1}{2}$ miles; Kentucky, 12 roads, 269 $\frac{3}{4}$ miles; Louisiana, 7 roads, 174 $\frac{1}{2}$ miles; Maine, 12 roads, 102 $\frac{1}{4}$ miles; Maryland, 8 roads, 251 miles; Massachusetts, 45 roads, 1,054 $\frac{3}{4}$ miles; Michigan, 29 roads, 441 $\frac{5}{8}$ miles; Minnesota, 12 roads, 216 miles; Mississippi, 1 road, 3 miles; Missouri, 32 roads, 521 $\frac{3}{4}$ miles; Montana, 6 roads, 59 $\frac{1}{2}$ miles; Nebraska, 12 roads, 212 miles; New Hampshire, 3 roads, 34 $\frac{1}{2}$ miles; New Jersey, 27 roads, 509 miles; New York, 82 roads, 1,399 $\frac{1}{2}$ miles; North Carolina, 7 roads, 37 $\frac{1}{2}$ miles; Ohio, 69 roads, 1,250 miles; Oregon, 8 roads, 109 miles; Pennsylvania, 99 roads, 1,998 $\frac{3}{4}$ miles; Rhode Island, 6 roads, 149 $\frac{1}{2}$ miles; South Carolina, no trolley-roads; South Dakota, 3 roads, 133 $\frac{3}{8}$ miles; Tennessee, 14 roads, 219 $\frac{1}{4}$ miles; Texas, 22 roads, 324 $\frac{1}{4}$ miles; Utah, 4 roads, 89 $\frac{1}{2}$ miles; Vermont, 4 roads, 24 $\frac{1}{2}$ miles; Virginia, 16 roads, 165 miles; Washington, 25 roads, 245 $\frac{1}{8}$ miles; West Virginia, 4 roads, 36 miles; Wisconsin, 19 roads, 334 $\frac{5}{8}$ miles. Total number of trolley roads in the United States, 671; total number of miles operated, 13,151 $\frac{1}{2}$. The total number of cars used on these roads is about 45,000. There are about 350 other street-railways in the country using some other form of electrical power, or steam or horses.

The trolley is being introduced all over the world, though its growth has been less rapid in other countries than in the United States, the extent of track-age in all Germany at the close of 1894 being but 180 miles. It has invaded unexpected countries, as Egypt, where a road from Cairo to the Pyramids is among those projected. The system of the West

End Company in Boston is the greatest in the world. It comprises 268 miles of tracks, has 2,172 cars in use, and does business with a capital of \$15,485,000. The Philadelphia Traction Company, recently consolidated with the Union Traction Company, has a greater trackage,—381 miles,—but it runs fewer cars, and its business does not equal that of the first mentioned company, although its capital is \$31,000,000.

The freight-carrying business of trolley-roads has only begun, though there is evidently a future in this direction. The Oakland, San Leandro and Haywards Electric Railway Company, in California, runs express and freight cars, making a specialty of flat-cars, on which loaded wagons are run for transportation. The power from the motor-car is used to draw the wagons upon the cars by means of skids. Coal-cars are also run, as well as the usual passenger-cars.

The trolley postal-service is being rapidly developed. On June 30, 1895, there were 82 street-railway mail routes in the country, with a trackage of 573 miles, and a daily carry of 1,856 pounds of mail matter. There are now 13 or more street-railway post-offices in operation, of which 7 are in Boston, 4 in Brooklyn, and 1 each in Philadelphia and St. Louis.

The cost of equipping a trolley-road is, in round numbers, as follows: Graded tracks, \$10,000 per mile; power-plant, \$35 to \$45 per horse-power, and 25 to 25 horse-power per car required; line-construction, \$2,000 to \$2,500 per mile; wooden-pole construction, \$2,500 to \$3,000 per mile; iron-pole construction, \$6,500 to \$7,500 per mile; cost of medium cars, with two motors each, truck and car-body, \$3,200 to \$3,500. The cost of operating trolley-cars averages 11 cents a mile, or $2\frac{1}{2}$ to $3\frac{1}{2}$ cents for each passenger carried. By the day, the cost of running cars varies from \$7 to \$12. The average travel of cars in active use is from 100 to 125 miles per day.

The rapid growth of the trolley-railways in the United States is largely owing to a development of suburban traffic, which has been neglected or slighted by the steam trunk lines. Until recently few steam-railroads have made any efforts to cultivate the local traffic about the larger cities. Now that the trolley-roads have come in and occupied this field, the mistake of the steam-roads in not cultivating this traffic is apparent. The low fares, combined with low cost of equipment and convenience of stoppages at every corner, have caused the steam-roads to suffer severely from trolley competition, and the question of the adoption of electric power on the steam-roads is, in consequence, one of growing importance. As at present constructed, the trolley lines do not have the speed of the steam-roads, though there is no mechanical reason why they should not. The conditions of city and suburban traffic have restricted their speed to from 6 or 8 to 12 or 15 miles an hour. The very numerous deaths and accidents resulting from running cars at a speed of ten or more miles an hour on the same level as foot-travelers has opened the eyes of the public to the need of changes that will render such

travel safer. The remedies used are slower speed, the employment of a superior class of men to operate the motors, with reduced hours of labor for them, and the application of fenders to the cars. Carelessness in recognizing the necessity for such precautions, in the first place, is the real cause for the alarming number of casualties which have caused the term of "deadly" to be associated with the trolley-railway system. In reality, it is no more dangerous than any other system of transit at the same speed through crowded streets.

There has been a constant effort since the introduction of the trolley-roads to devise a practical method of doing away with the exposed wire on which the trolley runs. The current carried, five hundred volts, is not seriously dangerous, though a few fatalities have resulted from a shock of that voltage, but it is the cause of continual protest on the part of the public, and in some cities, noticeably New York, permission is refused for the erection of such exposed overhead wires. To overcome this opposition, two methods have been tried with success. One is the use of a third rail between the tracks of an elevated road. From this the current is taken by means of a sliding-contact, thus doing away with the trolley-wheel, and rendering the name inapplicable to such a road. In this case, while the exposed wire is dispensed with, the exposure of the rail would be apt to prove quite as annoying to the public. The other system places the wire or conductor in an underground conduit, and has been successfully operated in Budapest, Hungary; Blackpool, England; Washington, District of Columbia; and New York City. A large number of patents have been issued for methods of arranging conduit railways, and most of them make use of a sliding-contact instead of a trolley-wheel to run upon the wire or wires. The first successful lines of this sort were built in warm climates, and when tried in colder sections, where snow and ice interfered during a portion of the year, were not satisfactory. The difficulty of good insulation, under such circumstances, however, appears to have been overcome in the latest road built on this principle, that on Lenox Avenue, New York. A continuous vault a little more than three feet deep is run under the tracks, which rest on the brick walls that form the sides of the vault. The floor of the vault is of concrete. Cast-iron yoke-pieces connect the rails below and support a sheet-iron conduit about 15 inches in width and 25 inches in height. This conduit has a narrow open slot at the top, to admit the plow or sliding-contact, that hangs from the car above, and which runs on the conducting-rails, which are protected by the conduit. A simple wire is not heavy enough to carry the current demanded by this system, hence the conducting-rails are used, supported at thirty-foot distances on soapstone piers, lead sheets being used for insulation. The soapstone piers are set in sulphur-lined troughs, as a further guard against electrical leakage. The road, thus equipped, has been operated successfully through severe snow-storms. The conduit is, of course, much more costly than an overhead line of wire on poles, yet its cost may be reduced materially, so that com-

panies now operating trolley lines in cities will be forced to adopt it or some modification thereof.

Should the trolley system come into use for heavy traffic, as now carried on the trunk lines, the overhead wire will have to be replaced by a much heavier copper conductor and the trolley-wheel by a sliding shoe, which will carry a stronger current. See also RAILROADS, in these Supplements.

C. H. COCHRANE.

TROLLOPE, EDWARD, an English clergyman and author; born April 15, 1817; educated at Eton and Christ Church, Oxford; entered the ministry, and was made prebendary of Liddington in 1867; suffragan bishop of Nottingham in 1877. He is a prolific writer on architecture and the early history of England. Among his works are *Illustrations of Ancient Art* (1854); *Introduction of Christianity into Lincolnshire* (1857); *Monastic Gatehouses* (1860); *Life of Hereward* (1861); *Norman Sculptures of Lincoln Cathedral* (1866); and *Boston and Other Churches* (1870).

TROLLOPE, FRANCES (MILTON), an English authoress; born near Bristol in 1780. She married unhappily in 1809; in 1829 went to America, and endeavored to establish herself in business in Cincinnati, but without success. Two years later she returned to England and published *Domestic Manners of the Americans*, a witty but coarse and overdrawn satire, which had great popularity. Thereafter she devoted herself to literature, and became the author of a great many novels and volumes of travels, among which are *The Refugees in America* (1832); *Adventures of Jonathan Jefferson Whitelaw* (1836); *Tremordyn Cliff* (1835); *A Visit to Italy* (1842); and *Fashionable Life* (1856). She died in Florence, Oct. 6, 1863.

TROLLOPE, THOMAS ADOLPHUS, an English author, son of Frances Trollope; born April 29, 1810. He was educated at Winchester and Alban Hall, Oxford, and published his first work, *Brittany*, in 1840. Thereafter he devoted himself to literature, and lived in Florence and Rome. He wrote, entertainingly, history, travels or fiction, though he never became as popular a writer as his brother, Anthony. Among his works are *Impressions of a Wanderer in Italy* (1850); *Girlhood of Catherine de Medici* (1856); *A Decade of Italian Women* (1859); *Marietta*, a novel (1862); *History of the Commonwealth of Florence*, his most important work (1865); *Diamond Cut Diamond* (1875), and *What I Remember* (1887-89). He died at Clifton, near Bristol, Nov. 11, 1892.

TROMPE. See BELLOWS, Vol. III, pp. 551, 552.

TROMSÖ, a town and small island on the northwest coast of Norway, in Finmark, between the island Kvalö and the mainland. The town is the capital of Tromsö province. Russian vessels from Archangel and the White Sea visit it and bring corn, which they exchange for dried fish. Population, about 3,000.

TRONA, a mineral. See SODIUM, Vol. XXII, p. 240.

TRONDHJEM, a city in Norway. Pop. 1891, 29,162. See THRONDHJEM, Vol. XXIII, p. 321.

Vol. 5—21

TROOPIALS, birds. See ICTERUS, Vol. XII, p. 697.

TROOST, GERHARD, a Dutch mineralogist, was born in Bois-le-Duc, Holland, March 15, 1776. He was educated at Amsterdam and Leyden, and studied also in Paris; was appointed by Louis Bonaparte, then king of Holland, scientific *attaché* of a naval expedition to Java in 1809. Returning from this mission, he spent a year in France; went to the United States in 1810; assisted in founding the Academy of Natural Sciences in Philadelphia in 1812; was president of that institution until 1817. In 1821 he became professor of mineralogy in the Philadelphia Museum, and in 1827 he went to Nashville, where, in the following year, he was appointed professor of chemistry, geology and mineralogy, a chair which he held until his death. He was also state geologist of Tennessee from 1831 until 1849. He died Aug. 14, 1850.

TROPES, arguments. See SCEPTICISM, Vol. XXI, pp. 380, 381.

TROPHY, a memorial of victory erected on the spot where the enemy had turned to flight. Among the Greeks (with the exception of the Macedonians, who erected no trophies) one or two shields and helmets of the routed enemy, placed upon the trunk of a tree, served as the sign and memorial of victory. After a sea-fight the trophy consisted of the beaks and stern-ornaments of the captured vessels, set up on the nearest coast. In early times the Romans never erected trophies on the field, but decorated the buildings at Rome with the spoils of the vanquished. Of this practice we have a familiar instance in the *rostra* or beaks set up in the forum. In later times, pillars and triumphal arches were employed to commemorate victories. Besides these, in modern times the humiliation of an enemy is rendered lasting by such devices as the naming of many streets in Paris (Austerlitz, Jena, Magenta, Solferino, etc.), the Waterloo Bridge in London, the Sedan festival in Germany, the Russian cannon set up in English towns, etc.

TROPICS. See GEOGRAPHY, Vol. X, p. 199.

TROSACHS OR TROSSACHS, a wooded defile of Perthshire, 8 miles W. by S. of Callander, which Scott's *Lady of the Lake* has rendered famous, and made one of the pilgrimages of the English-speaking tourist. Here, in the midst of one of the loveliest passes of the Highlands, the traveler sees:

"One burnish'd sheet of living gold,
Loch Katrine lay beneath him roll'd,
In all her length far winding lay,
With promontory, creek and bay,
And islands that, empurpled bright,
Floated amid the livelier light,
And mountains, that like giants stand,
To sentinel enchanted land.
High on the south, huge Benvenue
Down on the lake in masses threw
Crag, knolls and mounds, confusedly hurled
The fragments of an earlier world;
A wildering forest feather'd o'er
His ruin'd sides and summit hoar,
While on the north, through middle air,
Ben-an heaved high his forehead bare."

It extends one mile eastward between Lochs Katrine and Achray, and to the north has Ben A'an

(1,851 feet), to the southwest Benvenue (2,393 feet). See also PERTSHIRE, Vol. XVIII, p. 665.

TROTTING AND PACING. Being a much later creation than the thoroughbred, the harness race-horse—the trotter and pacer—has, since 1880, taken much longer strides upward and onward in the march toward perfection. Harness-racing is essentially an American sport, and in almost every town and hamlet in the United States is enjoyed each year. During the years 1895 and 1896 not less than six million dollars were offered in stakes and purses. In considering the advance made by the harness-horse since 1880, it is proper to name the influences that have been most potent in furthering progress, aside from the individual efforts of the breeders.

Tracks. To begin with, the improvement in the construction and maintenance of the tracks has proved to be one of the most important factors. Shrewd men observed the sorts of soil and location that conduced to the exhibition of speed, and later turned their observations to good account. Here is an example of modern track-construction: The Detroit Driving Club selected, close to the Detroit River, 80 acres of ground, grubbed out the poplar scrub, thoroughly drained the tract and surveyed the course. An excavation was made the entire width and length of the track. This was filled with the tough, peaty, fibrous sods taken from the marsh, the sods being cut 3 inches thick and 18 broad. These sods, set on edge, were packed tightly into the hole that had been scraped for their reception. A layer of clay ten inches thick was placed on top of the sods, then a second layer of sods as before, a second layer of clay, still another layer of sods, more clay, and then the track was completed at the inside. The outside, especially on the turns, was raised with alternate layers of sods and clay; three-inch tiles were laid four feet below the surface, across the course, every forty feet, and when the eight or ten inches of top-soil had been laid on the last layer of clay, the track was finished. An elaborate system of drainage disposes of the water discharged by the tiles draining the track, and permits of the course being thoroughly soaked in too dry weather. Various ingenious track harrows and planers have been devised for keeping courses in proper condition. For a time it was thought that a track built in the shape of a kite—with just one long turn—would prove much faster than the elliptical pattern; but the fallacy has been exploded, and more than one kite track has been worked over into the regulation shape. The records made on the kite tracks were disappointing, and the spectators could see but very little of the races.

Sulkies. Previous to 1892 the sulky or track vehicle was constructed of wood, and its wooden wheels were tired with steel. That year the experiment of using 28-inch steel wire pneumatic-tired wheels was first tried at Mystic Park, Boston, and it was but a few weeks until the new wheel came into active and general use. It is admitted that the pneumatic tire has added about four seconds to the speed of the trotter and pacer. In the same manner improvements in harness and horse goods have been made. It has always been conceded that the more

untrammelled a horse is, the faster he will go, and now most trotters and pacers are raced with a harness that consists merely of a saddle, crupper, bridle, martingale and reins—no breast-collar, or breeching. The hopple has come into very general use, and by recourse to it pacers may be made to trot and trotters to pace. The hopple is so devised that when it is put in place the horse can go at no gait save the one desired. Other boots and contrivances have all done their part in the lowering of the record.

Records. The two-minute mark has ever been the goal toward which the breeders of trotters and pacers have been striving. Time was when the pacer was despised, and the purses offered him to race for meager, indeed, when compared with those offered for the trotter; but he has steadily fought his way upward, until he stands to-day, in public estimation, quite on an equality with the trotter. In fact, the pacers have, for the past two years, been by far the greatest attractions on the harness turf, for the reason that certain of them could furnish much faster races than any of the trotters. The pacer takes less training than the trotter, comes more easily to his speed, is more easily kept in condition, and can go more races in a season. The reason is, that his gait is more nearly a natural one than the trot.

Trotting Records. In 1880 St. Julien was the trotting hero of the year, until Maud S. lowered his colors. August 27th, that year, St. Julien trotted at Hartford, Connecticut, in 2:11 $\frac{1}{4}$, but on September 18th Maud S. trotted at Dexter Park, Chicago, in 2:10 $\frac{3}{4}$, ascending a throne she was destined to hold, with the exception of 24 short hours, until 1891. She held the world's trotting record at 2:10 $\frac{1}{4}$ from 1881 to 1884, when Jay Eye See trotted, at Providence, Rhode Island, in 2:10. This was on August 1st, and the very next day Maud S. regained her laurels by trotting a mile in 2:09 $\frac{3}{4}$. July 30, 1885, Maud S. trotted her famous mile at Cleveland, Ohio, in 2:08 $\frac{3}{4}$, which stood as the world's best until Sunol lowered it one half-second on the Stockton, California, kite-shaped track, Oct. 20, 1891. With the assistance of the pneumatic-tired sulky, Nancy Hanks established the world's record at 2:04, Sept. 28, 1892, and just two years and one day later Alix set the mark at 2:03 $\frac{3}{4}$, where it remained at the close of 1896.

Pacing Records. The pacers have advanced still more rapidly. In 1884 Johnston set the world's pacing mark at 2:06 $\frac{1}{4}$, and there it remained until Direct lowered it to 2:06 in 1892. In that year Mascot still further lowered the mark to 2:04, the trotting and pacing records being then the same. In 1893 Flying Jib equaled the world's record, pacing in 2:04, but the next season (1894) Robert J. reduced the mark to 2:01 $\frac{1}{2}$, John R. Gentry paced in 2:03 $\frac{3}{4}$, and Joe Patchen in 2:04. In 1896 John R. Gentry reduced the world's pacing record to 2:00 $\frac{1}{2}$, and Joe Patchen lowered the half-mile-track record to 2:05 $\frac{1}{4}$; but in 1897 Star Pointer went the first mile in harness in two minutes or better. At Readville, Mass., August 28th, he paced a splendid mile in 1:59 $\frac{1}{4}$, and October 1st, at Springfield, Ill., reduced the world's race record to 2:00 $\frac{1}{2}$. Joe

Patchen paced in 2:01 $\frac{1}{4}$ to harness and lowered the world's wagon record to 2:04 $\frac{3}{4}$, from 2:08 $\frac{1}{2}$ where W. W. P. established it in 1896. From 2:09 $\frac{1}{4}$ Robert J. and John R. Gentry lowered the world's team record to 2:08, and Lottie Loraine and Bessie Bonehill lowered the world's pacing mark for mares to 2:05 $\frac{3}{4}$ in a dead-heat at Terre Haute, Ind., Sept. 30.

The training of yearling trotters and pacers had substantially been discontinued, and the two-year-olds trained in 1896 were much fewer than they had been five or six years before. Prices for trotters and pacers were low in 1894, 1895 and 1896. In the late eighties and early nineties they were very high. Axtell sold for \$105,000 and Arion for \$125,000, these being, with one exception, the largest prices ever paid for horses. The drop in values was tremendous; in fact almost incomprehensible. Following are the best records for the ages named:

TROTTERS.

- ADBELL, 2: 23, San José, California, Sept. 27, 1894.
- ARION, 2: 10 $\frac{3}{4}$, Stockton, California, Nov. 10, 1891.
- FANTASY, 2: 08 $\frac{3}{4}$, Nashville, Tennessee, Oct. 17, 1893.
- DIRECTUM, 2: 05 $\frac{1}{4}$, Nashville, Tennessee, Oct. 18, 1893.
- DIRECTUM, 2: 05 $\frac{1}{4}$, Nashville, Tennessee, Oct. 18, 1893.
- ALIX, 2: 03 $\frac{3}{4}$, Galesburg, Illinois, Sept. 19, 1894.
- AZOTE, 2: 05 $\frac{1}{2}$.

Yearlings.

BELLE ACTON, 2: 20 $\frac{3}{4}$, Lyons, Nebraska, Oct. 14, 1892.

Two-Year-Olds.

DIRECTLY, 2: 07 $\frac{3}{4}$, Galesburg, Illinois, Sept. 20, 1891.

Three-Year-Olds.

SEARCHLIGHT, 2: 07, Los Angeles, Cal., Oct. 24, 1897.

Four-Year-Olds.

ONLINE, 2: 04, Sioux City, Iowa, Oct. 12, 1894.

Fastest Stallion.

STAR POINTER, 1: 59 $\frac{1}{4}$, Readville, Mass., Aug. 28, 1897.

Fastest Mare.

LOTTIE LORAINÉ, 2: 05 $\frac{3}{4}$, Terre Haute, Ind., Sept. 30, 1897.

BESSIE BONEHILL, 2: 05 $\frac{3}{4}$, Terre Haute, Ind., Sept. 30, 1897.

Fastest Gelding.

ROBERT J., 2: 01 $\frac{1}{2}$, Terre Haute, Indiana, Sept. 14, 1894.

World's Champion Trotter.

ALIX, 2: 03 $\frac{3}{4}$, Galesburg, Illinois, Sept. 19, 1894.

World's Champion Pacer.

STAR POINTER, 1: 59 $\frac{1}{4}$, Readville, Mass., Aug. 28, 1897.

PACERS.

See also HORSE-RACING, in these Supplements.

J. H. S. JOHNSTONE.

TROUBADOURS OR TROUVERES. See PROVENÇAL LITERATURE, Vol. XIX, pp. 873-875.

TROUS-DE-LOUP. See FORTIFICATION, Vol. IX, p. 424.

TROUT, a fish. See SALMONIDÆ, Vol. XXI, pp. 222-227.

TROUT-FISHING. See ANGLING, Vol. II, p. 41.

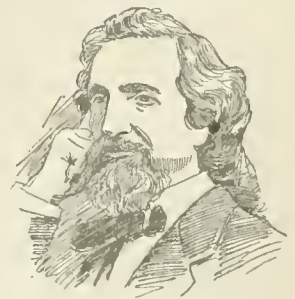
TROWBRIDGE, EDMUND, an American jurist; born in Newton, Massachusetts, in 1709. He was graduated at Harvard in 1728, and became attorney-general of Massachusetts in 1749. He was for a long time known by the name of Goff, after an uncle. He was a member of the council several years, but his apparent indifference to British aggressions caused him to be retired by his party in 1766. The next year, however, he was appointed to the supreme bench of Massachusetts, and gained a wide reputation as a profound lawyer and an able and upright judge. His stern sense of justice threatened to become embarrassing to him, in view of his attachment to the royal government, and in 1772 he resigned his office and retired to private life. As an executor of John Alfred, he founded, in Harvard, the Alfred professorship of natural religion, moral phi-

losophy and civil polity. He died in Cambridge, Massachusetts, April 2, 1793.

TROWBRIDGE, JOHN, an American physicist; born in Boston, Aug. 5, 1843; was educated at the Lawrence Scientific School, Harvard, graduating in 1866; tutor in the university until 1869, when he was made assistant professor of physics in the Massachusetts School of Technology. In 1870 he returned to Harvard and established, through his personal efforts, a laboratory course in physics, which is now carried on in the Jefferson Physical Laboratory on a very broad scale; in 1880 was made professor of experimental physics at Harvard; Rumford professor of the application of science to the useful arts in 1880; in 1878 was chosen to the National Academy of Sciences, and in 1879 associate editor of the *American Journal of Science*. He is the author of *The New Physics* (1884). He spent much time

in original investigation, especially on electricity and light, proved the presence of platinum in the sun, and was the inventor of the electrical transformer in ordinary use.

TROWBRIDGE, JOHN TOWNSEND, an American novelist; born at Ogden, New York, Sept. 18, 1827; commenced his career as a teacher, but removed to New York in 1846, as a writer for magazines, and settled in Boston the following year; became editor of *The Yankee Nation* (1850); and co-editor, with Gail Hamilton and Lucy Larcom, of *Our Young Folks* (1870-73). He wrote many novels under the pseudonym of



J. T. TROWBRIDGE.

"Paul Creyton." Among them are *Father Bright-hopes* (1853); *Burr Cliff* (1853); *Hearts and Faces* (1853); *Martin Merrivale* (1854); *Iron Thorpe* (1855); *Neighbor Jackwood* (1857); *The Old Battle-Ground* (1859); *The Drummer Boy* (1863); *Cudjo's Cave* (1864); *The Three Scouts* (1865, 1890); *Neighbors'*

Wives (1867); *The Story of Columbus* (1869); *Lawrence's Adventures Amongst the Ice Cutters* (1870); *Coupon Bonds* (1871); *Fast Friends* (1874); *The Book of Gold, and Other Poems* (1877); *Bound in Honor* (1877); *His Own Master* (1877); *The Silver Medal Series* (1880-82); *A Home Idyll, and Other Poems* (1881); *Tinkham Brothers' Tide-Mill* (1884); *Farnell's Folly* (1884); *The Little Master* (1887); *His One Fault* (1887); *Biding His Time* (1888); *The Lost Earl, and Other Poems and Tales* (1888); *A Start in Life* (1888); *The Adventures of David Vane and David Crane* (1889); *The Kelp Gatherers* (1890); *The Scarlet Tanager* (1891); *The Fortunes of Toby Trafford* (1892); *Woodie Thorpe's Pilgrimage* (1893); *The Lottery Ticket* (1895); *Two Biddient Boys* (1898); etc. His stories are immensely popular; he knows how to tell them and how to interest the reader. *Cudjo's Cave* had the greatest sale of all his books, but the author regards *Tinkham Brothers' Tide-Mill*, *The Little Master*, and *His One Fault* as his best works from a literary point of view. He also published a collection of his verse, entitled *The Vagabonds, and Other Poems* (1869), and *The Lost Earl* (1888), a volume of tales in rhyme.

TROWBRIDGE, WILLIAM PETIT, an American engineer; born near Birmingham, in Oakland Co., Mich., May 25, 1828; graduated first in his class at the Military Academy at West Point in 1848; assistant in the astronomical observatory of the academy for two years; entered the Coast Survey Service, and was appointed, under Alexander Bache, in the primary triangulation of the Maine coast; in 1853 was sent to the Pacific to make tidal and magnetic observations; in 1856 resigned his commission, and for a year was professor of mathematics in the University of Michigan; returned to the Coast Survey Service and during the war was employed in harbor and river surveys, and as chief of the engineer office in New York; in 1865 became vice-president of the Novelty Iron Works, in New York City; was professor of dynamic-engineering in the Sheffield Scientific School from 1870 to 1877; in charge of the engineering department of the School of Mines in Columbia College from 1877 until his death. He published *Heat as a Source of Power* (1874); *Turbine Wheels* (1879); and other scientific works. He died Aug. 12, 1892.

TROY, an ancient city of Asia Minor. See TROAD AND TROY, Vol. XXIII, pp. 577-583.

TROY, a city and the capital of Pike County, in southeastern Alabama, 70 miles S.E. of Montgomery, and on the Alabama Midland railroad and the Central Railroad of Georgia. It is a large cotton trade center, contains a fertilizer factory, foundry, flour and planing mill, has two banks, one daily and two weekly newspapers and a state normal school. Population 1890, 3,449; 1900, 4,097.

TROY, a city and the capital of Doniphan County, in northeastern Kansas, 17 miles N. of Atchison, and on the Chicago, Rock Island and Pacific, Burlington and Missouri and St. Joseph and Grand Island railroads. It is in a farming district. Population 1900, 947.

TROY, a city and the capital of Lincoln County, in eastern Missouri, 50 miles N.W. of St. Louis,

about 15 miles from the Mississippi River, and on the St. Louis and Hannibal railroad. It has tobacco factories, a flour-mill, two banks, a weekly newspaper and a high school. The district is agricultural and grazing, and also contains coal and iron mines. Population 1890, 971; 1900, 1,153.

TROY, the capital of Rensselaer County, east-central New York, on the east bank of the Hudson River, at the head of steamboat-navigation. The most noticeable buildings are the marble courthouse and the Troy Savings Bank. The city contains a high school, the Rensselaer Polytechnical Institute (q.v., in these Supplements), and a Roman Catholic seminary. Cotton, hosiery, paper, stoves, bells, engines, stoneware, mathematical instruments, etc., are manufactured, and there are foundries, breweries, distilleries, carriage factories, flour-mills and a number of shirt and collar factories, employing eight thousand girls. In 1890 the amount of capital invested in the manufacture of iron and steel was \$5,000,000, and in the production of shirts, collars and cuffs, \$4,000,000. There were 68 churches, and the public school system owned property valued at \$500,000. There are also the Willard Female Seminary, the La Salle Institute and St. Peter's Academy, the latter two being Roman Catholic institutions. The greater part of the traffic of the Erie and Champlain canals passes through Troy, and besides three railroads, there are daily lines of passenger and traffic steamers to New York and other cities. Pop. 1890, 60,956; 1900, 60,651. For description and further information, see also TROY, Vol. XXIII, p. 590.

TROY, a town and the capital of Montgomery County, in southwest central North Carolina, 35 miles from Wadesboro, and on the Aberdeen and West End railroad. The district is agricultural and stock-raising. There is a weekly newspaper. Population 1900, 878.

TROY, a village and the capital of Miami County, in western Ohio, on the Great Miami River and Miami canal, and on the Cincinnati, Hamilton and Dayton and Cleveland, Cincinnati, Chicago and St. Louis railroads. It is 80 miles N.E. of Cincinnati. It has abundant water-power, flour-mills, wagon factories, burlap and corn-husker factories, and a large grain trade. It has a daily and four weekly newspapers. Population 1890, 4,494; 1900, 5,881.

TROY, a borough of Bradford County, in northeastern Pennsylvania, 25 miles S. of Elmira, New York, and on the North Central railway. It has marble-works, engine and furniture shops, planing-mills, foundries, carriage factories and a creamery. It has graded public schools and a high school, nine churches, two hotels, two banks, two weekly newspapers; has ample water-works, and is lighted by electricity. The district is noted for its butter-making. Population 1890, 1,307; 1900, 1,450.

TROYON, CONSTANT, a French landscape and animal painter; born at Sèvres, Aug. 25, 1810. His parents desired him to be a decorator of porcelain, but he studied painting instead, under Riocreux, and made his *début* in the Salon of 1833; gained medals in 1838, 1840, 1846, 1848 and 1855, and was decorated with the Legion of Honor in 1849, and subsequently raised to the rank of chevalier. As a painter,

Troyon is careful and conscientious, but his pictures also indicate a poetic quality of mind that puts him in the rank of the great modern French masters, Corot, Millet, Daubigny, and Rousseau. Among his best pictures are *Morning* and *Evening*, both in the Louvre; the *Valley of La Touque*, belonging to the Goldschmidt estate in Paris; *Landscape and Cattle*, in the Metropolitan Museum, New York; and *Landscape with Animals*, in the Luxembourg. *The Ford* brought £2,480 in 1873; *Cows—Sunset*, £1,082; and *Driving Home the Flock*, \$17,250 in New York in 1896. Died in Paris, Feb. 21, 1865.

TROY WEIGHT, a system of weights used first at Troyes, in France, where, during the middle ages, an important annual fair was held, at a time when each city of importance had its own standard. The Troy pound of twelve ounces was first introduced into England, where there apparently already existed a standard pound of twelve ounces, and was made legal for measuring the precious metals, etc., in 1497. By act of Parliament (1824) the Troy pound was fixed at 5,760 grains, the pound avoirdupois weighing 7,000 grains. See ARITHMETIC, Vol. II, p. 533, and note.

TRÜBNER, NICOLAS, a German bibliographer and publisher; born in Heidelberg, June 12, 1817. He came to England, and in 1852 became a bookseller and publisher. He was especially interested in American literature, and published in 1855 *Bibliographical Guide to American Literature*, a second and elaborated edition of which appeared four years later. Before this he had translated Hendrik Conscience's *Sketches of Flemish Life*, the first Flemish book translated into English. In 1858 he edited Ludewig's *Literature of American Aboriginal Languages*. He died March 30, 1884.

TRUCE. See ARMISTICE, Vol. II, p. 552.

TRUCKEE, a town of Nevada County, northeastern California, near the crest of the Sierra Nevada, at an elevation of about six thousand feet, on the Southern Pacific railroad, 35 miles S.W. of Reno, Nevada, and 119 miles N.E. of Sacramento. It has extensive saw-mills and lumber manufactories, run by the water-power of the Truckee River. It is in the vicinity of Donner Lake and Lake Tahoe. In winter snow falls to a great depth. Population 1890, 1,350.

TRUCK—FARMING IN THE UNITED STATES. The following list of products will give an idea of the crops of the truck-farmer:

	ACRES.
Asparagus.....	37,970
Beans.....	12,707
Cabbage.....	77,094
Kale.....	2,962
Spinach.....	20,195
Irish potatoes.....	28,046
Beets.....	2,420
Celery.....	15,381
Cucumbers.....	4,721
Watermelons.....	114,381
Other melons.....	28,477
Peas.....	56,162
Sweet potatoes.....	28,621
Tomatoes.....	12,802
Miscellaneous vegetables.....	82,601
Total.....	524,540

Truck-farming is carried on in the vicinity of every city, town and village of the United States. In some states, as in Florida, New Jersey, the eastern part of Pennsylvania, in Illinois for the entire length of the state, in Maryland, North Carolina, and in New York, especially in Long Island, in Michigan, and even in Kansas, whence celery is now shipped to New York City, this industry covers certainly a million acres of land. Sweet corn alone occupies, around the city of New York, at least ten thousand acres of land, and one small town near that metropolis has sent out every evening, for years past, no less than 150 wagons loaded with this kind of truck, in the height of the season. The list of the districts in which this business is carried on is thus given, with the annual value of the produce:

DISTRICTS.	AREAS.	VALUE OF PRODUCTS.
New England.....	6,838	\$3,184,218
New York and Philadelphia.....	108,135	21,102,521
Peninsular.....	25,714	2,413,648
Norfolk.....	45,375	4,692,859
Baltimore.....	37,181	3,784,696
South Atlantic.....	111,441	13,183,516
Mississippi Valley.....	36,180	4,982,567
Southwest.....	36,889	4,979,783
Central.....	107,414	15,432,223
Northwest.....	1,083	204,791
Mountain.....	3,833	531,976
Pacific Coast.....	14,357	2,024,345
Total.....	534,440	\$76,517,143

TRUE CROSS. See CROSS, Vol. VI, pp. 610, 611.

TRULLAN COUNCIL. See CANON LAW, Vol. V, p. 16.

TRUMANSBURG, a village of Tompkins County, central southwestern New York, 2 miles W. of Cayuga Lake and 81 miles N.W. of Ithaca, on the Lehigh Valley railroad. The village contains a flouring-mill, a foundry and machine-shops, two churches and a weekly newspaper. Population 1900, 1,225.

TRUMBULL, BENJAMIN, an American theologian; born at Hebron, Connecticut, Dec. 19, 1735; graduated at Yale in 1759; was minister of the Congregational church at North Haven from 1760 until his death; was a volunteer soldier and chaplain in the War of the Revolution. He was the author of *Twelve Discourses on the Divine Origin of the Holy Scriptures* (1790); *Complete History of Connecticut, 1630-1713* (1797); and *General History of the United States of America, 1492-1792* (vol. 1, 1810). He died at Hebron, Feb. 2, 1820.

TRUMBULL, HENRY CLAY, an American author; born in Stonington, Connecticut, June 8, 1831; educated at Williston Seminary; in 1851 moved to Hartford and went into the railroad business; was appointed Sunday school missionary for Connecticut in 1858. During the war he served in the Tenth Connecticut Regiment as chaplain, having been ordained preacher in the Congregational Church; in 1865 was appointed missionary secretary of the American Sunday School Union for New England, and in 1872 normal secretary; in 1875 settled in Philadelphia and became the editor and chief owner of the *Sunday School Times*; was appointed Lyman Beecher lecturer at Yale in 1888.

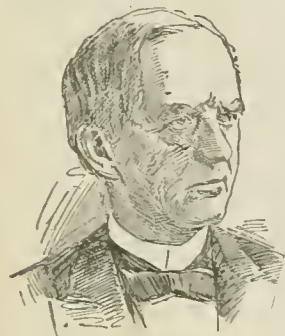
He wrote *Some Army Sermons* (1864); *The Knightly Soldier* (1865); *The Captured Scout of the Army of the James* (1869); *Teaching and Teachers* (1884); *The Sunday School* (1888); *Studies in Oriental Social Life*; and *War Memories* (1898). In 1881, while traveling in Arabia, he located the site of the Biblical Kadesh Barnea.



H. CLAY TRUMBULL.

TRUMBULL, JAMES HAMMOND, an American philologist, brother of Henry Clay Trumbull; born in Stonington, Connecticut, Dec. 20, 1821. He was educated at Yale, but did not graduate, on account of ill health; assisted J. H. Linsey in the preparation of catalogues of the mammalia, reptiles, fishes and shells of Connecticut; settled in Hartford in 1847; assistant secretary of state (1847-52 and 1858-61), secretary (1861-64); president of the Connecticut Historical Society (1863); librarian of the Watkinson Library of Hartford since 1863; president of the American Philological Society (1874-75); was elected to the National Academy of Sciences in 1872. In 1858 he began to devote his attention to the Indian languages of North America, and prepared a dictionary and vocabulary to John Eliot's Indian Bible. In 1871 Yale College, and in 1887 Harvard University, conferred the title of LL.D. upon him, and in the latter year Columbia College conferred the same degree. He wrote *Colonial Records of Connecticut* (1850-59); *The Origin of McFingal* (1868); *The Composition of Indian Geographical Names* (1870); *Best Methods of Studying Indian Languages* (1871); *On the Algonkin Verb* (1876); *The True Blue-Laws of Connecticut and the False Blue-Laws of the Rev. Samuel Peters* (1876); and *Memorial History of Hartford County* (1886). Died at Hartford, Conn., Aug. 5, 1897.

TRUMBULL, LYMAN, an American jurist, was born at Colchester, Connecticut, Oct. 12, 1813. In 1837 he removed to Belleville, Illinois. In 1841 he became secretary of state, and in 1848 was elevated to the supreme bench of the state. He was elected to Congress, as a Democrat, in 1854, and was chosen United States Senator in 1855. In 1860, having meanwhile acted with the Republican party and against his colleague, Stephen A. Douglas, on the question



LYMAN TRUMBULL.

of slavery, Senator Trumbull was prominently mentioned in connection with the Republican nomination for the Presidency, but he heartily coincided with the action of the Chicago convention, and labored earnestly for the election of Abraham Lin-

coln. In 1861 he was re-elected to the Senate, where he took an active part in securing the passage of the constitutional amendment providing for the abolition of slavery, and was one of the Republicans who voted against the impeachment of Andrew Johnson. After that occurrence he acted with the Democratic party, having been the Democratic nominee for governor of Illinois in 1880. He died in Chicago, June 25, 1896.

TRUMPETER PIGEON. See DOVE, Vol. VII, p. 379.

TRUMPET-FISH, a fish (*Fistularia tabacaria*) found on the Atlantic coast of North America. The elongated snout, which is tubular, suggested the name. Also, the name is sometimes applied to the European bellows-fish (*Centriscus scolopax*).

TRUMPET-FLOWER, the common name of the species of *Tecoma*, a genus of plants of the Bignonia family. They are woody-stemmed climbing plants, with pinnately compound leaves, a more or less trumpet-shaped corolla and flattish pods. *T. radicans*, the common species of the United States, known also as trumpet-creeper, climbs by rootlets, and has orange-yellow and scarlet flowers. Certain handsome Oriental species are cultivated in green-houses, often under the name of Bignonias.

TRUNK-FISH. Any fish of the family *Ostracodontida*, which constitutes the suborder *Ostracodermi*. These fishes are angular and polygonal in form. The body is inclosed in a firm case, composed of strong, interlocking plates. They are tropical forms.

TRUNK-LINE POOLS. See RAILROADS, in these Supplements.

TRURO, a town and capital of Colchester County, northern central Nova Scotia, near the head of Cobequid Bay, 61 miles N.E. of Halifax, on the Intercolonial railroad. It is in a fertile agricultural region, and has manufactures of engines, machinery, leather goods and shoe materials, woolen goods, musical instruments, furniture and wooden-ware. The provincial normal and model schools are located here. Population 1891, 5,102.

TRURO (THOMAS WILDE), BARON, an English jurist and statesman; born in London, July 7, 1782; educated at St. Paul's School; articled to his father, who was an attorney, and for some years practiced his profession; was called to the bar in 1817; in 1824 made sergeant-at-law; entered Parliament as member from Newark in 1831; in 1839 became Solicitor-General; Attorney-General in 1841; in 1846 chief justice of the Court of Common Pleas, and was sworn Privy Councillor; upon the formation of Lord John Russell's government in 1850, he was created Baron Truro, and was made Lord Chancellor; while a pleader he was junior counsel for the defense in the trial of Queen Catherine, and was counsel for O'Connell in 1844. Died Nov. 11, 1855.

TRUSSES. See *Frames*, under BRIDGES, Vol. IV, pp. 315-324.

TRUSTS. So far as they are the modern equivalents of the *fidei commissum* of the Roman civil law, fiduciary relations, or trusts, are exhaustively dealt with under TRUSTS, Vol. XXIII, p. 600. A more modern and as frequent legal use of the word is to

describe organizations for the control of several corporations under one direction, by the device of a transfer, by the stockholders in each corporation, of at least a majority of the stock to a central committee, or board of trustees, which issues, in return, to such stockholders, respectively, certificates showing, in effect, that although they have parted with their stock and the consequent voting-power, they are still entitled to dividends, or to their share in the profits, the object being to enable the trustees to elect directors in all the corporations, to control and suspend at pleasure the work of any of them, and thus to economize expenses, regulate production and defeat competition.

These, if anything, are legitimate descendants of the monopolies of Elizabethan and Stuart days in England. As to these, see *MONOPOLY*, Vol. XVI, pp. 757-758.

In a looser sense, the term *trust* is applied to any combination of establishments, in the same line of business, for securing the same ends, by holding the individual interests of each subservient to a common authority for the common interests of all. It is against public policy for a stockholder to divest himself of his voting-power; hence such a transfer of stock, if made, is revocable at the pleasure of the maker. So far as the object of such a combination is shown to be the control of prices of, and the prevention of competition in, the necessities or conveniences of life, it is held to be a criminal act, upon the principles which rendered engrossing and forestalling punishable, and a corporation, which by corporate act, surrenders its powers to the control of a trust thereby affords ground for a forfeiture of its charter by the state.

ANTI-TRUST LEGISLATION BY CONGRESS. The Fifty-first Congress of the United States adopted an important anti-trust act, providing as follows:

Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce, among the several states, or with foreign nations, is hereby declared to be illegal. Every person who shall make any such contract, or engage in any such combination or conspiracy, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by fine not exceeding five thousand dollars, or by imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

The statute further provides that—

Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons to monopolize, any part of the trade or commerce among the several states, or with foreign nations, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by fine not exceeding five thousand dollars, or by imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

Every contract, combination in form of trust or otherwise, or conspiracy, in restraint of trade or commerce, in any territory of the United States, or of the District of Columbia, or in restraint of trade or commerce between any such territory and another, or between any such territory or territories and any state or states or the District of Columbia, or with foreign nations, or between the District of Columbia and any state or states or foreign nations, is hereby declared illegal. Every person who shall

make any such contract, or engage in any such combination or conspiracy, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by fine not exceeding five thousand dollars, or by imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

The several circuit courts of the United States are hereby invested with jurisdiction to prevent and restrain violations of this act; and it shall be the duties of the several district attorneys of the United States, in their respective districts, under the direction of the Attorney-General, to institute proceedings in equity to prevent and restrain such violations. Such proceedings may be by way of petition setting forth the case and praying that such violation shall be enjoined or otherwise prohibited. When the parties complained of shall have been duly notified of such petition, the court shall proceed, as soon as may be, to the hearing and determination of the case; and pending such petition, and before final decree, the court may at any time make such temporary restraining order or prohibition as shall be deemed just in the premises.

Whenever it shall appear to the court before which any proceeding under section 4 of this act may be pending, that the ends of justice require that other parties should be brought before the court, the court may cause them to be summoned, whether they reside in the district in which the court is held or not, and subpoenas to that end may be served in any district by the marshal thereof.

Any property owned under any contract, or by any combination, or pursuant to any conspiracy (and being the subject thereof) mentioned in section 1 of this act, and being in the course of transportation from one state to another, or to a foreign country, shall be forfeited to the United States, and may be seized and condemned by like proceedings as those provided by law for the forfeiture, seizure and condemnation of property imported into the United States contrary to law.

Any person who shall be injured in his business or property, by any other person or corporation, by reason of anything forbidden or declared to be unlawful by this act may sue therefor in any circuit court of the United States in the district in which the defendant resides or is found.

In addition to this Federal statute, many of the separate states have enacted stringent anti-trust laws, but, owing to the emasculation and restriction these statutes have experienced at the hands of jurists, most of them have practically become dead letters. The subject of state regulation of trusts and monopolies has been for a considerable time one of the principal planks in socialist platforms, and a well-defined sentiment against them is prevalent and gaining force. No more vivid picture of the injustices worked by monopolies can be found than in the pages of H. D. Lloyd's *Wealth Against Commonwealth* (1894), wherein the operations and methods of the Standard Oil Trust are pictured in high lights, and an exhaustive list of all then existing trusts printed in an appendix.

TRUXILLO, a city of the republic of Honduras, capital of the province of Colon, a seaport on Truxillo Bay, in lat. 15° 55' N., long. 86° W. It was founded in 1524, and during the succeeding century was the principal Honduras port in its trade with Spain, but was burned by buccaneers in 1643 and never recovered its former position, although retaining considerable commerce. Steamers from New Orleans visit it weekly, and New York vessels call every three weeks. Among its exports are sarsaparilla, fruit and india rubber. Population, 2,500.

TRUXILLO, a town of Peru, in the province of Libertad, midway between Lima and Piura. A seaport 25 miles distant, Salavery, affords Truxillo its export facilities. Very little trade is carried on,

however, it being principally a residence town. The town was founded in 1535 by Pizarro, who fortified and garrisoned it. Population, about 7,500.

TRUXTON, THOMAS, an American naval officer; born on Long Island, Feb. 17, 1755; went to sea in a merchantman at 12, and at the outbreak of the Revolution was given an appointment on the *Congress* as lieutenant; in 1777 aided in fitting out the *Independence*, of which he took command and captured three prizes in the Azores; afterward commanded the *Mars* in the English Channel, and other vessels in different parts, being invariably successful in his encounters with the English; after the war, became interested in West India trade, and upon the reorganization of the United States navy in 1798, was appointed one of its six captains, and given command of the *Constellation*, and in it captured successively the French frigates *L'Insurgente* and *La Vengeance*, for the latter engagement receiving from Congress a gold medal and a vote of thanks. He was appointed to command the squadron fitted out for the Tripoli war, but retired, and, after living for a time in New Jersey, moved to Philadelphia, where he was sheriff from 1819 to 1821. He was the author of *Remarks, Instructions and Examples Relating to Latitude and Longitude*. He died May 5, 1822.

TRYGONIDÆ. See RAY, Vol. XX, p. 299.

TRYON, DWIGHT WILLIAM, an American landscape-painter; born in Hartford, Connecticut, Aug. 13, 1849; studied at the School of Fine Arts in Paris and under Daubigny and Guillemet. He won the second Hallgarten prize at the National Academy exhibit in 1887, and the Webb prize, Society of American Artists, in 1889; was made Academician in 1891; for a time professor of art at Smith College; in 1885 chosen director of the Hartford School of Arts. His paintings are poetic in sentiment and refined in execution. Among his best-known are *Harvest Time in Normandy*; *On the Maas*; *Evening in Autumn*; *Daybreak*; and *Moonlight*.

TRYON, WILLIAM, colonial governor in America; born in Ireland in 1725; entered the British army and received an appointment, through the influence of his wife, a relative of the Earl of Hillsborough, the Colonial Secretary, to the post of lieutenant-governor of North Carolina, entering upon his duties in 1764; in the following year became governor, which office he held until 1771, when he was made governor of New York; was made colonel in 1772; major-general in 1777; resigned the governorship in 1778; returned to England, and in 1782 was raised to the rank of lieutenant-general. As a governor he was detested for his severity and oppression. He died Feb. 27, 1788.

TSCHAIKOWSKY, PETER ILTITSCH, a Russian composer; born at Wotkinsk, in Vyatka province, April 25, 1840. His father was appointed, in 1850, director of the Technological Institute in St. Petersburg, and the son sent to the School of Jurisprudence, where the sons of high governmental officials only are educated, and received, in 1859, a post in the Ministry of Justice. This position he gave up in 1862, to study music in the newly established Conservatory of Music in St. Petersburg, where he re-

ceived instruction in harmony and counterpoint from Zaremba, and in composition from Anton Rubinstein. In 1865 he was graduated, receiving also a medal for his cantata on Schiller's ode, *An die Freude*. He was professor at the Conservatory of Moscow (1866-78). After the latter year he devoted himself entirely to composition. Tschaikowsky made liberal use of the melodies and rhythms of the folk-songs of his native country, and all of his work is strongly marked with the peculiar characteristics of Slavonic music, bold and brilliant orchestration, weird and fanciful melodies, and below all an undercurrent of melancholy. He wrote overtures, symphonies, concertos, marches, and several operas, including *Eugeny Onegin*, *The Maid of Orleans* (1881), and *Mazeppa* (1884). He visited London in 1889 and 1890, appearing in the Philharmonic concerts both years; and visited America and conducted the production of several of his own compositions at the opening of Carnegie Music Hall in New York. Died in St. Petersburg, Nov. 7, 1893.

TSCHUDI, JOHANN JAKOB VON, a Swiss traveler and scientist, descendant of the Swiss historian of the same name; born in Glarus, Switzerland, July 25, 1818. He was educated at Neuchâtel, Leyden and Paris, and in 1838 started on a journey around the world, but stopped in Peru, where he made extensive explorations for five years. Returning, he became, in 1866, Swiss ambassador in Vienna, a position which he held until 1883. Among his works are *Peruvian Fauna* (1844-47); *Journeys Through South America* (1866-68); and *The Organism of the Quechua Language* (1884). He died Oct. 8, 1889.

TSI-TSI-HAR, a province. See MANCHURIA, Vol. XV, p. 466.

TSUGA, a genus of coniferous trees, to which belong the hemlock or hemlock-spruce (*T. Canadensis*) of eastern North America, and the great Douglas spruce (*T. Douglasii*) of the Western mountain region.

TSUGARU STRAIT. See JAPAN, Vol. XIII, pp. 570-575, note.

TSUSHIMA, an island. See JAPAN, Vol. XIII, pp. 569, 573.

TUAREGS OR TUARICKS. See AFRICA, Vol. I, p. 261; and in these Supplements.

TUAT. See OASES, Vol. XVII, p. 695.

TUBER ÆSTIVUM. See TRUFFLE, Vol. XXIII, p. 591.

TUBERCLE, a disease. See PATHOLOGY, Vol. XVIII, pp. 405, 406.

TUBERCULIN, a glycerine extract from pure cultivations of the bacilli of tuberculosis. The solution, first made by Koch, is estimated by him to contain less than one per cent of the active principle. When injected in small quantity into healthy animals, no effect is noticeable. In animals suffering from tuberculosis a marked rise of temperature follows the injection, and in some varieties of the disease the animal is cured. In cases of lupus in the human subject, cure has been effected by the use of tuberculin; it is inapplicable, however, to consumption (tuberculosis of the lungs). Tuberculin has recently been used to ascertain whether cows are healthy. If they are at all affected by tubercular

disease, the system reacts under treatment; if they are healthy, no effect follows.

TUBERCULOSIS. See **VETERINARY SCIENCE**, Vol. XXIV, p. 204.

TUBERCULOSIS, a name for pulmonary consumption. See **PHTHISIS**, Vol. XVIII, pp. 855–858.

TUBERS. See **BOTANY**, Vol. IV, p. 98.

TUBES OF FORCE. See **ELECTRICITY**, § 9a, in these Supplements.

TUBICOLÆ, a suborder of worms, comprising the sedentary polychætous annelids. These build tubes, in which they dwell permanently. Such forms as *Serpula* secrete calcareous tubes. Others, like *Clymenella*, form tubes by cementing together particles of sand. Others live in mere holes excavated in the sand. The suborder is opposed to *Errantia*, which includes the free-swimming forms.

TUBINARES. See **PETREL**, Vol. XVIII, p. 712.

TÜBINGEN SCHOOL. See **BAUR**, Vol. III, pp. 448–450; and **CHRISTIANITY**, Vol. V, pp. 690, 691.

TUBULAR BRIDGE. See **BRIDGES**, Vol. IV, pp. 334–337.

TUBULARIA. See **HYDROZOA**, Vol. XII, pp. 547, et seq.

TUBULARIÆ, a suborder of *Hydromedusæ*, in which the polyp stocks are naked or with a chitinous covering, which is not, as in the opposed suborder *Campanulariæ*, prolonged into a cup (hydrotheca), surrounding the hydranth. The genera *Clava*, *Pennaria*, *Hydractinia* and *Tubularia* are common examples.

TUCKAHOE, an Indian name applied (1) to the starchy root-stocks of various plants which were useful for food, and (2) to a subterranean fungus of the southern United States, which, as a saprophyte forms large masses upon old roots, with bark-like exterior and compact white interior. Being used as food, this fungus is also called Indian bread or Indian loaf.

TUCKER, GEORGE, an American lawyer and author, a relative of St. George Tucker; born in Bermuda, in 1775. He emigrated to Virginia in 1787, and subsequently entered William and Mary College, graduating in 1797; studied law and practiced in Lynchburg; was member of the Virginia legislature for a time, and served in Congress (1819–1825); resumed his law practice and was subsequently chosen professor of moral philosophy and political economy in the University of Virginia, retaining the chair for twenty years. He wrote much on philosophical, political and literary subjects. Among his works are *Essays on Subjects of Taste, Morals and National Policy* (1822); *The Valley of the Shenandoah*, a novel that became very popular (1824); *Principles of Rent, Wages and Profits* (1837); *Life of Thomas Jefferson* (1837); essays on *Cause and Effect* (1842); and *The Association of Ideas* (1843); *Banks or no Banks* (1857); and *Essays, Moral and Philosophical* (1860). He died April 10, 1861.

TUCKER, HENRY ST. GEORGE, an American lawyer, son of St. George Tucker; born at Williamsburg, Virginia, Dec. 29, 1780, and educated at William and Mary College, and subsequently studied law; from 1815 to 1818 he was a member of Congress.

In 1824 he was appointed chancellor of Virginia, succeeding to the chief-justiceship of the court of appeals in 1831, and to the law professorship of the University of Virginia in 1841. He resigned that position in 1845, on account of failing health, and died at Winchester, Virginia, Aug. 28, 1848. Judge Tucker declined the Attorney-Generalship of the United States, tendered him by President Jackson. He was the author of *Commentaries on the Law of Virginia*; *Lectures on Constitutional Law*; and other works. In 1837 he received the degree of LL.D. from William and Mary College.

TUCKER, JOHN RANDOLPH, an American naval officer; was born at Alexandria, Virginia, Jan. 31, 1812. From 1855 to the breaking out of the war between the states, he was in charge of the receiving-ship *Pennsylvania*, at Norfolk. Upon the secession of Virginia he resigned his position in the United States navy, and became commander in the Virginia navy. He was afterward transferred to the Confederate navy, and served until the evacuation of Richmond, when he became a soldier in Ewell's corps of the Army of Northern Virginia, and with that command covered the retreat of the Confederate army. In 1866 he was appointed a rear-admiral in the Peruvian navy, and during the war between Chili, Peru and Spain commanded the forces of the two republics. He returned to Virginia at the close of hostilities, and died at Petersburg, June 12, 1883.

TUCKER, JOHN RANDOLPH, American lawyer and statesman, son of Henry St. George Tucker; born in Winchester, Va., Dec. 24, 1823. He was educated at the University of Virginia, studied law, and was admitted to the bar in 1845; attorney-general for Virginia (1857–63); professor of equity and public law in Washington and Lee University (1870–74); member of Congress (1874–87), during which time he was for a while chairman of the Ways and Means Committee, and of the Judiciary Committee in the Forty-eighth and Forty-ninth Congresses. He was a strong opponent of a protective tariff. Died Feb. 13, 1897, at Lexington, Va.

TUCKER, NATHANIEL BEVERLY, an American lawyer and author, brother of Henry St. George Tucker; born in Williamsburg, Virginia, Sept. 6, 1784. He was graduated at William and Mary College in 1801; studied law in Virginia until 1815, then in Missouri, where he was chosen judge of the circuit court; in 1834 was made professor of law in William and Mary College, and occupied this position until his death. He devoted much of his time to authorship, and in 1836 published the novel *The Partisan Leader: A Tale of the Future*, which forecast the political difficulties of the years following, including the secession movement, with considerable accuracy. It was reprinted, in 1861, under the title *A Key to the Disunion Conspiracy*. Among his other books are *Principles of Pleading* (1846); *George B. Icombe*, a novel (1836); and *Discourse on the Importance of the Study of Political Science* (1840). He died Aug. 26, 1851.

TUCKER, ST. GEORGE, a colonial jurist; born

at Port Royal, Bermuda, June 29, 1752. He was educated at William and Mary, and took up the study of law; went to Bermuda with an expedition against the island in 1775, but returned to the colonies in 1777 and served in the army during the Revolutionary War, being promoted to lieutenant-colonel at the siege of Yorktown. In 1778 he married Mrs. Frances Bland Randolph, mother of John Randolph. After the war he was successively judge of the general court of Virginia; professor of law, and chancellor, at William and Mary; commissioner to revise and digest the laws of Virginia; president of the court of appeals 1803 to 1811; and then judge of the United States district court of eastern Virginia till 1827. He published *How Far the Common Law of England is the Common Law of the United States; A Dissertation on Slavery, with a Proposal for its Gradual Abolishment in Virginia* (1796); *Letters on the Alien and Sedition Laws* (1799); besides considerable poetry; and edited an edition of *Blackstone's Commentaries, with Notes and References* (1803). He died at Edgewood, Nelson County, Virginia, Nov. 10, 1828.

TUCKERMAN, EDWARD, one of the foremost of American lichenologists; born in Boston, Massachusetts, Dec. 7, 1817; was educated at the Boston Latin School; graduated at Union College, New York, and at the law school of Harvard University, and pursued his legal studies at Cambridge, meanwhile taking a course at the divinity school connected with the university. He early manifested a taste for botany, and during a trip to Europe, in 1841, an acquaintance with Elias Fries, the distinguished Swedish cryptogamist, confirmed his interest in lichenology as a specialty. His valuable works, devoted to his favorite theme, especially the erudite *Genera Lichenum* (1872), and *Synopsis of the North American Lichens* (1882), justly entitling him to rank among the masters of the science. He died at Amherst, Massachusetts, March 15, 1886.

TUCKERMAN, FREDERICK GODDARD, an American poet; born in Boston, Massachusetts, Aug. 10, 1821; partially completed a collegiate course at Harvard University; graduated at the law school of that institution in 1842, and in 1845 was admitted to the Suffolk bar. In 1866 he published in Boston, and afterward in London, a volume of verses, many of which were marked by a delicate poetic insight and grace. He was the personal friend and correspondent of Tennyson, being the fortunate possessor of the manuscript of *Locksley Hall*, a friendly tribute from the poet. He died in Boston, May 14, 1877.

TUCKERMAN, HENRY THEODORE, an American author; born in Boston, Massachusetts, April 20, 1813. Because of ill-health he was compelled to abandon the prospect of a collegiate education, seeking restoration in European travel. *The Italian Sketch Book* (1835) resulted from his residence abroad. Upon his return to America he resumed his academic studies, and finally devoted himself exclusively to letters, contributing to magazines and various other literary publications many

essays and criticisms, characterized by scholarly attainments and a refined taste. Among his works may be cited *Rambles and Reveries* (1841); *Artist Life: or, Sketches of American Painters* (1847); *A Month in England* (1853); *Memorial of Horatio Greenough* (1853); *Leaves from the Diary of a Dreamer* (1853); *Life of John Pendleton Kennedy* (1871); etc. He died in New York City, Dec. 17, 1871.

TUCKERMAN, JOSEPH, an American philanthropist and clergyman; born in Boston, Jan. 18, 1778; graduated at Harvard, 1798; studied theology, and in 1801 was ordained pastor of the Unitarian church at Chelsea, Massachusetts. In 1812 he became deeply interested in the moral and religious improvement of seamen, and in 1826 resigned his pastorate to assume the duties of "minister at large" in Boston. He twice visited England, with the view of enlarging the field of his charitable labors, an institute in Liverpool bearing his name. His denominational belief allied him with the Unitarians, but his practical benevolence and catholic piety transcended the limits of a stated form of faith. During an absence from the country, necessitated by his precarious health, he died at Havana, April 20, 1840.

TUCKERMAN, SAMUEL PARKMAN, an American organist and composer; brother to Edward and Frederick Goddard Tuckerman; born in Boston, Massachusetts, Feb. 11, 1819. From 1840 to 1849 he was organist of St. Paul's Church, Boston, where in after years he lectured upon cathedral music, giving illustrative concerts in connection with the theme. In 1852 he received at Rome the diploma of the St. Cecilia Academy, and the following year the degree of Mus. D. was conferred upon him in England. His compositions include many anthems and chants, distinguished by the deepest religious feeling, while conceived according to the strictest canons of musical taste and the studious devotion to classical methods to which he adhered. He died at Newport, Rhode Island, June 30, 1890.

TUCSON, a city and the capital of Pima County, southern Arizona, on the Santa Cruz River, 978 miles by rail from San Francisco, and 250 miles E. of Yuma, on the Southern Pacific railroad. It has some trade in wool, hides and stock; produces gold, silver and copper ores; and has repair-shops of the Southern Pacific railroad. Here is also located the University of Arizona, a non-sectarian co-educational institution, having an average attendance of 60, with 12 instructors. Founded by the Jesuits in 1560, the city was the capital of Arizona from 1867 to 1877. Population 1890, 5,150; 1900, 7,531.

TUDOR, WILLIAM, an American author and journalist; born in Boston, Massachusetts, Jan. 28, 1779. He was educated at Harvard College, and then entered the counting-house of John Codman, with which house he retained connection during most of his life; made several business trips abroad, and in 1805, acting as agent of his brother Frederic, went to the West Indies, where he established the ice trade with tropical countries.

In 1823 he was appointed United States consul at Lima, Peru, and in 1827 *chargé d'affaires* in Brazil. He was the founder of the *North American Review* (1814), and for a number of years its editor; was the originator of the Bunker Hill monument; was one of the founders of the Boston Athenæum; and an active member of the Anthology Club. Among his publications were *Letters on the Eastern States* (1820); *Miscellanies* (1821); *Life of James Otis of Massachusetts* (1823); and a political allegory called *Gebel Tcir* (1829). He died in Rio Janeiro, March 9, 1830.

TUDOR DYNASTY IN ENGLAND extended from Henry VII to Elizabeth. See HENRY VII, Vol. XI, p. 662.

TUESDAY. The third day of the week, so called because of the translation for Mars, for whom the day was named in the Roman calendar. The Teutonic deity corresponding to Mars was Tyr or Tew, the genitive of which was Tiwes.

TUFA OR TUFF. See GEOLOGY, Vol. X, p. 239.

TUFTS COLLEGE, an institution for higher education, located at Medford, Massachusetts. It was founded in 1852, the land being given by Charles Tufts, after whom the institution was named, and the endowment by a number of other men, the largest donor being Sylvanus Packer. At present the school has four distinct departments, namely, the College of Letters, the Divinity School, opened in 1867; the Bromfield-Pearson technical school and the medical school, both opened in 1893. The college is under the control of the Universalist church, and the divinity school prepares students for the ministry in that denomination. There are ample accommodations in buildings and equipments, and in addition there is an endowment fund of \$1,500,000, which, with income from all other sources, furnishes annually between \$90,000 and \$100,000. The attendance averages about 450, and there are 75 instructors, while the library contains over 32,000 volumes.

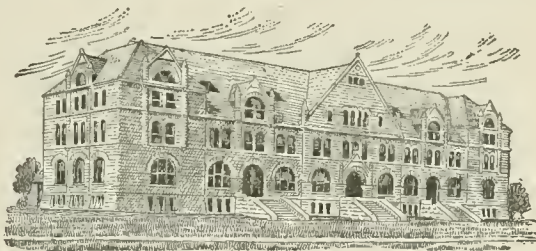
TUILERIES, a royal and imperial palace of France. Its site was on the right bank of the Seine, and it stretched from the Louvre to the Place de la Concorde. Originally there were tile-works here, and hence the name. The palace was begun by the Queen Mother Catherine de Medici in 1564, after plans by Delorme, but the structure underwent many subsequent modifications. It was in Renaissance style, and, despite a rococo profusion of embellishment, had imposing façades. A garden extended from its front to the Place de la Concorde. After the building of Versailles it was seldom used by the royal family, until the terrible day in 1789 when Louis XVI was forced by the people to take up his abode there. From that time it was the royal and imperial residence until it was burned by the Communards in May, 1871. At every revolution the populace broke into the building and looted it. In 1883 its ruins were removed.

TUKE, DANIEL HACK, an English physician; born at York, England, in 1827. He received his medical education at St. Bartholomew's Hospital,

London; graduated at the University of Heidelberg in 1853, and became a fellow at the Royal College of Surgeons in 1857. He made insanity his specialty, visiting all the important asylums for the insane in Europe, being for a time head of the York Retreat for the Insane, and from 1878 to 1892 editor of the *Journal of Mental Sciences*. He published, in connection with J. C. Bucknill, a *Manual of Psychological Medicine* (1857); and is also author of *Insanity in Ancient and Modern Life* (1878); *Chapters in the History of the Insane in the British Isles* (1882); *Illustrations of the Influence of the Mind Upon the Body in Health and Disease* (1884); and a *Dictionary of Psychological Medicine* (1892). He died in London, March 5, 1895.

TULA, a town of central Mexico, in the province of Hidalgo, on the Mexican Central railroad, 35 miles S.W. of Pachuca. It was formerly a powerful and wealthy city, and is supposed by some historians to be identical with Tollan, the Toltec capital. Population, 14,000.

TULANE UNIVERSITY, a co-educational institution in New Orleans. In 1884 it was reorganized, the name changed from Louisiana State University, and endowed with \$1,100,000 by Paul



ARTS AND SCIENCE BUILDING, TULANE UNIV.

Tulane. The university consists of six distinct departments, as follows: 1. Medical School, having its practical instruction in the Charity Hospital of 700 beds; 2. Law School; 3. College of Arts and Sciences; 4. College of Technology; 5. University Department of Philosophy and Science; and 6. the H. Sophie Newcomb Memorial College for Women, with an independent endowment of \$500,000. These are not all on one campus, but are located in different parts of the city, each having its own equipments. In 1898 there were 73 instructors and 856 students; the library had 20,000 volumes; the productive funds were \$1,477,000; and the total income was \$98,000.

TULARE, the name of a city and lake in California. (For the lake, see CALIFORNIA, Vol. IV, p. 697.) The city of Tulare is located in Tulare County, southern central California, 250 miles S. of San Francisco and ten from Visalia, on the Southern Pacific and Visalia and Tulare railroads. It is in a well-irrigated agricultural region, yielding fruits and cereals. Repair-shops of the Southern Pacific are located here. It has seven churches, a good school system, a public library, banks with a combined capital of over one hundred thousand dollars, and is supplied with good water from artesian wells. Population 1890, 2,697; 1900, 2,216.

TULE, a name chiefly applied to a western variety of *Scirpus lacustris*, a bulrush which grows to great size and covers large areas of marshy ground in California. Such areas are known as tule lands. Another species, *S. tatora*, is also a tule bulrush, but ranges farther south.

TULIP-TREE, the common name of *Liriodendron tulipifera*, commonly known also as white-wood and poplar. It belongs to the magnolia family, and is one of the most stately lumber-trees of the forests of the Mississippi Valley. It is not at all related to the poplars, but its light, soft lumber is sold under the name of poplar, and is one of the most common kinds of lumber.

TULL, JETHRO. See **AGRICULTURE**, Vol. I, pp. 299, 300.

TULLAHOMA, a village of Coffee County, southern middle Tennessee, on the Cumberland mountain plateau, 69 miles S.E. of Nashville and 81 miles N.W. of Chattanooga, on the Nashville, Chattanooga and St. Louis railway. It is an agricultural district, and has lumber and flour mills and turning-shops. There are ten churches, good schools, and two national banks, with a combined capital of \$100,000. Population 1890, 2,439; 1900, 2,684.

TULTCHA, TULCHEA, OR TULCEA, a town of northeastern Roumania, in Tultcha province, Dobruja, on the south arm of the delta of the Danube; has a large trade in grain and wood, and a large fishing industry. It is identified as the ancient *Ægissus*. Population 1890, 18,800.

TUMÁN, money of account. See **PERSIA**, Vol. XVIII, p. 622.

TUMBLE-WEEDS, a name applied to certain annual plants of prairies and pampas and steppes, which are torn from their scanty hold in the loose soil by the wind and scattered tumbling over the surface of the country, often for many miles, distributing their seeds, and often collected in great masses on the windward side of any obstruction. Among the common tumble-weeds of the United States are *Amaranthus græcizans*, *Cycloma atriplicifolia*, *Corispermum hyssopifolium* and *Salsola kali* var. *Tragus* (Russian thistle).

TUMBLING-BARREL. See **IRON AND STEEL**, in these Supplements.

TUMORS. See **PATHOLOGY**, Vol. XVIII, pp. 367-373; **SURGERY**, Vol. XXII, pp. 687, 688; and **SURGERY, AMERICAN**, in these Supplements.

TUNBRIDGE-WARE. See **TUNBRIDGE WELLS**, Vol. XXIII, p. 607.

TUNDRA, a belt of land. See **POLAR REGIONS**, Vol. XIX, p. 328.

TUNGURAGUA, a volcano. See **ECUADOR**, Vol. VII, p. 645.

TUNKERS, same as **DUNKERS**. Vol. VII, p. 543.

TUNKHANNOCK, a town and the capital of Wyoming County, northeastern Pennsylvania, on the Susquehanna River, 22 miles W.N.W. of Scranton, on the Lehigh Valley and Montrose railroads. It is in a district abounding in timber, and has saw and planing mills, pump and furniture manufactories, and also a tannery. There is a

national bank, with a capital of \$100,000. Population 1890, 1,253; 1900, 1,305.

TUNNELING DEVICES. See **HYDRAULIC MACHINERY**, in these Supplements.

TUNNELS, WATER. See **AQUEDUCT**, in these Supplements.

TUNSTALL OR TONSTALL, CUTHBERT, an English Roman Catholic prelate; born at Hatchford, Yorkshire, about 1475; entered Balliol College, Oxford, when about sixteen years of age; went to Cambridge, and was chosen a fellow of King's Hall (now Trinity College); then proceeded to Padua, where he received the degree of LL.D. He became vicar-general to Archbishop Warham and rector of Harrow-on-the-Hill (1511); prebendary of Lincoln (1514); archdeacon of Chester (1515); master of the rolls (1516); dean of Salisbury (1519); bishop of London (1522); and of Durham (1530). In 1516 he was joint-ambassador to Charles I of Spain, afterward Charles V, during which he formed the acquaintance of Erasmus. In 1527 he was a member of Wolsey's embassy to France; was also a plenipotentiary in 1529, to negotiate the peace of Cambray. He accepted the royal supremacy and concurred in the ecclesiastical reforms of Henry VIII, by whom he was made Lord Privy Seal in 1523. On the accession of Edward VI, he at first concurred in the continued reforms of that monarch; but grew alarmed, and was deposed and sent to the Tower in 1552. He was restored by Queen Mary; during whose reign, however, he allowed no one to be persecuted in his diocese. Was again deposed by Queen Elizabeth in 1559, and committed to the custody of Dr. Parker, archbishop of Canterbury. In 1823, while bishop of London, he received a visit from Tyndale (see **ENGLISH BIBLE**, Vol. VIII, p. 384); and while abroad bought up Tyndale's New Testaments and had them burned in Ludgate Hill. He was learned in languages and in science, and published one of the earliest works on arithmetic in the English language, *De Arte Supputandi* (1522); and an abridgment of *Aristotle's Ethics* (1554); others of his works being *In Laudem Matrimonii* (1518); *De Veritate Corporis et Sanguinis Domini Nostri Jesu Christi in Eucharistica, Libri II* (1854); *Contra Impios Blasphematores Dei Prædestinationis Opus* (1555). He died at Lambeth Palace, Nov. 18, 1559.

TUPAC AMARU, the name of two Peruvian Incas. See **PERU**, Vol. XVIII, pp. 677, 678.

TUPAIDÆ, a family. See **MAMMALIA**, Vol. XV, pp. 401, 402.

TUPELO, a town and the capital of Lee County, northeastern Mississippi, on the Old Town Creek, 50 miles S.W. of Corinth, on the Mobile and Ohio and Kansas City, Memphis and Birmingham railroads. The center of an agricultural section, it has cotton-compress, steam-gin and mills, and also a foundry, a machine-shop, and furniture and spoke factories. There are eight churches, a supply of good water from artesian wells, and a national bank with a capital of \$50,000. Population 1890, 1,477; 1900, 2,118.

TUPELO, one of the common names of species

of *Nyssa*, a genus of trees of the dogwood family, otherwise known as pepperidge and sour-gum. They have alternate simple leaves, small greenish flowers in axillary clusters, and a drupe-like, often very sour fruit.

TUPI-GUARANI, a race. See INDIANS, Vol. XII, p. 829.

TUPPER, SIR CHARLES, a Canadian statesman, was born at Amherst, Nova Scotia, July 2, 1821; he took the degree of M.D. at Edinburgh, and obtained the diploma of the Royal College of Surgeons in that city in 1843. From 1857 to 1860 he was a member of the executive council, and provincial secretary of Nova Scotia; and Prime Minister of that province from 1864 until he retired from office with his government, on the union



SIR C. TUPPER.

of the British American provinces as a confederation, July 1, 1867. He became a member of the Privy Council of the Canadian Dominion in 1870, and was president of that body until July, 1872, when he was appointed Minister of Inland Revenue. In 1873 he was nominated Minister of Customs; Minister of Public Works in 1878, and Minister of Railways and Canals in 1879. In the latter year he was knighted. He resigned his seat in the cabinet in 1884, and in May of that year was appointed High Commissioner for Canada in London. In 1887-88 he was one of the negotiators of the fisheries treaty with the United States, and was made a baronet for his services. In 1896 he retired from the High Commissionership in London, and, returning to Canada, became Premier of the Dominion, in succession to Sir Mackenzie Bowell. In the Canadian general elections of that year his administration was defeated on the question of the Manitoba School Bill, and he was succeeded by the Liberal government formed by the Hon. Wilfred Laurier.

TUPPER, MARTIN FARQUHAR, an English versifier and inventor, was born at Marylebone, July 17, 1810. He was educated at the Charterhouse and under five private tutors, and at 19 went up to Christ Church, Oxford. A stammer hindered him from taking orders; so, after graduating in 1831, he entered Lincoln's Inn, and in 1835 was called to the bar. But a single will and marriage settlement was his first and last exploit in the way of law; he had found his vocation in a life of authorship. Its chief events were his election to the Royal Society (1845), two visits to America (1851-1876), and a series of English and Scotch readings from his own works. Of those works (forty in number), one, *Proverbial Philosophy* (three series, 1838-67), brought him and his publisher, Hatchards, a profit of "something like £10,000 apiece." His inventions (safety horse-shoes, glass screw-tops to bottles, steam-vessels with the paddles inside, etc.) were not such suc-

cesses. A friend, "whose ambition it was to be Tupper's Boswell," died before him; but from his own archives he compiled *My Life as an Author* (1886)—a curious self-study of a poet. His writings have scarcely won popular favor, and some critics decline to acknowledge him as a poet. He died at Albury, Surrey, Nov. 29, 1889.

TURBELLARIANS. See PLANARIANS, Vol. XIX, pp. 170-174.

TURBEVILLE, GEORGE, an English poet; born at Whitechurch, Dorsetshire, about 1561; received his education at Winchester School and at New College, Oxford, of which he was elected a fellow in 1561; after studying law in London, he accompanied Sir Thomas Randolph, the ambassador of Queen Elizabeth, to Russia as secretary. He wrote three poetical descriptions of that country, which appeared in Hakluyt's *Voyages*, with Randolph's own narrative. His *Epitaphes, Epigrams, Songs and Sonnets*, printed originally in 1565, have been frequently reprinted in recent years. His other works include *Heroycall Epistles of the Learned Poet Publius Ovidius Naso, in English Verse* (1569); *The Booke of Faulconrie, or Hawking* (1575); *The Noble Art of Venerie, or Hunting* (1576); *Tragical Tales*, translated from the Italian (1576). The Bodleian Library of Oxford contains a MS. translation by Turbeville of Tasso's *Jerusalem Delivered*. He died about 1600.

TURBINES. See HYDROMECHANICS, Vol. XII, pp. 524-532.

TURDIDÆ. See ORNITHOLOGY, Vol. XVIII, pp. 47, 48.

TURGENEFF, IVAN. See TOURGUENIEFF, Vol. XXIII, p. 488.

TURGESCENT, in botany a swollen condition of thin-walled cells caused by the active absorption of liquid. It is a normal condition connected with the activity of cells.

TURKEY, EMPIRE OF. (For general article on Turkey, see Vol. XXIII, pp. 640-657.) The estimated area of the empire (including states nominally subject) is 1,576,677 square miles; population, 38,790,736. The following table gives the area and population of the main divisions:

	SQ. MILES.	POPULATION.
Immediate possessions:		
In Europe.....	62,744	5,711,000
In Asia.....	650,097	16,823,500
In Africa.....	398,900	1,300,000
Bulgaria (including Eastern Roumelia)—autonomous province....	37,860	3,309,816
Bosnia*.....	23,570	1,568,092
Crete.....	3,326	294,190
Samos—tributary principality.....	180	49,733
Egypt.....	400,000	9,734,495
Total.....	1,576,677	38,790,736

The populations of the largest towns in 1885 were: Constantinople, 873,565; Adrianople, 70,886; Salonica, 150,000; Monastir, 45,000; Scutari, 30,000; Janina, 20,000; Smyrna, 200,000; Damascus, 154,000; Bagdad, 145,000; Aleppo, 127,149; Beyrout, 120,000; Brusa, 76,303; Erzeroum, 38,900; Kaisarieh, 72,000; Kerbela, 65,000;

* Including Herzegovina and Novibazar, a tributary principality.

Mossul, 61,000; Mecca, 60,000; Homs, 60,000; Urfa, 55,000; Marash, 52,000; Sana, 50,000; Adana, 45,000; Hama, 45,000; Konieh, 44,000; Aintab, 43,150; Sivas, 43,122; Jerusalem (1891), 41,335; Bitlis, 38,886; Aidin, 36,250; Magnesia, 35,000; Trebizond, 35,000; Diarbekir, 34,000; Tripoli, 30,110; Van, 30,000.

The population of Constantinople is composed as follows: Mussulmans, 384,910; Greeks, 152,741; Armenians, 149,590; Bulgarians, 4,377; Roman Catholics (native), 6,442; Greek Latins, 1,082; Protestants (native), 819; Hebrews, 44,361; foreigners, 129,243. Total, 873,565.

CONSTITUTION AND GOVERNMENT. The legislative and executive authority is, under the supreme authority of the sultan, exercised by two high dignitaries, the "Sadr-azm," or grand vizier, the head of the temporal government, and the "Sheik-ul-Islam," the head of the church. Both are appointed by the sultan, the latter with the nominal concurrence of the "Ulema," a body comprising the clergy and chief functionaries of the law, over which the "Sheik-ul-Islam," presides, although he himself does not exercise priestly functions. Connected with the "Ulema" are the "Mufti," the interpreters of the Koran. The Ulema comprise all the great judges, theologians and jurists, and the great teachers of literature and science who may be summoned by the Mufti. The principal civil functionaries bear the titles of effendi, bey or pasha.

The empire is divided into vilayets, or governments, and subdivided into sanjaks, or provinces, and kazas, or districts. A vali, or governor-general, who is held to represent the sultan, and is assisted by a provincial council, is placed at the head of each vilayet. The provinces and districts are subject to inferior authorities, under the superintendence of the principal governor. The division of the country into vilayets has been frequently modified of late for political reasons. All subjects, however humble their origin, are eligible to, and may fill, the highest offices in the state.

The reigning sovereign is Abdul-Hamid II, born Sept. 22, 1842, the second son of Sultan Abdul-Medjid. He succeeded to the throne on the deposition, on account of insanity, of his elder brother, Sultan Murad V, Aug. 31, 1876.

The present sovereign of Turkey is the thirty-fourth, in male descent, of the house of Othman, the founder of the empire, and the twenty-eighth sultan since the conquest of Constantinople. By the law of succession obeyed in the reigning family, the crown is inherited according to seniority by the male descendants of Othman, sprung from the imperial harem. The harem is considered a permanent state institution. All children born in the harem, whether offspring of free women or of slaves, are legitimate and of equal lineage. The sultan is succeeded by his eldest son, but only in case there are no uncles or cousins of greater age.

It has not been the custom of the sultans of Turkey for some centuries to contract regular marriages. The inmates of the harem come, by

purchase or free will, mostly from districts beyond the limits of the empire, the majority from Circassia. From among these inmates the sultan designates a certain number, generally seven, to be "Kadyn," or ladies of the palace, the rest, called "Odalik," remaining under them as servants. The superintendent of the harem, always an aged lady of the palace, and bearing the title of "Haznadar-Kadyn," has to keep up intercourse with the outer world through the guard of eunuchs, whose chief, called "Kyzlar-Agassi," has the same rank as the grand vizier, but has the precedence if present on state occasions.

The civil list of the sultan is variously reported at from five to ten million dollars. To the imperial family belong a great number of crown domains, the income from which contributes to the revenue. The finances of the civil list have of late been put into order, but are still reported to be insufficient to cover the expenditure of the court and harem, numbering altogether over five thousand individuals. The amount charged to the budget of 1880 was \$2,616,500 for the support of the palace, and \$1,308,500 for the crown princes, the total amount being thus \$3,925,000.

The revenue for 1897-98 was \$81,449,816; the expenditure, \$81,089,408. The total national consolidated debt in 1898 was \$780,583,200.

COMMERCE AND SHIPPING. The imports in 1893 aggregated about \$90,000,000, the exports \$55,000,000. The mercantile navy of the Turkish Empire, according to *Lloyd's Register*, in 1898 consisted of 87 steamers (each of 100 tons or upward) of 46,498 gross tons, and 1,349 sailing-vessels of 252,947 tons.

In 1895-96 (March to February), the Ottoman ports of the Mediterranean and Black Sea were visited by 188,033 vessels of 38,409,144 tons.

ARMY. The standing army is composed of 648 battalions of infantry, 202 squadrons of cavalry; artillery, 1,356 guns; engineers, 39 companies; with a total numerical force of 700,620 men.

According to the existing system, the army consists of the nizam or regular army, two bans of redif or landwehr, and the mustahfiz or landsturm. Non-Mohammedans are not liable to military service, but have to pay an exemption tax, about six shillings per head per annum, levied alike on males of all ages. Military service is compulsory on all able-bodied Mohammedans who have reached the age of twenty. By the recruiting law of 1887 military service is rendered obligatory for all the Mussulman population of the empire, excepting only Constantinople and its suburbs, which still retains its privilege of exemption from military service. The conscripts are divided into two classes: 1. Those who can claim no reason for exemption; 2. Those who are infirm, sole supports of families, or who are exempt for various special reasons. The first class is again divided into two classes, called first and second levies (tertib).

As many men as are required to fill the ranks of the standing army are taken for the first levy, and go through twenty years' service, six with the

nizam and first reserve (Ikhtiyats), eight years in the redif and six in the mustahfiz or landsturm.

The men of the second levy have to undergo six to nine months' drill with a nizam battalion in the first year of their service, and thirty days' drill at their homes in every subsequent year. They are also liable on emergency to be called to join the nizam. Thus all the able-bodied Mohammedan population will receive a fair amount of military training, and it is expected that when the system is in working order, the Ottoman government will be able to put at least eight hundred thousand trained men into the field.

NAVY. The navy is in a disorganized condition, on account of the disposal of many of its largest vessels to foreign governments. The largest armor-clad ships are the *Mésoudiyé*, the *Abdul-Kadir*, and the *Hamidiéh*. The first two cruisers were built on somewhat similar designs, but the *Hamidiéh* is the smaller. The *Mésoudiyé* is 332 feet long, with extreme breadth of 59 feet. She is constructed on the central-battery principle, and has on the main deck a 12-gun battery, 148 feet long, the armor-plates of which are 12 inches thick at, and 10 inches thick above, the water-line. The bow also is strongly fortified, and fitted with a ram of great strength, adapted to pierce an opponent below the armor in the most vulnerable part. Forward, under the fore-castle, were two six-and-a-half-ton guns, firing ahead, and under the poop aft was one gun of the same caliber, but these have been removed for smaller Krupp guns. The *Abdul-Kadir* of eight thousand tons displacement, with 14-inch armor and armed with four 11-inch Krupp guns mounted *en barbette*.

RECENT HISTORY. A change of grand viziers occurred Sept. 3, 1891, which occasioned much excitement, as it was suspected that a plot had been hatched for replacing the deposed sultan, Murad, on the throne. The new grand vizier, who superseded Kiamil Pasha, was Djevad Pasha, governor of Crete. The change also seemed to indicate a departure from the Anglophile policy of Kiamil Pasha, as exhibited in regard to the passage of the Dardanelles by Russian transport ships to and from eastern Russia. Protesting against this, the British naval force made a demonstration at Sigri, on the island of Mitylene, near the entrance to the Dardanelles, for which the Porte demanded an explanation from Britain. On June 8, 1895, Djevad Pasha was dismissed, Said Pasha, an ex-grand vizier, succeeding. On Oct. 2d, immediately after the Stamboul riots (which arose when the Armenians were attempting to make a religious demonstration in the Koum Kapou cathedral), Said Pasha was replaced by Kiamil Pasha, recalled, Said Pasha becoming Minister of Foreign Affairs. Nov. 6th Kiamil Pasha gave place to Kahlil Rifaat Pasha, Minister of the Interior, Kiamil Pasha being appointed Vali of Aleppo, and thus banished him from Constantinople.

In June, 1892, a vicious attack was made upon Miss Anna Melton, of the board of foreign missions of the Presbyterian Church, at Nestoria, a village of Duree, in the Kurdish Mountains in

Nestoria. In August of the same year news was received that the house of Dr. Bartlett, an American missionary at Burdur, in Asia Minor, had been burned, which outrage was fully compensated for by the Porte. In 1893 an American woman, Dr. Mary P. Eddy, received permission to practice in Turkey. This was the first instance of a woman obtaining such permission in the Empire. On May 30, 1895, the Bedouins attacked the various consulates at Jiddah, an Arabian seaport, killing William S. Richard, the British consul. The fleets of the powers assembled at the port, and the Turkish government had to make prompt apology and reparation.

On July 12, 1890, a great fire devastated Constantinople. The damage was estimated at \$5,000,000. In 1894 Constantinople was visited by a series of earthquakes from July 10 to 18, two or more occurring almost each day. Buildings fell, quays subsided, and hundreds of people were killed. The seismic disturbance extended over a great area, being felt in the peninsula of Anatolia, 236 miles from Constantinople. The director of the meteorological observatory at Paris observed that the curve of the magnetograph was notably perturbed 16 minutes after the disturbance at Constantinople, July 18th, thus indicating that the magnetic wave had traveled three thousand kilometers, with ten times the velocity of sound.

On Oct. 14, 1893, the historic mosque, Jami' el Amwi, in Damascus, was destroyed by fire. The mosque occupied the site of the house of Rimmon (II Kings v: 18).

The Turkish government has had numerous revolts to deal with during the last decade. Chief among these is the Armenian trouble, which has caused much sympathy in Britain and America. The cause of the apparent inability of the powers to deal with this and other Turkish questions, can be traced to the Berlin treaty. An attack on Turkey would mean a general upheaval in Europe. So long as the Sultan can be maintained on his throne, the evil day is postponed; hence, diplomacy endeavors to avert the much-dreaded conflict, which, if precipitated, might result in a distribution of Ottoman territory unsatisfactory to the opposing powers, the all-important question in such dismemberment being, Who would possess Constantinople? Besides the Armenian question, the Cretan affair and the Macedonian rising are noted. Besides these there were revolts in Arabia, in Muscat, and among the Druses.

Toward the end of 1895 suspicions were aroused as to the existence of a secret treaty between Russia and Turkey. By this treaty it was supposed that Russia guaranteed to maintain the integrity of the Turkish Empire and to defend the Dardanelles.

THE ARMENIAN TROUBLES arose in the determination of the Turkish government to suppress the national movement to revive the ancient Armenian monarchy and the natural desire of the natives to worship according to their own accepted form. In 1888 the Turkish Government com-

menced oppressive measures, the Kurds, Circasians and Mussulmans attacking the Christians. Moussa Bey was accused, among other misdeeds, of abducting a girl after he had murdered her father; of having tortured a Christian with red-hot irons; of having outraged women, and of pillaging Christian communities and villages. The Kurdish chief was brought to trial, but acquitted.

In 1890 the Armenians were forbidden the right of meeting, even in their own representative church assembly. The natives were thoroughly terrorized. The Armenian national committees strove to obtain recognition in their efforts to secure autonomy from the foreign powers. In the early part of 1893 the lawless Kurds were again incited to acts of robbery and violence in Cæsarea, Mersivan, Yuzgat and other places. Riots constantly occurred, and hundreds of Armenians were arrested. In February, 1893, the Evangelical Girls' School, an American institution in Mersivan, was burned. The Turkish government compensated the American Missionary Society for the outrage. The trials of those arrested finally resulted in the execution of five prisoners, the Protestant professors were pardoned but banished, and the others had their sentences commuted and were deported to Arabia or Tripoli. In February, 1894, the women of Yuzgat accused the Turkish police of committing outrages, and called upon the Armenians to avenge them. Thus originated the "riot," in which the police were overpowered after they had killed thirty and wounded fifty rioters. The disturbance again broke out, and many were arrested. Five were executed and many more sentenced to prison for the affair. During the end of April the Mufti of Yuzgat was found hanged, a note, pinned to his sleeve, stating that this was but the first installment of revenge for the Turkish oppression. As a result of the attempts of the Turkish authorities to collect the taxes, further troubles arose. The Kurdish irregulars encountered the Armenians August 27, killed three hundred, and drove off a large number of cattle. The Armenians pursued, and a bloody affray followed, the cattle being recovered. A force of Kurdish cavalry was then sent to punish the rebellious Armenians, 750 of the latter being killed. Reports from Armenian sources stated that instructions had emanated from Constantinople for the violation of women, for the slaughter of the women and children, unless the mothers embraced Islam. Revolting tortures were practiced, the soldiers killed hundreds, churches were desecrated, villages burned, infants were thrown into the river, and the commanding officers selected female slaves for their harems. Armenian women, driven to desperation, had defended a town, and finally leaped from the wall to their death rather than forsake their religion or submit to violation. The number of Armenians killed in these encounters was estimated at from four to five thousand. The arrests and sentences to death became more frequent, and it was estimated that nearly three thousand Armenians were political prisoners.

Sept. 28, 1895, the British squadron which had been at Salonica was moved to Lemnos, at the entrance to the Dardanelles. This encouraged Armenians. Garabad, the head of the Protestant community was, July 1st, murdered; the American school at Tarsus was attacked in August; in Constantinople several Armenians were murdered as spies. These and other affairs were attributed to the Armenian "revolutionists." In September the Armenians arranged to make a great demonstration, and, as a result, a collision occurred with the Turks. On Oct. 8, 1895, a brutal outrage upon the Armenians occurred at Trebizond, in which eight hundred were slaughtered by the Turks. During this month, in other outrages, the Turks butchered nearly nine thousand Armenians. The belief gained ground that the Sultan had tacitly sanctioned the extermination of the Armenians. As many as twenty-five hundred Armenian villages are believed to have been obliterated, and a majority of the males killed, while the victims in the towns amounted to about twenty thousand. Half of the agricultural population was starving and shelterless, and seventy-five thousand in the towns were left destitute.

The powers assembled their fleets in the Levant and demanded permission to place a second vessel at Constantinople, which was finally granted, December 10th. The Armenian insurgents became aggressive and made attacks on Turkish villages. The Turkish authorities ordered twenty thousand troops to advance upon Zeitoun. On December 24th, the town was besieged; the attack was worsted, but after sending the women and children in safety to the mountains the defenders evacuated the place, removing their guns to a more commanding position. Later, terms of capitulation were arranged, but the negotiations were not completed, and on January 28th 1896, a battle between the Zeitounlis and the Turks occurred, in which the former were victors. But the insurgents surrendered on the terms agreed upon in February. The defense of the place had been heroic, and the surrender was compelled by circumstances, the Armenians being absolutely without further means of carrying on the struggle.

On January 22d, 1896, Miss Clara Barton, president of the American Red Cross Society, left the United States for Turkey for the purpose of administering relief to the sufferers on both sides. The Porte had modified its decree as to the admission of members of foreign relief societies, and Miss Barton was allowed to conduct her merciful mission among Turks and Armenians, with the direct aid and support of the government. She returned to the United States September 12th, 1896. She distributed \$116,000 in relief work.

The Armenian question was discussed in the British Parliament and the American Congress, the latter passing resolutions strongly denouncing the outrages as a disgrace upon civilization.

In April, 1896, the American missionary, Mr. Knapp, suffered expulsion; and on the 15th of the same month Mahmoud Pasha was appointed governor of Zeitoun, in direct defiance of the

agreement that the governor of that place should be a Christian.

The American missionaries published in April, 1896, a summary of the outrages and loss sustained by the Armenians in the Hârput district. Among the details given it appears that the needy persons amounted to 26,990; the houses plundered to 6,029; houses burned, 1,861; churches, chapels and monasteries burned, defiled or damaged, 73; forced marriages to Turks, 16; rape, 2,300; forced conversions, priests, 12; forced conversions, men and women, 7,664; wounded, 1,315; miscarriages, 829; killed in field and highways, 280; persons burned, 56; died from hunger and cold, 1,014; suicides, 23; martyrs, 1,922; total deaths, 4,127; and loss of property, \$7,268,605. These figures do not include the reports from Malatia, Arabkir, Egin, Charanjak, Geghi, Palu, Choonkoosh and Diarbkr districts.

During the latter part of 1896 great excitement existed in Britain and America in regard to the Armenian massacres. As late as September 24th, the very date when Gladstone was making his famous attack on the Sultan, a report was published of the massacre of six thousand Armenians. On October 2d, another terrible massacre was reported. October 22d, Apik Effendi, the millionaire Armenian, was condemned to three years' seclusion in a fortress, having been accused of being chief of the revolutionary committee, though this was not proved.

An irade was issued October 2d, ordering the formation of a flotilla of ten torpedo-boats for the defense of the Dardanelles, and October 22d another irade was issued, levying a tax of five piasters per head on all Mussulmans, besides other taxes. The purpose was to raise 1,200,000 Turkish pounds for military purposes. Money for the army has to be raised at any cost, and the levying of these taxes occasioned much discontent.

The visit of the Czar of Russia to Great Britain and France in September accentuated interest in the Turkish question. September 18th, Lord Rosebery, ex-Premier of Great Britain, made a speech in which he declared that for England to interfere in Turkey without the consent of the powers would lead to a European war. Six days later, the 24th, Mr. Gladstone made a speech at Liverpool, in which he declared that England was free to act alone, and denounced the Sultan as "the great assassin." In October, Lord Salisbury, in his Guildhall speech, took the attitude of Lord Rosebery, that isolated action by England would be the signal for a European struggle of far-reaching proportions.

THE MACEDONIAN TROUBLE arose in jealousies between the Christian nationalities and the Turkish authorities, creating a dispute with the kingdom of Greece in 1888. The Greeks nursed a hope to be able to extend their boundaries into Macedonia. Here a considerable portion of the population is Bulgarian. The Bulgarian exarch requested the Turkish government to install Bulgarian bishops in certain districts of Macedonia. This at once gave offense to Greece,

the people of which were endeavoring to foster their language and form of church worship in Macedonia. Eventually, supposedly on the intervention of Russia, the matter was temporarily settled by the Sultan refusing the request of the Bulgarians. Many of the latter were arrested for refusing to recognize the Greek clergy. Troubles arising therefrom continued, and developed in August, 1896, in an uprising against the Turks.

THE TROUBLE IN CRETE arose through the discontent of the Cretans at the exercise of the vetopowers by Turkey over the acts of the local assembly. Out of an estimated population of 200,000 Cretans, 40,000 are Mussulmans, but of the same race as the Christian majority. In 1889 Andreas Kriaris, a deputy, offered a resolution favoring union with Greece. The governor pronounced the resolution unconstitutional, whereupon Kriaris went into the provinces and incited the farmers. An insurrection broke out, and a bloody affair occurred at the village of Kalios. The insurgents fell upon the Mussulman villages, though these attacks began only after many fierce encounters had occurred between the contending factions. Then the Turkish military, 20,000 strong, entered Crete and stringent measures were adopted. The Turkish war-ships patrolled the coasts, but allowed the insurrectionary leaders to escape from the island, while their followers were driven to prison. On November 22d the Sultan signed a general amnesty, but excluding the insurgent leaders. The constitution was also altered, curtailing the privileges of the Cretans. The Christian governor was replaced. Gradually affairs settled down to normal conditions, but in 1896 the trouble broke out afresh; battles were fought at Retimo and other places between the Turks and the insurgents, the Turks having violated the terms of the armistice, which was followed by other encounters. The King of Greece made a declaration that he would abdicate if he had to give up his claim to Crete. On August 10th the Cretans had established a provisional government at Campos.

TURKMANSHAI, a village of Azerbaijan, 65 miles S.E. of Tabriz, Persia. Here, on Feb. 22, 1828, was concluded the treaty between Persia and Russia by which the former transferred to the latter all rights of sovereignty over the provinces of Erivan and Nakchevan.

TURKOMANS, TURCOMANS or TURKMANS. See TURKS, Vol. XXIII, pp. 660, 661.

TURK'S AND CAICOS ISLANDS, two groups of small cays S.E. of the Bahamas, West Indies, under the governor of Jamaica; area, 224 square miles; population, 4,745; principal settlement on the island of Grand Turk. Only industry, salt-raking, beside a small sponge fishery.

TURNAU, a city in Bohemia, in the Jung-Bunzlau Circle, on the east bank of the Iser, 50 miles N.E. of Prague. Its principal church, built in 1825, is reckoned one of the finest in the kingdom. Manufactories of cotton, woolens and artificial gems, the latter being exported in great quantities to the United States. Population, 4,700.

Here the Prussians defeated the Austrians, July, 1866.

TURNBULL, ROBERT JAMES, an American public man; born in New Smyrna, Florida, January, 1775. His father, an English M.D., married a Greek lady from Smyrna, and obtained a grant of land from the British government to settle a Greek colony in Florida (1772); having joined the revolutionary cause, his grant was forfeited, and he settled in Charleston, South Carolina. His son, however, was educated in England, then studied law in Philadelphia, and settled in Charleston for the practice of his profession. He gave it up in 1810 to supervise his large plantation. He wrote extensively in favor of free trade, and took an active part in the nullification agitation (1832). His book, *The Crisis*, became the textbook of the anti-tariff party. He died in Charleston, South Carolina, June 15, 1833.

TURNBULL, WILLIAM, an American engineer; born in Philadelphia, Pennsylvania, Oct. 9, 1800. Graduated from West Point (1819); entered first the artillery, and (1831) the United States engineer corps as a captain; in charge of the construction of the Potomac aqueduct (1832-43), and of the improvements in the harbors of Lakes Champlain, Erie and Ontario (1843-46); chief of engineers in the Mexican War; in charge of the improvement of Cape Fear River, North Carolina. He died in Boston, Dec. 9, 1887.

TURNBULL BLUE. See PRUSSIC ACID, Vol. XX, p. 24.

TURNER, a village of Du Page County, Ill., (now known as West Chicago), on the Chicago, Burlington and Quincy, the Chicago and North-Western, and the Elgin, Joliet and Eastern railroads. It is situated in an agricultural district, and besides the rolling-mills and machine-shops of the Chicago and North-Western railroad, which are located here, it has a creamery and manufactories of sash, doors and blinds, pumps and office furniture. Population 1890, 1,506; 1900, 1,877.

TURNER, CHARLES TENNYSON, an English poet, and the brother of Lord Tennyson; born July 4, 1808, at Somersby, England; graduated from Trinity College, Cambridge, in 1832; ordained in 1835; for many years vicar of Grasby, a village in the Lincolnshire wolds. In 1837 he married Louisa Sellwood, sister of Lady Tennyson. Took the name of Turner under the will of a relative. From 1830 to 1873 he published several small series of verse (collected in one volume, with a memoir, 1880). Throughout life he adhered to the sonnet form, but with an irregular distribution of the rhymes. His was a nature singularly and nobly simple, pure and tender, with a woman's tenderness "at once," his nephew Hallam (preface to the volume of 1880) justly observes, "childlike and heroic." He died at Cheltenham, April 25, 1879. His death was commemorated in a poem by Lord Tennyson, entitled *Midnight, June 30, 1879*.

TURNER, CHARLES YARDLEY, an American painter; born in Baltimore, Maryland, Nov. 25,

1850; a pupil of Jean Paul Laurens, Munkacsy and Bonnat, in Paris; opened a studio in New York City; was awarded the second Hallgarten prize (1884); elected a National Academician (1886). His specialties were *genre* and landscape.

TURNER, NAT, a Virginia slave and leader of the Southampton insurrection of 1831; born about 1800, and hanged at Jerusalem, Virginia, Nov. 11, 1831. He assumed to be inspired by heaven to procure the freedom of his race, and in the autumn of 1831, accompanied by half a dozen men, began his efforts in that behalf. He proceeded from house to house, his force steadily augmenting in numbers, and at the end of 48 hours had murdered 55 white persons without any of his followers having sustained injury. As they approached Jerusalem they encountered a force of white men, by whom they were put to flight. Turner escaped to the woods, where he remained hidden for some weeks, but was finally captured, tried, convicted of murder, and hanged. His companions to the number of 53 were eventually captured, and 17 of them were legally executed. The occurrence caused a feeling of apprehension to sweep over the slave states, but Turner's movement soon proved to have been isolated, and failed to bring out imitations.

TURNER, SAMUEL HULBEART, an American clergyman and educator; born in Philadelphia, Pennsylvania, Jan. 23, 1790; graduated from Pennsylvania University, 1807; ordained a priest in the Protestant Episcopal Church, 1814; rector of a church in Chestertown, Maryland, 1812-17; elected professor of historic theology in the General (Episcopal) Seminary, New York City, 1818; professor of Biblical learning and interpretation of Scripture (1821) at the General Theological Seminary; also professor of the Hebrew language and literature at Columbia College (1831). Among his many works are *Companion to the Book of Genesis* (1841); *Biographical Notices of Distinguished Jewish Rabbis* (1847); *Thoughts on the Origin, Character and Interpretation of Scripture Prophecy* (1852); *The Gospels According to the Ammonian Sections and the Tables of Eusebius* (1861). He died in New York, Dec. 21, 1861.

TURNER, SHARON, an English historian; born in London, Sept. 24, 1768; was educated to the law, and became a successful attorney and solicitor, but developed a great taste for historical researches. After years of hard reading and patient collection of materials he published (1799-1805), a *History of the Anglo-Saxons*, in three volumes, a work that has given its author a permanent place in English literature. He also wrote numerous other historical works. He died in London, Feb. 13, 1847.

TURNER, WILLIAM. See ORNITHOLOGY, Vol. XVIII, p. 3.

TURNER, SIR WILLIAM, an English scientist and educator; born in Lancaster, England, in 1832; studied at the St. Bartholomew's Hospital, London, and in 1853 became a member of the Royal College of Surgeons; was awarded an exhibition

and gold medal by the University of London, and received his M.D. in 1857; professor of anatomy at Edinburgh University (1867); later, dean of its medical faculty and president of the Royal College of Surgeons of Edinburgh; one of the founders of the *Journal of Anatomy and Physiology*; was knighted in 1886. He contributed the articles ANATOMY and DIGESTIVE ORGANS to this ENCYCLOPEDIA.

TURNER'S FALLS, a village of Franklin County, northwestern Massachusetts, 38 miles N. of Springfield and 3 miles N.E. of Greenfield, the county capital, on the Connecticut River, and on the New York, New Haven and Hartford and the Fitchburg railroads. The river furnishes excellent water-power, which is utilized in the manufacture of cutlery, one of the largest works in this industry in the world being located here, giving employment to 700 hands; also in cotton and leather factories and paper-mills. Population, with Montaguettown, 1890, 6,296; 1900, 6,150.

TURNIPS. See AGRICULTURE, Vol. I, pp. 365-368; and HORTICULTURE, Vol. XII, pp. 288, 289.

TURNPIKE. See HIGHWAYS, Vol. XI, pp. 811, 812.

TURNSOLE, same as HELIOTROPE. See Vol. XI, pp. 633, 634.

TURNSPIT. See DOG, Vol. VII, p. 331.

TURN-TABLE. See RAILWAY, Vol. XX, p. 238.

TURPETHUM MINERALE. See MERCURY, Vol. XVI, p. 33.

TURPIE, DAVID, an American statesman; born in Ohio, in 1829. He studied law, and was admitted to practice at Logansport, Indiana, in 1849; was appointed by Governor Wright judge of the court of common pleas in 1854, and was judge of the circuit court in 1856; in 1853 and 1858 he was a member of the legislature of Indiana; in 1863, elected a United States Senator for the unexpired term of Jesse D. Bright, and sat as a Democrat; member of the house of representatives of Indiana, and its speaker (1874-75); in 1878 was appointed one of the three commissioners to revise the laws of Indiana, serving as such three years; in 1886 was appointed United States District Attorney for Indiana, and served as such until March 3, 1887; was elected to the United States Senate Feb. 2, 1887, and took his seat March 4, 1887. He was re-elected in 1892.



DAVID TURPIE.

TÜRR, STEPHEN, a Hungarian soldier of fortune; born in Baja, Hungary, Aug. 10, 1824. Entered the Austrian army, and distinguished himself in the Italian campaign of 1848. Hungary having begun its great insurrection, he deserted to the Sardinian army, and commanded a regiment of Hungarian volunteers at the battle of Novara (1849). After that disaster he joined the revolu-

tionary army in Baden, and when it was defeated took refuge in London. During the Crimean War he took service under the British flag. Having set foot on Hungarian territory, he was arrested by the Austrian police, court-martialed and sentenced to be shot. Queen Victoria's personal interference was needed to save his life. From 1856 to 1859 he served under the Turkish Crescent. In 1859, under Garibaldi, commanded a battalion of Alpine chasseurs, and was severely wounded. He joined the Garibaldi expedition in the kingdom of the Two Sicilies. He was wounded at the storming of Palermo, but kept on with the conquering army. He influenced materially the final decision of Garibaldi to transfer his conquests to King Victor Emmanuel. He was created lieutenant-general, and married a princess of the younger Bonaparte branch. In 1870 he did his best to gain Italian and Austrian help for France. In 1886 he formed the company which finally dug the ship-canal through the Isthmus of Corinth, Greece.

TURRET. See FORTIFICATION, Vol. IX, p. 453.

TURRET SHIPS. See NAVY, Vol. XVII, pp. 285, 286; and in these Supplements.

TURTLE. See TORTOISE, Vol. XXIII, pp. 455-460.

TURTLE-DOVE. See DOVE, Vol. VII, p. 380.

TUSCALOOSA, a city and the capital of Tuscaloosa County, western Alabama, at the head of steamboat navigation, on the Black Warrior River, and on the Alabama Great Southern railroad, 75 miles N.N.W. of Selma, and 50 miles S.W. of Birmingham. It is the trade center of a rich cotton-growing section, has coal-mines in the immediate vicinity, and in the surrounding district iron-ore, timber and fire-clay are obtained. Tuscaloosa was formerly the state capital, and contains a university, high school, Central Female College, Tuscaloosa Female College, Institute for Training Colored Ministers (Presbyterian) and the University of Alabama (non-sectarian), a co-educational institution established by the state in 1831. In 1895 it had 17 instructors, 183 students and a library of 12,000 volumes. The Alabama Insane Hospital is also located here. The town has fine water-power. Population 1890, 4,215; 1900, 5,094.

TUSCAN ORDER. See ARCHITECTURE, Vol. II, p. 437.

TUSCARORAS, a tribe of North American Indians, who, at the settlement of North Carolina, had 15 towns on the Tar and Neuse rivers, and 1,200 warriors. In 1711 a great war took place between them and the colonists of North and South Carolina, resulting in a thorough defeat of the Indian braves, and the obligation for them and their families to abandon their old hunting-grounds. They moved in a body to the territory of the Iroquois Confederation, which they entered as the Sixth Nation.

TUSCOLA, a city and the capital of Douglas County, eastern Illinois, 150 miles S. of Chicago,

and an equal distance E. of St. Louis, on the Chicago and Eastern Illinois, the Illinois Central and the Indiana, Decatur and Western railroads. It is in a region devoted largely to the raising of broom-corn, being the largest shipping-point for this product in the United States. Population 1890, 1,897; 1900, 2,569.

TUSCUMBIA, a city and the capital of Colbert County, northwestern Alabama, on the Tennessee River, and on the Louisville and Nashville and the Memphis and Charleston railroads, 125 miles N.W. of Birmingham. It can be reached by steamboats on the river; is the center of an agricultural district; contains a flour mill and plow factory, and is the seat of several private educational institutions, among them the Deshler Female Institute. Pop. 1890, 2,491; 1900, 2,348.

TUSCUMBIA, a village and the capital of Miller County, central Missouri, on the Osage River, 35 miles S.S.W. of Jefferson City, its nearest railroad point being Aurora Springs, on the Missouri Pacific railroad. The village is in a timber region, has steamboat traffic, saw and flour mills, ships wheat, hides, pelts and furs, and has two weekly newspapers. Population 1880, 137; 1890, 238; 1900, 225.

TUSKEGEE, a town and the capital of Macon County, eastern Alabama, on the Tuskegee railroad, about 40 miles E. of Montgomery. It is in a cotton-growing section; has a cottonseed-oil mill, a carriage and furniture factory and gristmills. It has a bank and one weekly newspaper. It contains the Alabama Military Institute, the Alabama Conference Female College, the Alabama Normal School and the Tuskegee Normal and Industrial Institute. (See WASHINGTON, BOOKER T., in these Supplements.) Population 1880, 2,370; 1890, 1,803; 1900, 2,170.

TUSKEGEE INSTITUTE. See WASHINGTON, BOOKER TALIAFERRO, in these Supplements.

TUSSEH, TUSSUR OR TASAR, a worm. See SILK, Vol. XXII, p. 60.

TUTTLE, DANIEL SYLVESTER, an American divine; born in Windham, Greene County, New York, Jan. 25, 1837; graduated from Columbia (1857) and from the General Theological Seminary (1862); ordained priest in the Protestant Episcopal Church (1863), and occupied the rectorship of Zion Church, Morris, New York, until his appointment as missionary bishop of Montana, Idaho and Utah (1867). In 1868 he was elected bishop of Missouri, but declined the office, being wedded to his much harder and humbler duties. He did a great deal toward the effectual suppression of polygamy among the Mormons. Finally (1866), he accepted another offer of the diocese of Missouri.

TUTTLE, HERBERT, historian and educator; born in Bennington, Vt., Nov. 29, 1846; graduated from the University of Vermont in 1869, adopting journalism as his profession until 1880, when he taught the history and theory of politics and international law at Ann Arbor and Cornell. He wrote *German Political Leaders* (1870); *History of Prussia to the Accession of Frederick the Great* (1884);

History of Prussia under Frederick the Great (2 vols., 1888). Died in Ithaca, N. Y., June 21, 1894.

TUTTLINGEN, a city in Württemberg, on the right bank of the Danube; has manufactories of knives, needles, cloth, cotton, hosiery, linen, and silk, and carries on some agricultural trade. Known historically as the scene of a battle in 1643, in which the Austro-Bavarians, under Hatzfeld and Mercy, defeated the French. Population, 7,031.

TUTUILA, a mountainous but fertile island possession in the Pacific of the United States; area 55 sq. miles, with a population of 3,800. The island, with some others of the same group (the Samoan), was ceded to the United States by an agreement (concluded Nov. 1899) between Great Britain and Germany, and accepted, Jan. 1900, by the United States. It contains the only good harbor (Pago-Pago) in Samoa. See SAMOA in these Supplements, and NAVIGATORS' ISLANDS, Vol. XVII, p. 279.

TWAIN, MARK. See CLEMENS, S. L.

TWEED, WILLIAM MARCY, an American politician; born in New York City, April 3, 1823; died there, April 12, 1878. He received only a common-school education and entered business in his father's chair-making shop. Among the New York volunteer firemen he rose rapidly to popularity. He was elected alderman (1852-53), Congressman (1853-55), chairman of the Board of City Supervisors (1856), school commissioner (1856-57), and state senator (1867-71). As commissioner of public works of the city of New York he organized the famous "ring" that robbed the city right and left, especially in the construction of public buildings. A strong reform movement, having Tilden and Charles O'Connor at its head, caused his arrest. He was released on a million-dollar bail and re-elected to the state senate the same year. Finally, Nov. 19, 1873, he was found guilty of fraud and sentenced to 12 years in the penitentiary. This sentence was set aside by the court of appeals, but the civil courts rendered a judgment against him, in behalf of the city, for \$6,000,000. He was locked up in Ludlow Street jail in default of a three-million-dollar bond. He escaped and fled to Spain, but was returned by the Spanish government, and finally died in prison.

TWELVE TABLES. See ROMAN LAW, Vol. XX, pp. 679, 680.

TWESTEN, AUGUST DETLER CHRISTIAN (1789-1876), Schleiermacher's successor at Berlin. See LOGIC, Vol. XIV, p. 795, note.

TWIGGS, DAVID EMANUEL, an American soldier; born in Richmond County, Georgia, in 1790.—His father, GENERAL JOHN TWIGGS, commanded, through the Revolutionary War, a brigade that he had raised at his own expense. The son entered the volunteer army as captain (1812); was promoted to be major (1814); finally entered the regular army as a captain (1815); major (1825); lieutenant-colonel (1831); colonel Second Dragoons (1836); served in the Mexican War, under General Zachary Taylor; promoted to be brigadier-general (1846), and presented by Congress

with a sword of honor for bravery at Monterey. In the operations against the City of Mexico he led the Second Regiment of regulars, and later was made military governor of Vera Cruz. He was in command of the Department of Texas when the Civil War broke out and immediately surrendered his stores and ammunitions to the Confederates, joining their ranks as major-general. He died in Augusta, Georgia, Sept. 15, 1862.—His brother, LEVI (1793-1847), died bravely at Chapultepec, fighting in the ranks of the American army as a volunteer.

TWILLINGATE, a port of entry and the capital of Twillingate and Fogo district, Newfoundland, on the two Twillingate islands, off the northeast coast, 190 miles from St. John's. The islands are connected by a bridge. The harbor is exposed to severe northeast winds. Copper-mines are worked in the vicinity, while the finest Newfoundland dogs come from the neighborhood. Population 2,790.

TWILL-WEAVING. See **WEAVING**, Vol. XXIV, p. 464.

TWINING, WILLIAM JOHNSON, an American soldier; born in Indiana, Aug. 2, 1839; graduated at West Point (1863); appointed first lieutenant of engineers, and was engaged in the invasion of Georgia, in the operations against Hood's army and in the battles at Franklin and Nashville, also in the operations in North Carolina in 1865. Promoted captain (1868); major (1877); brevetted lieutenant-colonel of volunteers for gallant services; assistant professor of engineering at West Point (1865-67); chief engineer of the Department of Dakota (1872-76); commissioner of the District of Columbia (1878-82). He died in Washington, District of Columbia, March 5, 1882.

TWISS, SIR TRAVERS, an English jurist and historian; born in Westminster, England, March 19, 1809; graduated with highest honors from University College, Oxford (1830), becoming tutor and fellow of his college and one of the public examiners at the university (1835-39); elected to the Royal Society (1838); professor of political economy at Oxford (1842-47); professor of international law at King's College, London (1852-55); regius professor of civil law at Oxford (1855). He had been admitted to the bar and rose to be chancellor of the diocese of London (1858); advocate-general of the Admiralty (1862); queen's advocate-general (1867); served on a number of important royal commissions, notably that of 1867 to inquire into the laws of neutrality; that of 1868 to report on the laws of naturalization and allegiance, and that of 1869 to inquire into the laws of marriage in Great Britain, Ireland and the colonies. He drew the constitution of the Congo Free State (1884), and was the legal adviser to the British commission at the West African conference held in Berlin (1885). He was a man of great scholarly attainments and ever fond of the classics. His principal works are *Lectures on the Science of International Law* (1856); *The Law of Nations Considered as Independent Political*

Communities (2d. ed., 1884); *Law of Nations in Time of War* (2d. ed., 1875). He edited *Livy* (1840) for the Rolls Series. Died in London, Jan. 14, 1897.

TWO RIVERS, a city of Manitowoc County, eastern Wisconsin, on Lake Michigan, and on the Chicago and North-Western railroad, six miles N.E. of Manitowoc. It has a good harbor, a good lumber and lake trade, saw-mill, chair and woodenware works, a tannery, makes wood type, printers' cases and cabinets, etc., and has one newspaper. Population 1880, 2,052; 1890, 2,870.

TYBEE, an island in Chatham County, Georgia, at the mouth of the Savannah River. It is six miles long by three wide, and is separated from the coast islands by Lazaretto Creek; was occupied in 1861 by General Gillmore, who erected batteries for the reduction of Fort Pulaski, which capitulated, April 11, 1862. At the northeastern extremity of the island is a lighthouse 150 feet above the level of the sea, with a refractive lens, the light from which is visible for 18 nautical miles at sea.

TYCHE, a myth. Same as **FORTUNA**, Vol. IX, p. 468.

TYCOON OR TAIKUN. See **JAPAN**, Vol. XIII, p. 584.

TYE, CHRISTOPHER, an English musician; born at Westminster shortly after 1500. Graduated B. Mus. from Cambridge (1536); he held the office of musical instructor to Edward VI when Prince of Wales, received holy orders and was granted the degree of doctor of music from Cambridge in 1545, and from Oxford in 1548. Under Elizabeth, he was organist to the Chapel Royal, and produced various services and anthems, some of which are yet in repute among musicians. Dr. Tye's general scholarship was considerable. One of his most curious works is a metrical translation of the *Actes of the Apostles*, set to music.

TYLER, a city and the capital of Smith County, eastern Texas, on the International and Great Northern and the St. Louis Southwestern railroads, 100 miles S.E. of Dallas, and 129 miles N.E. of Waco. It is in a farming, fruit, stock, cotton-raising and lumbering region. It has saw and planing mills, canning factories, cotton-compress, foundry and machine-shops, a tannery, car, broom, chair, coffin and trunk factories, and tile and pottery works. It has United States and state courts, the Cotton Belt Hospital, 6 churches, 3 banks, 2 daily, 1 semiweekly and 3 weekly newspapers. Population 1890, 6,908; 1900, 8,069.

TYLER, DANIEL, an American soldier; born in Brooklyn, Windham County, Connecticut, Jan. 7, 1799. His mother was a granddaughter of Jonathan Edwards, and his father an officer in the Revolutionary War. Graduated from West Point (1819) as a second lieutenant of artillery; promoted first lieutenant (1824); and in command of the Pikesville arsenal, Baltimore (1826); visited the French School of Artillery and Engineering at Metz (1829), and was allowed to collect valuable information and make drawings. He translated (from the French) *Maneuvers of Artillery and School of the Driver*. On his return he was appointed on the committee for reorganizing national armories. He resigned in

1834, and entered business as president of a coal and iron company. After a trip to England, he erected the first coke hot-blast furnace ever built in this country. In 1840 he completed the Norwich and Worcester railroad; in 1843 he was president and engineer of the Morris Canal Company, and later was much interested in the construction of railroads. He served in the Civil War, first as colonel of the First Connecticut; brigadier-general of volunteers (March, 1862), and engaged in the siege of Corinth; in 1863 was in command of Harper's Ferry and Maryland Heights, and resigned in 1864. After traveling abroad, he founded large cotton and iron manufactories in Alabama (1872), and founded the town of Anniston, in that state. He also invested in a twenty-thousand-acre ranch in Texas. He was a man of extraordinary activity, even in his old age. He died in New York City, Nov. 30, 1882.

TYLER, LYON GARDINER, an American educator, and the son of President Tyler by his second wife, Julia Gardiner; born in Charles City County, Virginia, August, 1853; graduated from the University of Virginia, where he was awarded a scholarship (1875); studied law, and in 1877 was appointed professor of belles-lettres in William and Mary College; principal of the Institute, Memphis, Tennessee. He entered the practice of law at Richmond, Virginia (1882); elected to the Virginia legislature (1887), where he worked actively in favor of the regulation of child-labor; was president of William and Mary College (1888). He wrote *Letters and Times of the Tylers* (2 vols., 1883-84) and *Parties and Patronage in the United States* (1890).

TYLER, MOSES COIT, an American educator; born in Griswold, Connecticut, Aug. 2, 1835; graduated from Yale College in 1857. In 1860 he became pastor of the First Congregational Church of Poughkeepsie, New York; subsequently, professor of English literature at the University of Michigan, where he remained until 1881, when he became professor of American history at Cornell University. Besides filling the position of literary editor of the *New York Christian Union*, and being a frequent contributor to reviews and magazines, he wrote *A History of American Literature During the Colonial Times* (2 vols., 1878); *A Literary History of the American Revolution* (1895); the biographies of *Patrick Henry* (1887), *Berkeley, Dwight, and Joel Barlow* (1894); and *Glimpses of England* (1898).

TYLER, ROYALL, an American jurist; born in Boston, Massachusetts, July 18, 1757; died in Brattleboro, Vermont, Aug. 16, 1826. He graduated from Harvard (1776) and studied law in John Adams's office. Served as a volunteer (1785-86); settled as a lawyer in Guilford, Vermont (1790); made a justice of the supreme court of Vermont (1794), and its chief justice (1800). In 1809 he published two volumes of Vermont court cases. He did also considerable literary work, poems, songs, newspaper articles, stories and plays. His drama, *The Contrast*, was the first American play ever acted on a regular stage by professional actors (1786). *The Algerine Captive*, a fictitious autobiography, has been often republished since 1799, when it first came out.

TYLER, WILLIAM SEYMOUR. American clergyman and scholar; born in Hartford, Pa., Sept. 2, 1810; graduated from Amherst (1830) and Andover Theological Seminary (1836); professor of Latin and Greek at Amherst (1836-47), and of Greek only after 1847. He twice visited Europe and the East. He wrote or annotated a number of text-books, among which are *Germania and Agricola of Tacitus* (new ed. 1878); *Historics of Tacitus* (1848); *Plato's Apology and Crito* (1859); *Theology of the Greek Poets* (1867); *History of Amherst College* (1873); *Demosthenes de Corona* (1874); *Demosthenes's Philippics and Olynthiacs* (1875); and *Nine Books of the Iliad* (1886). Died at Amherst, Mass., Nov. 19, 1897.

TYLOR, EDWARD BURNETT, an English anthropologist and historian; born at Camberwell, England, Oct. 2, 1832, and educated at the school of the Society of Friends, Grove House, Tottenham. He early devoted himself to ethnological and philological studies. Elected a fellow of the Royal Society (1871). In 1883 he was appointed keeper of the Oxford University museum and reader in anthropology; first Gifford lecturer at the Aberdeen University (1888); president of the Anthropological Society. He wrote *Anahuac; or, Mexico and the Mexicans* (1861); *Researches into the History of Mankind* (1865); *Primitive Culture: Researches into the Development of Mythology, Religion, Art and Custom* (2 vols., 3d ed. 1891); *Anthropology: An Introduction to the Study of Man and Civilization* (1881); wrote, in this ENCYCLOPÆDIA, the articles ANTHROPOLOGY; CANNIBALISM; DEMONOLOGY; DIVINATION; GIANT; MEXICO; OATH; ORDEAL; SALUTATIONS.

TYMPANUM, a membrane. See EAR, Vol. VII, pp. 591, 592.

TYNDALL, JOHN, a British physicist and author, was born Aug. 21, 1820, in the village of Leighlin-bridge, County Carlow, Ireland. In 1844 he was employed by a firm in Manchester, and in 1847 accepted an appointment as teacher in Queenwood College, Hampshire. In 1848 he repaired to the University of Marburg, in Hesse-Cassel, where he studied under Bunsen and other eminent professors.



PROFESSOR TYNDALL

Afterward, Mr. Tyndall prosecuted his researches in the laboratory of Magnus, at Berlin. In 1853 he was chosen professor of natural philosophy in the Royal Institution of Great Britain, and succeeded the celebrated Faraday. The publication of an essay on the cleavage of slate rocks was the proximate cause of his joining his friend, Professor Huxley, in a visit to the glaciers of Switzerland in 1856, and they afterward published a joint paper on the structure and motion of glaciers. He returned to Switzerland in 1857, 1858 and 1859, and during the latter year commenced his researches on radiant heat, which disclosed relations previously unthought of between this agent and the gaseous form of matter. Mr. Tyndall was a Rumford medalist of the Royal Society, and a member of various

foreign scientific societies; he was made LL.D. of Cambridge in 1855 and LL.D. of Edinburgh in 1866. In 1872 Professor Tyndall proceeded on a lecturing tour in the United States, in the course of which he delivered 35 lectures. The proceeds of the lectures, before leaving for Europe, the professor placed in the hands of a committee, who were authorized "to expend the interest in aid of students who devote themselves to original research." Professor Tyndall presided at the annual meeting of the British Association held at Belfast in August, 1874, and on the occasion he delivered a notable address, the materialistic tone of which provoked a prolonged controversy. He accepted the presidency of the Birmingham and Midland Institute for the year 1877. For some years Professor Tyndall was scientific adviser to the Board of Trade and to the lighthouse authorities, but he resigned those offices in May, 1883. Professor Tyndall's writings include *The Glaciers of the Alps* (1860); *Mountaineering* (1861); *A Vacation Tour* (1862); *Heat as a Mode of Motion* (1863); *On Radiation* (1865); *Faraday as a Discoverer* (1868); *Diamagnetism and Magneto-Crystalline Action and Lectures on Electrical Phenomena* (1870); *Notes on Light and Hours of Exercise in the Alps* (1871); *The Forms of Water in Clouds and Rivers, Ice and Glaciers*, contributed to the International Science Series (1871); *Fragments of Science for Unscientific People* (1871, enlarged ed., 1876); *Contributions to Molecular Physics in the Domain of Radiant Heat* (1872); *On Sound and Six Lectures on Light* (1875); *Lectures on Electricity* (1876); *On the Floating Matter of the Air, in Relation to Putrefaction and Infection* (1881); and *New Fragments* (1892). To this great volume of work Professor Tyndall brought rare qualities of mind, which gave him an exalted place among men of science. He not only popularized but enriched the whole field of physics, embracing light, sound, radiant heat, electricity, magnetism, the properties of air and water. In addition to his elaborate disquisitions on these usually abstruse subjects, he delighted the non-scientific by his papers on Alpine climbing, on the use and limits of the imagination in science, with interesting biographical stories of famous scientists and litterateurs. He, moreover, possessed remarkable gifts as a writer and expounder, besides great powers of argument as a controversialist. As a lecturer he was brilliant and effective. A pathetic circumstance marked his death, which was caused by a dose of poison, accidentally given him by his wife, while he was suffering from insomnia. The close of his useful career occurred at his Surrey house, at Haslemere, England, Dec. 4, 1893.

TYNG, the name of a family of clergymen in the Episcopal Church. They were of Massachusetts origin, and the patronymic changed from Atkins to Tyng on the inheritance of some English property. The first, STEPHEN HIGGINSON, was born March 1, 1890, in Newburyport, Massachusetts, was graduated at Harvard, 1817; took orders in the Episcopal Church in 1821; held pastorates in Georgetown, District of Columbia, and in St. Anne's, Maryland; then in Philadelphia 16 years from 1829; then rector of St. George's Church, New York, for 33

years, during which time the congregation removed from Beekman Street to a splendid brownstone edifice in Stuyvesant Square. He died at Irvington, New York, Sept. 4, 1885. This Dr. Tyng was for many years the leader of the Low Church party in the Episcopal Church, during which time he turned large sums of money into the support of evangelical enterprises. He was a famous pulpit orator in his time, and an eloquent platform speaker. In Sunday school work he was an efficient organizer, and his schools were famous. He edited several evangelical weeklies, published many tracts and sermons, through the Evangelical Knowledge Society, which he created for such purposes. Of the books he left behind him the best are *Law and Gospel* (1832); *Recollections of England* (1847); *Forty Years in Sunday Schools* (1860); *The Prayer Book Illustrated by Scripture* (1867); and a memoir of his son, Dudley.—This son, DUDLEY ATKINS, was born in Maryland, 1825; educated at the University of Pennsylvania and at the Alexandria Theological Seminary; preached, as rector, in Columbus and Cincinnati, Ohio, in Charleston, West Virginia, and, as his father's successor, at the Church of the Epiphany, Philadelphia. In 1854 he preached abolition sermons, and was forced to resign his parish. He organized a new one on Filbert Street, but died soon after, April 19, 1858, near Philadelphia. He left several books of ephemeral interest and evangelical character.—Another son, STEPHEN HIGGINSON; born in Philadelphia, June 28, 1839; educated at Williams College, 1858, and Alexandria Seminary, 1861; rector of a church on Lexington Avenue, New York; army chaplain, 1864; organized Church of the Holy Trinity, New York, in 1865; built a fine structure for it near the Grand Central depot; tried and publicly censured for preaching in a Methodist church, in New Brunswick, N. J., without the consent of the Episcopal rectors of that city; wrought in evangelical revival movements in New York; engaged in life insurance business in Paris in 1881 for a large New York company. Died in Paris, Nov. 17, 1898.

TYPE AND TYPE-FOUNDING. See TYPOGRAPHY, Vol. XXIII, pp. 692-700.

TYPE-SETTING MACHINERY. A number of successful machines for setting type, or for forming lines as substitutes for set matter, have been introduced within a few years. The first to secure general introduction was the Thorne, which consists primarily of two vertical cylinders, set one above the other. In the surfaces of the cylinders are ninety upright channels, each for a different character. The upper cylinder is the distributor, and rotates with a step-by-step motion, bringing the channels into line with the lower cylinder, and supplying it with type. There is a rotating disk below the lower cylinder, and when one of the keys is touched, a plunger pushes out the type indicated upon the disk, from which it is carried by a belt and lifted by a packer into the line. The justifying of the lines is done by hand, and requires a second operator.

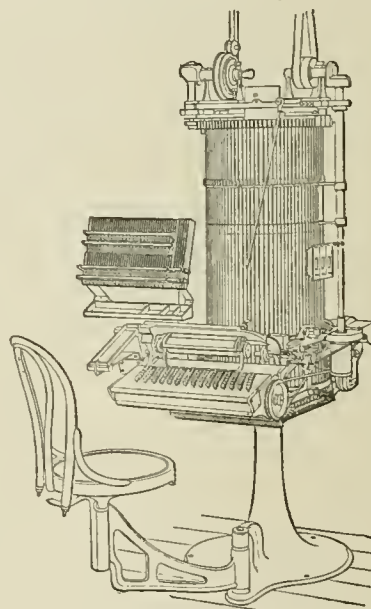
The Empire type-setting machine is of the same class, requiring two operators and setting individual type. The composing and distributing machines are separate, the latter being automatic, requir-

ing only to be supplied with pages or columns of type, and to have the type-channels removed when full. These type-channels, or trays, are carried to the composing-machine, which is divided into three cases, with 84 channels. In these channels the type are set horizontally in upright rows, and released by pushers set in action by levers from the keyboard. As each key is released, the corresponding type slides foot foremost down a glass front to its place in a raceway. A cam running in the raceway drives each letter as it drops, and the whole line to the left, in the direction of the justifier. This operator reaches into the raceway with a grab, and draws enough set matter toward him to form a line of the required measure, placing it in a galley, that serves as a composing-stick. He justifies the lines by hand, having several sizes of spaces conveniently placed for that purpose, so that they come to his fingers in the proper position. The makers of this machine claim that it is the fastest in actual use, and that it sets the cleanest proof. However, it requires more help for operation. The proofs are exceptionally clean because the justifier has time to read the type and correct minor errors as he goes along.

The Lanston monotype is both a type-casting and type-setting machine. The mechanism comprises a keyboard with 225 keys, and devices for punching a paper ribbon. There may be one or several of these keyboards, which are independent machines. The punched ribbons taken from them are fed automatically into a machine, that casts the type, sets it into lines, justifies them, and arranges them in columns. When an operator at the keyboard has punched enough holes to fill a line as nearly as may be, he glances at a scale which has automatically registered the amount of space remaining in the line; he has then only to strike the number of spaces lacking, at the end of the line, and the casting and setting machine will later divide that space among the different words of the line. The ribbon travels backward through the casting and setting machine, by which arrangement the machine obtains at the outset a record of the spacing required in a line, without which it would be impracticable to secure automatic justifying. The perforated paper ribbon serves to put in motion parts of the mechanism of the casting-machine that center the matrix represented by a perforation. The matrices are all on one small plate, about three inches square, so that a very slight travel is sufficient to center the matrix on the mold. The type are cast in a vertical position, by means of metal forced in through a nozzle, the mold being subjected to pressure at the same time, to secure good casts. From the mold a carrier conveys the type to its place in the galley, where it is held in position by a positive arrangement. The speed of the machine that does the casting and setting is not claimed to be quite equal to that of some competing machines, but as it is automatic and does not get tired, it can be worked more hours. The speed of work on the keyboards is limited only by the ability of the operator. As this work is almost identical with the operation of a typewriter, it is claimed that editors and reporters will become edu-

cated to its use, thus doing away with the compositor except for purposes of correction and make-up. The keyboard mechanism fills out blank spaces and lines of leaders with great rapidity, it being necessary only to hold a key depressed to secure the repetition of the character as many times as desired.

The Rogers typograph is a line-forming machine, the product of which resembles that of the linotype. The operation of the keyboard serves to release matrix-bars, which slide down wires attached to a tilting-frame. When enough matrix-bars are assembled to form a line, a treadle is depressed, and the justifying and casting operations are put under way. A secondary movement of the treadle releases the spaces and matrices, and allows the cast type-bar to go on to be trimmed and delivered. To distribute the matrices, it is only necessary to raise the front of the tilting-frame and allow them to slide back to their first position by gravity. The automatic justi-

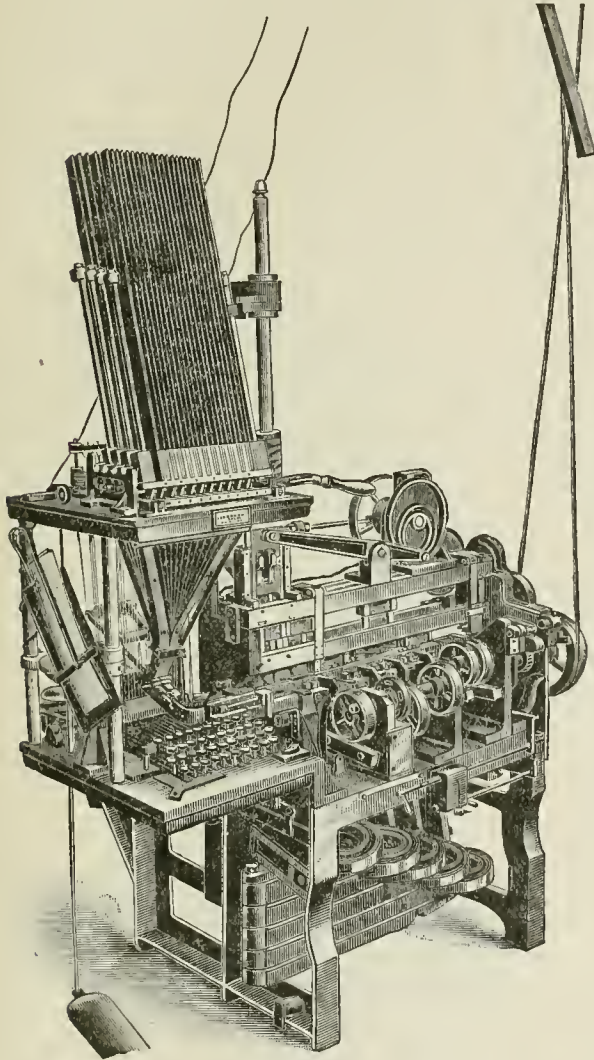


THORNE TYPE-SETTING MACHINE.

fyng is accomplished by means of rocking, cam-like disks, which spread the line to the proper length. At the first touch of the treadle a compressing-arm is brought parallel with the line of composed matrices, and to the point that is fixed for the length of line. A space-shaft is then rotated, and moved longitudinally, causing the spaces to expand and fill the length of line. The mold-slide and aligning-plate are then moved into engagement with the matrix-bars, so that the latter form the face of the mold. The metal-pot then swings forward into register with the mold, and a pump-plunger assists the pour. The finished product is a line stereotyped in a solid type-bar for printing a line. This machine has been shut out of use by a decision of the courts, for infringing the Mergenthaler linotype patent in the use of a type-bar, or solid line of type, in place of individual type. It will be reintroduced within a short time, on the expiration of the patent infringing.

The Calendoli type-setting machine is of French manufacture, and is not yet generally introduced.

It has fifteen alphabets in the keyboard, and the arrangement is such that the letters forming syllables or short words may almost invariably be found somewhere on the keyboard, in proper order, from left to right, so that they may be struck simultaneously. The keyboard is very hard to memorize, but when learned the operator plays it like a piano, with all ten fingers, and amazing claims of speed are made. The keys are connected by electric wires so as to operate small magnets, that pull the slides and release the type from upright channels, so that they



MC MILLAN TYPE-SETTING MACHINE.

may slide to their places in the line. Although several letters are struck simultaneously, the mechanism is such that they take their proper order from left to right in the line.

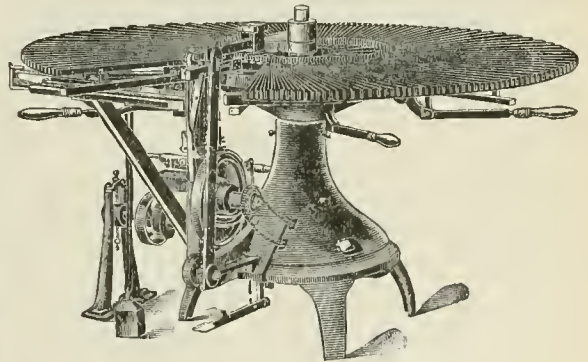
A German machine called the plectrotype has been announced. It resembles the monotype, but has the advantage that the ribbon may be read and corrected by hand by means of punches, so that when the tape goes to the machine it is perfect, and the type set automatically need not be proved and read again for errors, unless for some special purpose.

Paul F. Cox, a manufacturer of printing-presses at Battle Creek, Michigan, has patented a machine for setting type, in which the justification is accomplished by the use of crimped spaces. The lines, being set to full width or wider, are afterward compressed to the proper measure.

Gen. T. T. Heath, of Cincinnati has patented a matrix-making machine which has a keyboard that indents a paper matrix, so that a whole page or column may be cast at one time. It is a very simple machine, but presents difficulties in the way of correction of the matter.

McMILLAN TYPE-SETTING MACHINE. This machine, invented in 1883, belongs to the class utilizing gravity as the force for gathering the type to a common center. There are three parts, each independent of the other: The type-setting machine, the distributor and the justifier.

The machine proper occupies about half the space of the compositor's "frame." The operator sits before a keyboard, and works the keys as in the ordinary Remington typewriter. Set above the keyboard are four "sections," each containing twenty



MC MILLAN DISTRIBUTING-MACHINE.

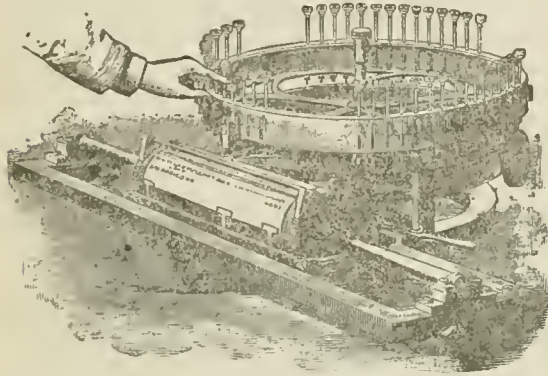
brass channels, each about twenty-four inches in length. These contain the various types. Each "channel" swings on a hinge as a door swings. By the touching of a key the required type is released, and drops by gravity into a race, whence it is carried forward to its destination, a peculiarly constructed "storage-galley," where line after line of "set" matter is "stored" for manipulation.

The "storage-galley" is rectangular in shape; is about twenty-four inches in length; will hold from twenty to forty lines, according to the size of the type, and reserves in temporary store five thousand or six thousand ems of matter. From this "storage-galley" a proof is taken, and when corrected the final justification is made.

The distributor is distinct from the type-setter. It consists of a disk revolving within a series of "sections" radiating from its outer circumference. The type is fed line after line into the disk-channels, while the steady revolution of the disk carries it around, and when the appropriate place for the type is found, as is indicated by the nicks, it is "discharged" into the "channels" severally designated by mechanical appliances. When a "channel" is filled, it is removed and stored on a "channel-rack," an "empty" channel being put in its place. The proof having been taken from the "storage-galley,"

nothing remains but the final justification into line-measure, which is done on a machine with one operator, when the matter is ready for the form. See also LINOTYPE, in these Supplements; and TYPOGRAPHY, Vol. XXIII, pp. 700, 701.

TYPEWRITING MACHINES. Like many another useful invention, the idea of a machine to do the work of the pen had suggested itself to many minds long before any practical machine was actually devised. As noted in the general article under WRITING-MACHINES, Vol. XXIV, pp. 697, 698, the earliest recorded attempt to produce a



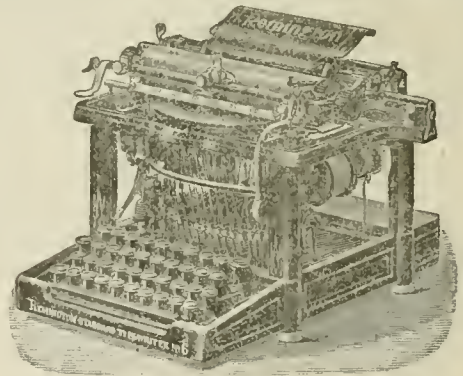
THE THURBER MACHINE.

writing-machine was in 1714, when, on January 7th of that year, a British patent was issued to Henry Mill, an engineer. With the exception of a machine intended for embossing printed characters for the blind, said to have been invented in the year 1784, Henry Mill seems to have found no imitators for many years. The first record of an American typewriter is that of a device patented by William A. Burt of Detroit, in 1829. This machine, although a working typewriter, was exceedingly crude in design and of the roughest construction. The record of this patent, together with the only model of the machine, was destroyed by fire in the patent-office, in 1836. Another and more elaborate attempt is recorded in the French *Brevets d'Invention* of 1833. The machine invented by Xavier Pröyrin of Marseilles, resembled the principles of the modern successful machines. The efforts of inventors to produce a telegraphic printing-machine gave an impetus to the idea of a writing-machine. (See TELEGRAPH, Vol. XXIII, pp. 120 et seq.) In 1843 Charles Thurber of Worcester, Massachusetts, took out a patent for a typewriter, which was the first really practical machine made, but, on account of its lack of speed, it was nothing more than a scientific toy. In his device a flat, horizontal wheel carried upon its circumference a number of perpendicular type-rods bearing letters at their lower ends. He introduced a cylindrical platen, sliding upon a rod with the paper wrapped around it in the manner common to modern machines. The type-bearing rods were pressed down upon this cylinder, leaving an impression of the type-faces upon the paper. This machine was never manufactured, and the only model in existence is now preserved by the Worcester (Massachusetts) Society of Antiquarians. The next recorded in-

vention is that of Pierre Foucault, a blind inmate of the Paris Institute for the Blind. It printed raised letters for the blind very successfully. It did not come into general use, although the inventor also claimed a general field for his machine by fitting it to write with printer's type and carbon paper. In the period between 1850 and 1856 several machines were invented, but no progress was made of any moment.

More in the line of practical progress were the inventions of A. Ely Beach of New York, for many years one of the editors of the *Scientific American*. In 1856 he took out a patent for a machine which marked a decided advance upon anything which had then been accomplished. The machine, which was bulky, consisted of a circle of double type-bars, each pair carrying a set of embossing-dies, and was primarily intended for embossing a strip of paper with raised letters for the use of the blind, although he also adapted it to printing with carbon-paper by the impact of a single set of type-bars upon the ribbon. This machine did good work, but was very slow.

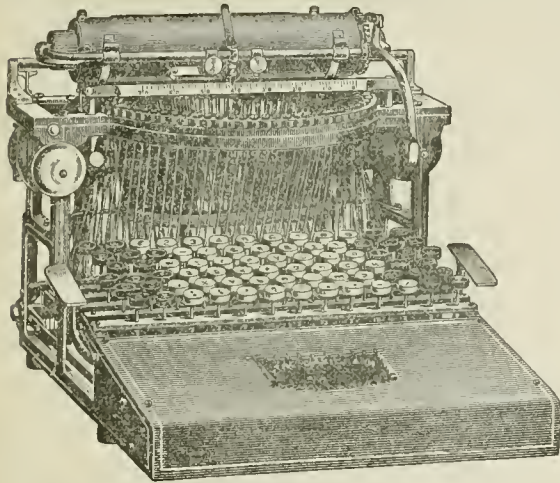
In 1857, Dr. Francis of New York, took out a patent for a typewriter, in which a motion similar to that of a piano-hammer was employed to throw up to a common center the types arranged in a circle. It was bulky and intricate, and, although capable of good work, was too costly for a commercial venture. This machine also contained many of the salient features of the typewriter of to-day, such as the carriage traveling from side to side over the type-basket, alarm-bell for indicating the end of the line, and a blank key for spacing. Other patents were granted in the United States in 1858 and 1865, the latter, for the House machine, being interesting merely as



THE REMINGTON NO. 6.

containing the device of a central guide for maintaining the alignment of the type, which has been introduced in later machines, and which is erroneously supposed by many to be a necessity for maintaining the good alignment of the machine. The first really practical writing-machine which was constructed, and which developed into the now famous Remington typewriter, originated in the winter of 1866 and 1867, in Milwaukee, Wisconsin, from the efforts of three inventors, C. L. Sholes, S. W. Soulé and Carlos Glidden. Sholes and Soulé were together engaged in perfecting a machine for

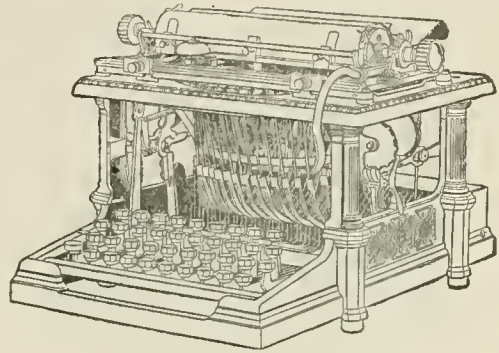
erially numbering the pages of blank-books. Glidden was, at the same time, in the same shop, interested in developing a mechanical spader intended to take the place of a plow. He took great interest in the paging-machine, and suggested to Sholes "Why cannot a machine be made which will write letters and words instead of simply figures?" Sholes's resolution to attempt the construction of such a machine was greatly strengthened by an editorial written by Mr. Beach (before mentioned) in the *Scientific American*, giving some description of a machine called the "Pterotype," an invention of John Pratt of Center, Alabama, which had been exhibited to the Royal Society in London. Soulé and Glidden joined Sholes in the enterprise, and the three went to work. They were ignorant of everything that had been attempted in this line before, save for the description of Pratt's device. The first crude model was largely the work of Soulé, who suggested pivoted types set in a circle. Sholes invented the letter-space device; all three worked persist-



THE CALIGRAPH.

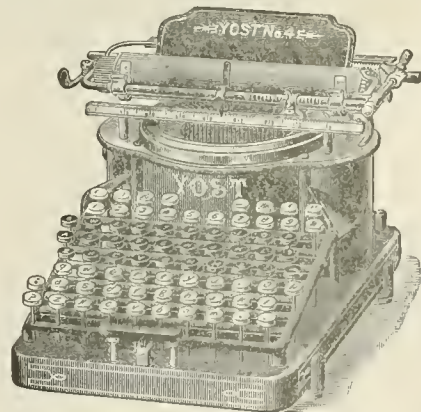
ently on the machine, each making suggestions and discussing those of the others. About September, 1867, the first machine was made. It was sufficiently successful to prove the correctness of some of the principles involved, as it wrote fairly well and with moderate rapidity. The inventors wrote many letters with it and sent them to friends. Among these letters was one to James Densmore, a friend of Sholes, then resident in Meadville, Pennsylvania. Mr. Densmore was a 'practical printer, and, becoming much interested in the enterprise, was admitted to the firm. Soulé and Glidden soon dropped out of the enterprise, leaving it in the hands of Sholes and Densmore. Densmore, an energetic, confident business man, spurred Sholes on to constant improvements. Twenty-five or thirty models were constructed, each being an improvement upon the one before, and each serving to exhibit some point of weakness in the device. Finally, a machine was constructed which seemed to include all that was necessary to make it marketable. The first patent was issued to the firm in June, 1868.

So far, all the machines that had been made were the product of an ordinary machine-shop, and the promoters perceived that to properly place the apparatus before the public, with a chance of ultimate success, the resources of a greater and better-equipped establishment than they had at command were necessary. With this project in view, Densmore, in 1873, interested the firm of E. Remington and Sons of Ilion, New York, rifle manufacturers.



THE REMINGTON-SHOLES.

After much negotiation, the Remingtons agreed to undertake the manufacture of the machines, and for a year after the date of the first arrangement they conducted careful and costly experiments to improve the form of the machine and place it before the public in a more practical shape. From this date the machine took the name of the Remington typewriter, and in 1874 the first machines manufactured by the Remingtons were put upon the market. The fundamental principles of the device alone survived, as the form of the machine had been greatly changed by the skilled mechanics who had charge of the work of improvement. A description of this



THE YOST.

machine as made and used for many years is given in Vol. XXIV, p. 698. The same principles are still in use, with new improvements added. The original model, known as the No. 1 Remington was made to write only in capital letters, figures and punctuation-marks. It was soon apparent that the invention must be made to write both large and small letters, and the No. 2, Remington came out,

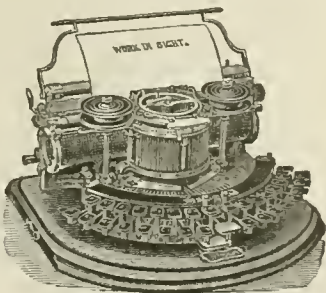
which had the largest sale of the Remington models. No. 3 is a repetition of No. 2, excepting that it is manufactured with a wider paper-carriage (taking paper 14 inches in width, whereas the No. 2, took a width of but 8 inches) and that it takes four additional keys. No. 4, like the No. 1, writes only capitals, but has the improvements of No. 3. No. 5 combines Nos. 2 and 3. No. 6 has a more perfect and permanent alignment, a lighter, stronger and



THE SMITH PREMIER.

steadier paper-carriage, an improved paper-feed, readily adjustable paper and envelope-guides, ingenious marginal-stops, marginal-release button; the inking-ribbon reverses automatically, an improved letter-spacing mechanism, and a block-signal to indicate the end of the line. The No. 7 is the No. 6 fitted for foreign use, with proper characters.

The Remington has been described in detail because it combines the various improvements and because it was the pioneer. It is given as the type of the class of machines which print by type-bars reaching a common center, having a shift-mechanism for printing capitals, and supplying the necessary ink by means of a ribbon. Among these ma-



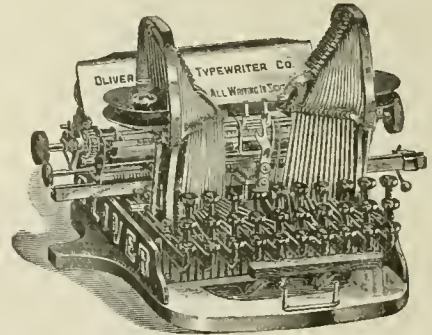
THE HAMMOND.

chines may be mentioned the Remington-Sholes machine and the Densmore. The Remington-Sholes claims as its distinctive features a rigid carriage combined with the universal keyboard as used by the Remington; the carriage is returned and spacing done in one movement; the small-sized carriage can be changed for a larger one instantly; the upper-case shift, when capital letters are to be printed, is effected by moving the basket instead of the platen, etc.

To a second class belong such machines as the Caligraph and Smith Premier, which have one type upon each type-bar and are not operated by a capital-shift. Such machines have, of necessity, what is called the double keyboard,—that is, a separate key for each character printed. The Smith Premier claims an easily detachable platen and paper-feeding mechanism, and a line-locking mechanism and carriage-stops which make it possible to write a page in columns, locking the printing-mechanism at the end of each column line.

To a third class belong such machines as the Yost, which has a compound type-bar motion, and inks the type by means of a moist pad, instead of by a ribbon. For these machines is claimed the special virtue of simplicity in construction and management. This machine, like those of the second class, has a double keyboard, and in the latest designs will write a line 12 inches in length. Its alignment is claimed to be unsurpassed.

To a fourth class belong the Hammond and its kindred, the Crandall, Munson, Blickensderfer, etc. These machines have a type-wheel or type-sleeve,



THE OLIVER.

which is inked both by an automatic pad and a ribbon, and which revolves so that the point of contact with the paper is the necessary character. For these wheels their makers claim perfect alignment, uniform impression, and a capacity to write on paper of any size.

Among the latest models of indefinite class, the Oliver, with its U-shaped type-bar, deserves mention. In this machine the writing is always in plain sight, owing to the shape of the bar and a device for removing the ribbon the moment a letter is struck. Perfect alignment is claimed, together with simplicity, independence of the platen and a downward stroke of the type.

TYPHA, a genus of monocotyledonous plants, whose species are commonly known as cattails or cattail-flags. They are marsh-herbs, with long, reed-like stems, long linear leaves, and a terminal dense cylindrical spike. *T. latifolia* and *T. angustifolia* are the two species of the United States.

TYPHLOPIDÆ. See SNAKES, Vol. XXII, p. 192.

TYPHOID FEVER. See TYPHUS, Vol. XXIII, pp. 678-680.

TYPHOON. See METEOROLOGY, Vol. XVI, p. 154.

TYR OR TY, a myth. See ÆSIR, Vol. I, p. 211.

TYRANNIDÆ. See KING-BIRD, Vol. XIV, p. 81.

TYRANNIES, THE. See GREECE, Vol. XI, p. 94.

TYRCONNEL (RICHARD TALBOT), EARL OF (1625-1691). See IRELAND, Vol. XIII, p. 268.

TYRNAU, in Hungarian, NAGI SZOMBAT, a town of Hungary, in the comitat of Ober-Neutra, on the River Trna, about 30 miles N.E. of Presburg. It has so many churches and convents that it has been nicknamed "Little Rome." Tyrnau has manufactories of cloth, linen, wood, etc., and a lively general trade, especially in wine. The famous "Tyrnau cask" is said to be twice as large as that of Heidelberg. Population, 11,500.

TYRONE, a town of Blair County, western central Pennsylvania, on the Little Juniata River, 14 miles N.N.E. of Altoona, on the Pennsylvania railroad. It has ten churches, an excellent school system, several banks and loan associations, and is extensively engaged in manufacturing, the principal industries being saw, flour and paper mills, iron and steel works, and broom factories. Population 1890, 4,705; 1900, 5,847.

TYRONE (HUGH O'NEIL), EARL OF, an Irish soldier; born in Ireland about 1550; was the illegitimate grandson of the first Earl of Tyrone; com-

manded a troop of horse in the service of Queen Elizabeth (1579-83); received from the Irish Parliament the title of Earl of Tyrone (1587) and from the crown the confiscated estates of Shane O'Neil. In 1590 he assumed the title of The O'Neil, and with the help of Red Hugh, The O'Donnell, raised the standard of revolt against the English sovereign, offering the crown to Philip II of Spain. Being declared a traitor, he defeated, successively, Sir John Norris (1597) and Sir H. Bagnal (1598), but was defeated, with his Spanish allies, in the attack of Kinsale (1601). He surrendered to Lord Mountjoy, but was pardoned by James I. Again suspected of intrigues in 1607, he fled to Belgium and finally settled in Rome, where he died, in poverty, in 1616.

TYROSINE, a white crystalline substance found in the liver during disease, and in the spleen and pancreas. It is formed also in the putrefaction of cheese and other putrid matter. Chemically it is paraoxyphenylalanine.

TYROTOXICON, a ptomaine extracted by Vaughan from putrid cheese. It is very poisonous, producing vomiting and diarrhœa.

TYRRHENI, a race. See ETRURIA, Vol. VIII, p. 633.

TZANA, a lake. See DEMBEA, in these Supplements.

U

UCAYLI—ULLOA

UCAYLI, a river in Peru, considered by many the true head of the Amazon. The rivers Mantaro, Apurimac, Vilcamayu and Paucartambo, whose union forms the Ucayali, rise on the eastern slope of the Western Cordillera, and run through narrow cañons, afterward watering some of the most fertile provinces of Peru. The Ucayali itself flows in the lowlands in a northerly direction and through virgin forests. It is destined to be the main eastern outlet of Peru. Its length, under its own name, is one thousand miles; adding to it the length of the Apurimac, it is fifteen hundred miles long. It is navigable by small steamships.

UCCELLO, PAOLO, an Italian painter; born in Florence, Italy, in 1397; died there, Dec. 11, 1475. From his love of birds his surname of Dono was changed to Uccello, or Uccelli. He learned the goldsmith's art, and acted as one of the assistants of Ghiberti when this great artist was working on the admirable doors of the Florence Baptistery. In the Duomo near by is found the colossal equestrian portrait of Sir John Hawkwood, painted by Uccello in *chiároscuro*, by means of *terra verde*. His frescoes in Santa Maria Novella, Florence, have vanished from sight. In Padua, in the mansion of the Vitaliani, are some giants, also done in *terra verde*. This artist showed admirable decorative skill. Among his smaller pictures, the Louvre Museum owned a panel containing his portrait and that of his contemporaries, the artists, Giotto, Donatello, Brunelleschi and Giovanni Manetti. The National Gallery, London, has also some examples of this artist's work.

UGANDA. Area, about 120,000 sq. miles; pop., about 3,920,000; capital, Mengo. Until June 19, 1894, the Imperial British East Africa Company, by virtue of several international agreements, and under a treaty with the Sultan of Zanzibar, occupied and administered the Uganda kingdom, northwest of the Victoria Nyanza. On that date, however, the company withdrew from Uganda and from the region between it and Lake Albert Edward and the river Semliki, and a British protectorate was declared, which has now at its head a royal commissioner. On June 30, 1896, Unyoro, to the west, and Usoga, to the east, were incorporated in the protectorate. There is a line of British forts between Lakes Albert and Albert Edward. A railroad line 657 miles long has been surveyed between the seaport of Mombasa and Victoria Nyanza, and its construction had in 1898 reached 250 miles inland. There is a good road between Mombasa and Kibwezi (200 miles inland). See also **UGANDA**, Vol. XXIII, pp. 717-18; and **AFRICA**, in these Supplements.

UGRIANS. See **EUROPE**, Vol. VIII, p. 698.

UHRICHSVILLE, a city of Tuscarawas County, eastern Ohio, on the Stillwater Creek, 32 miles S. of Canton, on the Pittsburg, Cincinnati, Chicago and

St. Louis and Cleveland, Lorain and Wheeling railroads. It is an agricultural and sheep-raising section, and is extensively engaged in the production of sewer-pipe, drain-tile and fire-brick. There are six churches, a school system, two private banks, and an electric railway. Pop. 1890, 3,842; 1900, 4,582.

UIST, NORTH AND SOUTH. See **HEBRIDES**, Vol. IX, p. 607.

UKEREWE, an island. See **NILE**, Vol. XVII, p. 504.

UKIAH, a city and the capital of Mendocino County, northwestern California, on the Russian River, about 110 miles N.N.W. of San Francisco, on the San Francisco and North Pacific railroad. It is the center of a farming, fruit-growing, stock-raising and lumbering section. It has flour-mills, a tannery, and a state bank with a capital of \$250,000. Population 1890, 1,627; 1900, 1,850.

ULCERATION. See **SURGERY**, Vol. XXII, p. 683; and **SURGERY, AMERICAN**, in these Supplements.

ULEMA. See **TURKEY**, Vol. XXIII, p. 654.

ULEX. See **FURZE**, Vol. IX, pp. 851, 852.

ULLMANN, KARL, a German divine; born at Epfenbach, Palatinate, March 15, 1796; studied at Heidelberg, Tübingen and Berlin, associated frequently with Hegel, Schleiermacher and Neander, and interested himself all his life in the reconciliation of dogmatic revelation and modern science; professor of theology at Heidelberg (1821), he founded the periodical entitled *Theologische Studien und Kritiken*; was for a few years professor at Halle, but returned to Heidelberg, where he remained in office until 1861 as president of the Chief Ecclesiastical Council of Baden. The following books of his have all been translated into English: *Gregory of Naziansus* (1825); *The Worship of Genius* (1840); *Reformers Before the Reformation* (1841); *Apologetic View of the Sinless Character of Jesus* (7th ed. 1873); *The Essence of Christianity* (1845). He died at Carlsruhe, Jan. 12, 1865.

ULLOA, JEROME, an Italian general; born at Naples, Italy, in 1810. He graduated in the royal navy, from the College of the Nunziatella. Arrested in 1833 for not having revealed what he knew about a conspiracy, he was detained in jail six months. In 1845 he had reached the rank of captain. In 1848, when the Austro-Sardinian war broke out, he took part in it with distinction, going north with a corps of Neapolitan volunteers to create a diversion against the Austrians. In May, 1848, he was elected Deputy to the Parliament of Naples, and one year later to the National Assembly of Venice. When reaction set in in his native country, he had to leave, and from 1849 to 1859 he resided in Paris. During the campaign of 1859 he was placed in command of the Tuscan volunteers, and fought for Italian unity. He wrote *Instructions on Shooting, for Artillerymen*

Naples, Political and Military, etc. He died in Florence, April 11, 1891.

ULLSWATER, LAKE. See CUMBERLAND, Vol. VI, p. 699.

ULMACEÆ. See ELM, Vol. VIII, pp. 151, 152.

ULNA, a bone. See MAMMALIA, Vol. XV, p. 359.

ULRICH, TITUS, a German poet; born at Habelschwerdt, Prussia, Aug. 22, 1813; received a French education from his father and graduated from the universities of Breslau and Berlin, taking the degree of doctor of philosophy in 1836. He had to pay his way by teaching, but his poetic genius manifested itself amid the direst privations. In 1845 he wrote an epic, *The Song of Songs*, and in 1848 a poem, entitled *Victor*, attacking the monarchy. He afterward devoted most of his time to the daily press, being one of the habitual contributors to the *National Zeitung* of Berlin.

ULTRAMONTANISM, in its present meaning denotes a doctrine of absolute papal supremacy. In its early use, *ultramontane* was opposed to *cismontane*, and was applied to countries on the north side of the Alps. As Gallicanism grew in importance, the controversies of the papal curia and the kings of France, especially in matters connected with the appointment of bishops, changed in geographical sense and import. It now stands for that view that makes Rome the central point whence the discipline of all matters, both secular and religious, are regulated without appeal to either kings or church councils. Ultramontanism began to be known in this sense when Lamennais, Montalembert and Lacordaire, shortly after the Revolution (1830), founded, in France, the liberal newspaper, *L'Avenir*, which, although thoroughly devoted to Roman Catholic principles, attempted to define and restrict the exact power of the Holy See, both in the interpretation of dogmas and in its intercourse with secular powers. Gregory XVI ordered the publication stopped. Lamennais, to whom Gregory's predecessor had offered a cardinal's hat, declined to fully renounce his anti-ultramontane convictions, and gradually drifted away from Roman Catholicism to a democratic ideal of Christianity all his own. He was duly excommunicated and died a broken-hearted man. Later, ultramontanism had a hard fight to sustain when it antagonized Bismarck, and led to that suspension of relations between the new German Empire and the Vatican known as the Kultur Kampf. Generally, ultramontanism stands for the supremacy of the papal authority everywhere over all those matters called spiritual by the Church of Rome.

ULTRA VIRES, a legal term applied to the contract of a corporation, when such contract is outside the powers conferred upon the corporation by its charter and the general laws in relation thereto. Baron Bramwell of England appears to have been the father of the term, when acting as counsel in a case in 1851. It is usually applied to the unauthorized acts of a corporation, but has also been adopted to describe authorized acts done in an unauthorized manner, or authorized acts done by unauthorized officers. It has further been extended to positively illegal acts of corporations. The tendency of

law is, however, to limit the term to the first definition in this article. As a general principle of law, *ultra vires* contracts are not enforceable. Torts committed by corporations do not fall within the definition of *ultra vires*. The remedy for *ultra vires* acts is by injunction obtained by stockholders or creditors, or, in some states, by proceedings to restrain the corporation or for the forfeiture of its charter, taken by the law officers in the state, and in the nature of *quo warranto* proceedings. *Ultra vires* is essentially the province of a lawyer, and the subject has been well treated in Green's edition of *Brice's Ultra Vires*.

ULUNDA OR LUNDA, a native feudal state of Africa, the largest and most populous empire in the Congo basin, comprising most of the territory lying between the Kwango and Kasai. Its ruler bears the official title of Muata Yanvo, and is the fourteenth in descent from the founder of the dynasty in the seventeenth century. He is the suzerain of about three hundred monas and muenes; that is, vassal chiefs and kinglets, who pay tribute in kind—ivory, lion and leopard skins, corn, cloth, salt, etc.—so long as the central power is strong enough to enforce it. Its present area cannot be estimated at much less than 100,000 square miles, with a population perhaps not exceeding 2,000,000. Capital, Musumba. The latest partition of Africa has placed Ulunda within the sphere of action of the Portuguese on one side of the Kassai River and the Congo Free state on the other side. See also AFRICA, in these Supplements.

UMATILLA, a river of Oregon, which rises in the Blue Mountains, in Umatilla County, the northwestern part of the state, and, after a westerly and northwesterly course of 150 miles, empties into the Columbia River at Umatilla, on the boundary line between Washington and Oregon.

UMBAGOG, a lake lying partly in Coos County, New Hampshire, from which it extends into Oxford County, Maine. It has a length of about nine miles, varies in width from one to four miles, is surrounded by beautiful scenery, and is a favorite resort for summer fishermen. The outlet of Lake Umbagog unites with the Margalloway River to form the Androscoggin River.

UMBELLIFERÆ, a large family of herbaceous dicotyledonous plants, often called parsley family, characterized by the hollow stems, leaves with an inflated sheath at base, small flowers in umbels, and a two-carpelled fruit variously ridged and winged, and whose walls contain "oil-ducts." The well-known forms are caraway, parsley, fennel, anise, coriander, poison-hemlock, carrot, parsnip, celery, etc.

UMBER. See PIGMENTS, Vol. XIX, p. 88.

UMBRELLA-BIRD, a name applied to certain cotingas which have a recurved crest. The best example is a South American crow-like bird *Cephalopterus ornatus*.

UMBRELLA-SHELL. See MOLLUSCA, Vol. XVI, p. 655.

UMBRELLA TREE, the common name of certain species of *Magnolia*, referring to the way in which the large leaves are borne upon the ends of

the shoots. They are abundant in the Alleghany region.

UMBRIDÆ, a family of fishes. See ICHTHYOLOGY, Vol. XII, p. 693.

UMLAUT. See GERMANV, Vol. X, pp. 519, 521.

UMNAK, one of the islands of the Aleutian Archipelago, Alaska, the most westerly of the Fox Island group. It was first visited by a Russian sea-captain in 1757; is mountainous and bare, and too cool for ordinary crops. The population is Aleut and scanty. The chief industries are fishing and sealing. The island is mountainous and volcanic, being in close proximity to Bogoslov (q.v., in these Supplements).

UMRITEUR. See AMRITSAR, Vol. I, p. 777.

UNADILLA, a village of Otsego County, south-eastern central New York, 43 miles E.N.E. of Binghamton and 18 miles S.E. of Norwich, on the Susquehanna River, and on the Delaware and Hudson railroad. It is in an agricultural and dairying region, and has wagon, box and cigar factories, milk-condensing establishment, foundry and machine-shop. Population 1900, 1,172.

UNALASKA, one of the Aleutian Islands, the second largest of the group, off the coast of Alaska, lying between the parallels 53° and 54° N. and the meridians 166° and 168° W., about 75 miles long and 25 broad, mountainous and treeless. The climate is too cool for the ordinary crops, although extreme cold is seldom experienced. The principal industries, in which the population, composed chiefly of Aleuts, with a few Russians and Americans, is engaged, are fishing and sealing. Unalaska town, the most important place on the island, is at the head of Captain's Bay, a well-known naval rendezvous.

UNALASKANS, a tribe of Aleut Indians. See ALASKA, in these Supplements.

UNARMORED VESSELS IN THE UNITED STATES NAVY. See NAVY, in these Supplements.

UNAU, a genus. See SLOTH, Vol. XXII, p. 162.

UNCAS, an American Indian chief; born in the Pequot settlement of Connecticut, about 1588. Internal dissensions caused his expulsion from the Pequot tribe, and, gathering together a number of his followers, he settled east from Lyme, Connecticut, where he founded the tribe known as the Mohegans. In 1637 he combined with the colonists, under Colonel John Mason, for the destruction of the Pequots. The allied forces being successful, he was given a portion of the conquered territory. His close intercourse with the colonists aroused the jealousy of Miantonomoh, chief of the Narragansetts, who invaded the land of the Mohegans with a thousand of his followers, and a desperate engagement resulted, in which the Narragansetts were defeated and their chief taken prisoner. Miantonomoh was tried before the colonial authorities, and, upon being sentenced to death, was taken to Norwich, where he was brained by a tomahawk in the hands of a brother of Uncas. This occurrence was the signal for a coalition of the Mohawks, Potomotoes, Narragansetts and other tribes against the Mohegans, and for the next few years Uncas was almost continuously engaged in defending his country from their inva-

sion. In one of these campaigns he was saved from capture by the timely arrival of Ensign Thomas Leffingwell of the English army, and out of gratitude he transferred to him the land upon which Norwich now stands. A monument has been erected there to his memory (1825). He died near Norwich, Connecticut, in 1682.

UNCIAL WRITING. See PALÆOGRAPHY, Vol. XVIII, pp. 145-149 (Greek); pp. 151-154 (Latin).

UNCONSCIOUS MENTALITY. See *Continuity of Consciousness*, under PSYCHOLOGY, Vol. XX, pp. 42 et seq.

UNCTION. See EXTREME UNCTION, Vol. VIII, pp. 813, 814.

UNDERCUTTING-MACHINE. Several machines have been introduced within a few years for undercutting a mass of coal, to facilitate its removal. The Jeffrey undercutter is a fair representative of them all. It has a horizontal bar three to three and a half feet long, and armed with claw-like cutting-blades, made of tool-steel. This bar is rotated by endless chains on an extensible framework, which is braced and thrust against the lower face of the breast. It cuts a hole four to five feet deep, and is then withdrawn, moved to one side and the operation repeated. About one hundred and twenty square feet can be cut in an hour. An electric motor is commonly used to furnish the power, and a worm and rack mechanism to feed in the cutting-bar. The machine is usually transported in a truck from room to room of the mine, set up on boards and braced up against the walls and ceiling.

UNDERSTANDING. See *Intellection*, under PSYCHOLOGY, Vol. XX, pp. 75 et seq.

UNDERWOOD, FRANCIS HENRY, an American author; born in Enfield, Massachusetts, Jan. 12, 1825. He enjoyed only a common-school education, and but one year at Amherst (1843-44). He taught school in Kentucky, studied law and was admitted to the bar, but had to leave in 1849, as his abolitionist ideas shut off all chances of his succeeding in Kentucky. Clerk of the Massachusetts senate (1852-54), he entered the publishing firm of Phillips, Sampson and Company of Boston as their literary adviser, and originated the idea of creating the *Atlantic Monthly*, with James Russell Lowell as its editor, and was himself its managing assistant. In 1857 the magazine became the property of Ticknor and Fields, and Mr. Underwood accepted the appointment of clerk of the Boston superior criminal court (1859-70). He soon began publishing his *Handbooks of English and American Literature*, which had a wide circulation. President Cleveland appointed him consul at Glasgow (1885), and consul at Edinburgh (1893). His literary activity never ceased, and he published four novels, *Cloud Pictures*; *Lord of Himself*; *Man Proposes*; and *Quabbin* (mainly autobiographical). His biographies of *Lowell*, *Longfellow*, and *Whittier* are excellent reading; so are his *Builders of the American Literature* and *Handbook of English History*. He died in Edinburgh, Scotland, Aug. 7, 1894.

UNDERWOOD, LUCIUS MARCUS, an American botanist; born in New Woodstock, New York, Oct. 26, 1853; graduated from the Syracuse University;

professor of botany and geology at the Wesleyan University of Illinois (1880-83); of biology at the Syracuse University (1883-91); of botany at the De Pauw University (1891). He prepared rare collections of *Fungi* and *Hepatica*, and wrote *Our Native Ferns, and How to Study Them* (1881); *Catalogue of North American Hepatica* (1884); etc.

UNDERWRITERS' ASSOCIATION. See FIRE INSURANCE, in these Supplements.

UNDERWRITING. See INSURANCE, Vol. XIII, p. 184; and MARINE INSURANCE, in these Supplements.

UNDULATIONS. See WAVE and WAVE-THEORY OF LIGHT, Vol. XXIV, pp. 415-459.

UNGULATA, an order. See MAMMALIA, Vol. XV, pp. 421-432.

UNIA, UNIATES OR MELCHITES, a sect of Christians observing the Greek rite. See GREEK CHURCH, Vol. XI, p. 157; ROMAN CATHOLIC CHURCH, Vol. XX, p. 631; and in these Supplements.

UNIAXALS. See MAGNETISM, Vol. XV, p. 265.

UNIGENITUS, a papal bull. See POPEDOM, Vol. XIX, pp. 507, 508.

UNIMAK, an island. See ALASKA, Vol. I, p. 444.

UNION, a town of Knox County, southern Maine, 14 miles N.W. of Rockland, on the Georges Valley railroad. Settled in 1774 as Taylor Town, it was incorporated under its present name in 1786, and had part of its territory cut off to make the town of Washington in 1811. It contains the villages of Union, North Union, South Union and East Union, and is engaged in agriculture and the production of stoves, mowing-machines, carriages, furniture and organs. The town has an excellent school system, churches and libraries. Population 1890, 1,436; 1900, 1,248.

UNION, a town and capital of Franklin County, eastern Missouri, on the Meramec River, 54 miles W.S.W. of St. Louis, on the St. Louis, Kansas City and Colorado railroad, which has repair-shops at this point. There are also flour-mills, a wagon factory and quarries of onyx and building-stone. Good clay and glass sand are abundant in the vicinity. Population 1890, 610; 1900, 744.

UNION, a city and capital of Union County, northeastern Oregon, in the southern part of the Grande Ronde Valley, about 110 miles S.S.E. of Walla Walla, on the Union Pacific railway. It is the center of a district producing grain, fruit and livestock, and had, in 1890, a population of 604, and in 1900 one of 937.

UNION, a town and capital of Union County, northwestern South Carolina, 65 miles N.N.W. of Columbia, on the Richmond and Danville railroad. It is the center of a hilly agricultural region, and granite, gold and iron ore are found in the vicinity. Population 1890, 1,609; 1900, 5,400.

UNION, a town and capital of Monroe County, southeastern West Virginia, 20 miles S.S.W. of White Sulphur Springs, the nearest railroad station being Fort Spring, on the Chesapeake and Ohio Railroad. The place is famous for its mineral springs, and is engaged in agriculture and stock-raising. Population 1890, 348.

UNIONACEA, a family. See MUSSEL, Vol. XVII, p. 110.

UNION CITY, a city of Randolph County, eastern Indiana, nine miles E. of Winchester, on the Chicago, St. Louis and Pittsburg and the Cleveland, Cincinnati, Chicago and St. Louis railroads. Situated in a region abounding in hardwoods and engaged in agriculture, it has lumber and flour mills and other manufactories. It has several churches, a good school system, and two banks with a net capital of \$180,000. Pop. 1890, 2,681; 1900, 2,716.

UNION CITY, a village of Branch County, southern Michigan, on Hog Creek, 11 miles N.W. of Coldwater, on the Michigan Central Railroad. The trade-center of a large agricultural region, it has two banks with a capital of \$100,000, and is also engaged in manufacturing. Population 1900, 1,514.

UNION CITY, a town of Erie County, northwestern Pennsylvania, 26 miles S.E. of Erie, on the Pennsylvania, the Erie and the Western New York and Pennsylvania railroads. It has six churches, good educational advantages, two systems of water-works, and electric lights. There are a number of manufacturing industries, including flour and wood-working mills and furniture and broom factories. The outlying country is covered with forest or devoted to agriculture. Population 1900, 3,104.

UNION CITY, a town and the capital of Obion County, northwestern Tennessee, 33 miles N. of Trenton, on the Mobile and Ohio and the Nashville, Chattanooga and St. Louis railroads. It has ten churches, educational advantages, banks and electric lighting, is engaged in manufacturing wagons and furniture, and has foundries and lumber and flour mills. The surrounding country is largely devoted to agriculture and stock-raising. Population 1890, 3,441; 1900, 3,407.

UNION COLLEGE, a college in Schenectady, New York, incorporated in 1795, chiefly by the efforts of General Philip Schuyler. It was named Union from its being established by the co-operation of several religious denominations. Its first president was John Blair Smith, of Philadelphia, who was succeeded in 1799 by Jonathan Edwards, the younger; but its great prosperity and usefulness were secured under the presidency of Rev. Eliphalet Nott, from 1804 until his death, in 1866. By his zeal, enterprise, and large benefactions, it was endowed and furnished with spacious buildings, a large library, and extensive cabinets of natural history. Dr. Nott was succeeded by Dr. Laurens P. Hickok, the distinguished metaphysician. In 1869 Dr. Aiken, of Princeton, was called to the presidency. He resigned in 1871, when Dr. Eliphalet N. Potter, son of Bishop Alonzo Potter and grandson of Dr. Nott, was made president. Under his administration the institution increased in funds and students. In 1884 he was succeeded by H. E. Webster, who in 1894 was followed by Dr. Andrew V. V. Raymond. In its general aims it has been greatly enlarged by a connection with the Law and Medical colleges at Albany, and, together with them, bears the name of Union University, of which the president of Union College is the chancellor. In 1898 it counted 21 instructors and 195 students, its

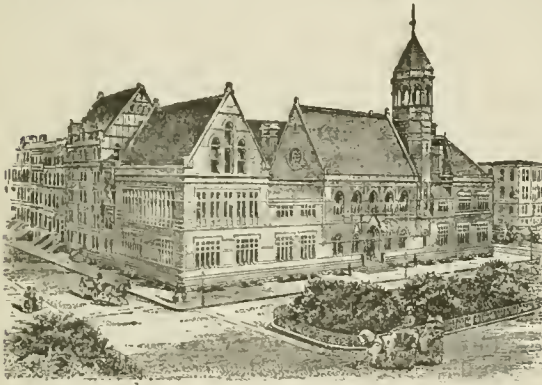
library contained 31,928 volumes, its invested funds amounted to \$393,602, and its annual revenue from all sources to \$75,229.

UNIONISTS. See **HOME RULE**, in these Supplements.

UNION-LABOR PARTY. See **LABOR PARTIES**, in these Supplements.

UNION SPRINGS, a town and the capital of Bullock County, southeastern Alabama, 40 miles E.S.E. of Montgomery, on the Central Railroad of Georgia. It is an important cotton-shipping point; situated in a grain, fruit and cotton raising district; has oil and steam cotton-gin works, cotton, grist and planing mills, a cannery and spoke and handle factories, and contains a college for women, a male and female institute, and boys' academy. Population 1890, 2,049; 1900, 2,634.

UNION THEOLOGICAL SEMINARY, an institution for the pursuit of studies in divinity, located in New York City. It was incorporated in 1836,



UNION THEOLOGICAL SEMINARY.

and, as its name would indicate, proposed to educate young men in theology, come from what denomination they might. It was to be free from traditional or radical extremes, was to make for peace, and offered a center about which men of moderate views and feelings might cordially rally. At first, recitations were heard in professors' houses, but in 1838 it found lecture-rooms with the University of the City of New York, on Washington Square. Forty-six years later it removed to Park Avenue, where it has dark brownstone buildings in ecclesiastical style, and a library which in 1898 had 72,562 volumes and a large number of pamphlets.

Although not legally a denominational school, acceptance of the Westminster Confession is required of each professor and director, while the president and the professors of systematic and practical divinity must be ordained men. The institution is virtually Presbyterian, and from its origin until 1870 was in sympathy with the New School of that denomination. Its direction is self-perpetuating and technically independent. In 1870 the Old and New schools of Presbyterianism united, and the directors, in the generosity of reconciliation, accorded to the General Assembly a veto over the appointment of professors, and the institution became enrolled on the minutes of the assembly as one of its authorized seminaries. In 1892, when

Dr. Briggs was translated from one chair to another, the General Assembly claimed the right to consider the transfer, and refused to accede to it. The directors then rescinded the concession, taking the ground that the original grant was beyond the power of the corporation and a violation of the charter. Thereupon the seminary was taken from the list of institutions approved by the General Assembly, and boards of education were instructed not to grant aid to candidates for the ministry attending institutions lacking that approbation. In 1898 the seminary held productive endowments valued at \$1,350,000, had a total income of \$75,000, and 12 instructors and 125 students, of whom nearly 90 per cent had taken collegiate degrees. Among its especial characteristics are provision for instruction upon the relations of the Bible to science, upon hygiene, and in voice-culture and music.

UNIONTOWN, a borough and the capital of Fayette County, southwestern Pennsylvania, on the national pike, and on the Baltimore and Ohio and the Pennsylvania railroads, 70 miles S.E. of Pittsburgh. It was one of the most prominent points on the national road, at a period in the early history of the nation when that public improvement was the highway of emigration from the Alleghanies to the Missouri River, and is to-day of importance as a receiving and shipping point on two of the leading lines of railway in the country. Besides being the depot and distributing-center for an immense area of agricultural territory, Uniontown also handles very large quantities of coke and iron, in the production of which heavy outlays are made annually, and has glass-works, manufactories of steel and structural iron, flour-mills, cigar and carriage factories. The borough is lighted with gas and electricity, has water-works and electric street-railways, numerous churches, banks, daily and weekly newspapers. It was founded by Jacob Beeson, in 1783, and was formerly known as Beesontown. Population, 6,359; 1900, 7,344.

UNIONVILLE, a town and the capital of Putnam County, northern Missouri, on the Chicago, Burlington and Kansas City railroad, 44 miles W.S.W. of Bloomfield, Iowa, and 140 miles N. of Jefferson City. It is in a region producing coal, grain, lumber and live-stock, and has flour and woolen mills. Population 1890, 1,118; 1900, 2,050.

UNIT, CURRENT. See **ELECTRICITY**, § 50, in these Supplements.

UNITARIANISM IN THE UNITED STATES. (Some account of this religious body may be found in Vol. XXIII, p. 726.) In the eighteenth century, Socinian views found acceptance here and there among the clergy and laity of New England. Both the Adamses, Presidents of the United States, were of these opinions. In 1783 Rev. James Freeman induced his congregation of King's Chapel, in Boston, to accept a revision of the *Book of Common Prayer*, from which all expressions involving a belief in the triune personality of the Godhead had been eliminated, and for several years this was the only avowedly Unitarian organization in the country. In 1796 a Unitarian congregation was formed in Philadelphia, owing to the influence of a course

of lectures on the "Corruptions of Christianity," delivered there by the famous Dr. Priestley. In 1801 the church organized by the Pilgrim Fathers in 1620, at Plymouth, Massachusetts, became avowedly a Socinian body. Under a Congregational polity there is much room for personal independence of pastors, and there is no efficient means for displacing a minister for heretical views. The number of clergymen and laymen in New England who tired of the arid propounding of a "plan of salvation," of inherited and imputed depravity, of vicarious atonement and of a trinity in the Godhead, was not insignificant, but no steps were taken, for a long time, to bring them together in a religious association. Hence it is quite common to reckon the commencement of Unitarianism as a denomination from the preaching of William Ellery Channing. His work was pre-eminently ethical, and he was impatient to strip away such dogma as obscured the need of personal piety. He believed in applying his reason to the interpretation of Scripture, affirming that "Our ultimate reliance is and must be on our own reason. I am surer that my rational nature is from God than that any book is the expression of His will." His fervor of mind, gentle sweetness and ethical insight touched the hearts of many, and he soon found himself in spiritual fellowship with other clergymen and congregations. Yet this discovery did not lead at once to denominational cohesion or forms. The parishes that sympathized with him were still Congregationalists, and the cleavage was expressed for years simply by calling the liberals Unitarian Congregationalists and the conservators of the traditional faith Orthodox Congregationalists. Testimony is borne to the spread in eastern Massachusetts of this freer thought, by Dr. Lyman Beecher, who removed to Boston to confront and stay the movement. He said in 1823 that "all the literary men of Boston, the professors of Harvard College, the judges on the bench, are Unitarians." About this time, Hosea Ballou (q.v., in these Supplements) was doing a kindred work of dogmatic emancipation in the more popular form of Universalism, and Elias Hicks was passing from meeting to meeting among the Quakers, shaking the hold of evangelicism upon them. A reaction had set in against the perfunctoriness and hardness of a "plan of salvation," and men were desiring more salvation as a conscious experience and less plan and catechism. If the early Unitarians were critical, it was not because they read German books or were bent on developing a school, but because they would strip away the husks and find the kernel of right living. Channing denied the depravity of man, in order to show how capable God had made him, of righteousness. He discarded a vicarious expiation of sin, because it seemed to him immoral, reflecting on the divine character on one side and weakening man's sense of responsibility on the other; he asserted the supremacy of character over creeds. Yet so mild and conservative was this earlier type of Unitarianism that Emerson felt obliged to withdraw from that fellowship. His sermon before the Harvard Divinity School in 1837 not only asserted the native dignity of human nature, but proclaimed that man must look within him-

self to find the revelation of God. His old preceptors turned savagely upon him, and the Unitarian Association of ministers seriously debated whether he could be a Christian. Theodore Parker, who stood loyally for Emerson's defense, four years later was driven into a like isolation (see PARKER, THEODORE, Vol. XVIII, p. 301). The dissension within the Unitarian body was hardly less bitter than that between Unitarian and Orthodox, and that was uncompromising. With the diffusion of more critical learning generally in churches, and the growth of a larger toleration, Unitarianism slowly came to some homogeneity, and the advance of the appreciation of ethical life has made the names of Emerson and Parker revered in this denomination, as if it would enroll them on its calendar of saints.

It remains to trace the efforts to heal misunderstandings within this religious body and to achieve a formal working cohesion. An ecclesiastical denomination it does not aspire to be, except so far as union will promote kindness, fervor and administrative economy.

The first Unitarian Association was formed in Boston, in 1820; and was known as the "Berry Street Conference of Ministers." Five years later the American Unitarian Association was organized, its objects being to aid feeble societies, help young men to enter the ministry, promote educational work, especially in the South, and to publish and distribute Unitarian literature. It is composed of those who have become life-members by the payment of \$50, and of ministerial and lay delegates from churches which contribute to its mission-work. There are also honorary members, chosen by the board of directors.

In 1865 a national conference was formed in New York City, for the purpose of strengthening the churches. It is an advisory body, having no ecclesiastical authority, and is in affiliation with other state and district conferences. It meets biennially, and is composed of delegates from various societies and associations.

The Western Unitarian Conference, whose headquarters are in Chicago, and which, administratively, is in the West very nearly what the American Unitarian Association is in the East, was organized in 1852, when there were scarcely a dozen Unitarian churches to support it. In 1865 there were but twenty. It has been closely affiliated with the American Unitarian Association, which, for a number of years, supervised all its mission-work. In 1895 there were 107 societies represented in this conference.

CONTESTS. The formation of the National Conference at once brought into prominence the differences between the orthodox or conservative elements of Unitarianism. After five years' debate the conference dropped its original liberal articles and adopted one in which allegiance to the gospel of Jesus Christ was affirmed, and only such as wished to be followers of Christ invited to fellowship. The American Unitarian Association, in consequence, dropped from the list of ministers in its year-book all who did not claim to be Christian. It also ceased to publish the works of Theodore Parker. But 12 years of pro-

gress brought in its train a mere conciliatory spirit, and a new article was adopted, declaring that the expressions of the conference "committed, in no degree, those who object to them," and welcoming to fellowship all who desired to "work with us in advancing the kingdom of God." In 1884 Theodore Parker's works again were produced by the Unitarian publishing-house and the names of the radical ministers were reinstated in the year-book.

The Western Unitarian Conference, which was established upon a simple ethical basis, with the motto, "Freedom, Fellowship and Character in Religion," had its struggle also for unity. Charges that the churches were "without a Christian basis" culminated at the Cincinnati meeting of 1886, when the conference adopted a resolution, declaring that it "conditions its fellowship on no dogmatic tests, but welcomes all who wish to establish truth and righteousness and love in the world." But this was considered by some too intangible, and the advocates of the "Christian" basis seceded. The American Unitarian Association withdrew its sympathy and support, and maintained separate headquarters in the West. In 1894, at the biennial meeting of the conference of the Unitarian and other Christian churches, at Saratoga, steps were taken toward the restoration of harmony by the adoption of the following resolution:

Resolved, That this church accepts the religion of Jesus, holding, in accordance with His teaching, that practical religion is summed up in love to God and love to man; and we cordially invite to our working fellowship any who, while differing from us in belief, are in general sympathy with our spirit and our practice.

This deliverance was generally hailed with pleasure as an acceptable form of concord—a real Unitarian *irenicon*.

There were, in 1895, in the United States and Canada, 455 societies, 519 ministers, and a total estimated membership, as given in the tables of the *Independent*, of 68,500. In Great Britain there were 356 societies, and in Hungary 100, with a membership of about 60,000.

The National Alliance of Unitarian and other Liberal Christian Women is a recent organization, formed to aid women's societies in the churches to do more effective work for the advancement of liberal religion.

Foreign missionary work is carried on in India and Japan.

The principal periodicals of the denomination are the *Unitarian*, *Every Other Sunday* and *The Christian Register*, at Boston; *The New Unity*, at Chicago; *Southern Unitarian*, at Atlanta, Georgia; *Pacific Unitarian*, at San Francisco, California; and *The Church Exchange*, at Portland, Maine.

Among the later authorities concerning Unitarian history and belief are *Manual of Unitarian Belief*, by J. F. Clarke (1886); *Unitarianism: Its Origin and History*, a course of 16 lectures delivered in Channing Hall (1889); *Boston Unitarians, 1820-1850*, by O. B. Frothingham (1890); and *Old and New Unitarian Beliefs*, John W. Chadwick (1894).

UNITED ARMENIANS, Catholics of the Ar-

menian rite. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631; and in these Supplements.

UNITED BAPTISTS. See BAPTISTS, in these Supplements.

UNITED BROTHERS IN CHRIST, a religious denomination founded in the Susquehanna Valley, Pennsylvania, in 1800. Its inception was due to Philip William Otterbein, a minister of the German Reformed Church, and of Martin Boehm, a Mennonite pastor in Pennsylvania, who, in a series of "revival" meetings, drew large accessions to the churches they served. Other evangelistic pastors joined Otterbein and Boehm, and with some of their followers met in informal conferences, the first one at Baltimore, Maryland, in 1789. The fellowship increased until, in 1800, at a conference held in Frederick County, Maryland, it was decided to organize a separate denomination under the title of "United Brethren in Christ." Otterbein and Boehm were elected superintendents or bishops. Under their leadership the churches multiplied, and in 1810 a second conference was established, at Miami, Ohio. In 1815 the organization was completed by the adoption of a confession of faith and rules of discipline. Their doctrines were Arminian, the confession consisting of 13 articles, setting forth the general faith of the Methodist Church, belief in the Trinity, the Holy Scriptures, justification and regeneration. Baptism and the Lord's Supper were observed, but the mode of administering the one or observing the other were left to the judgment of the individual, as was also the matter of infant baptism. Membership in secret societies was prohibited.

Like the Methodists, they have classes and class-leaders, itinerant and local preachers, circuits, quarterly and annual conferences, etc. Only one order is acknowledged in the ministry, that of elder.

In 1889 some changes were adopted in the discipline, which resulted in producing a split in the denomination. The changes adopted were the introduction of lay delegates in the conferences, the modification of the rule prohibiting membership in secret societies, and the licensing and ordaining of women. When these changes were adopted, Bishop Milton Wright and 11 delegates withdrew from the conference, and established a new conference under the old constitution. The two branches have since maintained separate organization, and numerous serious disputes over the possession of property claimed by each have resulted.

In 1894 the Liberal branch reported a total of 2,136 ministers, 4,097 church organizations and a total of 215,718 members in the United States, besides 12 ministers, 38 churches and 1,413 members in Canada.

The Radical (conservative) branch at the same time had 550 ministers, 800 churches and 30,000 communicants.

The membership is strongest in Ohio, Indiana and Pennsylvania. There is no representation in the New England states, nor in the states south of Virginia, Tennessee and Missouri. Though founded by and among the Germans, its members are now mostly English-speaking people.

Foreign missionary work is carried on chiefly in

Germany, Africa and Japan. In Africa the church has 398 preaching-places and about six thousand members.

There are theological schools at Westerville, Ohio (Otterbein University, q.v., in these Supplements), at Dayton, Ohio (Union Biblical Seminary), at Toledo, Iowa (Western College), and at Leocompton, Kansas (Lane University); besides numerous academies and seminaries. The publishing-house of the denomination is at Dayton, Ohio.

See *History of the United Brethren*, by John Laurence; *Life and Times of Philip William Otterbein*, by A. W. Drury, both issued at Dayton, Ohio; and *United Brethren*, Vol. XII, in American Church History series (1894). See also UNITED BRETHREN IN CHRIST, Vol. XXIII, pp. 726, 727.

UNITED BROTHERHOOD. See HOME RULE, in these Supplements.

UNITED CHRISTIANS OF ST. THOMAS. See THOMAS, Vol. XXIII, p. 308.

UNITED COPTS, Catholics of the Coptic rite. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631, and in these Supplements.

UNITED ÉVANGELICAL CHURCH, the name of the officially recognized church in Prussia. It is composed of the State Lutherans, who follow the Augsburg creed, and the Reformed congregations that adhered to the Heidelberg confession. For a fuller account, see LUTHERANS, Vol. XV, p. 86; and EVANGELICAL ASSOCIATION, in these Supplements.

UNITED GREEK CHURCH, Catholics following the Greek rite, and composed of Ruthenian, Melchite, Bulgarian and Melchite Catholics. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631; and in these Supplements.

UNITED HEBREW CHARITIES. See BENEFIT SOCIETIES, in these Supplements.

UNITED IRISHMEN, an organization formed in 1793 by Wolfe Tone, Hamilton Rowan and James Napper Tandy, to unite Catholic and Protestant Irishmen in constitutional agitation for reform, even to the extreme of creating a Republic of Ireland and calling in the help of the French. It spread rapidly, Grattan giving it his secret support, but Tone was captured before any action was taken, and the society died out in 1800, when the union with Great Britain was proclaimed.

UNITED LABOR PARTY. See LABOR PARTIES, in these Supplements.

UNITED METHODIST FREE CHURCHES. See METHODISM, Vol. XVI, p. 192; and in these Supplements.

UNITED NESTORIANS. Same as SYRO-CHALDEANS. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631.

UNITED PRESBYTERIAN CHURCH IN NORTH AMERICA is the main representative in the United States of the United Presbyterian Church of Scotland, and was formally established, in May 1858, by the union of the Associate and Associate Reformed Synods at a meeting in Pittsburg, Pennsylvania. The early history, as well as the account of the various seceding branches of the Scotch Presbyterian Church which finally combined in the United Presbyterian Church, is given in Vol. XXIII,

pp. 727, 728. This church accepts the Westminster Confession, but adds some 18 special articles deemed to be insufficiently stated in the former. Until recently, instrumental music in the churches was discountenanced; as late as 1894 solemn protest was made when an organ was used at the opening of the General Assembly. The church approves prohibition of the liquor traffic, and opposes secret societies and orders. It also opposes any change in creed, and hence refused to participate in the proposed Consensus Creed for the Federation of Reformed Churches holding the Presbyterian system. It prohibits "the use of uninspired songs in the worship of God under any circumstances." When this religious body sought union with the Reformed Presbyterian churches of the United States, the latter declined on the ground that Christians ought not to participate in political action under a government that does not recognize the headship of Christ, a course which this church leaves to the judgment of its members. This denomination is a firm supporter of a thoroughly trained ministry. The two bodies whose union formed the United Presbyterian Church established one of the first (1794) theological schools in America, at Service, Pennsylvania, and another in 1805, in New York City. In 1896 it had under its control a seminary at Xenia, Ohio, with 4 professors and 57 students, and one at Allegheny, Pennsylvania, with 4 professors and 84 students. It also maintains 9 colleges and academies, with an aggregate number of 1,417 students. There were in 1896, 12 synods, 65 presbyteries, 948 congregations and a total membership of 120,853. Missionary work is carried on, chiefly in India and Egypt, the amount expended for foreign missions during that year having been \$130,452. The total amount contributed for all purposes was \$1,418,098.

See *Presbyterians*, G. P. Hays (1892); *United Presbyterianism*, W. J. Reid (1883); and the *Minutes of the General Assembly*, issued by the United Presbyterian Board of Publication at Pittsburg, Pennsylvania.

UNITED PRESS. See NEWSPAPERS, in these Supplements.

UNITED PROVINCES. See HOLLAND, Vol. XII, p. 77, et seq.

UNITED STATES. Many questions of deep interest to a citizen of any country arise which an encyclopædia must pass by for reasons of space. A book especially designed for use in America may properly supplement such an article as is published in Vol. XXIII, pp. 729-830, with details that aid the student in solving ever-recurring questions of government and progress. It is believed that the following facts will not only bring the history of the country down to a recent day, but afford the reader information for reflection and consideration of an independent character.

A LIST OF THE SEVERAL STATES OF THE UNITED STATES, WITH DATE OF ADMISSION OF EACH. States are admitted by act of Congress, and the date of admission is usually regarded as that on which the act took effect:

Delaware	-----ratified the Constitution --	Dec. 7, 1787
Pennsylvania	--ratified the Constitution --	Dec. 12, 1787
New Jersey	----ratified the Constitution --	Dec. 18, 1787
Georgia	-----ratified the Constitution --	Jan. 2, 1788

Connecticut	ratified the Constitution	Jan. 9, 1788
Massachusetts	ratified the Constitution	Feb. 6, 1788
Maryland	ratified the Constitution	April 28, 1788
South Carolina	ratified the Constitution	May 23, 1788
N. Hampshire	ratified the Constitution	June 21, 1788
Virginia	ratified the Constitution	June 25, 1788
New York	ratified the Constitution	July 26, 1788
North Carolina	ratified the Constitution	Nov. 21, 1789
Rhode Island	ratified the Constitution	May 29, 1790
Vermont	was admitted to the Union	Mar. 4, 1791
Kentucky	was admitted to the Union	June 1, 1792
Tennessee	was admitted to the Union	June 1, 1796
Ohio	was admitted to the Union	Nov. 29, 1802
Louisiana	was admitted to the Union	April 30, 1812
Indiana	was admitted to the Union	Dec. 11, 1816
Mississippi	was admitted to the Union	Dec. 10, 1817
Illinois	was admitted to the Union	Dec. 3, 1818
Alabama	was admitted to the Union	Dec. 14, 1819
Maine	was admitted to the Union	Mar. 15, 1820
Missouri	was admitted to the Union	Aug. 10, 1821
Arkansas	was admitted to the Union	June 15, 1836
Michigan	was admitted to the Union	Jan. 26, 1837
Florida	was admitted to the Union	Mar. 3, 1845
Texas	was admitted to the Union	Dec. 29, 1845
Iowa	was admitted to the Union	Dec. 28, 1846
Wisconsin	was admitted to the Union	May 29, 1848
California	was admitted to the Union	Sept. 9, 1850
Minnesota	was admitted to the Union	May 11, 1858
Oregon	was admitted to the Union	Feb. 14, 1859
Kansas	was admitted to the Union	Jan. 29, 1861
West Virginia	was admitted to the Union	June 19, 1863
Nevada	was admitted to the Union	Oct. 31, 1864
Nebraska	was admitted to the Union	Mar. 1, 1867
Colorado	was admitted to the Union	Aug. 1, 1876
North Dakota	was admitted to the Union	Nov. 2, 1889
South Dakota	was admitted to the Union	Nov. 2, 1889
Montana	was admitted to the Union	Nov. 8, 1889
Washington	was admitted to the Union	Nov. 11, 1889
Idaho	was admitted to the Union	July 3, 1890
Wyoming	was admitted to the Union	July 10, 1890
Utah	was admitted to the Union	Jan. 4, 1896

The territories in 1896 were as follows: Arizona, organized in 1863; New Mexico, organized in 1850; Oklahoma, organized in 1890 from Indian Territory and the public land; Alaska, purchased of Russia in 1867, and organized as a district with executive officers in 1884; and Indian Territory, a portion of the public land of the United States set apart for various tribes of Indians in 1834.

PRESIDENTS OF THE EARLY AMERICAN CONGRESSES. The following is a full list of presidents of Congress up to the date of the adoption of the National Constitution, with the dates severally of their administrations:*

Peyton Randolph, of Virginia	1774-75
Henry Middleton, of South Carolina	1775-76
John Hancock, of Massachusetts	1776-77
Henry Laurens, of South Carolina	1777-78
John Jay, of New York	1778-79
Samuel Huntington, of Connecticut	1779-80
Thomas McKean, of Pennsylvania	1780-81
John Hanson, of Maryland	1781-82
Elias Boudinot, of New Jersey	1782-83
Thomas Mifflin, of Pennsylvania	1783-84
Richard Henry Lee, of Virginia	1784-86
Nathaniel Gorham, of Massachusetts	1786-87
Arthur St. Clair, of Pennsylvania	1787-88
Cyrus Griffin, of Virginia	1788-89

John Hancock, as president of the Congress, signed first the Declaration of Independence.

Elias Boudinot, as president, signed the definitive treaty of peace with Great Britain.

Thomas Mifflin received Washington's commis-

*Kindly furnished for these Supplements by Prof. J. D. Gray, A.M., of Trenton, New Jersey.

sion as commander-in-chief of the army when he resigned in 1783.

NUMBER OF REPRESENTATIVES IN CONGRESS ASSIGNED TO STATES AND TERRITORIES. The following table shows the number of Representatives to Congress assigned to each of the United States under the constitution, the apportionment being based upon each decennial census in proportion to population:

STATES AND TERRITORIES.	BEFORE CENSUS.	1790.	1800.	1810.	1820.	1830.	1840.	1850.	1860.	1870.	1880.	1890.
		Alabama			*1	3	5	7	7	6	8	8	8	9
Arkansas					*1	1	2	3	4	5	6	6
California						*2	2	3	4	6	7	7
Colorado									*1	1	1	2
Connecticut	5	7	7	7	6	6	4	4	4	4	4	4
Delaware	1	1	1	2	1	1	1	1	1	1	1	1
Florida						*1	1	1	2	2	2	2
Georgia	3	2	4	6	7	9	8	8	7	9	10	11
Idaho										*1	1	1
Illinois			*1	1	3	7	9	14	19	20	22	22
Indiana			*1	3	7	10	11	13	13	13	13	13
Iowa						*2	2	6	9	11	11	11
Kansas								*1	3	7	8	8
Kentucky		*2	6	10	12	13	10	10	9	10	11	11
Louisiana			*1	3	3	4	4	5	6	6	6	6
Maine				7	7	8	7	6	5	5	4	4
Maryland	6	8	9	9	8	6	6	5	6	6	6	6
Massachusetts	8	14	17	20	13	12	10	11	10	11	12	13
Michigan					*1	3	4	6	9	11	12	12
Minnesota						*2	2	3	5	7	7	7
Mississippi			*1	1	2	4	5	5	6	7	7	7
Missouri					*1	2	5	7	9	13	14	15
Montana									*1	1	1	1
Nebraska									*1	1	3	6
Nevada									*1	1	1	1
New Hampshire	3	4	5	6	6	5	4	3	3	3	2	2
New Jersey	4	5	6	6	6	5	5	5	6	7	8	8
New York	6	10	17	27	34	40	34	33	31	33	34	34
North Carolina	5	10	12	13	13	13	9	8	7	8	9	9
North Dakota										*1	1	1
Ohio		*1	6	14	19	21	21	19	20	21	21	21
Oregon									*1	1	1	1
Pennsylvania	8	13	18	23	26	28	24	25	24	27	28	30
Rhode Island	1	2	2	2	2	2	2	2	2	2	2	2
South Carolina	5	6	8	9	9	9	7	6	4	5	7	7
South Dakota										*2	2	2
Tennessee		*1	3	6	9	13	11	10	8	10	10	10
Texas						*2	2	4	6	11	13	13
Utah												*1
Vermont		*2	4	6	5	5	4	3	3	3	2	2
Virginia	10	19	22	23	22	12	15	13	11	9	10	10
Washington										*1	1	2
West Virginia									*3	3	4	4
Wisconsin						*2	3	6	8	9	10	10
Wyoming											1	1

NOTE. Ratios of representation: 1790 and 1800, 1 to 33,900; 1810, 35,000; 1820, 40,000; 1830, 47,700; 1840, 70,680; 1850, 93,420; 1860, 127,000; 1870, 131,425; 1880, 151,912; 1890, 1 to 173,912. Each territory is entitled by law to one Delegate, who has all the privileges of a Representative in Congress, except the right to vote and to move to reconsider.

LENGTH OF CONGRESSIONAL SESSIONS. Congressional terms are for two full years, beginning at noon, March 4th, of each odd year; the Congressional sessions generally begin on the first Monday in December of each year, and continue until formal adjournment or expiration of a term. The fol-

* Admitted into the Union after the apportionment under which they are here arranged was made, but before the succeeding census.
† Admitted in 1896, and has one Representative in Congress.

Following table gives the numbers of the several Congresses and the number and dates of the sessions during each Congressional term:

CONGRESS.	TIME OF SESSION.
1st	1st Session-- From March 4, 1789, to Sept. 29, 1789
	2d Session-- From Jan. 4, 1790, to Aug. 12, 1790
	3d Session-- From Dec. 6, 1790, to March 3, 1791
2d	1st Session-- From Oct. 24, 1791, to May 8, 1792
	2d Session-- From Nov. 5, 1792, to March 2, 1793
3d	1st Session-- From Dec. 2, 1793, to June 9, 1794
	2d Session-- From Nov. 3, 1794, to March 3, 1795
4th	1st Session-- From Dec. 7, 1795, to June 1, 1796
	2d Session-- From Dec. 5, 1796, to March 3, 1797
5th	1st Session-- From May 15, 1797, to July 10, 1797
	2d Session-- From Nov. 13, 1797, to July 16, 1798
	3d Session-- From Dec. 3, 1798, to March 3, 1799
6th	1st Session-- From Dec. 2, 1799, to May 14, 1800
	2d Session-- From Nov. 17, 1800, to March 3, 1801
7th	1st Session-- From Dec. 7, 1801, to May 3, 1802
	2d Session-- From Dec. 6, 1802, to March 3, 1803
8th	1st Session-- From Oct. 17, 1803, to March 27, 1804
	2d Session-- From Nov. 5, 1804, to March 3, 1805
9th	1st Session-- From Dec. 2, 1805, to April 21, 1806
	2d Session-- From Dec. 1, 1806, to March 3, 1807
10th	1st Session-- From Oct. 26, 1807, to April 25, 1808
	2d Session-- From Nov. 7, 1808, to March 3, 1809
11th	1st Session-- From May 22, 1809, to June 28, 1809
	2d Session-- From Nov. 27, 1809, to May 1, 1810
12th	3d Session-- From Dec. 3, 1810, to March 3, 1811
	1st Session-- From Nov. 4, 1811, to July 6, 1812
	2d Session-- From Nov. 2, 1812, to March 3, 1813
13th	1st Session-- From May 24, 1813, to Aug. 2, 1813
	2d Session-- From Dec. 6, 1813, to April 18, 1814
	3d Session-- From Sept. 19, 1814, to March 3, 1815
14th	1st Session-- From Dec. 4, 1815, to April 30, 1816
	2d Session-- From Dec. 2, 1816, to March 3, 1817
15th	1st Session-- From Dec. 1, 1817, to April 20, 1818
	2d Session-- From Nov. 16, 1818, to March 3, 1819
16th	1st Session-- From Dec. 6, 1819, to May 15, 1820
	2d Session-- From Nov. 13, 1820, to March 3, 1821
17th	1st Session-- From Dec. 3, 1821, to May 8, 1822
	2d Session-- From Dec. 2, 1822, to March 9, 1823
18th	1st Session-- From Dec. 1, 1823, to May 27, 1824
	2d Session-- From Dec. 6, 1824, to March 3, 1825
19th	1st Session-- From Dec. 5, 1825, to May 22, 1826
	2d Session-- From Dec. 4, 1826, to March 3, 1827
20th	1st Session-- From Dec. 3, 1827, to May 26, 1828
	2d Session-- From Dec. 1, 1828, to March 3, 1829
21st	1st Session-- From Dec. 7, 1829, to May 31, 1830
	2d Session-- From Dec. 6, 1830, to March 3, 1831
22d	1st Session-- From Dec. 5, 1831, to July 16, 1832
	2d Session-- From Dec. 3, 1832, to March 3, 1833
23d	1st Session-- From Dec. 2, 1833, to June 30, 1834
	2d Session-- From Dec. 1, 1834, to March 3, 1835
24th	1st Session-- From Dec. 7, 1835, to July 4, 1836
	2d Session-- From Dec. 5, 1836, to March 3, 1837
	1st Session-- From Sept. 4, 1837, to Oct. 16, 1837
25th	2d Session-- From Dec. 4, 1837, to July 9, 1838
	3d Session-- From Dec. 3, 1838, to March 3, 1839
	1st Session-- From Dec. 2, 1839, to July 21, 1840
26th	2d Session-- From Dec. 7, 1840, to March 3, 1841
	1st Session-- From May 31, 1841, to Sept. 13, 1841
27th	2d Session-- From Dec. 6, 1841, to Aug. 31, 1842
	3d Session-- From Dec. 5, 1842, to March 3, 1843
	1st Session-- From Dec. 4, 1843, to June 17, 1844
28th	2d Session-- From Dec. 2, 1844, to March 3, 1845
	1st Session-- From Dec. 1, 1845, to Aug. 10, 1846
29th	2d Session-- From Dec. 7, 1846, to March 3, 1847
	1st Session-- From Dec. 6, 1847, to Aug. 14, 1848
	2d Session-- From Dec. 4, 1848, to March 3, 1849
30th	1st Session-- From Dec. 3, 1849, to Sept. 30, 1850
	2d Session-- From Dec. 2, 1850, to March 3, 1851
31st	1st Session-- From Dec. 1, 1851, to Aug. 31, 1852
	2d Session-- From Dec. 6, 1852, to March 3, 1853
32d	1st Session-- From Dec. 5, 1853, to Aug. 7, 1854
	2d Session-- From Dec. 4, 1854, to March 3, 1855

CONGRESS.	TIME OF SESSION.
34th	1st Session-- From Dec. 3, 1855, to Aug. 18, 1856
	2d Session-- From Aug. 21, 1856, to Aug. 30, 1856
	3d Session-- From Dec. 1, 1856, to March 3, 1857
35th	1st Session-- From Dec. 7, 1857, to June 14, 1858
	2d Session-- From Dec. 6, 1858, to March 3, 1859
36th	1st Session-- From Dec. 5, 1859, to June 25, 1860
	2d Session-- From Dec. 3, 1860, to March 2, 1861
37th	1st Session-- From July 4, 1861, to Aug. 6, 1861
	2d Session-- From Dec. 2, 1861, to July 17, 1862
38th	3d Session-- From Dec. 1, 1862, to March 3, 1863
	1st Session-- From Dec. 7, 1863, to July 4, 1864
	2d Session-- From Dec. 5, 1864, to March 3, 1865
39th	1st Session-- From Dec. 4, 1865, to July 28, 1866
	2d Session-- From Dec. 3, 1866, to March 2, 1867
40th	1st Session-- From March 4, 1867, to March 30, 1867
	1st Session-- From July 3, 1867, to July 20, 1867
	2d Session-- From Nov. 21, 1867, to Dec. 2, 1867
41st	2d Session-- From Dec. 2, 1867, to July 27, 1868
	3d Session-- From Dec. 7, 1868, to March 3, 1869
	1st Session-- From March 4, 1869, to April 23, 1869
42d	2d Session-- From Dec. 6, 1869, to July 15, 1870
	3d Session-- From Dec. 5, 1870, to March 3, 1871
	1st Session-- From March 4, 1871, to April 20, 1871
43d	2d Session-- From Dec. 4, 1871, to June 10, 1872
	3d Session-- From Dec. 2, 1872, to March 3, 1873
	1st Session-- From Dec. 1, 1873, to June 23, 1874
44th	2d Session-- From Dec. 7, 1874, to March 3, 1875
	1st Session-- From Dec. 6, 1875, to Aug. 15, 1876
	2d Session-- From Dec. 4, 1876, to March 3, 1877
45th	1st Session-- From Oct. 15, 1877, to Dec. 3, 1877
	2d Session-- From Dec. 3, 1877, to June 20, 1878
	3d Session-- From Dec. 2, 1878, to March 3, 1879
46th	1st Session-- From Mar. 18, 1879, to July 1, 1879
	2d Session-- From Dec. 1, 1879, to June 16, 1880
	3d Session-- From Dec. 6, 1880, to March 3, 1881
47th	1st Session-- From Dec. 5, 1881, to Aug. 8, 1882
	2d Session-- From Dec. 4, 1882, to March 3, 1883
48th	1st Session-- From Dec. 3, 1883, to July 3, 1884
	2d Session-- From Dec. 1, 1884, to March 3, 1885
49th	1st Session-- From Dec. 7, 1885, to Aug. 6, 1886
	2d Session-- From Dec. 6, 1886, to March 3, 1887
50th	1st Session-- From Dec. 5, 1887, to Oct. 20, 1888
	2d Session-- From Dec. 3, 1888, to March 3, 1889
51st	1st Session-- From Dec. 2, 1889, to Oct. 1, 1890
	2d Session-- From Dec. 1, 1890, to March 3, 1891
52d	1st Session-- From Dec. 7, 1891, to March 3, 1892
	2d Session-- From Dec. 5, 1892, to March 3, 1893
53d	1st Session-- From Aug. 7, 1893, to Nov. 3, 1893
	2d Session-- From Dec. --, 1893, to March 3, 1894
	3d Session-- From Dec. --, 1894, to March 3, 1895
54th	1st Session-- From Dec. 2, 1895, to June 11, 1896
	2d Session-- From Dec. 7, 1896, to March 3, 1897
55th	1st Session-- From Mar. 15, 1897, to July 24, 1897
	2d Session-- From Dec. 6, 1897, to July 8, 1898
	3d Session-- From Dec. 5, 1898, to March 3, 1899

NOTE. To determine the years covered by a given Congress, double the number of the Congress and add the product to 1789; the result will be the year in which the Congress closed. Thus, the Thirty-fifth Congress = $70 \times 2 + 1789 = 1859$, that being the year which terminated the Thirty-fifth Congress. To find the number of a Congress sitting in any given year, subtract 1789 from the year; if the result is an even number, half that number will give the Congress, of which the year in question will be the closing year; if the result is an odd number, add one to it, and half the result will give the Congress, of which the year in question will be the first year.

EXTRA CONGRESSIONAL SESSIONS. The following tables show the extra sessions of Congress, including those called by the President, and those fixed at the adjournment of Congress. Examples of the latter are the sessions during President Johnson's administration; like those sessions, they are generally called by a Congress hostile to the President.

CALLED BY CONGRESS.

WHEN CONVENED.	CONGRESS	SESSION.	DATE OF PASSAGE OF ACT.
March 4, 1789-----	1st	First---	*1788, Sept. 13
1st Monday in Jan., 1790--	1st	Second--	1789, Sept. 29
4th Monday in Oct., 1791--	2d	First---	1791, March 2
1st Monday in Nov., 1792--	2d	Second--	1792, May 5
1st Monday in Nov., 1794--	3d	Second--	1794, May 30
1st Monday in Nov., 1797--	5th	First---	1797, March 3
Changed to 2d Monday in Nov., 1797-----	5th	Second--	†1797, July 1
3d Monday in Nov., 1800--	6th	Second--	1800, May 13
1st Monday in Nov., 1803--	8th	First---	1803, March 3
1st Monday in Nov., 1804--	8th	Second--	1804, March 26
1st Monday in Nov., 1808--	10th	Second--	1808, April 22
4th Monday in Nov., 1809--	11th	First---	1809, Jan. 30
4th Monday in Nov., 1809--	11th	Second--	1809, June 24
1st Monday in Nov., 1812--	12th	Second--	1812, July 6
4th Monday in May, 1813--	13th	First---	1813, Feb. 27
1st Monday in Dec., 1813--	13th	Second--	1813, July 27
Last Monday in Oct., 1814--	13th	Third--	1814, April 18
3d Monday in Nov., 1818--	15th	Second--	1818, April 18
2d Monday in Nov., 1820--	16th	Second--	1820, May 13
March 4, 1867-----	40th	First---	†1867, Jan. 22
March 4, 1869-----	41st	First---	†1867, Jan. 22
March 4, 1871-----	42d	First---	†1867, Jan. 22

CALLED BY THE PRESIDENT.

CONGRESS.	SESSION.	WHEN CONVENED.	CAUSE.
V-----	First---	May 15, 1797	Suspension of diplomatic relations with France.
VIII----	First---	Oct. 17, 1803	Cessions of Louisiana by Spain to France.
X-----	First---	Oct. 26, 1807	Relations with Great Britain.
XII----	First---	Nov. 4, 1811	Relations with Great Britain.
XIII----	Third---	Sept. 19, 1814	War with Great Britain.
XXV----	First---	Sept. 4, 1837	Suspension of specie payments.
XXVII--	First---	May 31, 1841	Condition of finances and revenue.
XXXIV--	Second--	Aug. 21, 1856	Failure of previous session to make appropriations for army.
XXXVII	First---	July 4, 1861	Insurrection in certain Southern states.
XLV----	First---	Oct. 15, 1877	Failure of previous session to make appropriations for army.
XLVI----	First---	Mar. 18, 1879	Failure of previous session to make appropriations for legislative, executive and judicial and army expenses.
LIII----	First---	Aug. 7, 1893	To repeal the silver-purchase clause of the Sherman Act of 1890.
LV-----	First---	Mar. 15, 1897	To receive such communications as might be made by the executive.

See also CONGRESS, in these Supplements.

* The first session of the First Congress was convened in accordance with the following resolution of the Continental Congress, adopted Sept. 13, 1788, namely:

"Resolved, etc., That the first Wednesday in January next be the day for appointing electors in the several states which before the said day shall have ratified the said Constitution; that the first Wednesday in February next be the day for the electors to assemble in their several states and vote for a President; and that the first Wednesday in March next be the time, and the present seat of Congress the place, for commencing proceedings under the said Constitution."

† Repealed the act of March 3, 1797.

‡ The act of Jan. 22, 1867, provided that in addition to the regular times of meeting of Congress, there shall be a meeting of the Congress of the United States, and of each succeeding Congress thereafter, at 12 o'clock meridian, on the fourth day of March, the day on which the term begins for which the Congress is elected. That act was repealed by the act of April 20, 1871. (17 Statutes, 12.)

POPULATION, 1900 (TWELFTH CENSUS). The total population of the United States in 1900, as shown by the returns of the Census Bureau, was 76,295,220. The increase during the past ten years in the number of inhabitants is 13,225,464 as against 12,913,973 in the preceding decade, and 11,161,574 between the years 1870 and 1880. The rate of increase for the last decade is practically 21 per cent.; that for the previous decade being 25 per cent. New York still holds the premier position of Empire State, with a population of 7,268,009, Pennsylvania coming second, with a population of 6,301,365. The States next in rank are Illinois, Ohio, Missouri, Texas, and Massachusetts. Texas in the past ten years has made great strides, taking the sixth place from Massachusetts and following close upon Missouri for fifth place. Some of the small States of the far West have made substantial gains, particularly Idaho, Montana, and North Dakota; while the South is also making gratifying strides. In the Middle West the average has only fairly been maintained. Here is the population by territorial divisions:

STATES	1900	1890
Alabama	1,828,697	1,513,017
Arkansas	1,311,564	1,128,179
California	1,485,053	1,208,130
Colorado	539,700	412,198
Connecticut	908,355	746,258
Delaware	184,735	168,493
Florida	528,542	391,422
Georgia	2,216,329	1,837,353
Idaho	161,771	84,385
Illinois	4,821,550	3,826,351
Indiana	2,516,463	2,192,404
Iowa	2,251,829	1,911,896
Kansas	1,469,496	1,427,096
Kentucky	2,147,174	1,858,635
Louisiana	1,381,627	1,118,587
Maine	694,366	661,086
Maryland	1,189,946	1,042,390
Massachusetts	2,805,346	2,238,943
Michigan	2,419,782	2,093,889
Minnesota	1,751,395	1,301,826
Mississippi	1,551,372	1,289,600
Missouri	3,107,117	2,679,184
Montana	243,289	132,159
Nebraska	1,068,901	1,058,910
Nevada	42,334	45,761
New Hampshire	411,588	376,530
New Jersey	1,883,669	1,444,933
New York	7,268,009	5,997,853
North Carolina	1,891,992	1,617,947
North Dakota	319,040	182,719
Ohio	4,157,545	3,672,316
Oregon	413,532	313,767
Pennsylvania	6,301,365	5,258,014
Rhode Island	428,556	345,599
South Carolina	1,349,312	1,151,149
South Dakota	401,559	328,808
Tennessee	2,022,723	1,767,518
Texas	3,048,828	2,232,523
Utah	276,565	207,905
Vermont	343,641	332,422
Virginia	1,854,184	1,655,980
Washington	517,672	349,399
West Virginia	958,900	762,794
Wisconsin	2,068,963	1,686,880
Wyoming	92,531	60,795
Totals, forty-five States	74,627,907	62,116,811
TERRITORIES, ETC.		
Alaska (estimated)	44,000	32,052
Arizona	122,212	59,620
District of Columbia	278,718	230,392
Hawaii	154,001	89,990
Indian Territory	391,960	180,182
New Mexico	193,777	153,593
Oklahoma	398,245	61,834
Persons in the service of the United States stationed abroad (estimated)	84,400	
Indians, etc., on reservations (except Indian Territory)		145,282
Totals, seven territories, etc	1,667,313	952,945

PRESIDENTIAL ELECTIONS IN THE UNITED STATES.

YEAR OF ELECTION.	NUMBER OF STATES.	TOTAL ELECTORAL VOTE.	POLITICAL PARTY.	*PRESIDENTS.			*VICE-PRESIDENTS.			YEAR OF ELECTION.	NUMBER OF STATES.	TOTAL ELECTORAL VOTE.	POLITICAL PARTY.	*PRESIDENTS.			*VICE-PRESIDENTS.			
				Candidates.	Vote.		Candidates.	Electoral Votes.	Candidates.					Vote.		Candidates.	Electoral Votes.			
					States.	Popular.								Electoral.	States.			Popular.	Electoral.	
1789	10	73		Geo. Washington		69				1836	26	294	D	M. Van Buren	15	761,549	170	Johnson	147	
				Joho Adams									W	W. H. Harrison	7		73	Granger	77	
				John Jay									W	Hugh L. White	2		26	Tyler	47	
				R. H. Harrison									W	Daniel Webster	11	736,656	14	Smith	23	
				John Rutledge									W	W. P. Mangum	1		11			
				John Hancock						1840	26	294	19	W. H. Harrison	19	1,275,017	234	Tyler	234	
				George Clinton									D	M. Van Buren	7	1,128,702	60	Johnson	48	
				S. Huntington									L	Jas. G. Birney		7,059				
				John Milton														Tazewell	11	
				Jas. Armstrong														Polk	1	
				Benj. Lincoln						1844	26	275	D	James K. Polk	15	1,337,243	170	Dallas	170	
				Edw. Telfair									W	Henry Clay	11	1,299,068	105	Freling's'n	105	
				Vacancies									L	Jas. G. Birney		62,300				
																		Fillmore	163	
1792	15	135	F	Geo. Washington		132				1848	30	290	15	Zachary Taylor	15	1,360,101	163	Butler	127	
			F	John Adams									D	Lewis Cass	15	1,220,545	127	Adams	127	
			D. R.	George Clinton									F. S.	M. Van Buren		291,263		King	254	
				Thos. Jefferson						1852	31	296	D	Franklin Pierce	27	1,601,474	254	Graham	42	
				Aaron Burr									4	Winfield Scott	4	1,386,578	42	Julian		
				Vacancies									F. S.	Jno. P. Hale		166,149		Breckinridge	174	
1796	16	138	F	John Adams		71				1856	31	296	D	Jas. Buchanan	19	1,838,169	174	Dayton	114	
			D. R.	Thos. Jefferson									R	Jno. C. Fremont	11	1,341,264	114	Donelson	8	
			F	Thos. Pinckney									A	M. Fillmore		87,534		Hamlio	180	
				Aaron Burr						1860	33	303	R	Abraham Lincoln	17	1,866,352	180	Lane	72	
				Samuel Adams									D	J. C. Breckinridge	11	845,763	72	Everett	39	
				O. Ellsworth									C. U.	John Bell	3	589,582	39	Johnson	12	
				George Clinton									D	S. A. Douglas	2	1,375,157	12	Johnson	212	
				John Jay						1864	36	314	R	Abraham Lincoln	22	2,216,067	212	Pendleton	21	
				James Iredell									D	G. B. McClellan	3	1,808,725	21		81	
				Geo. Washington										Vacancies					81	
				John Henry						1868	37	317	R	Ulysses S. Grant	26	3,015,071	214	Colfax	214	
				S. Johnson									D	H. Seymour	8	2,709,613	80	Blair	80	
				C. C. Pinckney										Vacancies					23	
1800	16	138	D. R.	Thos. Jefferson		173				1872	37	366	R	Ulysses S. Grant	31	3,507,070	286	Brown	286	
			D. R.	Aaron Burr									D	Horace Greeley	6	2,834,079		Wilson	47	
			F	John Adams									D	Charles O'Conor		29,408		Julian	5	
			F	C. C. Pinckney									T	James Black		5,608		Colquitt	5	
				John Jay										T. A. Hendricks				Palmer	3	
1804	17	176	D. R.	Thos. Jefferson		162	Clinton	162						B. Gratz Brown				Brallette	3	
			F	C. C. Pinckney			14	Kiog	14					C. J. Jenkins				Groesbeck	1	
1808	17	176	D. R.	Jas. Madison		122	Clinton	113						David Davis				Machen	1	
				C. C. Pinckney			7	King	47									Banks	1	
				George Clinton			46	Langdon	9					Not counted					14	
				Vacancy				Madison	3					R. B. Hayes	21	4,033,950	185	Wheeler	185	
								Monroe	3				D	S. J. Tilden	17	4,284,885	184	Hendricks	184	
													G	Peter Cooper		81,740				
1812	18	218	D. R.	Jas. Madison		118	Gerry	131					P	G. Clay Smith		9,522				
			F	DeWitt Clinton			89	Ingersoll	86					Scattering		2,636				
				Vacancy										Jas. A. Garfield	19	4,454,416	214	Arthur	214	
1816	19	221	D. R.	James Monroe		183	Tompkins	183						W. S. Hancock	19	4,444,952	155	English	155	
			F	Rufus King			34	Howard	22				G	J. B. Weaver		306,867		Chambers		
								Ross, etc	16					Scattering		12,576				
1820	24	235	D. R.	James Monroe		231	Tompkins	218						G. Cleveland	20	4,874,986	219	Hendricks	219	
			F	John Q. Adams			1	Stockton	8					Jas. G. Blaine	18	4,851,981	182	Logan	182	
								Rodney	4				G	Benj. F. Butler		175,370		West		
								Harper	1				P	John P. St. John		150,369		Daniels		
								Bush	1					Benj. Harrison	20	5,438,722	233	Morton	233	
													D	G. Cleveland	18	5,534,882	168	Thurman	168	
1824	24	261	D. R.	Andrew Jackson		156,872	Calhoun	182						Clinton B. Fisk		244,034		Brooks		
			C	John Q. Adams		105,321	Sanford	30						U. L. A. J. Streeter		146,839		Cunningham		
			D. R.	W. B. Crawford		44,282	Macon	24						G. Cleveland	23	5,556,562	277	Stevenson	277	
				Henry Clay		46,587	Jackson	13						R	Benj. Harrison	16	5,162,874	145	Reid	
								Van Buren	9					P. P.	James B. Weaver	5	1,055,424	22	Field	
								Clay	2					P	John Bidwell		268,361		Cranfill	
														S. L.	Simon Wing		21,164		Matchetti	
1828	24	261	D	Andrew Jackson		647,221	Calhoun	171						William McKinley	23	7,104,779	271	Hobart	271	
			N. R.	John Q. Adams		509,097	Rush	83						D	William J. Bryan	22	6,502,925	176	Seawall	149
								Smith	7					P	Joshua Levering		132,007		Johnson	
								Van Buren	189					N. P.	Charles E. Bentley		13,969		Southgate	
1832	24	288	D	Andrew Jackson		687,502	Sergeant	49						P. P.	William J. Bryan				Watson	27
			N. R.	Henry Clay		530,189	Lee	11						S. L.	Chas. H. Matchetti		36,274		Maguire	
				John Floyd				Ellmaker	7					N. D.	John M. Palmer		133,424		Buckner	
			A. M.	William Wirt		33,108	Wilkins	39												

Popular vote, McKinley over Bryan, 651,016; McKinley over all, 336,265; electoral vote, McKinley over Bryan, 95; straight fusion vote for Bryan, 6,304,300; straight Populist vote for Bryan, 150,643; total popular vote, 1896, 13,875,653-

F. stands for *Federalist*; D. R., *Democratic Republican*; R., *Republican*; C., *Coalition*; D., *Democratic*; N. R., *National Republican*; A. M., *Anti-Mason*; W., *Whig*; L., *Liberty*; F. S., *Free Soil*; F. D., *Free Democrat*; C. U., *Constitutional Union*; T., *Temperance*; G., *Greenback*; P., *Prohibition*; A., *American*; P. P., *Peoples Party*; U. L., *United Labor*; N. P., *National Party (Prohibition)*; S. L., *Socialist Labor*; N. D., *National Democrat*.

* Previous to the election of 1804 each elector voted for two candidates for President; the one receiving the highest number of votes, if a majority was declared elected President; and the next highest Vice-President.

† Three states out of 13 did not vote, viz.: New York, which had not passed an electoral law; and North Carolina and Rhode Island, which had no adopted the Constitution.

‡ There having been a tie vote, the choice devolved upon the House of Representatives, which selected Jefferson.

§ No choice having been made by the electoral college, the choice devolved upon the House of Representatives, which selected Adams on first ballot.

¶ No candidate having received a majority of the votes of the electoral college, the Senate elected R. M. Johnson Vice-President, who received 33 votes; Francis Granger received 16.

*CENTER OF POPULATION OF THE UNITED STATES. The center of population is the center of gravity of the population of the country, each individual being assumed to have the same weight. In 1790 the center of population was at lat. $39^{\circ} 16.5'$ N. and long. $76^{\circ} 11.2'$ W., which a comparison of the best maps available would seem to place about twenty-three miles east of Baltimore. During the decade 1790 to 1800 it appears to have moved almost due west to a point about eighteen miles west of the same city, being in lat. $39^{\circ} 16.1'$ and long. $76^{\circ} 56.5'$.

From 1800 to 1810 it moved westward and slightly southward to a point about forty miles northwest by west from Washington, being in lat. $39^{\circ} 11.5'$ and long. $77^{\circ} 37.2'$. The southward movement during this decade appears to have been due to the annexation of the territory of Louisiana, which contained quite extensive settlements.

From 1810 to 1820 it moved westward and again slightly southward to a point about sixteen miles north of Woodstock, Virginia, being in lat. $39^{\circ} 5.7'$ and long. $78^{\circ} 33'$. This second southward movement appears to have been due to the extension of settlement in Mississippi, Alabama and eastern Georgia.

From 1820 to 1830 it moved still westward and southward to a point about nineteen miles southwest of Moorefield, in the present state of West Virginia, being in lat. $38^{\circ} 57.9'$ and long. $79^{\circ} 16.9'$. This is the most decided southward movement that it has made during any decade. It appears to have been due in part to the addition of Florida to our territory, and in part to the great extension of settlements in Louisiana, Mississippi and Arkansas, or generally, it may be said, in the southwest.

From 1830 to 1840 it moved still farther westward, but slightly changed its direction northward, reaching a point 16 miles south of Clarksburg, West Virginia, being in lat. $39^{\circ} 2'$ and long. $80^{\circ} 18'$. During this decade settlement had made decided advances in the prairie states and in the southern portions of Michigan and Wisconsin, the balance of increase settlement evidently being in favor of the northwest.

From 1840 to 1850 it moved westward and slightly southward again, reaching a point about twenty-three miles southeast of Parkersburg, West Virginia, in lat. $38^{\circ} 59'$ and long. $81^{\circ} 19'$, the change of direction southward being largely due to the annexation of Texas.

From 1850 to 1860 it moved westward and slightly northward, reaching a point twenty miles south of Chillicothe, Ohio, this being in lat. $39^{\circ} 0.4'$ and long. $82^{\circ} 48.8'$.

From 1860 to 1870 it moved westward and sharply northward, reaching a point about forty-eight miles east by north of Cincinnati, Ohio, in latitude $39^{\circ} 12'$, longitude $83^{\circ} 35.7'$. This northward movement was due in part to waste and destruction in the South consequent upon the Civil War, and in

part, probably, to the fact that the census of 1870 was defective in its enumeration of the Southern people, especially of the newly-enfranchised colored population.

In 1880 the center of population had returned southward to nearly the same latitude which it had in 1860, being in lat. $39^{\circ} 4.1'$, long. $84^{\circ} 39.7'$. This southward movement was due only in part to an imperfect enumeration at the South in 1870. During the decade between 1870 and 1880 the Southern states made a large positive increase, both from natural growth and from immigration southward.

From 1880 to 1890 it moved northward into practically the same latitude which it occupied in 1870. It moved westward $53' 13''$, or 48 miles, being less by 10 miles than its movement during the preceding decade, 6 miles greater than the movement between 1860 and 1870, and slightly less than the average westward movement since the first census, its present position being in lat. $39^{\circ} 11' 56''$ and long. $85^{\circ} 32' 53''$. The most salient point of its latest ascertained progress is the northing which has been made, which is doubtless due to the great development in the cities of the Northwest and in the state of Washington, and in no small degree to the increase of population in New England.

The center of the area of the United States, excluding Alaska, is in northern Kansas, in approximate lat. $39^{\circ} 55'$ and approximate long. $98^{\circ} 50'$. The center of population is therefore about three fourths of a degree south and more than seventeen degrees east of the center of area. It is doubtful whether the population center will ever be identical with the center of area, or that it will vary materially in its location, for several decades. Not only do commercial movements point to these conclusions, but the physical geography of the country indicates their truth.

In considering the question of the center of population, it is of interest to note that with few exceptions, the Presidents of the United States have been elected from what was at the time the center of population. George Washington was elected from Virginia, the center of population at the time was near Baltimore. So with Thomas Jefferson and James Madison. John Adams was an exception, but was elected as the result of a turning of the tide. From 1860 to 1880 the center was near Cincinnati, Ohio. During that period Garfield, Grant, and Hayes, were elected from the states of Ohio and Illinois. McKinley, too, was chosen from the center of population, likewise Harrison. It is worthy of remark that in those years when the home of the President elected was not near the center of population, that home was in some state which contained a large population and whose temporary claims were recognized. Such was Massachusetts, the home of John and John Quincy Adams, and New York, the home of Cleveland. That the presidency should follow the center of population is but natural; did it not, the election could not be in accord with democratic principles. There are, of course, always other considerations likely to change this seeming rule.

*Furnished by Henry Gannett to the Census Department, Washington, District of Columbia.

ASSESSED VALUATION OF PROPERTY IN THE UNITED STATES. The assessed valuation of real and personal property in the several states and territories for 1880, 1890, and Jan. 1, 1899, was as follows:

STATES AND TERRITORIES.	TOTAL ASSESSED VALUATION.		
	1880.	1890.	Jan 1, 1899.
Alabama	\$ 122,867,228	\$ 258,079,575	\$ 256,256,295
Arizona	9,270,214	28,050,234	31,473,540
Arkansas	86,409,304	174,737,755	177,000,000
California	584,578,036	1,101,136,431	1,130,885,697
Colorado	74,471,603	220,554,004	192,243,080
Connecticut	327,177,385	358,913,056	534,405,257
Delaware	59,951,043	66,210,519	.....
Dist. Columbia	99,401,787	153,307,541	.....
Florida	30,938,309	91,761,711	93,900,823
Georgia	251,963,124	415,828,945	411,813,911
Idaho	6,440,876	25,748,437	30,423,671
Illinois	786,616,304	800,682,026	778,474,910
Indiana	727,815,131	856,838,472	1,285,965,056
Iowa	398,671,251	519,246,110	544,247,782
Kansas	160,891,689	347,717,219	325,889,747
Kentucky	370,743,384	547,596,788	552,957,768
Louisiana	160,162,339	234,320,780	261,545,868
Maine	235,978,716	309,129,101	329,516,244
Maryland	497,307,675	529,494,777	603,326,096
Massachusetts	1,584,756,802	2,154,134,626	2,764,242,784
Michigan	517,666,359	898,155,532	1,105,100,000
Minnesota	258,028,687	588,820,213	599,358,546
Mississippi	110,628,129	166,772,279	182,888,598
Missouri	561,939,771	887,975,928	1,106,066,625
Montana	18,609,802	112,937,384	133,969,519
Nebraska	90,585,782	184,737,305	167,810,764
Nevada	29,201,459	25,350,094	23,517,245
New Hampshire	205,586,805	263,050,798	276,118,255
New Jersey	702,518,361	893,859,866	812,609,000
New Mexico	14,675,209	43,675,209	39,122,146
New York	2,651,940,006	3,785,910,310	4,999,268,900
North Carolina	156,100,202	235,300,674	265,867,196
North Dakota	8,786,572	88,203,054	101,131,016
Ohio	1,534,300,508	1,778,138,477	1,748,908,639
Oklahoma	.....	40,623,816	.....
Oregon	52,522,084	166,025,731	133,533,577
Pennsylvania	1,683,459,016	2,650,796,909	.....
Rhode Island	252,536,673	321,764,503	399,912,580
South Carolina	133,560,135	168,262,600	.....
South Dakota	11,534,958	140,154,930	120,000,000
Tennessee	228,154,432	382,154,432	355,000,000
Texas	320,364,515	780,898,005	854,619,365
Utah	24,775,279	106,116,370	100,241,331
Vermont	86,866,775	162,008,513	157,265,133
Virginia	318,331,441	415,249,107	486,447,904
Washington	23,810,603	217,612,897	226,996,294
West Virginia	146,991,688	186,064,770	222,195,486
Wisconsin	466,303,185	577,066,252	600,000,000
Wyoming	13,621,829	32,621,829	39,789,291
Total	\$17,139,993,495	\$25,473,173,418	.....

Total increase in the decade 1880-90 \$8,333,269,923

URBAN POPULATION OF THE UNITED STATES. In the census reports of the United States the urban population has been understood as that included in cities which have each 8,000 inhabitants and over. While this limit is now recognized as too high (the 4,000 limit being generally regarded as the better one), it has been continued for the convenience of comparisons with the figures of the previous census reports.

The urban population returned in 1890 was 29.12 per cent of the total population of the whole country, the increase in the percentage over that of 1880 being much greater than in any preceding decennium. The following are the corresponding figures for the several censuses:

CENSUS YEARS.	POPULATION OF THE UNITED STATES.	POPULATION OF CITIES.	INHABITANTS OF CITIES IN EACH 100 OF THE TOTAL POPULATION.
1790	3,929,214	131,472	3.35
1800	5,308,483	210,873	3.97
1810	7,239,881	356,920	4.93
1820	9,633,822	475,135	4.93
1830	12,866,020	864,509	6.72
1840	17,069,453	1,453,994	8.52
1850	23,191,876	2,897,586	12.49
1860	31,443,321	5,072,256	16.13
1870	38,558,371	8,071,875	20.93
1880	50,155,783	11,318,547	22.57
1890	62,622,250	18,235,670	29.12

The official estimate of the population on June 30, 1898, was 74,522,000.

In 1870 there were only 14 cities reporting each a population of 100,000 or over; in 1880 there were 20; and in 1890 the number had increased to 28. In 1880 New York was the only city whose population had reached a million; now there are three, namely, New York, Chicago, and Philadelphia. The list and relative rank of the cities having each a population of 100,000 in the census years of 1870, 1880, and 1890 are shown as follows:

RANK.	1890.	1880.	1870.
1	New York, N. Y.	New York, N. Y.	New York, N. Y.
2	Chicago, Ill.	Philadelphia, Pa.	Philadelphia, Pa.
3	Philadelphia, Pa.	Brooklyn, N. Y.	Brooklyn, N. Y.
4	Brooklyn, N. Y.	Chicago, Ill.	St. Louis, Mo.
5	St. Louis, Mo.	Boston, Mass.	Chicago, Ill.
6	Boston, Mass.	St. Louis, Mo.	Baltimore, Md.
7	Baltimore, Md.	Baltimore, Md.	Boston, Mass.
8	San Francisco, Cal.	Cincinnati, Ohio.	Cincinnati, Ohio.
9	Cincinnati, Ohio.	San Francisco, Cal.	New Orleans, La.
10	Cleveland, Ohio.	New Orleans, La.	St. Francisco, Cal.
11	Buffalo, N. Y.	Cleveland, Ohio.	Buffalo, N. Y.
12	New Orleans, La.	Pittsburg, Pa.	Washington, D.C.
13	Pittsburg, Pa.	Buffalo, N. Y.	Newark, N. J.
14	Washington, D. C.	Washington, D. C.	Louisville, Ky.
15	Detroit, Mich.	Newark, N. J.	.....
16	Milwaukee, Wis.	Louisville, Ky.	.....
17	Newark, N. J.	Jersey City, N. J.	.....
18	Minneapolis, Minn.	Detroit, Mich.	.....
19	Jersey City, N. J.	Milwaukee, Wis.	.....
20	Louisville, Ky.	Providence, R. I.	.....
21	Omaha, Neb.	.....	.....
22	Rochester, N. Y.	.....	.....
23	St. Paul, Minn.	.....	.....
24	Kansas City, Mo.	.....	.....
25	Providence, R. I.	.....	.....
26	Denver, Colo.	.....	.....
27	Indianapolis, Ind.	.....	.....
28	Allegheny Cy, Pa.	.....	.....

According to the census of 1890 the distribution of the population in the various industrial occupations was as follows:

OCCUPATION.	MALES.	FEMALES.	TOTAL.
Agriculture, fisheries, mining	8,333,692	679,509	9,013,201
Professional services	632,641	311,682	944,323
Domestic and personal service	2,602,820	1,667,686	4,300,506
Trade and transportation	3,097,653	228,309	3,325,962
Manufacturing and mechanical	4,064,144	1,927,525	5,991,669
All occupations	18,820,950	3,914,711	22,735,661

AGRICULTURE. The agricultural interest of the United States is far greater than that of any other country. The chief products, in the order named, are corn, wheat, cotton, oats, tobacco, barley, rye, and buckwheat. The latest statistics of the various crops are given below.

Corn. The area, product, value, and yield per acre during recent years were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	41,036,918	850,148,500	\$550,043,080	64.7	20.7
1880...	62,317,842	1,717,434,543	679,714,499	39.6	27.6
1885...	73,130,150	1,936,176,000	635,674,630	32.8	26.5
1890...	71,970,703	1,489,970,000	754,433,451	50.6	20.7
1891...	76,204,515	2,060,154,000	836,439,225	40.6	27.0
1892...	70,626,658	1,628,464,000	642,146,630	39.4	23.1
1893...	72,036,465	1,619,496,131	591,625,627	36.5	22.5
1894...	62,582,209	1,212,770,052	554,719,162	45.7	19.4
1895...	82,075,830	2,151,138,580	544,985,534	26.4	26.2
1896...	81,027,156	2,283,875,165	491,006,967	21.5	28.2

Wheat. The area, product, value, and yield per acre were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	24,967,027	308,102,700	\$291,107,895	94.5	12.3
1880...	37,986,717	498,549,868	474,201,850	95.1	13.1
1885...	34,189,246	357,112,000	275,320,300	77.1	10.4
1890...	36,087,154	399,262,000	334,773,678	83.8	11.1
1891...	39,916,897	611,780,000	513,472,711	83.9	15.3
1892...	38,554,430	515,949,000	322,111,881	62.4	13.4
1893...	34,629,418	396,131,725	213,171,381	53.8	11.4
1894...	34,882,436	460,267,416	225,902,025	49.1	13.2
1895...	34,047,332	467,102,947	237,938,998	50.9	13.7
1896...	34,618,646	427,684,346	310,602,539	72.9	12.4

Cotton. The chief cotton-producing states are Texas, Georgia, Mississippi, Alabama, South Carolina, Arkansas, Louisiana, North Carolina, Tennessee, and Florida, in the order named. The area, product in bales, and farm value in recent years were as follows:

YEAR.	ACRES.	BALES.	AVERAGE GROSS WEIGHT OF BALES, POUNDS.	FARM VALUE.
1874...	.....	4,170,388	465.34	\$312,480,000
1880...	15,475,300	5,761,252	481.11	242,140,987
1885...	18,300,000	5,706,165	480.70	253,993,385
1890...	20,175,270	7,311,322	496.13	308,424,271
1891...	.....	8,652,597	498.81	350,000,000
1892...	.....	9,035,379	498.77	313,000,000
1893...	19,525,000	6,700,365	500.37	268,000,000
1894...	23,687,950	7,549,817	490.27	263,857,000
1895...	20,184,808	9,001,251	508.72	262,426,000
1896...	23,272,704	7,157,346	501.92	260,116,000
1897...	.....	8,757,964	502.08	287,787,000

Oats. The area, product, value, and yield per acre were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	10,897,412	240,369,000	\$125,047,530	52.0	22.1
1880...	16,187,977	417,885,380	150,243,565	36.0	25.8
1885...	22,783,630	629,409,000	179,631,860	28.5	27.6
1890...	26,431,369	523,621,000	222,048,486	42.4	19.8
1891...	25,581,861	738,394,000	232,312,617	31.5	28.9
1892...	27,663,835	661,035,000	209,253,611	31.7	24.4
1893...	27,273,033	638,854,850	187,576,092	29.4	23.4
1894...	27,023,553	662,036,928	214,816,920	32.4	24.5
1895...	27,878,466	824,443,537	163,655,068	19.9	20.6
1896...	27,565,085	707,346,404	132,485,033	18.7	25.7

Tobacco. The chief tobacco-producing states are Kentucky, North Carolina, Virginia, Tennessee, Pennsylvania, Ohio, and Connecticut, in the order named. The area, product, and value in recent years were as follows:

YEAR.	ACRES.	POUNDS.	VALUE.
1882.....	671,522	513,077,558	\$43,189,950
1885.....	752,520	562,736,000	43,265,598
1893.....	702,052	483,023,963	39,155,442
1894.....	523,103	406,678,385	27,760,739
1895.....	633,950	491,544,000	35,574,220
1896.....	594,749	403,004,320	24,258,070

Barley. The area, product, value, and yield per acre were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	1,580,626	32,552,500	\$29,983,769	92.1	20.6
1880...	1,843,329	45,165,346	30,090,742	66.6	24.5
1885...	2,729,359	58,360,000	32,867,606	56.3	21.4
1893...	3,220,371	69,869,495	28,729,386	41.1	21.7
1894...	3,170,602	61,400,465	27,134,127	44.2	19.4
1895...	3,299,973	87,972,744	29,312,413	33.7	26.4
1896...	2,950,539	60,665,223	22,491,241	32.3	23.6

Rye. The area, product, value, and yield per acre were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	1,116,716	14,990,900	\$12,870,411	85.9	13.4
1880...	1,767,619	24,540,829	18,504,560	75.6	13.0
1885...	2,129,301	21,756,000	12,594,820	57.9	10.2
1893...	2,038,485	26,555,446	13,612,222	51.3	13.0
1894...	1,944,780	26,727,615	13,395,476	50.1	13.7
1895...	1,890,345	27,210,070	11,964,826	44.0	14.4
1896...	1,831,201	24,369,047	9,960,769	40.8	13.3

Buckwheat. The area, product, value, and yield per acre were as follows:

YEAR.	ACRES.	BUSHELS.	VALUE.	VALUE PER BUSHEL CENTS.	YIELD PER ACRE BUSHELS.
1874...	453,590	8,016,600	\$6,477,885	80.8	17.7
1880...	822,802	14,617,535	8,682,488	59.4	17.8
1885...	914,394	12,626,000	7,057,363	55.9	13.8
1893...	815,614	12,132,311	7,074,450	58.3	14.9
1894...	789,232	12,668,200	7,040,238	55.6	16.1
1895...	763,277	15,341,399	6,936,525	45.2	21.1
1896...	754,898	14,089,783	5,522,339	39.2	18.7

Hay. The chief hay-producing states are Iowa, Kansas, New York, Missouri, Nebraska, Illinois, Minnesota, Pennsylvania, South Dakota, Ohio, and Indiana. In 1896 the total number of acres devoted to the hay crop in the United States was 43,083,544; the total crop was 59,191,158 tons; and its total value was \$388,154,618. It will be seen, therefore, that it was the most valuable crop in the country next after corn.

Potatoes. The chief potato-producing states are New York, Pennsylvania, Iowa, Michigan,

Ohio, Illinois, Wisconsin, Nebraska, Minnesota, Indiana, Maine, Missouri, and Kansas, in the order named. In 1896 the total area planted with potatoes in the United States was 2,767,465 acres; the total crop was 122,234,540 bushels; and the total value was \$72,182,351.

Wool. The wool clip in the United States for the years 1896-97 was as follows:

YEAR.	WOOL CLIP, WASHED AND UNWASHED, POUNDS.	SCOURED WOOL, POUNDS.
1896.....	272,474,708	115,284,579
1897.....	259,153,251	111,365,987

Sugar. The bounty paid on sugar produced in the United States in the years 1892-97 was as follows:

YEAR.	CANE.	BEEF.	MAPLE.	TOTAL.
1892...	\$ 7,077,316	\$240,098	\$ 2,466	\$ 7,319,880
1893...	8,763,831	531,364	60,119	9,355,314
1894...	11,114,000	852,175	116,122	12,082,897
1895...	957,612	8,057	355	966,024
1896...	4,708,373	402,789	121,765	5,232,927
1897...	1,015,508	68,584	.....	1,084,092
Total.	\$33,637,240	\$2,103,067	\$300,827	\$36,041,134

FARM ANIMALS IN THE UNITED STATES.

FARM ANIMALS.	1890.	1896.	1897.
Horses.....	14,213,837	15,124,057	14,364,667
Mules.....	2,331,027	2,278,946	2,215,654
Milch cows.....	15,952,883	16,137,586	15,941,727
Other cattle.....	36,849,024	32,085,409	39,508,408
Sheep.....	44,336,072	38,298,783	36,818,643
Swine.....	51,602,780	42,842,750	40,600,276

A comparison of 1896 and 1897 shows a decrease in the number of horses of 759,390; of mules 63,292; of milch cows of 195,859; of other cattle of 1,577,001; of sheep 1,480,140; and of swine 2,242,464. The aggregate value of all in 1890 was \$2,418,766,028; in 1897, \$1,655,414,612; showing a decrease in value of \$763,351,416.

MINERALS. The mineral products of the United States include iron, coal, copper, petroleum, natural gas, lead, gold, silver, zinc, quicksilver, aluminum, antimony, nickel, tin, platinum, building stone, salt, cement, limestone for flux, borax, gypsum, talc, soapstone, corundum, mica, graphite, sulphur, precious stones, etc. The total value of the whole mineral product for each of the years 1892-96 was as follows:

YEAR.	VALUE.
1892.....	\$648,675,081
1893.....	574,299,886
1894.....	527,144,381
1895.....	622,628,685
1896.....	623,717,288

The statistics relating to the chief minerals for the same years are given below.

Pig Iron. The quantity and the value at Philadelphia were as follows:

YEAR.	LONG TONS.	VALUE.
1892.....	9,157,000	\$131,161,039
1893.....	7,124,502	84,810,426
1894.....	6,657,388	65,007,247
1895.....	9,446,308	105,198,550
1896.....	8,623,127	90,250,000

Coal. The quantity and value of bituminous coal were as follows:

YEAR.	SHORT TONS.	VALUE.
1892.....	126,856,567	\$125,124,381
1893.....	128,385,231	122,751,618
1894.....	118,820,405	107,653,501
1895.....	135,118,193	115,749,771
1896.....	137,640,276	114,891,515

And the quantity and value of Pennsylvania anthracite were as follows:

YEAR.	LONG TONS.	VALUE.
1892.....	46,850,450	\$82,442,000
1893.....	48,185,306	85,087,078
1894.....	46,358,144	78,488,063
1895.....	51,785,122	82,019,272
1896.....	48,523,287	81,748,651

Silver. The quantity and the coinage value, at \$1.2929 per troy ounce, also the commercial value for 1895 and 1896, were as follows:

YEAR.	TROY OUNCES.	COINAGE VALUE.	COMMERCIAL VALUE.
1892.....	63,500,000	\$82,099,150	.....
1893.....	60,000,000	77,575,757	.....
1894.....	49,501,122	64,000,000	.....
1895.....	55,727,000	72,051,000	\$36,445,000
1896.....	58,834,800	76,069,236	39,655,000

Gold. The quantity and the coinage value, at \$20.6718 per troy ounce, were as follows:

YEAR.	TROY OUNCES.	COINAGE VALUE.
1892.....	1,596,375	\$33,000,000
1893.....	1,739,081	35,950,000
1894.....	1,910,816	39,500,000
1895.....	2,254,760	46,610,000
1896.....	2,568,132	53,088,000

Copper. The quantity, including copper made from imported pyrites, and the value at New York city, were as follows:

YEAR.	POUNDS.	VALUE.
1892.....	352,971,744	\$37,977,142
1893.....	339,785,972	32,054,601
1894.....	364,866,808	33,141,142
1895.....	392,639,964	38,682,347
1896.....	460,061,430	49,456,603

Lead. The quantity, from domestic ores only, and the value at New York city, were as follows:

YEAR.	SHORT TONS.	VALUE.
1892	173,654	\$13,892,320
1893	163,982	11,839,590
1894	159,331	9,942,254
1895	170,000	11,220,000
1896	188,000	10,528,000

Zinc. The quantity, and the value at New York city, were as follows:

YEAR.	SHORT TONS.	VALUE.
1892	87,260	\$8,027,920
1893	78,832	6,306,560
1894	75,328	5,288,026
1895	89,686	6,278,020
1896	81,499	6,519,920

Quicksilver. The quicksilver mines of the United States are limited to California, Oregon, and Utah. Cinnabar was first discovered in California in 1845, but very little quicksilver was produced prior to 1850, when work was commenced at New Almaden. In 1889, 26,464 flasks, or 2,024,469 pounds, or 1,012 tons of quicksilver were produced in California; 2,000 in Oregon; and 200 in Utah; cost, \$881,401; market value, \$1,190,500; profit, \$309,099; capital invested in mines, buildings, machinery, etc., \$1,331,114.

The yield, in flasks of 76½ pounds avoirdupois each, and the value at San Francisco, in the years 1892-96, were as follows:

YEAR.	FLASKS.	VALUE.
1892	27,993	\$1,245,689
1893	30,164	1,108,527
1894	30,416	934,000
1895	36,104	1,337,131
1896	30,765	1,075,449

Aluminum. The quantity, and the value at Pittsburg, were as follows:

YEAR.	POUNDS.	VALUE.
1892	259,885	\$172,824
1893	339,629	266,903
1894	550,000	316,250
1895	920,000	464,600
1896	1,300,000	520,000

Building Stone. The value was as follows:

YEAR.	VALUE.
1892	\$48,706,625
1893	33,885,573
1894	49,344,516
1895	52,892,276
1896	31,346,171

Petroleum. The quantity, in barrels of 42 gallons each, and the value were as follows:

YEAR.	BARRELS.	VALUE.
1892	50,509,136	\$26,034,196
1893	48,412,666	28,932,326
1894	49,344,516	35,522,995
1895	52,892,276	57,632,296
1896	60,960,361	58,518,709

Natural Gas. The value was as follows:

YEAR.	VALUE.
1892	\$14,800,714
1893	14,346,250
1894	13,954,400
1895	15,006,650
1896	13,002,512

SURVEYS OF PUBLIC LANDS OF THE UNITED STATES. I. Historical Note.* After the close of the Revolutionary War, the eastern colonies surrendered to the general government their several claims to the lands north of the Ohio, and west of Pennsylvania, as far as to the Mississippi river. Connecticut, however, retained the northeastern corner of Ohio, now called the "Connecticut," or "Western Reserve." Virginia also reserved a large tract in the southern part of Ohio, between the Scioto and Miami rivers. Georgia relinquished her claim to Alabama and Mississippi. Florida, the Louisiana Purchase, Texas, California, and Arizona were acquired either by treaty or by purchase.

As early as 1785 provision was made by Congress for a uniform system of surveys of all public lands. The present system was adopted in 1786. Jefferson is generally credited with its authorship. "Lot 16" of every township was set apart for the maintenance of public schools. Since 1852, sections 16 and 36 (called *school sections*) in every township are given to the school fund. No system was adopted in allotting the lands of the original states. Each tract was described by metes and bounds, often in a manner so vague as to give rise to various conflicting claims.

II. The Township and its Subdivisions. The public lands of the United States are laid out in *townships* and *sections*, which are designated by a simple and uniform system of numbering.

A *township* is six miles square, and contains 36 sq. miles, or 23,040 acres. Its boundaries are *meridians* on the east and west, and *parallels of latitude* on the north and south. A township is divided into 36 *sections*, each one mile square (640 acres) "as nearly as may be." The sections are numbered in the order indicated by Diagram 1. Section 1 is in the northeast corner of the township, and the numbers run alternately west and east. Sections are divided as in Diagram 2.

The government surveyors mark the corners of townships, sections, half-sections, and quarter-sections (except the corner in the center of the section) with stakes, stones, or mounds of turf, after a uniform system. In some of the later surveys, eighths and sixteenths are also measured.

* Originally and chiefly prepared for Swinton's Geography, and inserted in these Supplements, through the kindness of the American Book Exchange, New York.

DIAGRAM 1.
A Township.

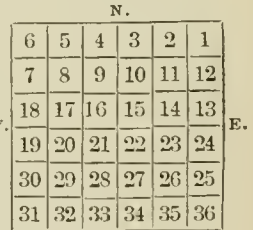
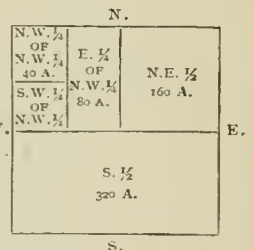


DIAGRAM 2.
A Section.



The *Tallahassee meridian*, in longitude $84^{\circ} 18'$ west from Greenwich, runs due north and south from the point of intersection with the base-line at Tallahassee, and governs the surveys in Florida.

The *Saint Stephens meridian*, longitude $88^{\circ} 2'$ west from Greenwich, starts from Mobile, passes through Saint Stephens, intersects the base-line on the 31st degree of north latitude, and controls the surveys of the southern district in Alabama and of the Pearl River district lying east of the river and south of township 10 north, in the state of Mississippi.

The *Huntsville meridian*, longitude $86^{\circ} 31'$ west from Greenwich, extends from the northern boundary of Alabama as a base, passes through the town of Huntsville and governs the surveys of the northern district in Alabama.

The *Choctaw meridian*, longitude $89^{\circ} 10' 30''$ west from Greenwich, passes two miles west of the town of Jackson, in Mississippi, starting from the base line 29 miles south of Jackson, and terminating on the south boundary of the Chickasaw cession, controlling the surveys east and west of the meridian and north of the base.

The *Washington meridian*, longitude $91^{\circ} 5'$ west from Greenwich, seven miles east of the town of Washington, in Mississippi, with the base-line corresponding with the 31st degree of north latitude, governs the surveys in the southwestern angle of the state.

The *Saint Helena meridian*, $91^{\circ} 5'$ west from Greenwich, extends from the 31st degree of north latitude, as a base, due south, and passing one mile east of Baton Rouge, controls the surveys in the Greensborough and the southeastern districts of Louisiana, both lying east of the Mississippi.

The *Louisiana meridian*, $92^{\circ} 20'$ west from Greenwich, intersects the 31st degree north latitude at a distance of 48 miles west of the eastern bank of the Mississippi River, and, with the base-line coincident with the said parallel of north latitude, governs the surveys in Louisiana west of the Mississippi.

The *New Mexico meridian*, longitude $106^{\circ} 52' 9''$ west from Greenwich, intersects the principal base-line on the Rio Grande del Norte, about ten miles below the mouth of the Puerco River, on the parallel of $34^{\circ} 19'$ north latitude, and governs the surveys in New Mexico, and the valley of the Rio Grande del Norte, in Colorado.

The *Great Salt Lake meridian*, longitude $111^{\circ} 53' 47''$ west from Greenwich, intersects the base-line at the corner of Temple Block, in Salt Lake City, Utah, on the parallel of $40^{\circ} 46' 4''$ north latitude, and governs the surveys of Utah.

The *Boise meridian*, longitude $116^{\circ} 20'$ west from Greenwich, intersects the principal base between the Snake and Boise rivers, in latitude $43^{\circ} 26'$ north. The initial monument, at the intersection of the base and meridian, is 19 miles distant from Boise City, on a course of south $29^{\circ} 30'$ west. The meridian governs the surveys in Idaho.

The *Mount Diablo meridian*, California, coincides with longitude $121^{\circ} 54'$ west from Greenwich, intersects the base-line on the summit of the mountain from which it takes its name, in latitude $37^{\circ} 53'$ north, and governs the surveys of all central and northeastern California and the entire state of Nevada.

The *San Bernardino meridian*, California, longitude $116^{\circ} 56'$ west from Greenwich, intersects the base-line at Mount San Bernardino, latitude $34^{\circ} 6'$ north, and governs the surveys in southern California lying east of the meridian and that part of the surveys situated west of it which are south of the eighth standard parallel south of the Mount Diablo base-line.

The *Humboldt meridian*, longitude $124^{\circ} 11'$ west from Greenwich, intersects the principal base-line on the summit of Mount Pierce, in latitude $40^{\circ} 25' 30''$ north, and controls the surveys in the northwestern corner of California lying west of the coast range of mountains and north of township 5 south of the Humboldt base.

The *Willamette meridian* is coincident with longitude $122^{\circ} 44'$ west from Greenwich, its intersection with the base-line is on the parallel of $45^{\circ} 30'$ north latitude, and it controls the public surveys in Oregon and Washington.

The *Montana meridian* extends north and south from the initial monument established on the summit of a lime-

stone hill, 800 feet high, longitude $111^{\circ} 40' 54''$ west from Greenwich. The base-line runs east and west from the monument on the parallel of $45^{\circ} 46' 27''$ north latitude. The surveys for Montana are governed by this meridian.

The *Gila and Salt River meridian* intersects the base-line on the south side of Gila River, opposite the mouth of Salt River, in longitude $112^{\circ} 15' 46''$ west from Greenwich, and latitude $32^{\circ} 22' 57''$ north, and governs the public surveys in Arizona.

The *Indian meridian* intersects the base-line at Fort Arbuckle, Indian Territory, in longitude $97^{\circ} 15' 56''$ west from Greenwich, latitude $34^{\circ} 31'$ north, and governs the surveys in that territory.

The *Wind River meridian* governs the subdivisional surveys within the Shoshone Indian Reservation, in Wyoming.

The *Uinta special base and meridian* govern the surveys of the Uinta Indian Reservation, in Utah.

The *Navajo special base and meridian* control the surveys of the Navajo Indian Reservation, in New Mexico and Arizona.

The *Black Hills meridian* is coincident with the west boundary of South Dakota, on the 27th degree of longitude west from Washington, and intersects the base-line in the parallel of 44° north latitude; it governs the surveys in the southwestern corner of South Dakota.

The *Grand River meridian* and base-line govern the subdivisional surveys for allotment to the Ute Indians, in western Colorado.

The *Cimarron meridian*, coincident with the eastern boundary of New Mexico, or 103d meridian of longitude west from Greenwich, intersects the base-line on the parallel $36^{\circ} 30'$ north latitude (the north boundary of Texas), and governs the surveys in the strip of public lands inclosed between Kansas and Colorado on the north, the Indian Territory on the east, Texas on the south, and New Mexico on the west.

V. Convergence of Meridians. In consequence of the convergence of meridians, townships accurately surveyed are not perfect squares, but are longer upon the southern than upon the northern boundary.

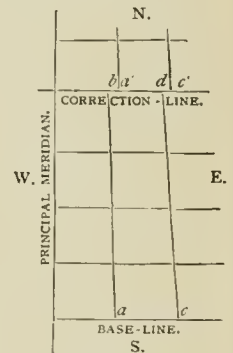
If the township corners upon a base-line are exactly six miles apart, the townships surveyed northward grow less and less as the distance from the base-line increases, and those surveyed southward grow larger. Hence the necessity of standard parallels, or *correction-lines*, to prevent the errors from becoming so great as to destroy the value of the system.

Upon these *correction-lines* the township corners are carefully placed, at distances of six miles apart.

The convergence of meridians is greater in the higher latitudes; but at latitude 42° it is about half a rod to a mile. Supposing the surveys to be perfectly accurate, and the correction-lines to be 24 miles apart, the convergence of the meridians will then be about 12 rods, and there will be a double set of township corners, as illustrated in the accompanying diagram, in which the convergence of the meridians is somewhat exaggerated, to make it evident to the eye.

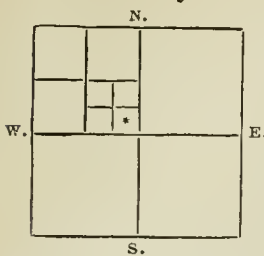
Explanation: In consequence of the convergence of meridians, a line run due north from *a* strikes the correction-line at *b* instead of at *a*. Double township corners are consequently established at *b* and *a*, and so on, their distance apart increasing with their distance from the principal meridian.

DIAGRAM 4.



Lands are legally advertised in the following way: "The southeast quarter of the southeast quarter of the northwest quarter of section thirty-five, in

DIAGRAM 5.



township twenty-nine north, of range seven east of the fourth principal meridian, containing ten acres more or less."

The above is often abbreviated thus: "The S.E. $\frac{1}{4}$ of the S.E. $\frac{1}{4}$ of the N.W. $\frac{1}{4}$ Sec. 35, T. 29 N., R. 7 E. of the 4th p. 1n."

Supposing the annexed drawing to represent the Section 35 described, the star (*) shows the position of the lot advertised.

The proper description is found by consulting the records of the land-offices or the deed by which the title was originally conveyed by the government.

These records are presumed to be correct, and the only appeal from them is to the Commissioner of the General Land Office, the Secretary of the Interior, and ultimately to the President of the United States.

VI. Public Land Sales and Grants. The immense extent of land, forming part of the United States, as yet chiefly uninhabited and uncultivated, is held to be national property, at the disposal of Congress and the Executive of the Republic. The public lands of the United States which are still undisposed of lie in nineteen states and five territories, including Alaska. The public lands are divided into two great classes. The one class has \$1.25 an acre designated as the minimum price, and the other \$2.50 an acre, the latter being the alternate sections, reserved by the United States in land grants to railroads, etc. Titles to these lands may be acquired by private entry or location under the homestead and timber-culture laws; or, as to some classes, by purchase for cash. The homestead laws give the right to 160 acres of \$1.25 lands, or to 80 acres of \$2.50 lands, to any citizen or applicant for citizenship over 21 who will actually settle upon and cultivate the land. The title is perfected by the issue of a patent after five years of actual settlement. The only charges in the case of homestead entries are fees and commissions.

Another large class of free entries of public lands is that provided for under the Timber-Culture Acts of 1873-78. The purpose of these laws is to promote the growth of forest trees on the public lands. They give the right to any settler who has cultivated for two years as much as five acres in trees to an 80-acre homestead, or, if 10 acres, to a homestead of 160 acres, and a free patent for his land is given him at the end of three years instead of five; still another means of land-entry is through the Desert Land law, by which 640 acres may be entered, provided the applicant shall have reclaimed said lands by means of the conducting of water for irrigation. Twenty-five cents an acre may be paid at time of entry and \$1 an acre additional, any time within three years. It is provided by law that two sections, or 640 acres of land, in each "township," are reserved for common schools, so that the spread of

education may go together with colonization. (For the extent and distribution of United States public lands, see PUBLIC LANDS, in these Supplements.)

The power of Congress over the public territory is exclusive and universal, except so far as restrained by stipulations in the original cessions.

RECENT HISTORY. For a connected account of the history of the United States to 1890, see UNITED STATES, Vol. XXIII, p. 729.

Early in 1891, a serious international complication was occasioned by the lynching of eleven Sicilians in the parish jail of New Orleans. The chief of the New Orleans police force, David C. Hennessy, was killed upon his own doorstep on the night of Oct. 15, 1890, the last words of the dying man being that he had been shot by "Dagos." The lowest Italian residents in New Orleans had been responsible for many murders and assaults, and had frequently succeeded in escaping punishment, partly by avoiding detection and partly owing to the fact that many had bound themselves to give perjured testimony whenever they should be called as witnesses against one of their countrymen. The belief that there was a "Mafia," or oath-bound society of assassination, appeared to many to be confirmed by this latest outrage on law and order. On Nov. 20, 1890, the grand jury returned indictments for the murder of Chief Hennessy against eleven suspects and held eight as accessories. When the cases of nine of these came to trial, six were acquitted and three received no verdict. Perjury of witnesses and bribery of the jury were the reasons at once assigned by the public in explanation of the result. Mob passion was aroused, and on March 14, 1891, great throngs of people began to assemble and denounce the trial. The populace entered the jail, and the leaders, apparently with little opposition from the police, shot down the eleven Sicilians.

When intelligence of the massacre reached Rome, the Italian government made formal protest to the Secretary of State for the United States, who answered that under the Constitution such cases belonged independently to the state, and that the Federal Government had no power to consider anything but an indemnity. For a time the diplomatic relations of the two governments seemed on the point of rupture, but, ultimately, the United States Treasury paid over to Italy the sum of \$25,000 as an indemnity to the relatives.

In 1891, the right to take seals in the Bering Sea became a subject of negotiation with Great Britain. The history of the matter is narrated under BERING SEA QUESTION, in these Supplements.

When the Congressional Junta came into possession of Santiago, Chili, on the downfall of Balmain, the populace of that city and the provisional government also evinced great dislike of the United States citizens there. The Chilians charged the American minister, Egan, with having given asylum to enemies of the Congressional party, and the cruiser *Baltimore* with carrying important information to the fallen president. In October, 1891, some sailors from the *Baltimore* were set upon by a mob in the streets of Valparaiso, maltreated, imprisoned, and two of the number killed. President Harrison

ordered two cruisers to that harbor, and demanded an apology, with reparation, and that the Junta should withdraw its surveillance of the American legation. This demand was treated with contumely, and the Chilian minister at Washington was directed by the Junta to publish his case without submitting it to the government of the United States. Much irritation ensued, but in January, 1892, the Chilian Minister of Foreign Affairs made ample apologies, and in October, on the termination of a legal inquest, three of the rioters were imprisoned, and an indemnity of \$75,000 was paid to the United States for distribution among those who had suffered in the Valparaiso mèlee.

In February, 1892, the proprietors of the Louisiana lottery gave up their struggle against the laws of the Union, and, by the more enlightened public opinion of their own state, the lottery was legally abolished. The headquarters of the company, however, were transferred nominally to Central America, and by various evasions the company was able, in great measure, to baffle the postal administration. Where it could not make use of the post-office it had especial contracts with express companies; and through them it carried on an immense business in the United States from its rendezvous in Honduras. In the closing hours of the Fifty-third Congress, in March, 1895, an anti-lottery bill became a law. By it, the introduction of any intelligence or tickets of foreign lotteries into the United States, the use of the mails for transacting business with them, or the carrying of any papers in their interest from one state to another, were made punishable by fine and imprisonment.

On July 7, 1892, the Republican National Convention met at Minneapolis. President Harrison, Secretary Blaine and Governor McKinley of Ohio were the most favored, the nomination being at length unanimously given to the first. The Democratic National Convention assembled in Chicago on June 21, 1892, and a unanimous nomination was given to ex-President Cleveland, who was elected President in November. The electoral vote was, for Cleveland, 277; for Harrison, 145; and 22 for Weaver, the candidate of the People's party.

When the Civil-Service Act was passed, in 1883, it affected only fourteen thousand offices; in 1895 it included over fifty-five thousand. On the 6th of May, 1896, the President issued an order extending the provisions of the civil-service law to thirty thousand more persons employed by the government. The jurisdiction of the Civil Service Commission, under these regulations, embraces, with less than one thousand minor exceptions, the entire service between mere laborers and unskilled workmen and those officials whose appointment must be confirmed by the Senate under the law. In 1893 the state of New York adopted a system similar to that of the general government, and placed its civil service under a state commission. In the following year Massachusetts enacted like provisions, and in 1894 an optional civil-service-reform law, providing the competitive plan for the appointment of all subordinate municipal officers, was passed in Illinois and adopted by the voters of Chicago in November

of that year. (See CIVIL SERVICE, in these Supplements.)

The presence of Chinese laborers in this country in large numbers, particularly in the state of California, had long been regarded with hostility by those American citizens whose labor came into competition with theirs. The parsimony of the Oriental, and his manner of living, made it possible for him to thrive on wages which seemed degrading to his competitors. In 1893 the Geary Act providing for the registration or deportation of Chinese laborers was tested in the Federal courts. (See CHINESE EXCLUSION ACT, in these Supplements.) The government then had three Chinamen arrested in New York and taken before the United States circuit court. They could show no certificates of registration, and their deportation was forthwith ordered. An appeal was taken to the supreme court, which decided that the law was constitutional. It had previously been decided in the supreme court that a Chinaman cannot become a citizen of the United States by naturalization, on the ground that no alien race can obtain that privilege by inference, but only when that race is expressly granted the right by statute. Yet a child of Chinese parentage born on the soil may exercise the right of citizenship.

On May 1, 1892, President Harrison sent out invitations to the leading nations to join the United States in a monetary conference, and acceptances came from all the principal European powers. On November 22d the conference was held, at Brussels. As the United States had been the prime mover in the matter, it devolved upon the delegates from this country to open the discussion and submit a line of procedure. This was done by Mr. Allison, on November 25th, who submitted for discussion the following resolutions:

1. That the re-establishment and maintenance of a fixed parity between gold and silver and the continued use of both as coined money of full debt-paying power, would be productive of important benefits to the world.

2. That these ends can be accomplished by removing the legal restrictions which now exist on the coinage of silver into full legal-tender money, and restoring by international agreement the parity value between the metals which existed prior to 1873, at such a ratio as may be decided upon by this conference.

3. That the essential provisions of such an international arrangement should be (a) unrestricted coinage of both gold and silver into money of full debt-paying power; (b) fixing the ratio in coinage between the two metals; (c) establishing a uniform charge, if any, to the public for the manufacture of gold and silver coins.

The conference refused to discuss this proposal, on the ground that it dealt with fundamental principles and not with matters of special reference to the conference. On the 17th of December the conference adjourned to meet May 30, 1893, provided the governments represented should approve, but there is no indication that such approval will be given.

HAWAIIAN ANNEXATION. Among the most important events of the year 1893 was the projected annexation of Hawaii to the United States. Within the previous six years revolution had been attempted no less than five times, and with every failure the idea of annexation to the United States had been urged as the only solution to the troubles of the kingdom. In Jan., 1893, Queen Liliuokalani attempted to abrogate the constitution in favor of a despotism, and disorder followed. The American minister, J. L. Stevens, in response to a request from American citizens, ordered Commander Wiltse of the United States steamship *Boston* to land sailors and marines for their protection. On January 17 the government buildings were seized by the revolutionists, and the supreme court of the kingdom declared the throne vacant. The Committee of Public Safety then issued a proclamation establishing a provisional government, and requested recognition of the same from the representatives of foreign powers. On the same day Minister Stevens officially recognized the new government on behalf of the United States. On learning of the recognition of the new government by the United States, the Queen surrendered the police station and the barracks as demanded by the committee. On Feb. 1, 1893, Minister Stevens, at the request of the provisional government, placed the islands under the protection of the United States, and the United States flag was hoisted on the government buildings. A commission of American and English residents of Hawaii reached Washington, Feb. 3, 1893, and by the 11th had negotiated a treaty of annexation, which on the 14th was transmitted by President Harrison to the Senate with his approval. Owing to pressure of business in the Senate the treaty remained unratified when Mr. Cleveland became President. On March 9, 1893, he requested its return to the State Department. He was opposed to the acquisition of distant territory, and sent, as special commissioner to Hawaii, Mr. James H. Blount, of Georgia, who withdrew the American protectorate and returned the sailors and marines on guard to the United States steamship *Boston*. Both branches of the American Congress subsequently passed resolutions unfavorable to Hawaiian annexation. The provisional government thereafter decided upon adopting an independent republican constitution. (See HAWAIIAN ISLANDS, in these Supplements.)

EXHIBITIONS. From May 1 to Oct. 31, 1893, the World's Columbian Exposition, commonly called the World's Fair (q. v.), organized to commemorate the discovery of America, was held in Chicago, the total admissions, including passes, being 27,539,521. Important exhibitions were also held in San Francisco in 1894, in Atlanta in 1895, in Nashville, Tenn. (the Tennessee Centennial), in 1897, and in Omaha in 1898.

FINANCIAL PANIC. Early in the summer of 1893 a severe financial panic swept over the United States, making the number of suspended banks reach the remarkable total of 158 during the year ending Oct. 31, 1893. While 65 of the suspended banks were insolvent, at least 86 afterward resumed business. The public distrust grew out of the fact that measures for changing the financial system of the country,

and especially one for reducing customs duties, were being agitated in Congress, during which time an element of uncertainty was intruded into all contracts and time engagements. (See TARIFF, in these Supplements.)

UTAH, ADMISSION OF. On July 17, 1894, President Cleveland signed the enabling act which permitted Utah to draw up a constitution, with a view to its admission into the Union as a state. In May, 1895, the convention called to draft the constitution completed its labors. A notable feature of the constitution was its grant of complete suffrage to women, to hold office and to sit on juries. No objection was made by the Mormons to the permanent prohibition of plural marriages. On Jan. 4, 1896, President Cleveland signed the proclamation admitting Utah into the Union, and Frank J. Cannon and Arthur Brown were elected United States Senators and took the oath of office January 27.

LABOR INTERESTS. In 1892 the Homestead strike, involving 4,000 men, the Buffalo switchmen's strike, involving several thousand, and the New Orleans street-car strike, involving 2,000, gave evidence of increasing industrial unrest. In the Homestead strike a political element was introduced by the employment of a large body of Pinkerton detectives to police the mills, at the expense of the owners. The strikers claimed that they were citizens ready to be sworn in as deputies of the sheriff, and desirous to enforce the public peace. The bringing of armed men at private cost from another state to perform police duty became a question of wide interest, and led to what are known as the PINKERTON LAWS (q. v., in these Supplements). The year 1894, however, was marked by the most bitter and disastrous labor revolts in the history of the nation. A hatters' strike at Danbury, Connecticut, and a silk-weavers' strike at New York were among the opening skirmishes of the three great struggles which followed, namely, the coal strike in Pennsylvania, the Great Northern railroad strike, and, the most notable of all, the Pullman boycott. Preliminary to the great coal strike of April was the outbreak among the Hungarian and Slav operatives in Fayette and Westmoreland counties, known as the Connellsville coke region, in Pennsylvania, which occurred on April 2. English-speaking laborers were driven from their work, mines and machinery were blown up and destroyed by dynamite, and the chief engineer of the Frick Coke Company at Connellsville, J. H. Paddock, was murdered by a mob of 200 Hungarians. In May the riotings broke out again at Scottdale, but the rioters were dispersed by deputy sheriffs armed with Winchester rifles.

A general strike of the miners of bituminous coal throughout the country on April 11, to go into effect on the 21st of that month, was ordered by John McBride, president of the United Mine-workers of America. The intention of the strike was to call out of the mines about 200,000 miners and close all the mines in an area covered by ten states and one territory, embracing Pennsylvania, Ohio, Indiana, Illinois, Michigan, Iowa, West Virginia, Tennessee, Kentucky, Alabama, and Indian Territory.

The strike began as ordered, on April 21, and in a few days after its inauguration the whole bituminous coal region of the United States was a scene of insurrection against the civil authorities and of lawless violence. In Illinois the strike grew to the proportions of a rebellion. For more than a week the coal region of that state was a pandemonium, with mobs threatening miners, closing mines, wrecking coal-trains, firing on trainmen, defying military and civil authorities, and putting a complete embargo on all kinds of business. In Indiana the governor brought out the militia of the state and checked the lawlessness which had gained such headway in Illinois. In Ohio the governor called out the state troops and sent them to the districts where mines had been closed, trains stopped, bridges burned, and tracks torn up. Similar outbreaks were reported from West Virginia, at Charleston; in Maryland, at Cumberland, Frostburg, and other points; and at various places in Iowa and other states. By June 5 the strike had spent its force. A conference was called to meet at Columbus, Ohio, on June 8, at which an agreement was made and signed on the 11th, which put an end to the conflict. It is estimated that during this strike the miners lost in wages \$12,500,000, while losses of other kinds were put at \$20,000,000 more.

The trainmen on the Great Northern road struck on April 13, 1894. The strike was against a new schedule of wages which went into effect in April, under which the pay of the men was reduced from 15 to 33 per cent. On the 19th Eugene V. Debs, president of the union, addressed to Mr. Hill, president of the road, a request for a conference. Mr. Hill consented to meet the committee on the 21st. The efforts to settle the strike by conference failed, and on the 27th Debs issued orders for a strike on all the Minnesota divisions of the Great Northern road, which completed the tie-up from St. Paul to the Pacific Coast. On the 28th the Brotherhood of Locomotive Engineers and Firemen held a conference with President Hill, and, as a result of the conference, Mr. Hill agreed to raise the schedule of both engineers' and firemen's wages to their last July rate if they would go to work on the 30th instant, which was agreed to. Subsequently arbitration was agreed upon, the question of wages amicably settled, and the strike declared off.

Following immediately upon the termination of the coal strike came the troubles at Pullman, Chicago, which had their climax in the boycott of the Pullman cars by the American Railway Union, and the fierce conflict that ensued. With the close of the World's Fair came business depression, which became general throughout the entire country, the reaction and curtailment being felt at Pullman as elsewhere. Reduction in wages and hours of labor followed decrease in the number of employees. The cutting of wages was resorted to until the reductions averaged $33\frac{1}{3}$ per cent, but, while there was such a reduction in wages there was no reduction in rents or water-rates, which the company collected monthly from its employees. On May 5, 1894, the Pullman carpenters met and organized Union No. 208 of the American Railway Union, and this

was followed shortly after by the formation of a Blacksmiths' Union. After ineffectual appeals for better remuneration the union met in secret on May 10, and unanimously voted to strike on Saturday, May 12, 1894. The company learned of these proceedings, and closed the works at noon on May 11, 1894. On June 22, 1894, notice of a boycott was served on the company, to commence June 26, if they did not meantime arbitrate. Obtaining no satisfaction, the union, through its president Eugene V. Debs, ordered the boycott on the date last named. The order carried with it a threat to strike on every railroad in the United States that hauled Pullman cars. In the evening the boycott began. Switchmen, engineers, and firemen left their trains, and passenger and freight traffic came to an end. The strike involved nearly all the roads entering Chicago, and extended northward to Milwaukee and St. Paul and westward to the Pacific states. The transportation of mails was practically abandoned, the tracks of the various roads being blocked by overturned freight cars. On the 28th United States Attorney-General Olney directed his district attorney at Chicago to have the obstructors arrested. On July 2 a Cabinet meeting was held at Washington, and the next day Federal troops from Fort Sheridan were ordered to Chicago, and soon after soldiers from other posts arrived. In the southern portion of the city, mob rule and rioting prevailed, and trains could be moved only under guard of the soldiers. Six hundred cars and locomotives were burned or wrecked, 96 cars overturned, and 9 buildings destroyed by fire. Several engagements between the troops and the rioters resulted in a number of deaths of the latter. On July 10 Debs was arrested by the United States authorities. The force of the strike having spent itself, the railroads gradually resumed business. Debs and other directors of the American Railway Union were sentenced to imprisonment in jail for disobeying an injunction of the United States court forbidding interference with the movement of the mails. The total cost of the strike to all concerned was estimated at over \$7,000,000.

The governor of Illinois, John P. Altgeld, protested against the sending of Federal troops into his state without a request from the state executive, as contrary to the Constitution of the United States; but the administration claimed to be charged with the protection of the mails, and to have acted within its lawful powers. Thus the question of state-rights was raised anew, and became a matter of political consideration in the national conventions for the nomination of a President and Vice-President in 1896.

A strike of the street-railway employees in Brooklyn, New York, ordered by the Knights of Labor, began the 14th of January, 1895, and continued 16 days. It involved 48 trolley-lines, and over 5,000 men were thrown out of employment. The cause was mainly an attempt of the companies to obtain increased profit on capital without giving labor any corresponding benefit. (Report of New York State Assembly Committee.) Mobs obstructed the tracks, and 1,000 cars were damaged. Arbitration failing, the governor sent troops to quell the

disturbance. The strikers were defeated. It is computed that the employees lost \$225,000 in wages, and the companies \$750,000 in business.

To secure an eight-hour working day, the electrical workers in New York city inaugurated a strike in February, 1895, which, through sympathy, involved other trades to the number of 8,000 men. A conference of the Council of Conciliation, walking delegates, and master builders resulted in an agreement, March 20, and the strike came to an end, the strikers gaining the eight-hour day for which they had contended.

At Massillon, Ohio, a coal-miners' strike, causing great destitution among the miners, was ended on Jan. 16, 1895, by the miners agreeing to work at the wages offered.

On March 16 a strike of 10,000 coal-miners in the Pittsburg, Pa., region began, which spread rapidly. The men demanded an advance from 55 to 59 cents per ton. Most of the mine-owners yielded, and 17,000 out of 22,000 miners secured the advance.

On July 28, 1895, the United Brotherhood of Tailors declared a strike, and within a few hours more than 15,000 workers in New York and Brooklyn quit work. The strike extended to Newark, N. J., and later to Boston, Mass. It was aimed at the sweat-shop system as opposed to regular hours of work. By the middle of August most of the contractors had yielded the main points of contention, and nearly all the tailors began work again. But in December the contractors repudiated the agreement they had made in August, and 4,000 tailors in New York and 2,000 in Brooklyn again quit work. To avert a general strike, the contractors, on Jan. 25, 1896, agreed, in conference with representatives of the Brotherhood, to conform to the agreement of the previous August, and to resort to arbitration for the settlement of future disputes.

Early in July, 1895, began a strike of 5,000 miners in the iron regions of Ishpeming and Negaunee, northern Michigan. The miners demanded \$1.50 to \$2.00 a day in place of \$1.35 to \$1.50. The companies refused the increase in wages. Under the protection of militia the companies operated the mines, and the strike collapsed. The movement was disastrous to the miners, the daily loss in wages being nearly \$6,000. The daily expense to the county for militia was nearly \$1,000.

On Dec. 17, 1895, the employees of the Union Traction Company, of Philadelphia, to the number of over 5,000, struck for a ten-hour work-day at \$2.00 per day, and against the discharge of union men without other sufficient cause. Mobs attacked motormen, and cars were damaged. Many committees of the employees had conferences with the company, a settlement was reached through the intervention of a citizens' committee, and the strike came to a conciliatory end. But new men to the number of 1,900 displaced as many of the old employees.

On Dec. 17, 1895, the Contractors' Association of New York and Brooklyn locked out the tailors, in

consequence of a refusal of the men to submit to an alteration of the agreement made by the contractors in July, 1895, by which the "task" system would have been restored. The dispute was settled on Jan. 25, 1896, in time to avert a general strike of about 20,000 garment workers, the Contractors' Association agreeing with the United Brotherhood of Tailors to continue the agreement of August, 1895, and to provide a joint board of arbitration to settle future disputes.

In Feb., 1896, a strike of about 6,000 garment workers was begun in Baltimore, Md., but it was unsuccessful, and on March 30 the men abandoned the struggle; and in March there was a strike of clothing cutters and trimmers in Chicago, Ill.

In May, 1896, a strike of lithographers and engravers in New York was settled by fixing the time of work at forty-seven and a-half hours per week, by abolishing piecework, and by making \$18 a week the minimum wages.

In the same month about 700 or 800 boiler-makers were locked out in Cleveland, O.; an agreement was come to on July 27, under which the men returned to work, but owing to some misunderstanding the agreement was not properly carried out by the employers, and the men struck, and most of them got work elsewhere. During the lock-out there were some disturbances, in the course of which two of the locked-out men were shot and killed.

On May 4, 1896, 1,200 street-railway employees of Milwaukee, Wis., struck for an increase of one cent per hour in wages and a reduction of the working-day from 12 to 10 hours. The strikers instituted a boycott on the street-cars, which became very effective on account of the sympathy of the public. The strikers fitted up wagons and omnibuses, and carried passengers. The boycott continued for five weeks, when the strike was declared off. Many of the old employees asked to return to work, but were mostly put on the company's waiting-list.

On June 8, 1896, all the linotype operators and printers on the daily papers in Minneapolis and St. Paul, Minn., struck, demanding wages of \$24 a week of forty-nine hours.

On July 15, 1896, the miners of Leadville, Colo., struck, demanding \$3 a day for all classes of workmen. The strike was accompanied by violence, and on Sept. 21 an attempt was made to blow up the Coronada mine with dynamite, five men being killed, and several others injured. Troops were called out, and the place was put under martial law. The drainage pumps were stopped, and several mines were flooded. On March 6, 1897, the strike was finally declared off, the men accepting a compromise offered by the mine-owners.

On July 22, 1896, the garment-workers of New York and Brooklyn struck against an attempted restoration of the "sweating," or "task" system. By the middle of August about 13,000 men were on strike, when the contractors conceded their demands, and the strike ended.

In Nov., 1896, about 1,000 coal-miners at Rutland, Ill., struck against alleged frauds in weights. After the strike had continued about two months,

during which the men had made threats of violence, and been confronted by the militia, the company agreed to adjust differences, and the strike ended.

On May 16, 1897, the garment-workers of New York, Brooklyn, N. Y., Newark, N. J., and other places, to the number of about 25,000, again struck, alleging that the contractors had broken the agreement of August, 1895.

On July 2, 1897, a great general strike of the bituminous coal-miners in Illinois, Indiana, Ohio, Pennsylvania, and West Virginia, was ordered, the chief scene of the struggle being the Pittsburg district. The main ground for the strike was for higher wages, and the number of men involved was about 150,000. There was a good deal of marching about and some violence on the part of the strikers, the women being especially demonstrative. About the middle of August injunctions were obtained in Pennsylvania and West Virginia to restrain the miners from "assembling or encamping in proximity to" the mines, "for the purpose of intimidation, and by menaces, threats, and opprobrious words, of preventing said miners" from working; and several strikers were arrested and imprisoned for the alleged violation of an injunction of this kind. Early in September the mine-owners and the strikers came to a partial settlement as to the rate of wages, and agreed to submit their other differences to arbitration; and on Sept. 12 the strike was officially declared off. In the meantime, at Lattimer, near Hazleton, Pa., on Sept. 10, a body of marching miners, mostly Hungarians, were ordered by Sheriff Martin to disperse, and the riot act was read to them. On their alleged failure to obey, whether through lack of knowledge of the English language or otherwise, the sheriff and his armed deputies, 102 in number, fired upon the strikers, killing eighteen, and wounding about forty others. The sheriff and deputies were arrested, and on Oct. 28 the grand jury found a true bill against them for murder. The trial came on before Judge Woodward on Feb. 1, 1898, lasted for five weeks, during which about 150 witnesses were examined, and resulted, on March 9, in a verdict of acquittal.

In January, 1898, a reduction of wages in about 150 cotton mills in New England, affecting about 125,000 operatives, resulted in strikes at New Bedford, Mass., and other places in New England. The strike was hopeless from the first, and, after remaining out for about three months, the strikers succumbed, and returned to work on the employers' terms. The loss occasioned by the strike was estimated at \$1,500,000.

In May, 1898, a coal-miners' lockout was declared at Pana, Ill. The operators of four large mines tried to induce the miners to leave the union and go to work below the union price, but without success, and in August there was some rioting, in which three union men were injured. In September the operators imported some negroes from Alabama to take the place of the strikers. This led, on Sept. 28, to a further riot, in which one negro was killed and several were wounded; and Governor Tanner ordered three companies of

soldiers to the city to protect the citizens and their property, but with strict injunctions not to assist the mine-owners in operating their mines with imported labor. The strike culminated on Oct. 12 in a fatal riot at Virden, precipitated by an attempt of the Chicago-Virden Coal Co. to run a train-load of 200 negroes from the South inside a stockade which the company had erected. A battle ensued between the strikers and the deputies on the train, in the course of which 14 persons were killed and 25 wounded. Governor Tanner sent some troops to the scene, with instructions to disarm everybody, and to prevent imported laborers from leaving any train inside the city; and by these means order was restored. On Nov. 10, 17, and 18 there was some further rioting in Pana; but on Nov. 16 the strike at Virden was settled by the mine-owners conceding the demands of the strikers. In December, Governor Tanner was indicted for malfeasance in office. On March 25, 1899, the last of the troops who had been stationed at Pana were removed. On April 11, 1899, however, another riot occurred at Pana between the white and black miners, in which five men and one woman were killed, and eight persons were wounded. The trouble was finally settled by the mine-owners agreeing to send away the imported negroes.

On June 23, 1898, a riot occurred at Oshkosh, Wis., as a result of the woodworkers' strike. A mob of several hundred women, armed with stones, clubs, pepper, etc., prevented anyone from entering the factories, and some incendiary fires occurred. The militia were called out, and on June 29 the strike was declared off.

On July 1, 1898, the stereotypers of the Chicago newspapers, 200 in number, through their union, struck for an increase in wages from \$3.25 to \$4 a day, and for a reduction of their hours of labor from eight to seven a day. In consequence, for four days Chicago had no newspapers. The publishers of the eight leading dailies pooled their resources, and easily obtained non-union stereotypers to take the place of the strikers; the Typographical Union refused to countenance the strike; and the strike ultimately failed.

In Sept., 1898, a strike was declared in the last-branch of the shoe business of southeastern Massachusetts, affecting about 2,600 lasters, the ground of the strike being the substitution of last-branch machines for hand last-branch.

In April, 1899, the street-railway employees in Wheeling, W. Va., struck for higher wages and shorter hours—20 cents an hour instead of 15, and 9 hours a day instead of 12. On June 29 a compromise was agreed to of 18 cents an hour, and a day of 11 hours.

On April 24, 1899, the Miners' Union at Wardner, Idaho, struck for higher wages (\$3.50 per day to men underground), and against the employment of non-union men; and on April 29 the Bunker Hill and Sullivan Mill was blown up with dynamite, about \$250,000 worth of property being destroyed. On May 8 Governor Steunenberg placed the district under martial law, and

prohibited mine-owners from employing members of organizations which had been guilty of criminal acts.

On May 5, 1899, a grain-shovelers' strike, involving 1,500 shovelers, was declared in Buffalo; and several thousand freight-handlers, coalheavers, and others joined in the strike from sympathy.

On June 10, 1899, a general strike of street-railway employees was begun in Cleveland, Ohio, which was accompanied by much disorder and rioting, and by some bloodshed. A settlement was come to on June 24, but it proved only temporary, and the strike was speedily resumed, accompanied, as previously, by violence and rioting, several cars being blown up with dynamite, and some of their passengers injured. The car companies refused to grant the demands of the strikers, and imported other men to fill their places.

On June 10, 1899, an arrangement was come to by which the wages of 45,000 employees in the iron and steel industries in Detroit, Mich., were raised 25 per cent.

On June 16, 1899, the coal-miners of Colorado went on strike, throwing 30,000 men out of employment. At the instance of the employees, a state law had recently reduced the working day from 12 hours to 8, and the employees demanded that, though the reduction in time had been one-third, the reduction in wages should be only one-sixth. Some companies agreed to the demand of the strikers, others offered a compromise. In the meantime the question of the constitutionality of the law was submitted to the Supreme Court.

On June 20, 1899, the street laborers of Rochester, N. Y., went on strike for \$1.50 per day of eight hours, and on June 24 their demands were granted pending a decision of the courts.

On June 21, 1899, some miners who were on strike at Evansville, Ind., attacked some 30 negro miners who had been imported from Kentucky, and five of the negroes and one white man having charge of them were shot. The mine was closed, and the imported negroes were kept in hiding.

On June 30, 1899, some men on strike at Fredonia, Ill., attacked a party of imported negroes, killing one of them and the wife of another. In revenge the negroes burned Union City, a town inhabited by the union miners, and drove the union men into the woods, where the fight was continued.

In July, 1899, the discharge of 15 men from the Carnegie Company's works at Homestead, Pa., led to a strike affecting some thousands of employees.

From the report of Carroll D. Wright, Commissioner of Labor, for the years 1881 to 1894, it appears that in that time there were in the United States 14,380 strikes, involving 69,167 establishments, and throwing out of employment 3,714,406 persons. The loss in wages is estimated to have been \$163,807,866 from strikes and \$26,685,516 from lockouts; the loss to employers \$82,590,386 in strikes and \$12,235,451 in lockouts. The strikes were successful in 45 per cent of the cases, and

partly so in 12 per cent. Twenty-five per cent of the strikes arose from an effort to raise wages; 13 per cent to reduce the hours of labor; 8 per cent to resist reduction of wages; 7 per cent were sympathetic. In his report published in 1896 the Commissioner shows that probably about 5 per cent of the working classes in the United States are constantly unemployed, a proportion which is of course greatly increased during times of depression.

Early in the spring of 1894 a movement growing out of the disturbed condition of labor and capital, was started by J. S. Coxey. The organization was known as the "Commonweal Army" or the "Industrial Army," and was formed for the purpose of marching to Washington, D. C., to urge upon Congress the passage of laws, which Mr. Coxey and his followers believed would prove a panacea for the ills of which the wage-workers of the country complained. The first of these armies was Coxey's, which had a maximum strength of 500 men. Next was Frye's detachment, from Los Angeles, Cal., with 1,000 men. Kelly's contingent, from San Francisco, reached a maximum of 2,000; Randall's, from Chicago, 1,000; Hogan's, from Montana, 500; and one from Oregon, 900. This gives a total of about 6,000 in the leading organizations. Smaller bands from other sections swelled the total to about 10,000.

Coxey's army entered Washington on April 29, and numbered 336 men, and on May 1 it paraded through the streets to the capitol grounds. Coxey and his lieutenants were arrested for carrying a banner in the capitol grounds and for trespassing on the grass. They were convicted, and sentenced to twenty days' imprisonment with five dollars' fine. The army had a hard time in Washington, suffered for want of food, was forced to camping-grounds out of the city, where its members were arrested for vagrancy, by the officers of both Virginia and Maryland, and it rapidly disintegrated and went to pieces. The other "industrial armies" gradually melted out of existence.

In Aug. and Sept. 1899, a further strike and boycott of a menacing aspect occurred at Cleveland, O., occasioned by the refusal of the street railway company to recognize the union organizations of their employees. Considerable violence was resorted to by the strikers, who also attempted for a time to boycott everyone who rode in the cars or who supported the company in its antagonism to the men. A counter boycott on the part of the business community ensued, when the strikers either returned to their duties or were replaced by new employees.

During the year 1900 the labor world in the United States manifested more or less restlessness, which in various centres revealed itself in strikes. In the months of February and March, Chicago was greatly disturbed by a lockout in the building trade and by a strike among the piano makers. In March there was a strike among those employed in the granite quarries of New England, which was happily settled by a compromise between employers and employed. In May and June St. Louis

had disagreeable experience of a strike among the employees of the City Transit Company, who showed much lawlessness and disregard for the convenience of the citizens. The most extensive revolt of labor during the year happened, however, in September in the Pennsylvania anthracite coal fields, where about 125,000 men struck out of a total of nearly 140,000 employed in the region. The strike appears to have been ordered by the "United Mine Workers of America," a Western organization which the capitalist operators and railroad corporations in the State were loth to recognize. As usually happens, the justice of the strike was not in every item of grievance apparent; had this been otherwise arbitration no doubt would have settled the issues. The miners demanded, with increase of wages, the abolition of the company's stores; semi-monthly instead of monthly payments; reduction of the price the miners have to pay for blasting powder; and revision of the methods of weighing and measuring the coal. Answers to these grievances were made by the operators of the mines, but they were not deemed satisfactory by the strikers, though as we go to press there appears to be a disposition to settle differences amicably.

One feature of the strike was the embarrassment it occasioned party manœuvrers in the Presidential campaign of 1900. The political aspects of the strike were not long in showing themselves. The Democrats holding the McKinley administration responsible for this and other wrongs of labor. These tactics are understood to have brought about conferences between the managers of the Republican National campaign and the financiers in control of the anthracite coal roads. As a result, important concessions to the miners were agreed to be made, with a ten per cent. advance in wages. President Mitchell, of the United Mine Workers, on the other hand, refused to accept any terms other than those demanded by the miners at the Hazleton convention, and stated that no new terms would be accepted without the approval of a new convention. Thus the matter at issue stood on going to press. In the contentions, it is pleasant to have to state, that there were few instances of illegal acts on the part of the strikers, and but one instance of reckless shooting on the part of deputies. In general, quiet and order prevailed, due in part, no doubt, to the presence of a considerable body of State troops in the region of the strikes.

These labor disturbances, where they are accompanied by violence and temporary mob rule, are exceedingly ominous and menacing to our New World communities. Our American civilization appears just now to be seriously confronted with alien discontent and a disposition to resort to crime and anarchy. With labor and its cause all fair minds must have a hearty and even active sympathy, and where real injustice is done it, and where combinations of capital unscrupulously menace its welfare, there is justification for strikes, though not for terrorism and violence. Lawlessness nowhere serves its end, and on whatever pre-

text it is resorted to, only trouble comes of it, as well as such havoc as injures the cause of labor and repels from it the countenance and support of those whose friendly aid might otherwise be helpful to it and on occasion serve it a good turn.

It is saddening to see how blind to its own interest labor often is, particularly at periods of class strife and disorder. At such seasons we see men commit outrages which are foreign to their nature and training as Americans, and resort to crimes which we have been accustomed to associate only with alien socialists or with labor just escaped from serfdom. The mob rule which at periods of industrial strife has disgraced many of our cities no mere disregard of the rights of labor could justify or active sympathy tolerate. Especially must these disorders react with crushing effect upon the strikers and disturbers of the peace when we know them to be instigated, as they often are, not so much by a sense of personal wrong, as by chagrin and resentment at the employment of non-union men to take the discarded places in the service of our industrial corporations. It is here where labor always and most disastrously puts itself in the wrong, in interfering with the employing of substitutes during strikes, and in resorting to acts of foul violence to deter non-union men from entering the service of the companies or corporations with whom labor has had disagreement.

Resort to the boycott, it should also be said, shows the unscrupulousness as well as the vindictiveness of strikers. Tyranny of this sort is not to be borne and our city administrators greatly fail in their duty, as well as show themselves lacking in a proper sense of right and wrong, by tolerating such interferences with the liberty of the citizen. To take the community by the throat in this way is little less criminal than shooting innocent persons in the streets, and as the resort of intimidators it ought to be most sharply dealt with. Men who resort to such acts to overawe and coerce the community put themselves beyond the pale of consideration and tolerance. G. M. A.

THE MONETARY PROBLEM. In 1893 the condition of the United States Treasury was such that fear existed as to the ability of the government to maintain its gold reserve for the protection of its treasury-notes. Business disturbances reduced the revenues below estimates, expenditures exceeded receipts, and gold was constantly drawn out of the treasury. At the close of the fiscal year the reserve had decreased to \$95,000,000, with prospects of further depletion. An extra session of Congress was called in August to consider the financial condition. President Cleveland thought that the repeal of the Sherman law—which made compulsory the monthly purchase of 4,500,000 ounces of silver by the United States Treasurer—would bring some relief to the government. The law was repealed in October, 1893, but the shrinkage still went on, and when Congress adjourned the reserve had fallen to \$84,000,000, and at the end of January, 1894, to \$65,000,000. On January 17, 1894, the Secretary of the Treasury called for proposals for \$50,000,000 five-per-cent bonds, payable in coin at the option of the government in

ten years. These bonds brought \$58,660,907, being sold at a premium; but as \$24,000,000 of gold for their purchase was withdrawn from the treasury by the deposit of Treasury notes, only \$34,000,000 was actually realized by the transaction, yet enough was obtained to bring the reserve up to \$106,000,000. The exportation of gold still continuing, the reserve declined till in August it was \$52,000,000, and a fresh loan on the same terms of a similar amount was offered Nov. 13, 1894. Bids for more than three times the sum named were received, and the allotment of the bonds in December brought \$58,820,747 into the treasury, which brought the reserve up to over \$105,000,000. But by the end of December it had depleted to \$86,000,000, in January, 1895, to \$49,000,000, and in February to a little more than \$41,000,000. In February, 1895, the President and Secretary of the Treasury made an arrangement with a syndicate of foreign bankers for maintaining the gold reserve, by which the government purchased 3,500,000 ounces of gold at \$17.80½ per ounce, giving in payment four-per-cent bonds to the amount of \$62,317,500. The contract provided that at least one-half the gold was to be supplied from Europe, the shipments not to exceed 300,000 ounces per month, and that the syndicate should exert its influence to protect the treasury against withdrawals of gold pending the performance of the contract. The delivery of gold to the treasury began at once, and the reserve reached \$68,000,000 by February 20, \$87,000,000 by February 28, \$90,000,000 by March 30, and \$107,523,162, June 29—when the amount contracted for was all delivered and the obligation of the syndicate terminated. On Jan. 6, 1896, the Secretary of the Treasury called for sealed proposals for the purchase of \$100,000,000 United States four-per-cent coupon bonds, payable in coin in thirty years. When the bids were opened their number was 4,640, offering to take \$568,259,850 of bonds. The \$100,000,000 was distributed to the Eastern, Western, Central, and Southern states. This large over-subscription was a surprise to the country and the Treasury officials, and demonstrated the financial strength of the nation. In 1897-98, under the stimulus of a large excess of exports, gold flowed into the country, and the Treasury reserve increased until, on Dec. 31, 1898, it reached \$281,729,434, the highest amount on record. On June 30, 1899, the amount was \$273,393,480.

FOREIGN COMMERCE OF THE UNITED STATES. The following tables show the value of imports and exports of merchandise for the years 1890-98, inclusive, for the fiscal years ending June 30:

YEARS.	DOMESTIC EXPORTS.	FOREIGN EXPORTS.	TOTAL EXPORTS.
1890.....	\$ 845,293,828	\$12,534,856	\$ 857,828,684
1891.....	872,270,283	12,210,527	884,480,810
1892.....	1,015,732,011	14,546,137	1,030,278,148
1893.....	831,030,785	16,634,409	847,665,194
1894.....	809,204,937	22,935,635	802,140,572
1895.....	793,392,599	14,145,566	807,538,165
1896.....	863,200,487	19,400,451	882,600,938
1897.....	1,032,007,603	18,985,953	1,050,993,556
1898.....	1,210,291,923	21,190,417	1,231,482,330

YEARS.	IMPORTS.	EXCESS OF EXPORTS.	EXCESS OF IMPORTS.
1890.....	\$789,310,409	\$ 68,518,275	\$
1891.....	844,916,197	39,564,614	.....
1892.....	827,402,462	202,875,686	.....
1893.....	866,400,922	.....	18,735,728
1894.....	654,994,622	237,145,950	.....
1895.....	731,969,065	75,568,200	.....
1896.....	779,724,674	102,882,264	.....
1897.....	764,730,412	286,263,144	.....
1898.....	616,049,654	615,432,676	.....

Gold. The exports and imports of gold coin and bullion for the years 1890-98, inclusive, were as follows:

YEARS.	EXPORTS.	IMPORTS.	NET EXPORTS.	NET IMPORTS.
1890...	\$ 17,274,491	\$ 12,943,342	\$ 4,331,149	\$
1891...	86,362,654	18,232,567	68,130,087	.....
1892...	50,195,327	49,699,454	495,873	.....
1893...	108,680,844	21,174,381	87,506,463	.....
1894...	76,978,061	72,449,119	4,528,942	.....
1895...	66,468,481	36,384,760	30,083,721	.....
1896...	112,409,947	33,525,065	78,884,882	.....
1897...	40,361,580	85,014,780	.....	44,653,200
1898...	15,466,391	120,391,674	.....	104,925,283

Silver. The exports and imports of silver coin and bullion for the years 1890-98, inclusive, were as follows:

YEARS.	EXPORTS.	IMPORTS.	NET EXPORTS.
1890.....	\$34,873,929	\$21,032,984	\$13,840,945
1891.....	22,590,988	18,026,880	4,564,108
1892.....	32,810,559	19,955,086	12,855,473
1893.....	49,737,319	23,193,252	17,544,067
1894.....	50,451,265	13,286,552	37,164,713
1895.....	47,295,286	20,211,179	27,084,107
1896.....	60,541,670	28,777,186	31,764,484
1897.....	61,946,638	30,533,227	31,413,411
1898.....	55,105,239	30,927,781	24,177,458

FINANCES. Receipts and expenditures for the years 1890-98, inclusive:

YEARS.	TOTAL REVENUES.	TOTAL EXPENDITURE'S.	SURPLUS OR DEFICIT.
1890.....	\$463,063,081	\$358,618,585	\$105,344,496
1891.....	458,544,233	421,304,470	37,239,763
1892.....	425,868,260	415,953,807	9,914,453
1893.....	461,716,562	459,374,888	2,341,674
1894.....	372,802,498	442,605,759	*69,803,261
1895.....	399,373,203	433,178,426	*42,805,223
1896.....	409,475,408	434,678,654	*25,203,246
1897.....	430,387,168	448,439,622	*18,052,454
1898.....	494,333,953	532,381,201	*38,047,247

Statement of the Secretary of the Treasury of the currency circulation of the United States for the years 1890-98, June 30 of each year:

FISCAL YEARS.	AMOUNT IN CIRCULATION.	CIRCULATION PER CAPITA.
1890.....	\$1,429,251,270	\$22.82
1891.....	1,497,440,707	23.41
1892.....	1,601,347,187	24.44
1893.....	1,596,701,245	23.85
1894.....	1,660,808,708	24.28
1895.....	1,601,968,473	22.93
1896.....	1,506,434,966	21.10
1897.....	1,640,209,519	22.49
1898.....	1,837,859,895	24.66

RECIPROCITY AND EUROPEAN RETALIATION. The tariff act of 1890 contained a reciprocity clause to

* Excess of expenditures over receipts.

take effect in July, 1892, which set forth that whenever the President should be satisfied that any country imposed duties or other exactions upon the agricultural or other products of the United States which were discriminative, or unequal, or unreasonable, he should have the power to suspend by proclamation the provisions of the act which related to the free introduction of the commodities named from such countries for such time as he should deem just. This clause was designed to secure reciprocal trade with certain countries, especially with those of South America and Central America. The countries with which reciprocity treaties were concluded prior to June 30, 1892, were Austria-Hungary, Germany, Guatemala, Honduras, Nicaragua, Salvador, British West Indies, Cuba, Porto Rico, San Domingo, Brazil and British Guiana. The tariff act of 1894 discriminated against German beet-sugar. Germany retaliated in October, 1894, by issuing a decree prohibiting the landing of American cattle and dressed meat at the ports of Germany, alleging that such cattle were affected with Texas fever. In December, Germany imposed restrictions on the importation of American canned goods, claiming that the sugar tax of the tariff law of 1894 infringed on the "most-favored-nation" clause of existing treaty stipulations between the two countries. In this Germany did not stand alone, for, in December, 1894, Belgium prohibited the importation of live cattle from the United States, and France and Austria placed such restrictions on the cattle trade as made it practically prohibitive. Dec. 5, 1894, Brazil announced its intention of terminating reciprocity with the United States in January, 1895. So seriously disturbed were the commercial relations of the United States with European countries that a bill was introduced in Congress, in January, 1895, repealing the differential duty of one tenth of a cent a pound on all imported sugars on which an export bounty had been paid; but the bill died with the Congress. Immediately after the enactment of the Wilson tariff law, Spain abrogated the reciprocity agreement of 1891 and ordered custom-house officers in Cuba and Porto Rico to apply the maximum schedule rates, together with "special imposts." The United States minister at Madrid at once sought to secure a reversal of the Spanish policy, and in this he was successful, the Cortes at Madrid approving, January 30th, a bill admitting, to the ports of Cuba and Porto Rico, products from the United States at the minimum schedule rates. The average difference between the maximum and minimum rates being about ten per cent, manufacturers generally in the United States seem to favor a return to the policy of reciprocity which was adopted by Congress in 1890, but abrogated in 1894.

THE VENEZUELAN IMBROGLIO. A long-standing dispute between Venezuela and Great Britain over their respective boundaries in South America assumed grave proportions in 1895, on account of the interference of the United States. A brief account of the dispute will aid in understanding the reasons for the intervention. In 1810, a large portion of territory between the mouths of the Orinoco and

Amazon rivers came into the possession of Venezuela as the successor in title of Spain. In 1814, Holland ceded to Great Britain adjacent territory now known as British Guiana. No treaty had ever definitely fixed the boundary between the Spanish and Dutch possessions in South America. In 1887, the dispute resulted in the breaking of diplomatic relations between England and Venezuela. Supported by a long array of historical facts, Venezuela claimed all the territory west of the Essequibo River; also, supported by historical facts, England claimed territory up to the Pomaron River (some leagues west of the Essequibo). In 1840, Great Britain set up a claim to the entire Atlantic coast as far as the Orinoco delta; in 1844, Great Britain proposed a boundary-line west of the Pomaron River; in 1866, she claimed territory to the bank of the Guiana River; in 1890, she claimed practical control of the Orinoco delta; in 1893, she proposed a boundary-line beginning at the mouth of the Amacuro and running so as to include the upper waters of the Cumaná. The United States viewed the progress of this dispute with anxiety, and as an attempt on the part of Great Britain to acquire additional territory in America in contravention of the Monroe doctrine, and frequently tried to effect a settlement by arbitration. Feb. 20, 1895, at the suggestion of the President, Congress, by joint resolution, recommended to Great Britain and Venezuela the reference of their dispute to friendly arbitration, but Great Britain refused, on the ground, chiefly, that certain territory claimed by Venezuela is recognized as an established portion of the British domain, and cannot be subject to the judgment of arbitrators; and further, that the matter in dispute is between Great Britain and Venezuela, and that the good offices of the United States are not regarded as essential to a settlement of the question. On Dec. 17, 1895, President Cleveland submitted to Congress the correspondence in the case between Great Britain and the United States, accompanied by a special message, in which he said: "If a European power, by an extension of its boundaries, takes possession of the territory of one of our neighboring republics against its will, . . . it is difficult to see why, to that extent, such European power does not thereby attempt to extend its system of government to that portion of this continent which is thus taken. This is the precise action which President Monroe declared to be 'dangerous to our peace and safety.' . . . Having labored faithfully for many years to induce Great Britain to submit this dispute to impartial arbitration, and having been finally apprised of her refusal to do so, nothing remains but to accept the situation, . . . and to deal with it accordingly. . . . It is now incumbent upon the United States to determine . . . what is the true divisional line between the republic of Venezuela and British Guiana. . . . I suggest that the Congress make an adequate appropriation for the expenses of a commission, to be appointed by the executive, who shall make the necessary investigation and report upon the matter with the least possible delay. When such report is made and accepted, it will, in my opinion, be the duty of the United States to resist by every means in

its power . . . the appropriation by Great Britain of any lands . . . which of right belong to Venezuela." In England the publication of the message caused profound agitation and amazement, and aroused no little resentment. In Congress the message was received with approval, and the majority of the press applauded it as American, vigorous, and just. But there were men of influence in and out of Congress who questioned the President's interpretation of the Monroe doctrine, and the wisdom of confronting Great Britain with an implied threat of war before the merits of the dispute were determined. However, Congress appropriated one hundred thousand dollars for the expenses of the commission, and the President appointed as the commission: David J. Brewer, associate justice of the supreme court; Richard H. Alvey, chief justice of the court of appeals, District of Columbia; Andrew D. White, ex-president of Cornell University; Frederick R. Conder, counsel for the United States in the Bering Sea arbitration; and Daniel C. Gilman, president of Johns Hopkins University. The commission met Jan. 4, 1896, and organized by electing Justice Brewer as president. On January 20th, the commission suggested that Great Britain and Venezuela be invited to present their respective cases and proofs for the consideration of the commission, which suggestion was communicated to the two governments by Secretary Olney. Though not acknowledging the authority of the commission to inquire into the matter in dispute, Lord Salisbury, February 7th, replied that her Majesty's government would readily place at the disposal of the commission documents relating to the boundary question. Counsel for the Venezuelan government appeared before the commission March 6th. In March, 1896, the British and Venezuelan cases were both duly presented to the commission, after which time the commission had the matter under investigation. On Nov. 9, 1896, it was announced by Lord Salisbury, in a speech at the Lord Mayor's banquet in London, that arbitration was agreed to by England. Later information disclosed the details of the arrangement and showed that the suggestions of Secretary of State Olney in behalf of the United States had been accepted by Great Britain, the latter thus receding from the stand first taken in the beginning of negotiations. Secretary Olney's chief proposition, and the one which afforded Lord Salisbury an opportunity for a graceful withdrawal, was that the right of possession of property in the disputed territory by English citizens, who had had that possession uncontested for fifty years, should not be disputed. This term of years defined the phrase "settled districts." The board of arbitration was to consist of two representatives of Great Britain, two of the United States, and a fifth to be selected by King Oscar II of Sweden and Norway. Thus the validity of the United States Monroe doctrine was upheld and a new point in international law established, making fifty years' occupation a *bona fide* settlement.

An arbitration treaty embodying the above points was signed at Washington on Feb. 2, 1897, by the Venezuelan minister and the British ambassador; approved by the Venezuelan Congress on April 5, and finally ratified at Washington on June 14. The

Boundary Commission appointed by President Cleveland made its formal report on Feb. 27, 1897, and subsequently published four volumes of documents and maps relating to the subject.

THE NATIONAL ELECTION IN 1896. The National Convention of the Republican party was held in St. Louis, Missouri, June 16th-18th. William McKinley, of Ohio, was nominated for President, receiving on the first ballot 661½ votes against a combined total of 240½ for his opponents. Garret A. Hobart, of New Jersey, was nominated for Vice-President, receiving on the first ballot 535½ votes against a combined total of 340½ for his opponents. The platform renewed and emphasized the allegiance of the party to the policy of protection of American industries; demanded the renewal and extension of reciprocity arrangements—which had been repealed during the Cleveland administration—on such terms as would equalize trade with other nations; in short, protection and reciprocity were measures of Republican policy which should go hand in hand. The money plank opposed the coinage of silver dollars upon any ratio to gold not sustained by international agreement, and affirmed that until such agreement could be obtained the existing gold standard should be preserved. The Monroe doctrine was reasserted to its full extent. The ballot on the gold plank was 812½ to 110½.

The Democratic Convention was held in Chicago, Illinois, July 7th-11th. William Jennings Bryan, of Nebraska, was nominated for President, and Arthur Sewall, of Maine, for Vice-President. The platform demanded tariff duties for revenue only, and taxes to be limited to the needs of the government, honestly and economically administered. It denounced interference by Federal authorities in local affairs, and especially "government by injunction" as a new and highly dangerous form of oppression by which Federal judges became at once legislators, judges, and executors. It opposed the issuing of interest-bearing bonds of the United States in time of peace, and demanded the free and unlimited coinage of both silver and gold at the present ratio, 16 to 1, without waiting for the aid or consent of other nations.

The National Prohibition Convention was held in Pittsburg, Pennsylvania, May 27th-28th. Joshua Levering, of Maryland, was nominated for President, and Hale Johnson, of Illinois, for Vice-President. The platform declared solely for prohibition, with a woman-suffrage supplemental resolution attached. The convention by a vote of 427 to 387 rejected a money plank in favor of the free and unlimited coinage of silver in the ratio of 16 to 1.

After the rejection of the free-silver plank by the National Prohibition Convention, some two hundred delegates "bolted" from the convention, reorganized themselves under the name of the National party, and nominated Charles E. Bentley, of Nebraska, for President, and James Haywood Southgate, of North Carolina, for Vice-President. Their platform favored the free coinage of silver.

The Socialist-Labor Party nominated at New York, July 4th, Charles H. Matchett, of New York, for President, and Matthew Maguire, of New Jersey, for Vice-President.

The People's Party (Populistic) nominated, at St. Louis, Missouri, July 26th, William Jennings Bryan, of Nebraska, for President, and Thomas E. Watson, of Georgia, for Vice-President.

The National Democratic Party nominated, at Indianapolis, September 3d, John McAuley Palmer, of Illinois, for President, and Simon Bolivar Buckner, of Kentucky, for Vice-President.

The election on November 3d resulted in a victory for the Republican Presidential ticket, and the election of a majority in both houses of Congress who were pledged to oppose the free coinage of silver.

The silver agitation continued, however, and a conference of board-of-trade delegates from Chicago, St. Louis, Cincinnati, and other cities, met at Indianapolis on Dec. 1, 1896, and issued a call for a "nonpartisan convention" to meet in Indianapolis on Jan. 12, 1897, for the purpose of considering the question of currency reform.

The second session of the 54th Congress opened on Dec. 7, 1896. President Cleveland, in his annual message, referred to the continuance of the warfare in Cuba, and the slight probability of its being brought to an end, and to the consequent injury to American interests in the island; and after rejecting in turn proposed solutions of the question by recognition of belligerency, recognition of independence, offer to purchase the island, or armed intervention, favored a solution by the granting of autonomy by Spain, with guarantees by the United States for Spain's fulfilment of her promises. The message also asserted the duty of the United States, in the interests of humanity, to find some way of ending the fruitless strife with or without Spain's friendly coöperation; and stated that the country would not tolerate the transfer of Cuba by Spain to any other Power. In domestic matters the message recommended the withdrawal of the greenbacks from circulation in exchange for bonds, and the enactment of legislation to remedy the evils of trusts.

On Feb. 22, 1897, those Republicans in Congress who were in favor of the free coinage of silver seceded from the Republican party, and formed themselves into a new party, known as the Silver Republican party, and elected a provisional national committee, with Hon. Charles A. Towne of Minnesota as chairman.

Among the acts passed at this session were one (passed March 3, 1897) authorizing the President, among other things, to appoint special commissioners "to negotiate diplomatically with other countries" for a bimetallic agreement; one abolishing the death penalty in all cases except murder, rape, and treason, and allowing the jury, in cases of murder and rape, to qualify their verdict by adding "without capital punishment"; and one to prohibit the ownership of land in the territories of the United States by aliens, with certain exceptions. A bill to restrict immigration passed both Houses, but was vetoed by the President on March 2, just two days before the expiration of his term of office, a curious illustration of the ultra-monarchical and despotic power vested by the Constitution in the chief magistrate, even four months after his party has been defeated at a general election, and when he himself is officially moribund

and has lost the confidence of the people, as declared at the polls. The bill was passed by the House on March 3, over the President's veto, by a vote of 193 to 37, but it could not be acted on by the Senate for lack of time, and consequently failed to become law.

On March 4 President McKinley was inaugurated: and on March 5 he nominated as his cabinet: Secretary of State, John Sherman of Ohio; Secretary of the Treasury, Lyman J. Gage of Illinois; Secretary of War, Russel A. Alger of Michigan; Attorney-General, Joseph McKenna of California; Postmaster-General, James A. Gary of Maryland; Secretary of the Navy, John D. Long of Massachusetts; Secretary of the Interior, Cornelius N. Bliss of New York; Secretary of Agriculture, James Wilson of Iowa.

On March 6 the President issued a call for an extra session of the new (55th) Congress, "to receive such communications as might be made by the executive"; and Congress met accordingly on March 15. Hon. T. B. Reed of Maine was again elected Speaker of the House, the Democrats voting for Hon. Joseph W. Bailey of Texas, and the Populists for Hon. John C. Bell of Colorado. The chief measure passed was the Dingley Tariff Bill (July 24, 1897). A joint resolution appropriated \$2,583,000 to relieve the sufferers by the Mississippi floods and to improve the river. A treaty of arbitration between the United States and Britain was signed on Jan. 11, 1897, but was, on May 5, rejected by the Senate on a vote of 52 for the treaty and 31 against, the minority prevailing against the majority, a curious anomaly in a country where the majority is supposed to govern. Congress adjourned on July 24.

Under the act of March 3, 1897, President McKinley, on April 12, appointed Senator E. O. Wolcott of Colorado, Gen. Charles J. Paine of Boston, and ex-Vice-President Adlai E. Stevenson as commissioners to go to Europe for the purpose of bringing about an international bimetallic conference. The commissioners were successful in their appeal to the French Government, and thereupon, on July 12 and 15, held conferences in London with members of the British Government, the chief proposals of the American commissioners being: 1. The reopening of the Indian mints to the free coinage of silver; 2. Holding one-fifth of the reserve in the Bank of England in silver; 3. Raising the legal-tender limit of silver to, say, £10; issuing £1 legal-tender notes based on silver; and retiring the present gold half-sovereigns. The American envoys were informed that no reply could be made to the proposals till the attitude of the Indian Government was known. The reply of that Government, which was strongly adverse to the reopening of the mints, was received in October, and thereupon the British Government courteously but firmly declined to accede to the American proposals, and the envoys returned to America. On Jan. 17, 1898, Senator Wolcott, in a speech in the Senate, gave a full account of the mission, and of its failure.

The second session of the 55th Congress opened Dec. 6, 1897. The President's message recommended the adoption of some measure of currency reform, and requested that careful consideration should be given to the plan of Mr. Gage, Secretary of the Treasury. On December 16, Secretary Gage submitted to the House

committee a draft bill, the chief provisions of which were as follows: 1. The banking operations of the Treasury should be separated from its ordinary ones relating to revenue and expenditure, by means of a Division of Issue and Redemption, which should carry a redemption fund of (a) \$125,000,000 in gold coin and bullion, and (b) sufficient standard silver dollars and bullion to equal the silver certificates and the Treasury notes of 1890 in circulation; this fund to be kept intact, all notes and certificates presented for payment being retained unless paid out for an equivalent amount of the coin in which they were redeemed. 2. The Secretary of the Treasury may redeem any of the five per cent bonds issued prior to 1895 with two and one-half per cent gold bonds payable at the option of the government after ten years, thus effecting a saving in interest estimated at \$10,000,000 annually. 3. National banks may deposit these two and one-half per cent gold bonds in the Treasury, as security for banknotes in circulation, instead of the five per cent bonds now deposited, and may issue banknotes to the full face value of such gold bonds. 4. National banks may also deposit U. S. notes and certificates sufficient to equal, with the bonds deposited, the bank capital, and may issue banknotes to the amount of the U. S. notes and certificates so deposited, provided the total amount of U. S. notes and certificates so deposited shall not exceed \$200,000,000. 5. National banks may also issue banknotes unsecured by any deposit of bonds or U. S. notes or certificates to the extent of 25 per cent of the secured issues, these unsecured notes to be a first lien on all the assets of the issuing bank, and their payment to be also guaranteed by the United States, which is to secure itself by a tax of two per cent on all unsecured notes in circulation. This provision is intended to give flexibility to the circulation, so as to meet temporary and fluctuating demands. 6. National banks are to deposit in the Treasury ten per cent of the total circulation of each bank, such deposits to constitute a general fund for securing the redemption of all banknotes regularly issued. 7. No banknotes for less than \$10 each are to be issued; and all notes of lower denominations are to be called in and destroyed. This provision is intended to ensure the general use of silver as subsidiary currency, and thus employ all the silver now owned by the government. 8. National banks with a capital of not less than \$25,000 may be established in any place of not more than 2,000 inhabitants. This provision is intended for the special convenience of the people in sparsely settled portions of the country, in moving their crops, etc.

The bill, after being slightly modified in the committee, was reported to the House, but further action was deferred until all the proposed currency measures were ready for consideration together.

In response to the call of the conference held at Indianapolis on Dec. 1, 1896, 270 delegates from trade and commercial organizations of 64 cities and 26 states met at Indianapolis on Jan. 12-13, 1897, and after adopting resolutions in favor of the gold standard, of retiring all classes of United States notes, of separating the revenue and note-issue departments of the Treasury, and of a reform in the

banking system, appointed a general committee to further the aims of the convention; and this committee, on Aug. 10, 1897, selected a commission of eleven men, of whom ex-Senator George F. Edmunds was chairman, to make recommendations of whatever changes in our banking and currency laws might be found necessary and expedient. This commission met at Washington on Sept. 22, and after over three months' assiduous labor, published its report on Jan. 3, 1898, making the following recommendations: 1. The creation of a Division of Issue and Redemption; 2. The reserve to be maintained from revenue when adequate, and by sale of bonds when necessary; the proceeds thereof to be used for that purpose, and no other; 3. Notes to be cancelled as paid, up to the amount of \$50,000,000; the cancellation thereafter for five years not to exceed the increase of banknotes. After five years the notes paid to be retired at a rate not exceeding 20 per cent per annum of the amount then outstanding; at the end of ten years the legal-tender quality of the notes then outstanding to cease; 4. No note, once paid, to be reissued except in exchange for gold; provided that redeemed and uncanceled notes, if excessive in amount, may be used to purchase United States bonds. As regards banking the recommendations of the commission were: 1. A national system with improved regulations as to examination, supervision, etc.; 2. The issues to be based upon those readily convertible assets which represent the exchangeable wealth of the country in its natural products and manufactured goods; 3. A limitation of the amount of the issues to the unimpaired capital of the issuing bank; 4. A further security in a common guarantee fund; 5. The continuance of the present redemption fund and method of redemption, with the extension of the places of redemption under the approval of the Secretary of the Treasury; 6. A further security in the liability of the shareholders to the full amount of the par of their shares; 7. Banks with \$25,000 capital to be allowed in places of less than 4,000 inhabitants; also branch banks to be permitted. The commission further proposed that the reserve in the Division of Issue and Redemption be maintained in gold coin and bullion at 25 per cent of both United States notes and Treasury notes of 1890 outstanding, besides five per cent of the amount of the coinage of silver dollars; this reserve to be maintained, when necessary, by the sale of three per cent gold bonds. Another convention, composed of 450 delegates, met at Indianapolis on Jan. 20-26, 1898, approved unanimously of the foregoing report, and reappointed the executive committee to carry on the work for currency reform.

About the same date, namely, on Jan. 20, 1898, Senator Teller introduced a resolution in the Senate that all United States bonds are payable, at the option of the Government of the United States, in silver dollars. On Jan. 27 President McKinley declared that the United States would pay all its obligations in the currency recognized as the best throughout the civilized world. On the following day the Senate adopted the Teller resolution by a vote of 47 to 32; but, three days later, the House, by a vote of 182 to 132, refused to concur.

THE WAR WITH SPAIN. The year 1898 marks an epoch in the history, not alone of the United States, but of the world. From causes apparently trivial have developed consequences the end of which cannot be even outlined. The treatment by Spain of her colonial possession of Cuba; her course of petty annoyances practiced rather than intentionally directed against United States commerce; and the feeling of irritation against the Spanish nation, engendered in the hearts of the American people by these blows at her sympathies and her interests, have wrought changes in the map of the world, and in the relations of its nations, that far transcend the apparent importance of their initial impulses. The prominent features of the struggle of the Cubans for their independence are given in these Sup'ts, under CUBA, XXVI, pp. 324-330.

The daily expressions in the American press of sympathy with the Cuban cause, and recurring efforts in Congress to commit the United States to a more active manifestation of this feeling, had their reflection in the temper of the Spanish people. The passage by the United States Senate, on Feb. 28, 1896, of a resolution favoring the recognition of Cuban belligerent rights aroused the Spaniards to riotous demonstrations against the American people in Madrid, Valencia, and other cities, and even to attacks upon the United States consulates in Barcelona and Bilbao. The Spanish government promptly disavowed the acts of the mobs; yet, while friendly relations were not severed, it also commenced a policy of naval activity which was apparently directed against American commerce in anticipation of the outbreak of war. Strong intimations were also given by the Spanish government that the recognition of Cuban belligerency by the United States would be met by appeals to the European Powers, concerning whose favorable attitude toward the upholding of Spanish dominion in Cuba there seemed little doubt.

Meanwhile the course of the United States lay strictly within the lines of international obligation. So closely had these lines been adhered to that, in a speech on the resolution of February 28, mentioned above, Senator Morgan asked: "Why is it that every time an outbreak has occurred in Cuba, the first thing which has been done by the President of the United States was to issue a most radical proclamation, warning our people and forbidding them in the strongest possible manner from going into the island of Cuba and from violating our laws intended to prevent them from doing so? . . . We have stood here as . . . an outline of defence of the monarchy of Spain . . . for very nearly a century, during which time five great insurrections or revolts have occurred in Cuba." Such an emphatic proclamation was issued by President Cleveland on July 30, 1896. The restrictions of these laws and proclamations held enchained the law-abiding American people, and restrained them, as a nation, from lending the vigorous aid which their individual sympathies for an oppressed people would have gladly extended. But, backed by Cuban funds, several expeditions left American ports with men and munitions of war, some of which were safely landed on

Cuban soil, while others came to grief by shipwreck, or by capture by Spanish or American vessels. In the last-named event the offenders were brought to trial, and, despite sympathetic juries, several were convicted and punished. (See CUBA, in these Sup'ts, XXVI, p. 327.) In the Spanish view, however, the United States were guilty of aiding and abetting the insurgents, and a condition of friction was maintained between the two countries that the cloak of friendly diplomacy vainly pretended to conceal. This condition was pointed out by President Cleveland in his message to Congress of December 7, 1896, in which he thus spoke of the demands made by the American people for some measures by which the Cuban question could be definitively settled:

"It was at first proposed that belligerent rights should be accorded to the insurgents, a proposition no longer urged because untimely, and, in practical operation, . . . injurious to our own interests. It has since been . . . contended that the independence of the insurgents should be recognized. But, imperfect . . . as the Spanish government of the island may be, no other [capable of recognition] exists there. . . . It is also suggested that the United States should buy the island,—a suggestion possibly worthy of consideration [if Spain desired to sell]. It is urged finally that, all other methods failing, the existing internecine strife in Cuba should be terminated by our intervention, even at the cost of a war between the United States and Spain." Further declaring the United States policy as an adherence to "right, not might," as a policy of peace and abstention from territorial greed, the President's message proceeded: "It would seem that if Spain should offer to Cuba genuine autonomy,—a measure of home rule which, while preserving the sovereignty of Spain, would satisfy all rational requirements of the Spanish subjects,—there should be no just reason why the pacification of the island might not be effected on that basis." To this was added a suggestion that, inasmuch as the Cubans would decline to lay down their arms upon Spain's mere promise to grant such autonomy, the United States would endeavor to furnish guarantees, in a manner inoffensive to Spain, that the proposed plan would be faithfully carried out. The message then proceeded with the clear warning to Spain, and indirectly to all the world, that the United States would brook no acquisition of the island, or interference with its affairs, by any other Power; that they would not long continue in an expectant attitude; and that when Spain had demonstrated her inability to cope with the situation the American people would hardly hesitate to recognize and discharge the higher obligations presented to them.

The tone of the message was unmistakable, but its language was dignified, and withal so couched as to moderate the Spanish indignation at the first reading of its telegraphed words. Subsequent discussions of the subject in Congress were vigorous, and resolutions were introduced looking to the recognition of the Cuban Republic and the expulsion of Spanish dominion from the Western hemisphere. A clash

between the President and Congress, as to their respective powers in the matter, brought all hope of positive action to naught.

On the 4th of February, 1897, the scheme of Cuban autonomy was promulgated at Madrid, and the decree was signed by the Queen Regent. On the 20th of April the plan went into operation.

Meanwhile, in the United States, William McKinley, of Canton, Ohio, was inaugurated President on March 4, 1897. An important event was his early decision to retain Gen. Fitzhugh Lee as consul-general at Havana. Under the former administration General Lee was reported to have felt some irritation at a lack of government support when he found it necessary to make strong representations to the Spanish authorities in Cuba, and rumors of his intended resignation had been circulated. Lee's retention was cordially approved in all sections of the country, the people recognizing in the former Confederate general a strong and patriotic American, well calculated to uphold American honor and dignity under trying circumstances. The appointment of Gen. Stewart L. Woodford as minister to Spain was also regarded favorably; and the opinions formed at this time, in regard to both representatives, were afterwards fully justified by the results. General Woodford presented his credentials at Madrid on the 13th of September, and one of his first acts (on September 23) was to present a note to the Spanish government declaratory of the President's desire for the maintenance of friendly relations, but at the same time warning Spain that American patience was well-nigh exhausted, and that unless the Cuban question could be satisfactorily settled before November, the belligerent rights of the insurgents would be recognized, and steps taken for the protection of American interests. The note further proffered the good offices of the United States government to bring about a settlement. Spanish diplomacy has always been noted for its policy of delay, but it was not unreasonable that Sagasta's ministry should at this juncture ask for time in which to test the new scheme of autonomy.

In the United States Congress a message from the President was received on May 17, asking for an appropriation of \$50,000 for the relief of suffering Americans in Cuba. The Senate promptly passed a resolution in accordance therewith; but an attempt in the House to introduce into the measure a recognition of Cuban belligerency delayed its passage for a few days. It was finally passed, and was signed by the President on the 24th. The debate in the House clearly revealed the temper of Congress and the desire among many members for immediate and vigorous interference between Spain and her colony.

Diplomacy still continued to handle the many questions arising from the strained relations between the two countries, and Congress formulated demands upon Spain for the liberation and other relief of alleged filibusters and others who had been captured by the Spanish forces. On the 18th of November the prisoners of the *Competitor* were released. But the specific demands of the United States government formulated in the note presented by General Woodford, — the acceptance of the offer

of mediation, and positive guarantees that the strife in Cuba should speedily end, — were not complied with. The recall of General Weyler, and the appointment of Marshal Blanco as governor-general, with offers of amnesty to the insurgents and new schemes of autonomy, awakened hope of an improved condition of affairs. But toward the end of the year an article by Mr. Hannis Taylor, formerly American Minister at Madrid, which appeared in the *North American Review* and advocated the bringing to bear upon Spain of the strongest moral pressure, backed by a plain intimation that the United States would, in the event of failure, not hesitate to proceed in her own manner, kept alive and even fanned the flame of unrest which now dominated nearly every American heart. This feeling was strongly expressed in the political platforms of both great parties.

The year 1898 opened with public feeling on both sides in a high state of tension. The North Atlantic squadron of the United States navy rendezvoused at the Dry Tortugas. The American press was filled with accounts of the horrors of reconcentration in Cuba, where the wretched *pacíficos* were dying by hundreds of sheer starvation, and many others were massacred on various pretexts by the Spanish troops or were executed under the guise of judicial condemnation. Outbreaks (largely incited by the Spanish volunteers) occurred in Havana, where such demonstrations were made against General Lee and Americans generally that it became necessary for Spanish troops to guard the consulate. Under these circumstances the American government despatched the battleship *Maine* to Havana, but with an open declaration that in so doing it was only actuated by a desire to indicate "the resumption of friendly naval relations with Spain," such exchange of courtesies having for some time been interrupted.

The Spanish government promptly acquiesced in this view of the movement, and ordered the first-class armored cruiser *Viscaya* to proceed to New York on a like visit of courtesy. The *Maine* arrived at Havana on the 25th of January. On the 8th of February the Cuban Junta made public a letter which had been written by Señor Dupuy de Lome, Spanish Minister at Washington, to his friend José Canalejas, at Havana, and which had been stolen from the latter with a view to making political capital thereof. This letter, while discussing political events in Cuba with great freedom, and revealing some insincerity of dealing, was extremely offensive to the American people by reason of the coarse terms applied therein to President McKinley. On realizing the situation Señor De Lome resigned, and his resignation was promptly accepted by the Spanish government, so as to save the ignominy of his dismissal on the demand of Minister Woodford. On the 14th of February Señor Luis Polo y Bernabé was accredited to Washington, the Spanish government duly expressing its regret at the incident.

The morning of the 16th of February brought a stunning blow to the people of the United States. The previous evening, at 9:40, the *Maine*, peacefully lying at anchor at a spot in Havana harbor, to which she had been guided by a regular pilot, blew up with

an explosion which shook the city. The vessel was completely destroyed, and 266 of her crew perished. Many others were seriously injured. (See "MAINE," THE, XXVII, p. 688.) The immediate and natural assumption of Spanish treachery (the justification or disproof of which belief is as yet, and probably will forever remain, an unsolved mystery) roused the American people to the fighting stage. Diplomacy still pursued its course, and Congress awaited the verdict of the board of naval inquiry, which was immediately appointed (February 17), with a patience which was barely reflected in the temper of individual opinion. Still, every disposition to comply with the formalities and the spirit of justice was shown, and for four weeks the country suspended its judgment—outwardly at least. Spain repudiated complicity in the affair and expressed its regret on the 16th; and on the 18th the *Vizcaya* (her commander and crew ignorant of what had happened) entered New York harbor, where she lay until the 25th, at which date she sailed for Havana. During her stay she was constantly guarded by police boats against any fanatical attack or reprisal, and every courtesy consistent with the circumstances was shown to her.

The Spanish government sought to have a joint investigation of the cause of the *Maine* explosion, but this was not acceded to by the United States, nor was a proposal to submit the question of responsibility for the disaster to arbitration listened to. The question of intervention in Cuba was the subject of many debates in Congress, but little of a practical nature was done until after the report of the board of inquiry. There was, however, a constant demand for information concerning both intervention and the *Maine* affair,—a demand which the President could not always satisfy.

Meanwhile, at the instigation of the President, and moved by tales of the horrors of famine and disease in Cuba, the American people raised a fund of over \$200,000 in money and supplies, which was forwarded to Cuba, and was distributed largely by the American National Red Cross Society under the supervision of Miss Clara Barton. (See RED CROSS SOCIETY, XXVIII, p. 563.) The fact that some of this relief was shipped on naval or other government vessels raised a protest from Spain, who also (March 5) demanded the recall of General Lee from Havana. This request was promptly refused by the United States, and it was later withdrawn.

Spain's purchases of ships and naval activity generally foreshadowed a corresponding movement in America. On the 7th of March a bill was introduced in the House of Representatives appropriating \$50,000,000 for the national defence. The bill was promptly passed on the following day, and on the 9th it passed the Senate and was signed by the President. Preparations were at once made, under the President's personal supervision, for strengthening the coast defences (including the submarine mining of the principal harbors), purchasing ships, arms, and ammunition at home and abroad, and increasing the army. In fact much activity had been displayed in this regard before the appropria-

tion, but with the passage of this measure the preparations for actual conditions of war made apparent its near approach. The Navy Department, in addition to purchasing abroad, made provision for three new battleships and a number of torpedo boats and torpedo-boat destroyers. A naval board was appointed for the inspection, purchase, or charter of auxiliary vessels, and a large fleet of yachts and tugs was added to the regular naval force. The large transatlantic steamships *Paris* (renamed the *Yale*), *New York* (the *Harvard*), *St. Paul*, and *St. Louis* were chartered under the special provisions attending their American registry and mail-carrying subsidies, and during the war they did valuable service in scouting, cable-cutting, transportation of troops, etc. A flying squadron, under the command of Commodore W. S. Schley, was formed at Hampton Roads, the squadron including the *Brooklyn* (flagship), the *Texas*, *Massachusetts*, *Minneapolis*, and *Columbia*. On the 11th of March the War Department began vigorous measures of army mobilization. The Department of the Gulf was created, with headquarters at Atlanta, Ga., and a southward movement of troops was begun, military centers being established at Tampa, New Orleans, and Mobile. On the 19th the battleship *Oregon* sailed from San Francisco on her long voyage around Cape Horn to join the Atlantic squadron,—a voyage of extraordinary interest from its length, sustained speed, naval importance, and the zeal displayed by her officers and crew. (See CLARK, CHARLES EDGAR, in these Sup'ts, XXVI, p. 184.) On the 14th of March the ships of the Spanish squadron under Admiral Cervera sailed from Cadiz, their avowed destination being Porto Rico, at which island they were to report to General Blanco. They made a rendezvous (April 2) at the harbor of St. Vincent, Cape Verde Islands, where they remained until notified, on the 29th of April, of Portugal's attitude of neutrality.

The United States Congress was thrilled at this time (March 14) by the recital, by Senator Proctor of Vermont, of tales of horrors that he had witnessed in Cuba; and later (March 24) by a similar story from Senator Thurston of Nebraska. (See CUBA, in these Sup'ts, XXVI, p. 329.) The completion of the report of the *Maine* board of inquiry on the 19th kept the nation agog until its transmission to Congress by the President on the 28th revealed the verdict and gave to the expectant people the information it had so patiently awaited. The finding that the explosion was caused by an external influence, without, however, definitely stating what that influence was or how it had been set in motion (see "MAINE," THE, XXVII, p. 688), still further steeled the nation's heart to adhere to its resolve to put an end to the barbarities at its threshold. But while it had become generally recognized that war was inevitable, delay was of vital importance to the United States. Immediately on the declaration of war the expected announcements of neutrality by other Powers would operate to bar the further purchase of munitions of war and the shipment of those already acquired. The negotiations for such purchases and shipments were therefore hurried forward as fast as possible. The new cruiser *New Orleans* (formerly the *Amazonas*),

purchased in England from Brazil, sailed from London for America, accompanied by the *San Francisco*, on the 27th. Later (April 9) the cruiser *Topeka* and the torpedo-boat *Somers* sailed from England, but on account of disasters to the latter she was ultimately left behind, the neutrality regulations having meanwhile become operative. The unfinished cruiser *Albany* was also thus belated.

The Spanish report of the *Maine* explosion, made to the government at Madrid on the 26th of March, held that it was scientifically and practically demonstrated that the explosion was internal.

On the 26th of March President McKinley announced his intention of asking Congress for an appropriation of \$500,000 for the relief of the Cuban reconcentrados, and the Spanish government promptly agreed to interpose no obstacles to the sending of such relief. Every effort was made by the United States government to avoid anything that would lead to open rupture, and for several days, both in America and in Spain, statements were given out that the prospects for peace were improving. The work of preparation for probable war progressed unceasingly, however; enlistments in the army and navy went on under relaxations of the ordinary strict rules; and notice was given to the national guard and naval reserve to be prepared for a call. The end of March found the fleet at Key West, under Sampson, stripping for action; Schley awaiting orders at Hampton Roads; harbors mined and shore defences manned; patrol boats scouting along the coast; and an anxious but determined and patriotic people waiting eagerly for further developments.

In Europe the prospects of war caused a decline in Spanish bonds, which fell steadily, with but few and unimportant rallies, till the disastrous outcome of the war rendered their value merely speculative and nominal. The attitude of the European Powers was long in doubt, and for a while it was uncertain whether the opening of hostilities might not involve a general war. Spain sought the influence of the Pope and the active support of both Austria and Germany. The last-named Power appeared to be the most friendly disposed toward the Spaniards, and at one time, in subsequent events at Manila, it seemed as if German sympathy might assume an active form. The German government, however, has throughout assured the United States of its consistent neutrality. The attitude of England at this juncture was a revelation to those in America who, from ill-digested study of the history of the Revolutionary period, and a superficial reading of a biased press, had come to see in England only an hereditary foe, blind to everything but her own commercial interests, and especially bitter and hostile toward the United States. Whatever may have been the moving impulse, the position taken by the English government, press, and people was generally one of the warmest sympathy and support, and it is said that diplomatic history could reveal the manner in which England's firm attitude throughout the war and its events withheld the other Powers of Europe from interference. Early in April the Pope made a final appeal to Spain, urging her to grant an armistice to the Cuban insurgents, and it is said

that the European Powers also brought pressure to bear in the same direction.

The United States consuls in Cuba were recalled on the 5th, and they quitted their posts and embarked for home, with as many refugees as sought shelter or who could be accommodated with passage in the next few days, General Lee leaving on the 9th. On the 7th President McKinley was visited by the Ministers of Great Britain, France, Germany, Austria, Russia, and Italy, who presented a joint note appealing "to the feelings of humanity and moderation of the President and of the American people," and hoping that further negotiations would "lead to an agreement which, while securing the maintenance of peace, [would] afford all necessary guarantees for the reestablishment of order in Cuba." In his reply the President, stating his appreciation of the action of the Powers, expressed his confidence "that equal appreciation [would] be shown for its own earnest and unselfish endeavors to fulfill a duty to humanity by ending a situation the indefinite prolongation of which has become insufferable." On the same date Señor Gullon, Spanish Minister of Foreign Affairs, replying to a similar joint note from the Powers, said that Spain had reached "the limit of international policy in the direction of conceding the demands and allowing the pretensions of the United States." On the 9th the Spanish government decided to suspend hostilities in Cuba, but this step was already too late. On the 11th of April President McKinley sent his message to Congress, which had been withheld for a week in the hope of an amelioration of the situation.

The message reviewed Cuban history, and pointed out that "the present revolution is but the successor of other similar insurrections . . . extending over a period of nearly half a century, each of which during its progress has subjected the United States to great effort and expense in enforcing its neutrality laws, caused enormous losses to American trade and commerce, . . . and, by the exercise of cruel, barbarous, and uncivilized practices of warfare, shocked the sensibilities and offended the humane sympathies of our people." It specifically disclaimed the idea of American annexation of the island, and set forth the reasons for the inexpediency of recognizing the Cuban republic; that such recognition is "not necessary in order to enable the United States to intervene and pacify the island"; that it would tend to "subject us to embarrassing conditions of international obligation toward the organization so recognized"; and that, when "there is within the island a government capable of performing the duties and discharging the functions of a separate nation, . . . such government can be promptly and readily recognized, and the relations and interests of the United States with such nation adjusted."

The message took up the question of forcible intervention to stop the war, and justified such action because of the barbarities practiced in its conduct; because these horrors lay "right at our door"; because American citizens in Cuba were entitled to protection; because of the injury to American commerce, and the devastation of the island; and because of the constant menace to peace and the enormous expense

of restraining filibusters and of keeping "on a semi-war footing with a nation with which we are at peace." After reviewing the case of the *Maine* and referring to the utterances of his predecessors as to the ultimate necessity of intervention, the President continued: "The long trial has proved that the object for which Spain has waged the war cannot be attained. The fire of insurrection . . . cannot be extinguished by present methods. The only hope of relief and repose from a condition which can no longer be endured is the enforced pacification of Cuba. In the name of humanity, in the name of civilization, in behalf of endangered American interests, which give us the right and the duty to speak and to act, the war in Cuba must stop. In view of these facts . . . I ask the Congress to authorize . . . the President to take measures to secure a full and final termination of hostilities; . . . and to secure . . . the establishment of a stable government capable of maintaining order and observing its international obligations, ensuring peace and tranquillity and the security of its citizens as well as our own; and to use the military and naval forces of the United States as may be necessary for these purposes." Recommending the continued distribution of relief to the starving Cubans, the President concluded: "The issue is now with Congress. . . . Prepared to execute every obligation imposed upon me by the Constitution and the law, I await your action."

The message was referred in both Houses to their respective committees on foreign affairs. A conference committee of the Senate and House agreed to report the Senate resolutions, which, after rehearsing the Spanish atrocities and the destruction of the *Maine*, declared "that the people of Cuba are, and of right ought to be, free and independent; that . . . the government of the United States" demands "that the government of Spain at once relinquish its authority . . . in Cuba and withdraw its land and naval forces from Cuba and Cuban waters; that the President of the United States be . . . empowered to use the entire land and naval forces . . . and to call into actual service the militia of the several States; that the United States hereby disclaims any . . . intention to exercise sovereignty . . . over said island, except for the pacification thereof, and asserts its determination, when that is accomplished, to leave the government and control of the island to its people." These resolutions were passed by both Houses on the 19th of April, and on the following day they were signed by the President, and the ultimatum was cabled to Minister Woodford at Madrid. A copy was served on the Spanish Minister at Washington, who immediately asked for and received his passports and started for Canada. The following day (the 21st) General Woodford, while preparing to present the ultimatum and to give the three days' grace within which to comply with its demands, was presented with his passports. He turned over the embassy to the British Minister, and left for Paris. Meanwhile (on the 20th) the Spanish Cortes convened, and the Queen Regent addressed it in a warlike speech.

Immediately after the first act of war (for so, by act of Congress of April 25th, it was determined to

consider the rupture of diplomatic relations), the United States government declared its intention to blockade Cuban ports, and ordered Admiral Sampson, at Key West, to sail on that errand. The fleet moved in the early morning of the 22d, and before night Havana was blockaded, and the first prize of the war—a Spanish merchant steamer—had been captured by the *Nashville*.

On the 21st Great Britain notified Spain that coal was contraband of war,—an important decision, and one affecting Spain more unfavorably than the United States. The following day the President's proclamation notified the Powers that a state of war existed, and on the 24th Spain made a similar announcement. Great Britain took the lead in declaring her neutrality, the other Powers, with the exception of Germany, following her example in quick succession.

On the 22d of April Congress passed an act providing for the Federal enlistment of State troops, and on the following day the President issued a call thereunder for 125,000 volunteers to serve for two years, unless sooner discharged. The response was made with alacrity; the quotas of the States were quickly filled; and the numbers presenting themselves for enlistment were so largely in excess of the call that the recruiting officers were able to enforce the rules relative to physical condition, and thus to collect one of the finest bodies of men for military service ever put into the field. Owing to the constitution of the State organizations there was difficulty in some cases regarding the breaking up of State regiments and the reënlistment of their members as individuals in the Federal service. The few cases of refusal thus to enlist, however, were to be attributed solely to principle and not to unwillingness to serve. Defects of organization, transportation, and commissariat, which later aroused discussion, may fairly be attributed to the long period of peace which the country had enjoyed, and the consequent unfamiliarity with practical details thus engendered. A month later (May 25th) a second call, for 75,000 men, was issued, unlimited as to previous military training.

Both regular and volunteer troops were now pouring toward the Southern and Eastern camps and points of embarkation. A vast national camp was formed at Chickamauga Park, on the site of the bloody conflict of the Civil War. (See CHICKAMAUGA, in these Sup'ts, XXVI, p. 149.) This was known as Camp Thomas, and other large camps were named Alger (Virginia), Meade (Pennsylvania), Wheeler and Shipp (Alabama), Hamilton (Kentucky), Cuba Libre and Rodgers (Florida), Poland (Tennessee), and Merritt (California). At the close of the war the returned troops were largely sent to Camp Wikoff, Montauk, L. I. (of which mention is made later). State camps for the concentration of the militia and volunteers were also formed, Camp Black, at Hempstead, L. I., being one of the most important.

Apart from the State militia, one organization deserves special mention. This was the irregular cavalry corps known as the Rough Riders. Composed of the best and most daring riders of the country,—cowboys, and others whose business or

sports had given them constant practice in the saddle and in open-air life, as well as facility in the use of weapons,—this corps, which before Santiago did such gallant service on foot, was looked upon as one of the most distinctively American features of the war, and it was confidently expected to accomplish great results should the war be fought chiefly on land. Recruited principally in the West, but with a good representation from the East,—a representation which included men of college and business training,—two of the three regiments were commanded by representative Western men, Cols. J. L. Torrey and Melvin Grigsby. The third regiment was commanded by Col. Leonard Wood; and its lieutenant-colonel and the leading spirit in its organization was Theodore Roosevelt, who later, on Colonel Wood's promotion, became its colonel. (See ROOSEVELT, THEODORE, XXVIII, p. 617.)

While military preparations were thus going on at home, and the navy entered upon the weeks of weary blockading which were enlivened with little more than captures of merchantmen ignorantly or wilfully attempting to enter Cuban ports, the first serious blow of the war was to be struck many thousand miles away, in a region where American interests had been largely overshadowed by those of other nations. At the time of the outbreak of war, the Asiatic squadron, under command of Commodore Dewey, was awaiting orders at Hong Kong. On the 25th of April, Dewey was ordered (on account of neutrality obligations) to seek another port. He proceeded, via Mirs Bay, toward Manila, entered the bay on the night of April 30, destroyed the Spanish fleet (May 1), and so commanded the city that its capture at a later date was a comparatively easy task. (See MANILA; MANILA BAY; and DEWEY; also, AGUINALDO; CAVITÉ; GREENE, F. V.; GRIDLEY; LOILO; MERRITT; OTIS; and PHILIPPINES, in these Supplements; also, XXIX, pp. 394-395.)

The news of this victory aroused the wildest enthusiasm in the United States, and it had a powerful influence on Spanish strategy, inducing in the Spanish ministry, besides despair over the loss, an irresolution in action which did much to bring about the final result of the war. It revealed to the American people the state of decay and inefficiency into which the Spanish navy had fallen, and it likewise displayed the opposite qualities of their own navy,—the highest degree of expertness in gunnery, mechanical seamanship, and naval tactics,—developed by long training and devotion to duty.

On the 26th of April the President issued a proclamation announcing the intention of the United States, although not bound so to do, to adhere to the provisions of the Declaration of Paris in regard to privateering, blockades, and neutral ships and cargoes. The Spanish government gave its adhesion to the principles applicable to neutral rights and blockades, but declared its intention to reserve its privileges, as a non-signatory Power, in the matter of privateering. In the ensuing war this latter question, however, never arose.

On April 27 the first shot by the blockading squadron on the Cuban coast was fired by the *New*

York at Matanzas, the object of the brief bombardment being to stop the erection of batteries at that point. (See MATANZAS, XXVIII, p. 49.) Several minor affairs of this nature occurred at points along the coast, and shots were exchanged with Havana; but, with exceptions that will be noted, such affairs amounted to little more than target practice for the American ships; yet they served to keep in check any considerable fortifying of the shores of Cuba by the Spanish troops.

Great interest was felt in the United States, and some anxiety was caused by, the movements, actual or reported, of the Spanish fleet commanded by Admiral Cervera, which had sailed from Cadiz on the 14th of March, ostensibly for the Canary Islands. On the 2d of April this fleet arrived at the Cape Verde Islands, a Portuguese possession, and here it lay idle for several weeks, infringing Portuguese neutrality. The uncertain quality of this fleet in strength and fighting ability, coupled with the fact that the torpedo boats which formed a part of Cervera's force were a comparatively untried and hence dreaded weapon of offense, caused some uneasiness to those who were directing American naval affairs. The coast-patrol fleets were kept constantly on the watch, scouting up and down the coast and out to sea. The Atlantic harbors that were protected by mines were kept strictly closed between sunset and sunrise, and vessels attempting to enter at forbidden hours or by prohibited channels were fired at. Rumors of cannonading at sea, and of ships prowling within striking distance of the coast, sent the scouts on many bootless errands. The crews of the fleets chafed under the inactivity imposed on them by the necessity of holding in reserve a force capable of meeting the uncertain but expected maritime foe. This anxiety and uncertainty were in no way allayed when, on April 29, Admiral Cervera was compelled by the Portuguese authorities to put to sea, and he headed for the West Indies. (See CERVERA, XXVI, p. 101; SAMPSON, XXVIII, p. 662; SCHLEY, XXIX, p. 18; and XXIX, pp. 388-390.) About this time the *Oregon* and her consort, the *Marietta*, arrived at Rio Janeiro on their long voyage from the Pacific coast, and renewed anxiety was felt lest they might be intercepted by Cervera and destroyed by force of numbers before reaching the protection of Sampson's squadron. (See CLARK, CHARLES EDGAR, XXVI, p. 184.)

May 11 witnessed an engagement between the Spanish batteries and gunboats at Cardenas, in which the first officer killed in the war (Ensign Worth Bagley) met his death with four of his men. (See CARDENAS, XXVI, p. 59.) The same day, at Cienfuegos, on the south side of the island, the *Marblehead*, *Nashville*, and *Windom* were engaged in the task of grappling for, raising, and cutting the telegraph cable connecting Havana with Santiago, and another between Cienfuegos and Batabano. The Spaniards on shore were prepared to defend these vital communications, having entrenched themselves and mounted rapid-fire guns. The work of cable-cutting had to be carried on in small boats, which were covered by the ships offshore, and further in by steam launches provided with machine guns. The

Spainards maintained a constant and harassing fire upon the boats, the crews of which succeeded, nevertheless, in cutting both cables, each in two places, taking out the pieces, so that repair, under the circumstances, should be impossible. A third and smaller local cable was also cut, and with the accomplishment of this task the boats withdrew, in the belief that communication between Governor-General Blanco and the Madrid government had been entirely destroyed. This, however, proved to be an error. One man killed and several wounded were the American losses; the Spainards suffered heavily.

On the 11th of May, also, Admiral Cervera's fleet was reported in the vicinity of Martinique. Immediately (May 12) the waiting squadron of Commodore Schley put to sea from Hampton Roads to locate the enemy and give him battle. With the naval force of Spain in the East already destroyed, and the knowledge that the third fleet—that of Admiral Camara, supposed to be fitting out at Cadiz—was mostly composed of inferior vessels, the importance of intercepting Cervera before he could reach a base of operations in a Cuban port, or coöperate with Blanco at Havana, could not be overrated.

Meanwhile Admiral Sampson had sailed from Key West on the 3d of May, on a cruise to the eastward, for the purpose of locating and engaging Cervera's fleet, which it was suspected might rendezvous at San Juan, Porto Rico. Finding that the Spanish fleet had not arrived at that port, the admiral bombarded the forts for three hours, but without any intention of capturing the city. (See PORTO RICO, XXVIII, p. 465, SAMPSON, XXVIII, p. 662; and XXIX, p. 393.) The American loss was trifling, while that of the Spaniards and the damage to the fortifications were considerable.

Admiral Cervera had by this time (the 12th) reached Martinique, where, however, he was unable, by reason of the neutrality of France, to procure the supplies he needed. Proceeding to the Dutch port of Curaçao, he found similar difficulties in the way, and it became necessary for him to make port in one of the Spanish West India Islands. To do this he had to evade Sampson's and Schley's squadrons, besides the host of scouting, despatch, and newspaper vessels which were constantly traversing the Caribbean Sea, the North Atlantic, and the Gulf of Mexico. But, notwithstanding American vigilance, the Spanish admiral succeeded, on the 19th, in slipping into the harbor of Santiago de Cuba, where he anchored in the upper reaches of the bay, only to come forth to his destruction on the 3d of July.

On the 12th of May an attempt by a detachment of regular troops, aided by some Cuban scouts, to land a supply of arms for the Cuban insurgents at Cabanas, Pinar del Rio, from the steamer *Gussie*, failed, largely by reason of the publicity given to the scheme by an overzealous press, an evil subsequently, and on this account, mitigated by the establishment of a censorship. Later in the month (May 21) a stronger expedition on the steamer *Florida*, consisting mainly of Cubans under General Lcret, succeeded in landing a large amount of provisions and military stores at Point Banos.

Meanwhile, at Manila, Commodore Dewey (who had been promoted to the rank of rear-admiral) had maintained a strict blockade of the city, but with the limited force at his disposal was unable to do more. Bombardment, without land forces to assist in the capture and subsequent holding of the place, would have wasted ammunition, wrought useless destruction, and accomplished no decisive or useful results. It became necessary to send out a strong military force under convoy of vessels which could also reinforce Dewey's squadron. Accordingly Gen. Wesley Merritt was appointed military governor of the Philippine Islands, and was ordered to hurry forward troops as fast as possible. On the 25th of May the first expedition, under the command of Gen. T. H. Anderson, and consisting of three transports carrying 2,500 men, sailed from San Francisco for Manila. On the 15th of June the second Manila expedition, consisting of four transports carrying 4,200 men, under Gen. Francis V. Greene, sailed from San Francisco; and a third, of five transports, with 5,000 men, under General Merritt, left on the 27th.

In due time (viz., June 30, July 19 and 25) these expeditions reached Manila, and, proceeding to the reduction of the place, effected its capture on the 13th of August. (See MANILA, XXVIII, p. 14; PHILIPPINE ISLANDS, XXVIII, pp. 405-406; and *post*, p. 394.)

Naval assistance had also been sent to Admiral Dewey. The *Charleston*, which sailed from San Francisco on the 21st of May, arrived out with the first convoy of transports, having stopped on the passage to take possession of the island of Guam, one of the Ladrones Islands, which was accomplished under ludicrous circumstances on June 20. (See GUAM, XXVII, p. 178.) The *Monterey*, *Monadnock*, *Mohican* and *Newport* were also sent to the Philippines.

The *Oregon*, which made so marvellous a run from San Francisco around Cape Horn, her commander not knowing when or where he might meet a fatally superior Spanish fleet or lurking torpedo-boats, reached Jupiter Inlet, Fla., on the 24th of May, and speedily joined the blockading and hunting fleet off the Cuban coast.

About the 23d of May it was rumored that Admiral Cervera had entered Santiago harbor, but definite information was not attainable until the 29th, when Commodore Schley reported the fleet in the bay. The narrow entrance to the harbor rendered it an easy task to blockade the ships effectually and prevent their escape by stealth; but the same circumstance, combined with the natural and artificial fortifications, also prevented the American fleet from entering the bay to give battle to the Spanish ships or to capture the city. On May 31 the *Massachusetts*, *Iowa*, and *New Orleans* moved inshore and engaged the land batteries and the Spanish flagship. A sharp exchange of fire took place, sufficient to develop the fact that the task of reducing the fortifications and capturing the fleet would be almost too difficult to be undertaken. The same night two Spanish torpedo-boats ran out of the harbor and made for the *Texas*, but they were easily repulsed by that ship's quick-firing guns. The following day (June 1) Admiral Sampson joined forces

with Schley, and, assuming command of the united fleets, maintained a close investment of the harbor. Not satisfied with this, he still further attempted to keep Cervera within the bay by sinking (June 3) the collier *Merrimac* in the channel. (See "MERRIMAC," THE, XXVIII, p. 75.)

The still persistent doubt as to Cervera's actual strength in Santiago Bay worried the American commander. Not being able to rely on the accounts and descriptions given by Cuban scouts and others, he chose a naval officer, Lieut. Victor Blue, and sent him on a tour of personal inspection among the hills surrounding the harbor. This perilous task was successfully carried out, and the locations and number of the ships were definitely ascertained.

On the 6th of June the fleet bombarded Santiago and Aguadores, seriously damaging and silencing the Spanish batteries. A few days later the dynamite cruiser *Vesuvius*, which had never before practically tested her guns, threw three charges of guncotton, of 250 pounds each, over the intervening land fortifications into the city and harbor. The last discharge made a deep hole in Cayo Smith, and was thus far satisfactory in showing the power of the explosive and the feasibility of discharging the pneumatic guns without injury to the vessel and her crew; but apart from this the *Vesuvius* was not of particular service save as a despatch-boat and scout. In this latter capacity she made a surreptitious entry into the mouth of Santiago harbor on the night of June 24, and by steaming around the sunken hull of the *Merrimac* demonstrated the failure of Lieutenant Hobson to close the channel, a fact which Cervera also ascertained.

Army mobilization had progressed as rapidly as the means of transportation and the facilities for procuring supplies would permit. Delays and defects in the quartermaster's department occasioned much criticism, and the causes and the seat of responsibility were made the subject of inquiry after the close of the war. But troops poured into the ports of embarkation, especially Tampa, Fla., where transports were collected for the purpose of ferrying over to Cuba the army of invasion. The regular army had been increased from its nominal strength of 25,000 men (actually it was much less) to 62,600. The first call for volunteers had furnished 125,000, and the second call 75,000 men. The Rough Riders, the increased Engineer Corps, and the regiments specially recruited on account of their immunity from yellow fever, numbered about 15,000. This large force was commanded by Maj.-Gen. Nelson A. Miles, and the first assignment of subordinate commands was as follows: First Corps (and Department of the Gulf), Maj.-Gen. John R. Brooke; Second Corps, Maj.-Gen. W. M. Graham; Third Corps, Maj.-Gen. James F. Wade; Fourth Corps, Maj.-Gen. John J. Coppinger; Fifth Corps, Maj.-Gen. William R. Shafter; Sixth Corps, Maj.-Gen. James H. Wilson; Seventh Corps, Maj.-Gen. Fitzhugh Lee; Cavalry Division, Maj.-Gen. Joseph H. Wheeler. The Department of the Pacific was placed in charge of Maj.-Gen. Wesley Merritt, with Maj.-Gen. Elwell S. Otis as second in command.

The embarkation of the army of invasion began

at Tampa, Fla., on the 6th of June, but the ships put back and did not finally get off until a week later, when, convoyed by the *Indiana* and several other warships, twenty-nine transports, carrying nearly 16,000 men, sailed for the Cuban shores. On the 10th a body of 600 marines was landed from the *Panther* at Guantanamo Bay, where they were vigorously attacked by the Spaniards and with difficulty held their position. Reinforced by the navy and some Cuban soldiers, the American troops made good their grip on the soil. (See GUANTANAMO BAY, XXVII, p. 179). On the 16th the Spanish earthworks at Caimanera were destroyed by fire from the American ships, and the forts at the mouth of Santiago harbor were shelled.

Gen. Shafter's transports arrived in the neighborhood of Santiago on the 20th of June, and the general immediately held consultations with Admiral Sampson and Gen. Calixto Garcia, the latter of whom, with about 4,000 Cubans, held the town of Aserraderos. At this council the plans for landing the troops and for their subsequent movements were discussed and perfected. On the 22d the navy began to clear the way for the landing by shelling the Spanish batteries and positions all along the coast, but especially at Aguadores, Las Altares, Siboney, Daiquiri, and Juragua. The landing was effected under difficulties on account of physical obstacles and lack of proper appliances, but little or no resistance was offered by the Spaniards. By night about 6,000 troops had been landed, and advances had been made toward Santiago. The Spaniards, under Gen. Linares, retreated before the advancing Americans, making a stand at Las Guasimas, near Sevilla. Meanwhile Gen. Wheeler had landed his division at Siboney, and had marched to join the main body; and a third landing had been made at Aguadores. The disembarkation had been successful in landing all the troops with but two lives lost by drowning. The unacclimated men had yet to meet the hardships of a summer campaign in the tropics. These they encountered on the advance toward Santiago. The lack of roads, the tangled growths incumbering the tracks that passed for roads, the sweltering and enervating heat, and the scarcity of supplies almost demoralized the American troops. Knapsacks, tents, blankets, rations,—everything but weapons,—were thrown away in this first march, and the ensuing chilly night sowed the seeds of malarial fever in exhausted bodies. On the 24th the first important land engagement of the war was fought. Gen. Young's brigade of 965 men encountered about 2,800 Spaniards advantageously posted on the densely wooded hills at Las Guasimas. The American forces dislodged the enemy and held the position. (See GUASIMAS, LAS, XXVII, p. 180.)

Throughout the ensuing week the troops pushed on toward Santiago, the necessity of securing the city and destroying or capturing the Spanish fleet becoming imperative in view of the approaching rainy season, in which land operations would be well-nigh impossible, and the blockade of the harbor perilous in the extreme. The ground already covered by the troops was held, and the American line was thin;

stretched out in the endeavor to encompass the city and prevent sorties or the arrival of succor. When it was learned that General Pando was on the march for Santiago with 8,000 men, the necessity for prompt action became greater. Besides the numerous cases of sickness among the rank and file, the commander of the corps, General Shafter, and Generals Wheeler and Young were also prostrated, the first-named being so ill that at one time he contemplated resigning his command to General Wheeler.

Accordingly a plan of advance was made, and on the 1st of July the strong Spanish line, fortified with blockhouses, rifle-pits, earthworks, and barbed-wire fences, was carried after a desperate assault on the heights of El Caney and San Juan, in which the Spanish commander, General Linares, was wounded, and his second in command, General Vara del Rey, was killed. (See *EL CANEY*, XXVI, p. 502.) The American troops hastily strengthened their line, and on the following morning the Spaniards strove fruitlessly but gallantly to regain their lost positions. The 3d of July, which was to see the final destruction of the Spanish navy, found the victorious American army extended around the city from the east, northward and westward, till its right rested on Caimanes. General Pando had meanwhile reached Palma, to the northwest of Santiago. Early in the morning General Shafter sent a demand to General Toral, the Spanish commander in Santiago, for the surrender of the city, threatening to bombard unless his demand were complied with. Toral refused to surrender, and on request of the foreign consuls and for other reasons the bombardment was postponed until the 10th. (See XXIX, pp. 391-392.)

During these events on shore, Admiral Sampson's fleet had maintained its ceaseless watch over the mouth of Santiago harbor, acted (as already shown) as convoy ships for the transports, and taken part in the disembarkation of the troops and in their subsequent operations, covering the landing-parties by shelling Spanish positions, and similarly aiding in the battles preceding the investment of the city of Santiago. It was now to accomplish a feat unparalleled in the history of the world, in view of the entirely new conditions under which its operations were to be conducted; to demonstrate the utility of the new fighting-machines of which it was composed; and to reveal the wonderful results of patient drill, admirable discipline, and cool courage.

A cordon of American troops having been drawn part way around Santiago, and its surrender having been demanded, the Spaniards made a colossal blunder which turned the whole tide of the war and brought about its swift conclusion. It seems to be undoubted that had the Spanish fleet remained within the bay of Santiago, and had the Spanish army held out for a few more days, the American troops, already suffering with disease and climatic exhaustion, would have had to be largely reinforced before they could have captured the city, even though assisted by the guns of the fleet.

The plan of campaign, already rather a creature of circumstances than of deep-laid strategy, would have undergone still further change, and during the

time spent in procuring reinforcements, General Blanco, in Havana, would have had a chance to bring his large army into active operation. But it was already decreed that Santiago should be abandoned by Cervera, who was ordered to make his escape, if possible, and find a refuge and a new base of operations at Havana. Accordingly, on the morning of the 3d of July, the Spanish admiral burst forth from the mouth of the harbor, and, making a futile effort at fighting as he ran, endeavored to escape to the westward. His supposition that, being Sunday, the American sailors might be at divine service and so off their guard, was based on a faulty estimate of his opponent's watchfulness. So far from neglecting to keep a lookout, American eyes and search-lights were constantly trained on the channel beneath the walls of Morro Castle. At the first glimpse of the outcoming columns of smoke the news was signaled along the American line; the engines of every ship were started into vigorous action, later to be strained to their full capacity; and then ensued a running fight that in little more than an hour resulted in the beaching and total destruction of the *Maria Teresa* (the admiral's flagship), the *Almirante Oquendo*, and the *Vizcaya*, and the sinking of the torpedo-boat destroyers *Pluton* and *Furor*; while in less than four hours from the emergence of the Spanish ships the last one, the *Cristobal Colon*, shared the fate of the others, being run ashore at the mouth of the Rio Torquino, 48 miles west of Santiago. (See *CERVERA*, XXVI, p. 101; *SAMPSON*, XXVIII, p. 662; and *SCHLEY*, XXIX, p. 18.)

The Spanish loss in the whole engagement was six ships, 300 killed, 150 wounded, and about 1,800 prisoners. The crews of the American ships, their necessary work of destruction done, wrought nobly to save the lives of their foes. Admiral Cervera surrendered to Commander Wainwright, of the *Gloucester*, who had been the executive officer of the *Maine* at the time of her destruction. The prisoners were treated in a manner to call forth expressions of their gratitude. The officers were assigned to quarters at Annapolis, while the crews were confined on an island in the Piscataqua river, near Portsmouth, N. H. The American loss was one man killed and one wounded.

The destruction of these ships — the second of Spain's fleets to be annihilated by the American navy, and in fighting quality estimated to contain her best vessels — left but one squadron more to represent Spanish power on the seas. Admiral Camara, at Cadiz, had been placed in command of a heterogeneous collection of vessels in various conditions of inefficiency, which had been prepared for sea with what vigor a procrastinating and bankrupt government could exert. The rumors circulated about the composition of this squadron, its strength, speed, and destination, were widely contradictory. The inferior character of the ships was known to the American navy department, but the uncertainty regarding their mission necessitated the setting apart of a fleet which could defend the American coasts, encounter the Cadiz squadron upon the ocean, or, if necessary, cross the Atlantic, and, at a long distance from a naval base or

source of supplies, threaten or bombard the Spanish shores. This force, designated the Eastern Squadron, was placed under the command of Commodore John C. Watson. Admiral Camara, after ostentatious ceremonies participated in by the ministry and the Church, put to sea from Cadiz on the 15th of June, and for a few days some uneasiness was caused in small American coast towns by a fear that Spain might adopt the policy of harrying undefended places. This fear was set at rest by news that the fleet had passed Gibraltar, standing east, and by later reports of its further eastward progress. While it was supposed that Camara's destination was originally Manila, there was yet a chance that Hawaii or San Francisco might be attacked. On the 24th the announcement was made at Washington that if the Spanish fleet passed the Suez Canal, American ships would bombard Spanish ports. On the 26th Camara reached Port Said, and attempted to coal there from his accompanying colliers and to engage a force of firemen; but this he was not permitted to do, and on the 30th he was ordered by the Egyptian government to leave the port. Meanwhile, on the 27th, Commodore Watson was ordered to prepare for sea and to attack the Spanish coast. On the 1st of July Camara entered the Suez Canal, but not until he had paid the canal tolls in gold, his draft on the Spanish Treasury being refused. Reaching Ismailia, he lay there until the 9th of July, when he steamed back on his course, again paying the tolls, and returned to Spain, arriving in Cadiz on the 29th of July. The Spanish ministry attempted a feeble answer to the American threat to visit her coasts, during Camara's absence, by ordering Admiral Barrosa to organize a fleet at Cadiz, but nothing came of it.

When the Spanish minister, Señor Polo y Bernabé, quitted Washington at the outbreak of the war, he withdrew to Toronto, accompanied by his secretary, Señor Du Bosc, and the naval attaché of the legation, Lieutenant Carranza. The latter organized a spy system in Montreal, which was keenly watched by officers of the United States Secret Service. Much anxiety was felt on account of the machinations of this hostile bureau in a friendly country,—an anxiety which was not relieved when it was discovered that one of the Spanish spies was employed as a steward on the U. S. S. *Brooklyn*. The arrest of this man and the seizure of his papers led to his committing suicide in prison and to the revealing of many of the Spanish plots. Some of Du Bosc's and Carranza's papers were obtained by the American special officers, and, the nature of the Spaniards' work being shown to the Dominion government, the spies were promptly ordered out of the country.

The special appropriation by Congress of \$50,000,000, which on March 7 had been placed at President McKinley's disposal to meet the emergency expenses of national defence, was followed by acts providing the sum of \$311,742,927 for the expenses of the war. This enormous sum was voted in ten acts, passed between May 4 and July 8, 1898. On the 10th of June Congress passed a war revenue bill which received the President's signature and became a law on the 13th. This measure provided for the increase

of existing taxes and the creation of new schedules declaring deeds, bonds, transfers and certificates of shares, bank checks, bills of exchange, promissory notes, telegrams, money orders, bills of lading, foreign sea-passage tickets, insurance policies, leases, custom-house entries, warehouse receipts, etc., beer, wines, liquors, tobacco, proprietary medicines, etc., and the occupations of bankers, brokers, proprietors of theatres and billiard-rooms, etc., liable to taxation by the affixing of revenue stamps to the documents or articles taxed, or by the payment of license fees in the case of occupations.

As has already been stated the surrender of Santiago was demanded and refused on July 3, but bombardment was postponed at the request of the foreign consuls. General Shafter reported to Washington that the capture of the city was impossible with the troops at his disposal, and requested that 15,000 reinforcements be sent to him. Victorious as the American troops had been, the situation was critical, and the army's tenure of its hardly won position was very slight. Generals Shafter, Wheeler, and Young were seriously ill, and the soldiers were exhausted by the fatigues of their marches and assaults, and suffering from lack of proper supplies and from the inroads of disease. The Spaniards, however, were demoralized by the vigor and persistence of the American attacks, by the destruction of Cervera's fleet, the death of General Vara del Rey, and the wounding of General Linares (the command then devolving upon General Toral); and by the influences within the city which clamored for surrender and peace. General Garcia had lent his assistance in the events around Santiago, and on the 3d of July reported that he held the railroad running from Santiago to San Luis. On the 5th one Austrian and two British warships entered Santiago harbor for the purpose of removing foreign subjects desiring to leave the city. The foreign consuls urged General Linares to surrender, but to no purpose. On the 6th Lieutenant Hobson and his seven fellow prisoners were exchanged after a month's imprisonment.

During the suspension of hostilities the citizens of Santiago swarmed out of the town, making their way to the rear of the hills on which the American troops kept guard, and begging for food from their nominal enemy. This relief it was difficult to afford; but at this juncture the Red Cross Society came forward and from its stores fed many of the refugees. This exodus of citizens was shrewdly encouraged by General Toral, who not only obtained more room and provisions for his troops, but also succeeded in introducing the fevers of Santiago into the American ranks. The town of El Caney being filled to overflowing with the Santiago exiles, they straggled on to Siboney, where the miserable houses formed hotbeds and incubators for yellow fever, which broke out on the 11th of July. General Miles immediately ordered the destruction of the town by fire, which was accomplished by the next day.

On the 8th General Shafter again threatened to bombard the city if it were not surrendered. General Toral, after communicating with the government at Madrid and with General Blanco at Havana, offered to evacuate Santiago if he were permitted to march

out unmolested with arms and colors. This offer was refused, the American terms being unconditional surrender; but the truce was extended until four o'clock in the afternoon of the 10th. At five o'clock on that day three of the American ships lying off Aguadores opened fire with shell in the direction of Santiago, but without accomplishing much. The troops on shore also fired on the outer Spanish lines, but without eliciting any vigorous return. So weak, indeed, was the return fire that it was at one time feared that the Spanish garrison was escaping. Meanwhile General Shafter's force had been considerably augmented, and on the morning of July 11 his effective strength was estimated at 22,500 men. At six o'clock the bombardment was resumed, and the American troops advanced their positions, occupying the Spanish trenches and drawing the net closer around the city. General Ludlow occupied the town of Caimanes on the northwest outskirts, and the American lines were extended down to the bay. On the 11th General Miles arrived at Siboney, and, pushing forward, held a conference with General Shafter and Admiral Sampson; and the auxiliary cruiser *Hist* succeeded in cutting the cable between Santiago and Havana via Cienfuegos and Manzanillo.

By July 12 rumors that Spain was willing to listen to peace proposals gained circulation and rapidly increasing strength. But Spanish honor was still unappeased, and the hints at surrender were coupled with stipulations that the American terms must be made very easy. General Toral, though evidently weakening, avowed his determination to resist to the last. On the 13th a council of war was held between Generals Miles, Shafter, and Garcia, and Lieutenant Hobson (representing Admiral Sampson.) It was determined to begin a thorough and continuous bombardment by both army and navy if Toral still refused to yield, and on the latter's being so notified he agreed to a personal conference with the American leaders. Accordingly Generals Miles, Shafter, and Wheeler, with their aides, rode out on the 14th to meet General Toral, similarly attended, and accompanied by the British vice-consul. The result of the conference was an agreement by Toral to surrender Santiago, and all that part of the island east of Aseraderos, Palma, and Sagua, upon conditions to be arranged by commissioners from each side. After some discussion and slight misunderstandings the articles of capitulation were agreed upon, and on the 16th they were signed. The principal conditions were as follows: The capitulation to include all the Spanish forces and the surrender of all war material within the prescribed limits. The Spanish troops to be transported to Spain, at American expense, as soon as possible. Officers to retain their side-arms, and officers and men their personal property. The Spaniards to assist in clearing Santiago harbor of torpedoes and other obstacles to navigation. Military archives to be released to Spain. Guerrillas and Spanish volunteers to be suffered to remain in Cuba on parole, conditional on the surrender of their arms. The Spanish troops to march out with honors of war, depositing their arms, but with a stipulation that the American commissioners recommend the

return of the latter. There was some disposition to mutiny among the Spanish troops, but no outbreak occurred. The Spanish soldiers, however, sacked the town.

On the 17th of July the city was formally surrendered. The American troops marched in; the Spanish flag was hauled down and replaced by the Stars and Stripes; and the defeated army, after depositing their arms in the arsenal, went into camp outside the city lines. Later they were deported to Spain on transports provided by the United States government. The surrendered territory was immediately put under American administration, President McKinley issuing a proclamation on the 18th, defining the mode of rule, and guaranteeing liberty and security to the inhabitants. (See SANTIAGO, XXVIII, p. 673.)

An unpleasant circumstance occurred after the surrender of Santiago. General Garcia, the Cuban leader, considered that his soldiers and himself had been slighted at the time of the entry into the city, and he found especial fault with the retention in power of certain Spanish municipal officers, deeming that Cubans should have been recognized by appointment to office and that all Spaniards should be ousted. He therefore tendered his resignation to General Gomez, and withdrew, with his forces, to an inland position. Throughout the subsequent events, and even after the evacuation of Cuba by the Spaniards, much petulance was displayed among the Cuban soldiers, leading in some instances to riot and bloodshed.

Comparatively slight as had been the American losses from the time of landing down to the capture of Santiago, the army now began to suffer the effects of the Cuban climate in its most deadly season. On the 27th of July General Shafter reported 4,122 cases of sickness, of which 3,193 were fever cases, with 822 of the latter new ones. This heavy sick list was in spite of the removal of the troops to the highest and most salubrious camp-sites possible. On the 3d of August a conference of commanders decided that nothing but removal to a northern climate could save the army from destruction by the yellow fever and malaria that were devastating its ranks. This expression of views by subordinate military officers, antagonistic as it was to the plans of the War Department, was put in the form of a "round robin," signed by three major-generals, four brigadiers, and one colonel. Technically a breach of discipline, and a very unusual proceeding,—a fact manifestly recognized by its signers electing to use this peculiar form,—the round robin met with popular approval, and such pressure was brought to bear on the authorities that a camp-site was selected at Montauk Point, Long Island. Thither the soldiers of the Fifth Corps were gradually removed; but they suffered many hardships *en route* to and after arriving at Camp Wikoff, as the quarantine and convalescent camp was named. Ships unfitted for the transportation of troops; insufficient or improper food, medicines, and medical assistance; lack of system, and imperfect discipline, all served to raise loud murmurs against the War Department and those having charge of military bureaus. The unprepared condition of the country for war at the outset of the campaign, due to the lulling influences of peace and prosperity, was of course largely the cause of these

hardships. Charges and counter-charges of incompetence, fraud, and corruption, were freely made, and few of those holding positions of responsibility escaped censure in some form. Doubtless much blame was laid at the doors of some who were innocent of guile, and who had displayed the highest zeal and patriotism in the fulfillment of their duties. Military investigations of many scandals have followed, but so far with comparatively little result in attaching responsibility for evils that were manifest. That there were many unnecessary deaths and much unnecessary sickness, even among troops that had not left the country, cannot be denied. Similar charges have been incidental to all wars, and when public feeling runs high it is difficult to arrive at a correct judgment in such matters.

By the end of August it was decided to abandon Camp Wikoff, and to distribute the soldiers among other camps, or, as the war had by that time closed, to send to their homes those who could be disbanded. Early in October the camp was deserted.

Meanwhile, Santiago having fallen into American hands, General Miles with part of the Fifth Corps, and reinforced by fresh troops (in all 3,400 men), sailed from Guantanamo Bay on the 21st of July, under convoy of nine warships, for Porto Rico. The previous day General John H. Wilson, with 4,000 troops, had left Charleston, S. C., for the same destination; and on the 23d five transports sailed from Port Tampa with General Schwan's command. An additional force was rapidly collected at Newport News, and on the 28th General John R. Brooke sailed thence to join the other divisions. On the 24th General Miles's squadron arrived off San Juan, and on the following day he effected a landing at Guanica, meeting with but slight resistance. On the 27th the American troops advanced toward Yauco, while the Spaniards began to concentrate at San Juan. The following day Commander Davis, of the *Dixie*, demanded the surrender of Ponce, which was at once yielded, the Spanish garrison retreating toward San Juan, and the populace welcoming the invaders with open arms. The American flag was hoisted, and General Miles issued a proclamation announcing the pacific attitude of the United States toward Porto Ricans.

Preparations still continued for further reinforcing the invading army, and on the 31st of July fifteen regiments were ordered from the camp at Chickamauga. By the 1st of August General Miles was joined by Generals Brooke and Schwan, his forces then numbering 9,000. With these troops he advanced toward San Juan, and on the 4th occupied Arroyo, which had surrendered to Commander Wainwright, of the *Gloucester*. On the 5th the town of Guayama, on the southern coast, surrendered to General Hains after a slight skirmish; and on the northern shore a party of marines landed near San Juan. On the 7th a general advance was made, columns of troops pushing out to the northwest (Mayaguez), east, and northeast. The Spaniards being reported as holding a strong position at Aibonito, General Miles changed his plans so as to avoid the mined and entrenched military road across the mountains, and, by flanking the enemy,

cause him to give losing battle, to surrender, or to retreat upon San Juan. On the 8th there was a slight skirmish near Guayama, and on the 9th the town of Coamo was captured. At Hormigueros, near Mayaguez, on the 10th, General Schwan defeated a Spanish force, and the following day he occupied Mayaguez.

Peace negotiations having by this time taken definite shape, the reinforcements destined for Porto Rico were held back, but the American advance continued till on the 12th the cavalry was within three miles of Aibonito. Here a brisk artillery duel took place, but without many casualties. On the 13th the American troops were about to open fire on the Spanish batteries near Guayama, when a staff officer arrived with orders for the suspension of hostilities, the peace protocol having been signed on the previous day, and the blockades of Havana, Porto Rico, and Manila having been raised. On the 20th of September the evacuation of the island by the Spanish troops was begun. (See PORTO RICO, XXVIII, p. 465.)

The fall of Santiago was followed on the 18th of July by the destruction of three Spanish transports and five gunboats at Manzanillo, on the southwest coast of Santiago province. A fleet of five American auxiliary vessels, accompanied by two naval gunboats, entered the harbor early in the morning, and after a bombardment of about three hours accomplished its task without the loss of a single American life. On the 21st a force of four American gunboats entered the harbor of Nipe, on the northeast coast of the island, silenced the Spanish batteries, drove out the garrison, and sank the warship *Jorge Juan*. By the 24th of July all the Spanish troops in Santiago had surrendered, and, with General Wood as military governor of the city, American rule had begun over a section of a population that had previously known no government but one of despotism and robbery.

Peace rumors had been rife for several days when, on the 26th of July, M. Jules Cambon, the French ambassador in Washington, called upon President McKinley and announced that he had been instructed to ask upon what terms the United States would agree to a suspension of hostilities pending the conclusion of a treaty of peace. The President refused to offer any terms until he had an opportunity to consult his advisers, and the proposal was submitted to the cabinet. That body discussed the matter, and on the 30th of July M. Cambon was informed of the results of the deliberations. The fundamental conditions were as follows: The United States, waiving any claim for pecuniary indemnity, required the relinquishment of all claim of sovereignty over, or title to, the island of Cuba, and immediate evacuation thereof by Spain; the cession and immediate evacuation of Porto Rico and other Spanish West India islands; the cession of an island in the Ladrões; and the recognition of the American right to hold the city, bay, and harbor of Manila pending the conclusion of a treaty of peace which should determine the control, disposition, and government of the Philippines. No financial obligation should be assumed by the United States in regard to debts contracted by Spain on behalf of Cuba and Porto Rico. It was

made a condition that the foregoing terms be accepted by Spain immediately and in their entirety, in which event commissioners would be named by the United States to meet Spanish commissioners for the purpose of concluding a treaty of peace on the basis indicated. By the 2d of August it became known that Spain had virtually accepted the American terms, and on the 9th M. Cambon formally presented the Spanish answer to the President. The following day M. Cambon and the American Secretary of State, William R. Day, agreed on the terms of a protocol, embodying the basic conditions of negotiation, which was signed at Washington on the 12th. Proclamation of the fact was at once made, hostilities were suspended, and blockades raised, as set forth above (p. 393).

The final act of war in Cuba was the bombardment of the town of Manzanillo by five American warships in the afternoon of August 12, while the signatures were being affixed to the protocol at Washington. About four o'clock the ships opened fire, which was continued till dark, a desultory firing being continued through the night. The Spaniards, having heard of the protocol, attempted unsuccessfully to communicate the news to the fleet, but at daylight a flag of truce was sent out with a despatch to the American commander, and the threatened renewal of the attack never took place.

In the Philippines, subsequently to Admiral Dewey's victory over the Spanish fleet, comparatively little was done by the American forces pending the arrival of reinforcements. The blockade of Manila was maintained by the fleet with little of event except some obstructing tactics by the German admiral, Diederichs, whose conduct drew from Dewey a peremptory demand for a clear understanding as to German intentions. The German annoyances had consisted in violations of the blockade regulations, hence of international law and courtesy. Dewey's firmness, together with the openly manifested attitude of the senior naval officer of the British squadron, finally brought Diederichs to realize his position; and the German government later indicated its friendliness by placing Prince Henry of Prussia in command of its Eastern squadron and by subsequently completely withdrawing the German ships from Manila.

The Filipino insurgents took the field four weeks after Dewey's victory, and met with general success. (See AGUINALDO, XXV, p. 102; PHILIPPINE ISLANDS, XXVIII, p. 405.) On the 22d of July Aguinaldo declared himself dictator, and on the 29th the advance of the American troops from Cavité was begun. Up to this time the American naval and military forces had assisted Aguinaldo, and had treated him and his insurgent troops as allies against the common enemy. With the arrival of the reinforcements and the commencement of active operations for the reduction of Manila, differences began to arise between the "allies," and thus commenced the misunderstandings of the Filipinos and the arrogance of Aguinaldo which led to a state of war between the United States and her subsequent colonial "rebels."

General Augusti, the Spanish governor of Manila, realized the dangerous character of his native enemy, and therefore urged upon his home government the

necessity of surrendering to the American army. But Spain would not listen to his protests; his officers resented his attitude; and he was even threatened with assassination by his own men. As a result he resigned, or was deposed by his army, or removed by orders from the Spanish Cabinet. Whichever method actually was used, Augusti certainly made his escape on a German warship, and his failure to take part in the surrender was afterward made the basis of Spanish quibbles as to the validity of the capitulation.

On the 31st of July the advance of the American army encountered the Spaniards near Malate, between Cavité and Manila, and in the engagement that ensued the enemy suffered heavy loss, while that of the United States was about 15 killed and 47 wounded. On the 7th of August a formal demand for the surrender of Manila was made by General Merritt and Admiral Dewey, and forty-eight hours were given for Spanish consideration of the proposition. Before the expiration of that time another day's grace was asked for and granted, the extension being till noon of the 10th. In anticipation of bombardment the ships were cleared for action, and the warships of other countries took up positions to observe the attack. In this apparently trivial matter an important manifestation of the attitudes of the neutral nations was made. The German and French ships moved off in one direction, while the British and Japanese vessels retired to a position near the American fleet. This grouping was emphasized by the British flagship stopping her engines while passing the *Olympia*, and saluting the latter vessel with the strains of the "Star-Spangled Banner." Despite these preparations, action was postponed until the 13th, the unreadiness of the army being alleged as the cause; but it has been stated that the delays were due to a desire to avoid bloodshed, the Spaniards being convinced of the hopelessness of resistance, but being unwilling to surrender without a sop to their honor.

At half-past nine o'clock on the morning of the 13th the fleet opened fire, the bombardment lasting about an hour and a half. Meanwhile the troops on shore made a spirited attack on the Spanish positions, whose defenders replied vigorously at first, but unsuccessfully. Their fortifications were either carried by assault or entered without serious opposition. By noon a white flag announced the surrender of the city, and about two o'clock the Stars and Stripes were hoisted over the government palace. The losses sustained by the American troops were 8 killed and 40 wounded; the Spanish losses by death and wounds are unknown; but about 7,000 men laid down their arms, of which nearly 12,000 stand were transferred to the victors, besides several million rounds of ammunition. Manila was placed under American martial law, and the Filipino insurgents were forbidden to enter the city without first surrendering their arms.

On the 14th the commissioners appointed to draw up the articles of capitulation met and agreed upon the following terms: Surrender of the Spanish troops, the city, and its defences, with all honors of war; arms to be deposited, and officers to retain side-arms, horses, and private property. Public property

to be turned over to the United States. Questions of repatriation of Spanish troops to be settled by the authorities at Washington. Arms to be returned to Spanish troops on final settlement of negotiations. Public funds to be turned over to the United States, the latter to furnish rations and necessary aid to the surrendered troops. The city and its inhabitants, churches and religious worship, educational establishments, and private property to be protected by the American army.

The capture of Manila took place on the day following the signing of the protocol, but remained valid for the reason that the news had not reached the seat of war. (For the ultimate disposal of the Philippines by the treaty of peace, see *ante*, p. 393, and *infra*; and for the later struggles of the insurgent Filipinos against American rule, see PHILIPPINES, XXVIII, p. 406.)

On the 16th of August President McKinley named the American commissioners to arrange the evacuation of Cuba and Porto Rico, and on the 19th and 21st the Spanish commissioners for the same purpose were appointed. By the 9th of September the American Peace Commission was completed, its five members being William R. Day, who resigned his office of Secretary of State on the 16th; Senator Cushman K. Davis, of Minnesota, Chairman of the Committee on Foreign Relations; Senator William P. Frye, of Maine, a member of the same committee, as well as Chairman of the Committee on Commerce; Senator George Gray, of Delaware, also a member of the Committee on Foreign Relations; and Mr. Whitelaw Reid, formerly American Minister to France, and editor of the *New York Tribune*. In order that the commissioners might have the benefit of personal and authoritative reports from the Philippine Islands, General Merritt sailed from Manila on the 30th of August to meet the Commission in Paris. The American contingent sailed from New York on the 17th of September, and on the following day the Spanish government announced as its representatives Don Eugenio Montero Rios, President of the Senate, Don Buenaventura de Abarzuza, Don José de Garnica, Don Wenceslao Ramirez de Villa-Urrutia, and General Don Rafael Cerero.

On the 27th of September the American commissioners held their first session in Paris, and on the 1st of October they met the Spanish board in joint conference. Negotiations proceeded, with adjournments from time to time for separate discussion, and subsequent resumption of joint sessions. Difficulties presented themselves early in the negotiations, the principal points of difference being the responsibility for the Cuban debt and the disposition and status of the Philippine Islands and their debt. As regards the first, the American commissioners uniformly declined to accept any responsibility, practically alleging the non-existence of a Cuban debt and the sole responsibility of Spain for money borrowed on the security of Cuban revenues. In the matter of the Philippines, the questions as to American capture of the whole group in the taking of Manila, and other points at issue, were merged in an offer by the United States to pay \$20,000,000 for the islands. This offer, which was

accompanied by a refusal to arbitrate the questions, was made on the 21st of November, and one week was fixed as the limit for Spanish acceptance. On the 28th Spain's commissioners signified their assent to the terms, and the work of drafting the treaty was begun. The treaty practically embodied the conditions of the protocol and the agreements here set forth. The first four articles were agreed upon by the 30th, and on the 10th of December the commissioners, at Paris, signed the treaty of peace, shortly afterward quitting the French capital and repairing to their respective countries.

The treaty as thus concluded was laid before the United States Senate on the 4th of January, and was by that body referred to the Committee on Foreign Relations, which reported favorably on the 11th. The subject of the ratification of the treaty was vigorously discussed both in and out of Congress, much apprehension being felt as to the matter of expansion,—a question of first instance and to be settled by the votes of popular representatives unaided by precedents. The fact that the United States Constitution was framed without any foresight of the peculiar conditions brought about by the course of events of 1898 seemed to indicate a settled policy for the United States of strict self-concentration and of abstention from extra-territorial expansion or intermeddling in the politics of the outer world. Naturally this idea took a strong hold of a large section of the people and their representatives, while an equally large section recognized the unavoidably altered conditions and sought to evolve a new policy from the necessities confronting the nation. A two-thirds vote of the Senate being necessary to a ratification of the treaty, canvasses of the members of the Chamber showed that the voting would be very close. But on the 6th of February the Senate declared for ratification by a vote of 57 to 27, one vote thus deciding the issue. Public attention was then turned to the attitude of Spain, and doubt was expressed as to the probability of the Cortes ratifying the treaty. The situation was, however, relieved by the action of the Queen-Regent, who, on the 17th of March, affixed her signature to the treaty.

The official termination of the war was effected at Washington on the 11th of April, 1899, when ratifications of the peace treaty were exchanged. M. Cambon, the French ambassador, who had represented Spain in the preliminary negotiations, officiated in her behalf in the concluding ceremonies; and Secretary of State John Hay represented the United States. The formalities consisted in the signing of a protocol reciting the circumstances, and the exchange of handsomely bound copies of the treaty. President McKinley immediately thereafter issued a proclamation of the facts, setting forth the terms of the treaty in full, and calling the attention of American citizens to its provisions. In addition he announced the appointment of Mr. Bellamy Storer, of Ohio, as minister to Spain, thus restoring diplomatic relations. The Spanish government has similarly appointed the Duke of Arcos as minister to Washington.

Thus ended one of the most remarkable wars in the world's history. Lasting only 113 days of actual warfare, the blows struck by the American forces—especially by the navy—were so crushing that at its termination Spain was left without a colony in the Western hemisphere, and with little other territory besides her peninsular kingdom. The war adds considerably to the area of the United States, if it be the will of the nation to retain these extra-continental possessions. The area now stands, including the territories, at 3,025,600 square miles. To this has to be added the area of Alaska, estimated at 531,000 square miles; Hawaii, with an area of 6,740 square miles; Guam, with an area of 370 square miles; Porto Rico, with an area of 3,670 square miles; and the Philippine Islands, including the Sulu archipelago, with an area (approximately) of 115,000 square miles;—a total area (exclusive of Cuba) of 3,682,380 square miles. The total population today of this entire area (as per 12th Census, 1900, returns) is 76,295,220.

RECENT HISTORY. In the past two years the United States has continued her remarkable career of commercial expansion. The amount of the total foreign commerce of the country, for the year ending June 30, 1900, exceeded by \$317,729,250 the aggregate for any previous year. The exports of domestic merchandise for the fiscal year ending June 30, 1900, were in value \$1,370,476,158 against \$1,203,931,222 for the previous year. The imports for 1900 were in value \$849,714,670 against \$697,148,489 in 1899. A gratifying feature in our export trade, besides its steadily increasing annual amount, is its growth in all parts of the world, and especially in the branch of manufactures, which now forms over 30 per cent. of the total exports. The total number of immigrants for 1899 was 311,715. The public debt of the United States to Dec. 31, 1899, including certificates and Treasury notes, which, however, are offset by cash in the Treasury, amounted to \$2,104,874,863. The amount disbursed for pensions for 1899 was \$139,387,353, the number of pensioners being 991,519. The total appropriations by Congress for the same year amounted to \$462,509,570. The revenue for 1899 (to June 30) was \$610,982,004, while the expenditure was \$700,093,564; the chief increase being occasioned by the demands of the War Department, amounting for the year to no less than \$228,834,154. This large disbursement was occasioned by the increasing cost of the Philippine insurrection, and by the necessity of keeping the army on a war, rather than on a peace, footing. The present regular army force stands at 2,248 officers and 61,999 men; while the new volunteer force, called into existence in 1899 mostly for service in the Philippines, numbers 1,524 officers and 33,050 men. Additions, involving heavy expenditure, are also being made to the navy and the naval force of the country, especially since the Boxer outbreak in China. In 1899 Congress was asked to authorize the construction of three armored cruisers of about 13,000 tons displacement, three protected cruisers of about 8,000 tons

displacement, and twelve gunboats, sheathed and coppered, of about 900 tons displacement.

The first session of the Fifty-sixth Congress began Dec. 4, 1899, David B. Henderson, of Iowa, being elected Speaker. The only change in the Cabinet during the year was the substitution of Mr. Elihu Root, of New York, as Secretary of War, in place of Mr. Russell A. Alger, who retired at the end of July. Vice-President Garret A. Hobart died Nov. 21, 1899. In the history of the year, the chief items embrace the ratification in the Senate of the treaty of peace with Spain, by 57 votes to 27 (Feb. 6, 1899); the passing by Congress of the Army Reorganization Bill, which authorizes the raising of the regular army to a maximum strength of 95,000 and a minimum of 57,000; a bill appropriating \$1,000,000 for a further investigation of the Isthmian Canal route (Mar. 3); and a bill appropriating \$20,000,000 to be paid to Spain in fulfillment of the terms of the Peace Treaty. On July 7, the President called for ten volunteer regiments for service in the Philippines; and in Oct. the United States and Great Britain agreed on a temporary adjustment of the Alaskan boundary dispute. In Sept. Admiral Dewey was accorded a great reception in New York on his return from Manila. In Nov. Great Britain relinquished her territorial claims in Samoa, and in Dec. following the Samoan partition treaty between Germany and the United States was signed at Washington.

During the year (1899), the war dragged on in the Philippines, military operations being pushed actively, however, with the coming of the dry season and the advent of large reinforcements. Early in the year, the Filipinos, in large force, attacked the American defences at Manila and in Feb. the battle of Caloocan occurred. In March General Wheaton occupied Pasig and General MacArthur captured Malolos. He also captured, later on, Calumpit and San Fernando, while General Lawton led an expedition to San Isidro. Toward the close of the year General Lawton was killed in an attack on San Mateo. In Oct. General Schwan operated in Southern Luzon and occupied Malabon and Rosario. In Nov. sharp fighting took place near San Jacinto, where Major John A. Logan was killed. In Nov., also, the President's Philippine Commission, which had been investigating the political condition of things in Luzon between the months of March and September, submitted its preliminary report. A War Department investigating report was also submitted Feb. 9, 1899. It reflected severely on the Commissary-General for purchasing rations, in large quantities, that were afterwards found unfit to eat; it also re-proved the commanding officer of the army for "dereliction of duty."

During the year 1900 colonial problems continued to attract attention in political circles as well as in Congress. The debate on the Porto Rican tariff engrossed Congress in the month of February, the decision of the House finally levying a tariff of 15 per cent. to continue in force till March 1, 1902, and to meet only the need for revenue of the

colony. The destitute condition of many Porto Ricans, in consequence of the destructive cyclone that passed over the island in the previous year, claimed and received attention from the War Department. The Hon. C. H. Allen was on May 1 appointed civil governor of Porto Rico. A new Philippine Commission, under the Presidency of Judge W. H. Taft, of Ohio, offering the Filipinos a definitive scheme of government, was appointed to proceed to the islands to carry out the instructions of the administration with regard to a peaceful settlement. Insurgency on the islands was still rife during the year, though the area of fighting was considerably narrowed, and many towns were occupied and held by American forces. As the year advanced, however, brigandage and the depredations of guerilla bands provoked reprisals and a more active prosecution of the war on the part of the American military authorities. In March, 1900, the Secretary of War issued a general order creating four military departments in the Philippines, under specific command, to facilitate supervision and suppress looting and other belligerent or piratical acts. These departments, which are under the chief command of General Otis, are: Northern Luzon (Major-Gen. MacArthur locally commanding); Southern Luzon (Maj.-Gen. J. C. Bates); Visayas (Brig.-Gen. R. P. Hughes); and Mindanao and Jolo (Brig.-Gen. W. A. Kobbe).

On June 21, 1900, General MacArthur, Military Governor of the Philippines, caused a notice of amnesty to the Filipinos to be proclaimed, on their acknowledging, within ninety days, American sovereignty and abstaining from further acts of rebellion.

An indication of the seriousness of the attempt to enforce American authority on the Filipinos, and of the loss of life from wounds and sickness, which the military occupation of the islands has entailed, may be seen from the report of the Secretary of War to the Senate (June 2). That report gives the casualties in the Philippine war from July 1, 1898, to May 24, 1900, as follows: Deaths—regulars, 36 officers and 920 enlisted men; volunteers, 41 officers and 854 enlisted men. Wounded—regulars, 37 officers and 721 enlisted men; volunteers, 1,115 men.

The great feature of the year was, naturally, the political party conventions for the nominations of the President for the ensuing term of office, and the discussion to which they gave rise. The first of the two great parties to meet was the Republican party, which held its national convention at Philadelphia, June 19-21, 1900. The nominations, which were unanimous, were Wm. McKinley, of Ohio, for President, and Theodore Roosevelt, of New York, for Vice-President. There was but one ballot, comprising 926 votes. The platform, which was a moderate and unsensational one, accepted protectionism, a gold standard, subsidies for American shipping, and a resolution in favor of regulating trusts and restricting immigration. It also favored the construction, ownership, control, and protection by the Government of the United States of an Isthmian canal; non-intervention in

European controversies, though commending the part taken by the Government in the Peace Conference at The Hague; the acceptance of the just responsibilities of American victories in the Spanish war, including provision for the maintenance of law and order, and for the establishing of good government among the unorganized populations whom our intervention had freed from Spain. The latter obviously commits the party and the country, if endorsed at the November elections, to retaining possession of Porto Rico and the Philippines, while granting their peoples rights of local self-government; with the promise, by and by, of giving independence to Cuba.

The national convention of the Democratic party held its sessions in Kansas City, Mo., on July 4th and following days. The nominations were the Hon. Wm. Jennings Bryan, of Nebraska, for President, and the Hon. Adlai E. Stevenson, of Illinois, for Vice-President. The platform of the party declares against trusts, and is on the workmen's side in almost all questions between them and capitalists; it is also in favor of bimetallism at the ratio of 16 to 1; but the main plank is denunciation of imperialism, opposition to militarism, and distrust of Republicanism in regard to the expansion policy of the McKinley administration. It favors the election of senators by direct vote of the people, demands repeal of the war taxes, condemns alliance with England, and denounces the retention of Porto Rico and a colonial policy inconsistent with republican institutions.

The Presidential nominees (1900) of the minor parties in the country were as follows: Silver Republicans and Populists, W. J. Bryan (P.) and A. E. Stevenson (V.-P.); Middle-of-the-Road Populists, Wharton Barker, of Pa. (P.) and Ignatius Donnelly, of Minn. (V.-P.); Prohibitionists, J. G. Woolley, of Ill. (P.) and H. B. Metcalf, of R. I. (V.-P.); Socialist Labor, Job Harriman, of Cal. (P.) and Max S. Hayes, of Ohio (V.-P.); Social Democrats, Eugene V. Debs, of Ind. (P.) and Job Harriman, of Cal. (V.-P.).

In June, 1900, the United States, together with the peoples of the Old World, were startled by serious disturbances in China, which menaced the safety of the Foreign Legations at Peking and threatened the foreign missions throughout the Empire. The rising occurred in a quasi-military organization known as the "Boxers," whose designs are hostile to foreigners resident in China, and, though nominally under the ban of the imperial authorities, are in reality encouraged and abetted by them. The suspected inspirer, if not actual leader, of the movement, was Prince Tuan, father to the heir to the Manchu throne, who, with the despotic Empress-Dowager, are known to be averse to the foreign element in the country, and desirous of extruding, if not massacring, it. The movement began with threatening Tien-tsin, the treaty port on the Gulf of Pechili, and with an attack on the Legations at the Capital. With the spread of the rebellion the situation became very serious for foreigners within the Empire, and most alarming to the various European and American govern-

ments, which for a time could get no communication with their representatives at the Peking Embassies. The outbreak became more grave when the Chinese opened fire on the warships of the international fleet at Taku, murdered Baron Von Ketteler, the German Minister, and a Japanese official at the Embassies, and forced back the allied troops, under the British Vice-Admiral (Seymour), that were seeking to relieve the Legations at the Capital. When news reached the United States of the trouble troops were despatched at once to China, the Ninth Regiment was hurried forward from Manila, and Admiral Remy was instructed to give any aid in his power, either in the conveyance of troops from the Philippines, or for the safety of American citizens and property in jeopardy in China. The Cabinet at Washington also addressed itself actively to the diplomatic demands of the situation. At length a strong international force made its way from Tien-tsin to Peking, and on August 15 captured and took possession of the Capital, bringing timely relief to the besieged Legations and the hundreds of Americans and Europeans who had taken refuge at the British Embassy. The Chinese Court, it was found, had fled inland, and for a time it was feared, that under the influence of the reactionary Empress-Regent and Prince Tuan, all the foreign missionaries and traders in the Empire would be massacred. The missions, as it turned out, suffered severely, and the loss of life, particularly among the native converts, was great. The United States, while giving Admiral Remy and General Chaffee full power to act in the emergency, was careful, both in her acts and in her diplomatic negotiations, to refrain from European entanglements and to be moderate in her demands for compensation for the country's losses. As we write, there has as yet been no adjustment of the claims of the foreign allies, though the Chinese Commissioners, Prince Ching and Earl Li Hung Chang, ostensibly acting for the Empress-Regent, have proposed to the Powers a basis for peace negotiations, with the offer of a money indemnity amounting to £40,000,000 sterling, payable in sixty instalments, the Chinese imperial customs being pledged for the faithful payment of the sum. Preliminary to the settlement, the Commissioners ask that the Powers shall refrain from taking further military action in the Empire, that the foreign troops shall be withdrawn, and that the Tsung-li-Yámen, or Chinese foreign office, be permitted to resume its functions. So far no conclusion has been come to, or agreement on the part of the Powers to accept China's offer: meantime an alliance has been effected between Great Britain and Germany, with the object of maintaining the "open door" policy and to prevent the partition of the Empire. The matters that block settlement are, besides the continued disturbances in the country which create distrust of the *bona fides* of the Chinese court, the difficulty in the way of bringing to punishment those who are responsible for the outrages at Peking, the lack of proper guarantees for the future safety of foreign life and property within the Em-

pire, and the absence from the capital of any *de facto* ruler in whom the Powers can place confidence.

THE PRESIDENTIAL ELECTION (1900), AND ASSASSINATION OF PRESIDENT MCKINLEY (Sept. 1901). The result of the Presidential election (Nov. 6, 1900) sustained the McKinley Administration and party. The Democratic nominee for the high office was again Mr. W. J. Bryan, of Nebraska, while the Republican nominee for Vice-president, on the ticket with Mr. McKinley, was Governor Theodore Roosevelt. The total popular vote was 13,970,300, Mr. McKinley receiving a majority of 443,054 of all the votes cast. His plurality over Mr. Bryan was 832,280. In the electoral college, the McKinley-Roosevelt majority was 137, the votes being 292 for the Republican, and 155 for the Democratic, nominee. The election of Mr. McKinley for a second term to the Presidency had a calamitous sequel, ten months later, on the occasion of the President's visit to the Pan-American Exposition, at Buffalo, N. Y., Sept. 6, 1901. There, at a public reception in the Exposition grounds, a murderous attack was made upon Mr. McKinley by an anarchist, named Leon Czolgosz, which had a fatal termination Sept. 14, to the great grief of the nation. On the same day, at Buffalo, Vice-president Roosevelt took the oath of office and succeeded to the Presidency, at the same time stating that it would be his aim to continue the policy, in the main, of his lamented predecessor. President McKinley's remains were taken from Buffalo to Washington, where impressive funeral rites took place, after which the body was removed to the family home at Canton, Ohio, and there interred (Sept. 19).

RECEIPTS AND EXPENDITURES OF THE GOVERNMENT (1899). In 1899 the total receipts of the United States government amounted to \$515,652,666, of which \$206,141,225 were derived from customs, \$272,486,648 from internal revenue, and \$37,024,793 from miscellaneous sources. The total expenditure for the year (1899) amounted to \$605,551,323, of which \$228,834,154 were spent on the war department, and \$64,814,440 on the navy; \$139,387,353 went in pensions, and \$39,895,940 in interest on the public debt; \$12,784,676 were disbursed on behalf of the Indians; while \$119,834,761 represents the expenditure on civil list and other miscellaneous items.

FINANCIAL. The net receipts of the government, exclusive of loans and treasury notes, for the year ending June 30, 1899, amounted to \$610,928,004. The chief sources of the revenue were the customs, the internal revenue levies, and the receipts from the postal service. With the sums raised from loans and treasury notes the total annual receipts were \$1,133,472,724, being nearly two million dollars in excess of the previous year. The total ordinary expenditure for the same period was \$700,093,564, or including the redemption of the public debt during the twelve months, \$1,041,243,523. Owing to the expenditure on the army and navy, the gross disbursements for the year were over a million dollars in excess of the expenditure for 1898. To meet, in part,

the heavy increase in expenditures on war account, Congress by an act, approved June 13, 1898, increased the war revenue taxes in addition to the increased customs duties levied by the tariff act of 1897. For the detail of these customs and revenue levies, see the chief almanacs for the year 1900

UNITED STATES BANK. In 1791 the only banks in the United States were the bank of North America, chartered by Pennsylvania, and one each in New York and Boston. The Bank of North America had been of invaluable aid to the government during the last part of the Revolution, and for some years following; but its capital was too small to enable it to take charge of the government finances, and a new bank was deemed necessary. So Hamilton advanced his plan of a larger bank, which should act as the agent of the government. There was much opposition to the bill in Congress, chiefly on the grounds of constitutionality, but it was finally passed, and signed by Washington on Feb. 25, 1791. As chartered, the bank had a capital of \$10,000,000, of which \$2,000,000 were furnished by the government; its notes were legal tender for public and private debts, and the charter had a life of twenty years. After a successful career, with branches located in all the principal cities of the United States and headquarters in Philadelphia, it ceased to exist on the refusal of Congress to renew its charter. During the next few years only poorly regulated state banks existed, which, on account of the crisis created by the war with England, were inadequate to the financial needs of the country, and it was found necessary to return again to the United States Bank. In 1816, after considerable debate, an act was passed chartering such a bank. Its headquarters were to be in Philadelphia; it had the power to establish branches in all cities in the country, and was governed by a board of 25 directors, five of whom were chosen by the government. The capital was fixed at \$35,000,000, of which \$7,000,000 were furnished by the government, and the bank was to be the repository of the public money, which it was compelled to disburse at any point in the country free of charge. In return for its privilege the bank was to pay a bonus of \$1,500,000 to the government. The books and records were subject to examination, and all government deposits could be withdrawn by the Secretary of the Treasury, if he deemed such a course best; but he must report his reasons to Congress. It was this latter proviso which finally led to the annihilation of the bank. The first two years of its existence were not successful, but after that it developed wonderfully and became immensely powerful. When Andrew Jackson became President, in 1829, he immediately got into a quarrel with the bank, owing, it is said, to its refusing a political favor. At any rate, he waged a bitter war upon it, charging the governors and stockholders with corruption and with meddling in politics. Whether there was any truth in the charges or not, the institution had grown into such a vast monopoly that people were becoming afraid of it. Nicholas Biddle of Philadelphia was president of this gigantic concern, and its officers

were all men of prominence and influence. The bank thought best to try for a new charter in 1832, although its old one did not run out until 1836, and a bill was passed by Congress providing for a new charter at the expiration of the old one; but Jackson vetoed this, and went before the country for re-election on this plank. He was elected by an overwhelming majority, and thought himself justified in going to any length against the bank. One of the first things he did after re-election was to order William J. Duane, Secretary of the Treasury, to remove the government deposits, or, rather, to cease making deposits, and when Mr. Duane refused he was called upon to resign. His successor, Roger B. Taney, afterward appointed chief justice of the United States by Jackson, followed Jackson's instructions and placed the Federal money in certain state banks afterward nicknamed "pet banks." The controversy continued throughout Jackson's administration, and the bank was refused a charter in 1836. Two bills were passed during Tyler's administration providing for a successor to the United States Bank, but he vetoed both of them. Much distress resulted in the business world after the expiration of the bank's charter, and this was universally laid to Jackson's policy of distributing Federal deposits to banks which did business on this capital.

UNITED STATES DAUGHTERS. See COLONIAL SOCIETIES, in these Supplements.

UNITED STATES NATIONAL DEBT. See DEBT, UNITED STATES NATIONAL, in these Supplements.

UNITED WORKMEN, ANCIENT ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

UNITS, ELECTRICAL. See ELECTRICITY, § 110, in these Supplements.

UNITS OF HEREDITY. See HEREDITY, in these Supplements.

UNITY, DRAMATIC. See DRAMA, Vol. VII, pp. 391-92.

UNIVERSALISTS. The Universalist Church in the United States traces its origin to John Murray, a native of Alton, England (1741-1815), who came to America in 1770. Himself a convert from the Calvinism of Whitefield, he held all the Westminster Confession except the tenet of reprobation, averring that the atonement was complete, and all men must attain ultimate salvation. But in the churches and societies that were founded in New England, and as far south as Philadelphia, upon his teachings, there soon developed a spirit of opposition to evangelical views that found expression through Hosea Ballou (q. v., in these Supplements), in his *Treatise on the Atonement*. Ballou denied the doctrine of vicarious atonement. His sermon in Mr. Murray's pulpit in 1798, in which he first gave public utterance to his views, became historic. Mrs. Murray, from the audience, declared that the views expressed were not such as were taught by him who usually occupied that pulpit. Modern Universalism dates from Hosea Ballou. The central element of Universalist belief is, that "man is created in the spiritual image of God, capable of knowing and doing his will," and that man is not a fallen creature, sunk in moral depravity, but is a product

of evolution, a gradual unfoldment of infinite capabilities. His development does not cease with his earthly life, but continues through the endless ages of existence. Salvation is not a redemption from the consequences of sin, but from sin itself. No basis for the formerly frequent charge of Antinomianism is apparent in the writings of eminent Universalists. They hold that the chief duty of man is the creating and up-building of character, and that the chief duty of the church is to stimulate the moral energy of mankind by holding before men the ideals of life as represented by Jesus Christ.

While the church, as a body, was thoroughly in harmony with the opinions and doctrines of Hosea Ballou, a limited number held contrary views, and in 1830 organized the "Restorationist Movement." These held to future retribution, but, also, that God would ultimately "restore the whole family of mankind to holiness and happiness." The organization lasted but eleven years, when most of the members returned to the church they had left, but some joined the Unitarians.

The faith held by the church was expressed in 1803, in the Winchester profession, which was as follows:

"1. We believe that the Scriptures of the Old and New Testament contain a revelation of the character of God, and of the duty, interest and final destination of mankind.

"2. We believe that there is one God, whose nature is love, revealed in one Lord Jesus Christ by one Holy Spirit of grace, who will finally restore the whole family of mankind to holiness and happiness.

"3. We believe that holiness and happiness are inseparably connected, and that believers ought to be careful to maintain order and practice good works; for these things are good and profitable unto man."

This credo eventually became objectionable, as implying views no longer generally held in the church. Several efforts at revision resulted in the acceptance, by the General Convention of 1895, of the following substitute for the Winchester profession, but it required ratification by the convention of 1897:

"1. We believe in the Fatherhood of God and the brotherhood of man.

"2. We believe that God, who hath spoken through all his holy prophets since the world began, hath spoken unto us by his Son, Jesus Christ, our example and Saviour.

"3. We believe that salvation here and hereafter consists in spiritual union with God, who, leading to repentance and life by his spirit, will gather, in Christ, the whole family of mankind."

In Universalist church polity, separate parishes control the selection of their ministers and retain supervision of parish affairs. Ministerial and lay delegates from the parishes in each state form the state conventions, and delegates from the state conventions form the General Convention, an incorporated body, and a court of final appeal in all disputes and matters of discipline. Prior to 1889 the General Convention met annually, but in that year the meetings were made biennial, and intermediate conferences were organized to be held for the consideration of questions

relating to religion, morals, education, etc., but having no ecclesiastical authority.

In 1895 there were 44 state conventions, 1,009 parishes, 802 churches with a total membership of 47,986, and 967 Sunday schools with 57,394 pupils. There were, in charge of the denomination, 13 universities, colleges and academies, with a total of 165 professors, 1,524 students, and property valued at \$2,787,500. The total church property is valued at \$9,000,000, and about \$1,000,000 is contributed annually for parish-support. There are three divinity schools: one at Tufts College, Massachusetts; another at St. Lawrence University, Canton, New York; and Ryder Divinity School of Lombard University, at Galesburg, Illinois.

Foreign missions have been confined mainly to work in Japan, where eight churches, a number of out-stations, a school for girls and a theological school at Tokyo for training native ministers attest their activity. The home missionary work is supported by the Woman's Centenary Association. The young people of the denomination are organized in a Young People's Christian Union, in which 425 societies were represented in 1895. The publishing house of the church issues *The Christian Leader* at Boston and *The Universalist* at Chicago, weekly periodicals; the annual *Universalist Register*; besides books, pamphlets and Sunday school literature. The Universalist Historical Society is a corporation having charge of a library of Universalist books, which contains some four thousand volumes, besides manuscripts and papers.

See *Universalism in America*, Dr. Richard Eddy (1884); *The Ancient History of Universalism*, Hosea Ballou, 2d (1878); *The Theology of Universalism*, Thomas B. Thayer (1870); *History of Universalism, and Life of Hosea Ballou*, by Thomas Whittemore (1860); *The Columbian Congress of the Universalist Church*, papers and addresses (1894); and a series of manuals on *Faith and Duty*, published by the Universalist Publishing House.

UNIVERSALS. See SCHOLASTICISM, Vol. XXI, pp. 418 et seq.

UNIVERSITY EDUCATION. See UNIVERSITIES, Vol. XXIII, pp. 831-858; and EDUCATION IN THE UNITED STATES, in these Supplements. For particular universities, see under their proper names, in these Supplements.

UNIVERSITY EXTENSION, an educational movement under the supervision of some institution of higher learning, or a group of such institutions. The purposes of this movement may be stated as follows: To organize people into centers where competent lecturers may come to address them, and to co-operate as far as possible with institutions of learning and other bodies for the purpose of bringing to the many the best thought of the few. It is an outcome of the desire of the universities and colleges to extend to the people the benefits accruing from their accumulated wealth and learning. It is a form of education designed not only to supply the wants of those who have not had the advantage of a higher education, but to aid the college graduate who wishes to keep up his study, and in

fact to furnish a means whereby all who wish to be better informed upon matters of general interest may pursue their studies systematically, while it also serves to develop habits of sound thinking and right conduct, and trains the mind for independent thought and study. This opportunity is furnished by means of systematic courses of lectures, and classes in subjects usually taught at high schools and universities. These courses of lectures are delivered by competent instructors, usually from the universities and colleges of the land, during certain periods, at intervals of one or two weeks, with special aids for students' work in the mean time. In addition to the lecture, part of the evening is given up to asking and answering questions, so that in some cases the course possesses practically the same functions as a debating society. In the immediate neighborhood of an institution of learning the plan of outside classes is sometimes adopted. These are taught by instructors from the institution, and follow the same courses as the classes in the school.

In organizing a center for a course of such lectures, a number of people get together, and after deciding upon the nature of the course desired, tickets are sold in sufficient numbers to pay the expenses of the course, and the lecturer is secured. Certain subjects are not well adapted to teaching. Especially is this true of the laboratory sciences, mathematics and languages; but, fortunately, the subjects generally demanded come under the heads of literature, history, political science, sociology, economics, or Biblical study, which are exceptionally well adapted to this mode of teaching.

When, in 1873, Cambridge University, at the instance of James Stuart, a fellow and lecturer in Trinity College, offered to supply the towns of England with instructors in various departments of knowledge, under the supervision of the university, they found a scheme all worked out and ready for adoption. As early as 1867 Professor Stuart had delivered a course of lectures before some women's clubs in the north of England. These had proved so successful that during the next few years he delivered courses of lectures, chiefly before laborers' associations, in Crewe, Leeds, Sheffield, Manchester and Liverpool. Early in his experience he found a demand for a class or review hour in which to clear up questions that were not understood, and to answer questions in general relating to the previous lecture. These lectures had become very popular, so that the ground was all prepared when Cambridge took control of the movement. In 1873, centers were first established, and since that time the system has been a recognized part of the university. In 1876, the London Society for the Extension of University Teaching was established, and in 1885 Oxford engaged permanently in the work. The system has developed surprisingly fast, and is adopted in Scotland, Ireland and Wales.

University Extension was first introduced into the United States in 1887 by J. N. Larned, super-

intendent of the Buffalo Library. The subject had been agitated by persons connected with Johns Hopkins University, and had been brought before the American Library Association in September, 1887. Mr. Larned secured the services of Edward W. Bemis, a graduate of Johns Hopkins, who delivered 12 lectures on *Economic Questions of the Day*. But nothing of importance came of the movement until 1890, when the University of Pennsylvania, under Provost Pepper, sent George Henderson to England to study the subject. An organization was formed, called the Philadelphia Society for the Extension of University Teaching, and shortly afterward reorganized and enlarged under the name of the American Society for the Extension of University Teaching. It has continued successfully at work ever since, but its field has been largely in the centralization of the work in the eastern part of the United States. However, the work has spread into all parts of the country, and has been taken up by all the larger universities and colleges. In some parts of the country several colleges have banded together for the advancement of the scheme, while the University of Chicago supports a special department for this work. This work demands men of scholarly ability and broad learning. The audiences are made up almost entirely of grown men and women—persons whose judgments are mature. The increasing demand for such men led, in 1892, to the establishing of a seminary, where University Extension lecturers might receive the proper training. This was in charge of Edmund J. James, president of the American Society, assisted by the ablest professors from a number of Eastern universities. In spite of the fact that in the last two or three years over one hundred thousand persons have taken advantage of these lectures, the enthusiasm is not nearly as great as might be desired, and it is only by the hardest work of the promoters that the plan has been anything like a success. Some institutions have introduced the plan of allowing credits for work done in this way, if the person obtaining them takes a residence course at the school later on. The literature of the subject is now abundant, the best-known works being *Handbook of University Extension*, and the monthly journal of the American society called the *Citizen*.

UNIVERSITY OF CHICAGO, THE, founded by John D. Rockefeller, in Chicago, Illinois. The original University of Chicago was chartered in 1857, and continued in existence until 1886, when a series of financial difficulties caused its discontinuance. Scarcely two years later, John D. Rockefeller of New York City, after conference with Professor William R. Harper, then of Yale University, signified to the Rev. F. T. Gates, secretary of the American Baptist Education Society, his desire to aid in the establishment of a new university in the city of Chicago. This project was at once brought by Mr. Gates before his society, which, in December, 1888, appointed a committee to perfect plans for the contemplated foundation of such an institution. In May

of the next year, Mr. Gates announced to the board of his society, then in session in Boston, the offer of Mr. Rockefeller to contribute, through the society, \$600,000 for the founding, in Chicago, of an institution for higher education, upon the condition that an additional \$400,000 should be subscribed for the same cause on or before June 1, 1890. Already resolutions "to take immediate steps toward the founding of a well-equipped college in the city of Chicago" had been adopted by the society. Mr. Gates and T. W. Goodspeed having been appointed to attend to the fulfillment of the conditions upon which Mr. Rockefeller's original gift was receivable, succeeded in obtaining before June 1, 1890, not only the subscription of the stipulated \$400,000, but the grant, from Marshall Field of Chicago, of land valued at \$125,000, upon which the uni-

GRADUATE AND DIVINITY
DORMITORIES.

COBB LECTURE HALL.

UNIVERSITY OF CHICAGO.

versity should be located. Adjacent land was purchased for \$282,500, and the site thus constituted comprises four unbroken city blocks, the city council having relinquished their claim upon the streets which should pass through this tract. Upon the 10th of September, 1890, the new institution was incorporated under the name "The University of Chicago," the first board of trustees having been appointed by the Education Society. Professor William Rainey Harper, having been elected president of the university at the first meeting of the board of trustees after incorporation, assumed the duties of his new office upon the 1st of July, 1891. Upon the 26th of November of that year, work was begun upon the first building of the university. Three months later, the value of another \$1,000,000 was received from Mr. Rockefeller, and in the same month a chemical laboratory and its equipments were pledged to the university by S. A. Kent of Chicago. The promise of Marshall Field, made in March, 1892, of \$100,000, to be paid upon the subscription, within ninety days, of \$900,000 additional, led to the donation of several large amounts for the erection of buildings, and the conditions of Mr. Field's gift were fulfilled within the time specified. These gifts led to the erection of Kent Chemical Laboratory, Cobb Lecture-Hall, Ryerson Physical Laboratory, Walker Museum, Snell Hall, Nancy Foster Hall, Beecher Hall and Kelly Hall, the last three being ladies' dormitories.

Cobb Lecture-Hall was occupied upon the 1st of October, 1892, the day upon which the university first opened its doors to students. Two dormitories were the only others of the present university buildings ready for use at that time. In the

first year, 900 students were enrolled. In 1896 there were about 2,000 in residence. After the opening of the university, Mr. Rockefeller gave to it, in December, 1892, "one thousand thousand-dollar five-per-cent bonds" for additional endowment. Another \$1,000,000 was raised before July 1, 1894, for general equipment, half of this amount being donated by Mr. Rockefeller. At about the same time \$100,000 was pledged by Mrs. Caroline E. Haskell of Chicago for the erection of the Haskell Oriental Museum. The gift of \$300,000 by Charles T. Yerkes of Chicago enabled the university to erect, at Lake Geneva, Wisconsin, the Yerkes Observatory, in which is the largest telescope in the world. The 30th of October, 1895, was made memorable in the history of the university by a letter from Mr. Rockefeller, containing his promise to contribute, before Jan. 1, 1896, \$1,000,000, and his further promise to contribute an additional \$2,000,000, the latter sum to be paid in amounts equal to the contributions of others to the university up to Jan. 1, 1900. Less than two months later, Miss Helen Culver of Chicago presented to the university the value of \$1,000,000, this gift "to be devoted to the increase and spread of knowledge within the field of the biological sciences." From this contribution have been erected the four Hull Biological Laboratories.

The university buildings which are now erected have been built to accord with the general plan for the completed group, which was prepared before the work of erection had been begun. There is no educational institution in the world whose buildings excel those of the University of Chicago in symmetry and beauty of architecture, nor in arrangement of interiors. Blue Bedford stone is the building-material to be used upon the entire group, whose architectural style is Gothic. The university campus, twenty-four acres in extent, lies midway between Jackson and Washington parks, and fronts upon the magnificent boulevard which connects them, the Midway Plaisance. Lexington Avenue is its eastern limit, Fifty-seventh Street its northern, and Ellis Avenue borders it upon the west.

The five statutory divisions of the university are: The University Proper; the University Extension; the University Libraries, Laboratories and Museums; the University Press; and the University Affiliations. The last division includes a large number of Western preparatory and technical schools of earlier foundation than the university proper. The graduate schools of the university are its most notable feature. In these are enrolled more than one third of all students in attendance—a proportion unequaled at any other American institution. Undergraduates at the university are grouped into the junior or senior colleges, dependent upon the number of credits already obtained, admission to the senior college being allowed upon the accomplishment of one half the collegiate work for an A.B., or degree of equal rank. The rapid growth of the University of Chicago has been unequaled in the history of educational

institutions. It has become one of the chief factors in the education of the people of the West. In 1898 there were 200 instructors and 2,500 students; the library had 336,740 volumes; the productive funds were \$5,800,000; and the total income was \$706,973.

UNIVERSITY OF THE SOUTH, an institution of higher learning, located at Sewanee, Tennessee. It was founded by Leonidas Polk, bishop of Louisiana, and was chartered in 1858, but was not opened, as its buildings and endowment were lost during the Civil War. It still possessed ten thousand acres of land, and in 1868 a small school was started by Bishop Quintard, to which, in 1870, a college department was added. Since then the institution, though pressed by lack of funds, has developed steadily. A theological department was added in 1873, a medical school in 1892, and a law school in 1893. The institution is under the control of a board of trustees, consisting of the bishops and 3 elected representatives from 15 dioceses of the Protestant Episcopal Church in the Southern states, and the administrative head is called the vice-chancellor. In 1898 there were 42 instructors and 427 students; the library had 41,000 volumes; the productive funds were \$160,000; and the total income was \$39,000.

UNIVERSITY OF THE STATE OF IOWA, the state institution of Iowa for higher education; located in Iowa City, supported in part by legislative appropriations, and in part by the fund derived from the sale of the Congressional land grants. It was organized in 1847; receives students of both sexes; reorganized upon its present state basis in 1860. It has six departments—undergraduate, and the five professional schools of law, medicine, homeopathy, dentistry, and pharmacy. It occupies the building once used as the



UNIVERSITY OF STATE OF IOWA.

state capitol, with a number of additional structures since added to meet its rapid growth. In 1898 there were 112 instructors, 1,313 students, and a library of 30,000 volumes. There is a tuition charge of \$25 to \$75 a year, a productive fund of \$232,000; and in 1898 the income was \$150,038. The geological department is practically a separate school, begun in 1864, and greatly enriched by specimens from the state geological survey. It has a well-developed system of University Extension lectures.

UNIVERSITY OF THE STATE OF NEW YORK. See NEW YORK, UNIVERSITY OF STATE OF, in these Supplements.

UNIVERSITY PRESS, a name borne by the printing and publishing establishments of certain great British universities.

At Oxford, the first book printed, a treatise on the *Apostles' Creed*, bears date of 1468, but it is conjectured that it should be ten years later. In time the Oxford Press passed under the control of the syndics of the university, and it became famous for its production of various authorized editions of the Bible and *Book of Common Prayer*. It is a very complete establishment, even manufacturing its own paper and type, and doing its own binding. It employs over a thousand persons, and is said to be in possession of a secret for producing the India paper used in its Bibles and prayer-books.

At Cambridge, there is a publishing establishment under the auspices of the university. Its publications are chiefly historical, geographical, mathematical, and treatises relating to natural sciences and economics.

In the United States the *imprimatur* "University Press" denotes that the tractate or treatise bearing it concerns some matter of original research at the university whence the document proceeds, and that it can be obtained there, if at all. Such method of publication is rapidly extending in the great centers of education.

UNIVERSITY SETTLEMENTS. When Edward Denison went, in 1867, to live in Stepney and see the life led there by the poor, he wrote that all efforts to alleviate the wretchedness of the oppressed seemed to him wasted, except so far as they were educational. Denison died soon after, but his work made a profound impression on his friends. It seemed as if the chief work of education needed was that that men of cultivation and affairs could impart by daily and friendly contact with the depressed. Eight years later, Arnold Toynbee, a clerk in the India Service, and an enthusiast for humanity, began to spend his vacations in Whitechapel, an East End parish of London, where he studied the conditions of poverty, called about him cultivated friends, discussed social problems and contrived plans to bring the best thought of refined men into contact with those who were at the moral antipodes of sound society. Many other influences of like character were at work, as that of the new London Charity Organization Society, which was proclaiming with might that personal friendship was worth more to the poor than alms. Cambridge University was ripe for the work of extending its means of education to the people and had entered with eagerness upon that task. But the especial contribution of Denison and Toynbee to the work was that of calling attention to the worth of scholars in the elevation of the poor. Thus came the name of University Settlements. When Toynbee died in 1883, his Oxford friends built a memorial hall to his memory in Whitechapel, to carry on his work. Its conduct was in the hands of

Rev. S. A. Barnet. The plan took with the many who wished to do good with their resources and time, but found their alms to miscarry. Walter Besant made these new studies the basis of his romance, *All Sorts and Conditions of Men*, and it led to the establishment of a People's Palace in Bethnal Green to commemorate the jubilee of the Queen's reign. The idea was abroad. It was copied far and wide. Mrs. Ward had found, in a like work, a solution of *Robert Elsmere's* spiritual difficulties, and tried to realize it in an East End university hall.

The scheme is a simple one. It requires that cultivated people shall go to live among the destitute and try to make a common life for both. Poverty has nothing to offer, but cultivation has adjustments. To decent poverty, patronage and alms are either offensive or degrading. Friendship is neither. University Settlement, then, means a residence of refined people in halls among the depressed, where the inmates can study the social, moral and intellectual needs of their neighbors, and provide means for every variety of a higher social life. Lectures and studies, visits and entertainments, and every ingenious device for building up local society and personal character enter into it. The plan has long passed beyond university impulse. That name is only a symbol. The English movement passed to Scotland. In 1887 it appeared in New York as a "neighborhood guild." In 1891 the University Settlement Guild was organized in New York. In 1896 there were like establishments in all the principal cities of the United States from Boston to San Francisco. Of these there are no better examples than the College Settlement in New York, the Hull House in Chicago, the Philadelphia College Settlement, and the Denison and Andover houses, Boston.

UNLEAVENED BREAD, FEAST OF. See PASSOVER, Vol. XVIII, pp. 343, 344.

UNST, a Shetland island. See ORKNEY, Vol. XVII, pp. 846 et seq.

UNWIN, WILLIAM HAWTHORNE, an English engineer; born at Coggeshall, England, in 1838. He was educated at the City of London School, and served his apprenticeship in the works of Sir William Fairbairn at Manchester; became instructor in the Royal School of Naval Architecture at South Kensington; professor of mechanics and hydraulic engineering in the Royal Indian Engineering College at Cooper's Hill, in 1872; and professor of engineering at the City and Guilds' Institute at South Kensington, in 1884. He was a fellow of the Royal Society, and a member of numerous engineering societies, and was a contributor to various magazines. Among his published works are *Wrought Iron Bridges and Roofs* (1869); *The Elements of Machine Design* (1877); *The Testing of Materials of Construction* (1888); and was contributor of the articles HYDRO-MECHANICS and WIND-MILLS, in this ENCYCLOPÆDIA.

UPANISHADS. See VEDANTA, Vol. XXIV, pp. 117-120.

UPAS TREE, the so-called poison tree of the East Indies (*Antiaris toxicaria*), of the family *Artocarpaceæ*. It yields a very acrid poison, but it is

needless to say that the grotesque stories concerning the deadly upas, representing it as giving out a fatal emanation, are gross exaggerations. It is also called Bohun upas.

UPCHURCH, JOHN JORDEN, an American organizer, was born in Franklin County, North Carolina, March 26, 1822. He was brought up on a farm, failed in the hotel business at Raleigh, was for 13 years master mechanic on the Mine Hill and Schuykill Haven railroad and lost all his savings in an oil investment in 1864. In 1868, while employed in the machine-shops of the Atlantic and Great Western railroad, at Meadville, Pennsylvania, he founded the Ancient Order of United Workmen, and organized the first lodge, Oct. 27, 1868. The order has since spread throughout the United States and Canada, and in 1894 had a membership of more than 328,755, and disbursed in benefits, during the fiscal year, \$6,479,175. Upchurch traveled much in the interest of the society established by him, and during the later years of his life resided at Steelville, Missouri, where he died, Jan. 18, 1887.

UPHAM, CHARLES WENTWORTH, an American clergyman and author; born in St. John's, New Brunswick, May 4, 1802. After serving as an apothecary's apprentice and working on a farm, he went to Harvard, where he graduated in 1821, and from the Divinity School in 1824; was then confirmed as assistant to John Prince, pastor of the First Church in Salem, where he remained until 1844, when ill health compelled his retirement; was editor of the *Christian Register* for a couple of years; and then traveled and lectured as the agent of the Massachusetts State Board of Education; in 1849 was elected mayor of Salem, and in 1849 a member of the legislature, and then successively state senator, national Congressman, state senator and finally, in 1859, Representative again. Among his works are *Letters on Logos* (1828); *Prophecy as an Evidence of Christianity* (1835); *Lectures on Witchcraft Comprising a History of the Salem Delusion of 1692* (1831); *Life, Letters, and Public Services of John Charles Frémont* (1856); and a *Memoir of Timothy Pickering* (1867-72). He died at Salem, June 15, 1875.

UPHAM, THOMAS COGSWELL, an American educator; born at Deerfield, New Hampshire, Jan. 30, 1799. He was a graduate of Dartmouth, and Andover Theological Seminary, and acted as assistant professor of Hebrew for one year at the latter place; was then (1823) ordained for the ministry as pastor of the Congregational Church in Rochester, New Hampshire, and in 1825 was chosen professor of mental and moral philosophy at Bowdoin College, which position he held until retired in 1867, retaining the title of professor emeritus. He published *Manual of Peace* (1830); *Philosophical and Practical Treatise on the Will* (1834); *Elements of Mental Philosophy* (1839); *Outlines of Disordered and Imperfect Mental Action* (1840); *Life of Faith* (1848); *Religious Maxims* (1854); *Letters Written from Egypt, Europe and Palestine* (1855); and *Christ in the Soul* (1872). He died in New York, April 2, 1872.

UPJOHN, RICHARD, an American architect; born in Shaftesbury, England, Jan. 22, 1802. After receiving a fair education he was apprenticed to a cabinet-maker and builder; became a master mechanic in his craft and worked at it in England until 1829; removed to America, where he worked at his profession, first in Massachusetts, and later in New York. He is best known as a builder of churches, mostly in Gothic architecture, although some of his residences and other buildings contained ideas much in advance of his time. His first work was the entrances to Boston Common, followed shortly by the church of St. John, in Bangor, Maine. Among his most noted buildings are the churches of the Ascension and the Holy Communion, Trinity Chapel, St. Thomas's, the Trinity Building, the Corn Exchange, replaced now by a sixteen-story building, all in New York; Christ and Grace churches, and Church of the Pilgrims, in Brooklyn; and St. Paul's at Buffalo. The Trinity steeple (286 feet high) was for years the highest building in America. Mr. Upjohn was president of the American Institute of Architects from 1857 to 1876. He died in Garrison's, Putnam County, New York, Aug. 16, 1878. See also ARCHITECTURE, in these Supplements.

UPLAND, a borough in Delaware County, southeastern Pennsylvania, 2 miles W. of the Delaware River, on the Philadelphia, Wilmington and Baltimore railroad, 2 miles W. of Chester and 16 miles W.S.W. of Philadelphia. It contains the Crozer (Baptist) Theological Seminary, two churches and three cotton factories. Population 1890, 3,572; 1900, 3,355.

UPOLU, an island. See NAVIGATORS' ISLANDS, Vol. XVII, p. 279.

UPPER ALTON, a city of Madison County, southwestern Illinois, on the Chicago, Burlington and Quincy and Chicago and Alton railroads, two miles N. of Alton. It is in a fruit region; has extensive brick, tile and stoneware works. The city has a fine park and street-railway. Here is Shurtleff College, a Baptist institution founded in 1827 and chartered in 1835. The college had, in 1895, 24 professors, 201 students, and 8,000 volumes in its library, with a total income amounting to \$8,223. Population 1900, 2,373.

UPPER MARLBORO, a village and the capital of Prince George County, south-central Maryland, on the western branch of the Patuxent River, and on the Baltimore and Potomac railroad. It is in a grain, tobacco and fruit growing region, and has fruit and vegetable canneries, and two weekly newspapers. Population 1880, 541; 1890, 439; 1900, 449.

UPPER SANDUSKY, a village and the capital of Wyandot County, northwestern central Ohio, on the Sandusky River, and on the Columbus, Hocking Valley and Toledo railroad, 60 miles S. of Toledo. It has foundries, carriage and wagon factories, machine-shops, flour and saw mills, one evening and four weekly newspapers. Population 1890, 2,275; 1900, 2,131.

UPSHUR, ABEL PARKER, an American states-

man; born in Northampton County, Virginia, June 17, 1790. He studied law, and practiced in Richmond until 1824, when he was elected to the legislature from Northampton County; was appointed a judge in the general court of Virginia in 1826; a member of the convention called to revise the state constitution, and then returned to his office of judge, which he retained till 1841. In that year he was appointed to the post of Secretary of the Navy by President Tyler, and in 1843 Secretary of State to succeed Daniel Webster. He was killed, together with several others, while in company with the President and his Cabinet, witnessing some experiments in gun-firing on board the United States steamship *Princeton*, on the Potomac River, Feb. 28, 1844. He published *Brief Inquiry into the True Nature and Character of Our Federal Government* (1840).

UPSHUR, JOHN HENRY, an American naval officer; born in Northampton County, Virginia, Dec. 5, 1823, and entered the navy, Nov. 4, 1841, becoming a passed midshipman in 1847, after the fall of Vera Cruz, in the bombardment of which he participated. He was promoted to be master, July 18, 1855, and became lieutenant on September 14th following. At the breaking out of the Civil War he was ordered to the North Atlantic squadron, and was present at the capture of the forts along Hatteras Inlet and the coast of North Carolina. In 1862 and 1863 he participated in the operations of the South Atlantic squadron off South Carolina, and on July 16th of the former year was promoted to be lieutenant-commander, becoming commander July 25, 1866, captain July 31, 1872, and rear-admiral Oct. 1, 1884. He was placed on the retired list June 1, 1885. He served on the board of inspectors (1877-80); commandant of the Brooklyn navy-yard (1882-84); commander-in-chief of the Pacific station (1884-85); and for a number of years on the examining board.

UPSON, ANSON JUDD, an American educator and theologian; born in Philadelphia, Nov. 7, 1823. He was educated at Hamilton College and studied law at Utica, New York; became tutor in Hamilton College in 1845; adjunct professor of moral philosophy and rhetoric (1849); and professor of logic, elocution and rhetoric (1853-70.) Between 1870 and 1880 he was pastor of the Second Presbyterian Church in Albany; was professor of sacred rhetoric and pastoral theology in Auburn Theological Seminary (1880-87); was elected vice-chancellor of the University of the State of New York (1890), and chancellor (1892). He continued to be a regent of the State University from 1874, and was a member of the Presbyterian General Assembly (1871, 1877 and 1884) and was a delegate to the Evangelical Alliance, Belfast, Ireland (1884).

UPTON, a town of Worcester County, Massachusetts, about 14 miles S.E. of Worcester, 30 miles W.S.W. of Boston, and on the Grafton and Upton railroad. The town comprises the villages of West Upton and Upton Center. The chief industry is the manufacture of straw hats.

It has five churches, seven public schools, a high school and a public library. Population 1900, 1,937.

UPTON, EMORY, an American soldier; born in Batavia, Genesee County, New York, Aug. 27, 1839. He was partially educated at Oberlin, and graduated from the United States Military Academy in 1861. He served in the war, during the first year at Fort Washington, then in the Peninsular campaign, and commanded a battery of artillery in the Maryland campaign; was in the campaign before and took part in the battle of Antietam; was in the subsequent Rapidan campaign; led a brigade during the battle of the Wilderness, and was transferred to the West, in command of a division of cavalry, in the latter part of 1864. After the reconstruction of the army he was made lieutenant-colonel; was commandant of cadets at West Point (1875); on duty in Asia (1875-77); and served on the board to codify army regulations (1877-81). He died in San Francisco, March 15, 1881. He published *A New System of Infantry Tactics* (1874); *The Armies of Asia and Europe* (1878), and left partially finished a work on *The Military Policy of the United States*.

UPTON, GEORGE PUTNAM, an American musical critic and journalist; born in Roxbury, Massachusetts, Oct. 25, 1834. He graduated at Brown University in 1854, and the next year removed to Chicago, where he became connected with the *Native Citizen*; was city editor of the *Evening Journal* (1856-61); war correspondent on the *Tribune* (1862-63); musical critic on the same paper (1862-81); and editorial writer from 1872. He was the first newspaper-man to establish a separate musical department, and was the founder and the first president of the Apollo Musical Club of Chicago, founded in 1872. Aside from contributions to magazines, he published *Letters of Peregrine Pickle* (1869); *The Great Fire* (1872); *Woman in Music* (1886); *Standard Operas* (1885); *Standard Oratorios* (1886); *Standard Symphonies* (1888); *Standard Cantatas* (1887); and a translation of Mohl's *Lives of Eminent Musicians* (1883-84).

UPUPIDÆ, a family. See HOOPOE, Vol. XII, pp. 154, 155.

URÆMIA, a disease. See PATHOLOGY, Vol. XVIII, p. 388.

URAGA, an important town and port of Japan, on the eastern coast, near the entrance to Tokyo Bay, and connected by a railroad with Tokyo City. Important government works, including a naval arsenal and gunnery, are located here. The first American gunboat to land a representative of the United States government dropped anchor in Uraga in 1853, and Commodore Perry, in command of the vessel, landed here. Population 1896, about 13,000.

URAL, a river of Russia, called Rimna by the ancients, later Jaik, and since 1875 by its present name. It rises in the southern section of the Ural Mountains, flows south past the town of Virchni-Uralsk, to its confluence with the Kasil, in which region its current is very rapid, owing to its narrow bed. At the town of Orsk, the river bends westward, and runs to the mouth of

the River Tchagan; thence it flows directly south, and falls into the Caspian Sea. Navigation of the river is impossible. Its fisheries yield to the Cossacks settled along its banks an average annual revenue of 600,000 rubles (\$468,750). It has long served as the frontier separating Russia from the Kirghis steppes, and many forts manned by the Ural Cossacks have been established along the river. The length of the Ural is 1,040 miles. The principal affluents are the Kasil and Sakmara on the right, and the Or and Ilel on the left.

URANIA. See APHRODITE, Vol. II, pp. 171, 172; and MUSES, Vol. XVII, p. 74.

URANINE, a dark red dyestuff, which is chemically the sodium salt of fluorescein, $C^{20}H^{10}Na^2O^5$.

URANITE OR PITCHBLLENDE. See MINERALOGY, Vol. XVI, p. 386.

URANUS, a planet. See ASTRONOMY, Vol. II, pp. 812, 813.

URATES. See URIC ACID, Vol. XXIV, p. 12.

URBANA, a city and the capital of Champaign County, east-central Illinois, on the Illinois Central, the Wabash and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in an agricultural and mineral region. It contains the shops of the last-named railroad; has two banks and two weekly newspapers. It is the seat of the University of Illinois (q. v., ILLINOIS, UNIVERSITY OF, in these Supplements). Population 1890, 3,511; 1900, 5,728.

URBANA, a city and the capital of Champaign County, western central Ohio, on the Cleveland, Cincinnati, Chicago, and St. Louis, the Erie, and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. It is an agricultural region; has agricultural-implement, wagon and carriage works, woolen-mill, glue, strawboard, furniture, broom and shoe factories and water-wheel works. The Fountain Park Magnetic Springs, twelve miles distant, are much resorted to by invalids. Population 1890, 6,510; 1900, 6,808. See also URBANA, Vol. XXIV, p. 9.

URCHIN. See HEDGEHOG, Vol. XI, p. 610.

URE, ANDREW, a Scotch chemist; born in Glasgow in 1778. He was educated at Glasgow University, prosecuted his medical studies at Edinburgh, and received his M.D. at Glasgow (1801); appointed to the chair of chemistry at the Andersonian University, Glasgow (1802); was the first astronomer to the Glasgow Observatory, which his efforts helped to establish (1809). The literary works for which he is chiefly distinguished are his *Dictionary of Chemistry* (1821) and his *Dictionary of Arts, Manufactures and Mines* (1739), many revised editions of which have been published since. He died in London, Jan. 2, 1857.

UREDINEÆ. See FUNGUS, Vol. IX, p. 831.

URETER, the duct which conveys urine from the kidney to the bladder. Each kidney has its own ureter. In man it is a cylindrical tube, about 17 inches long, of the diameter of a goose-quill. It has three coats, an outer or serous, a middle or muscular, and an inner or mucous.

URETHRA, the canal which conveys urine from the bladder. In the female it is short; in

the male, from eight to nine inches in length. It is divided into three parts; the prostatic portion, next the bladder, surrounded by the prostatic gland—into this part the seminal ducts open; the membranous portion, less than an inch in length; and the cavernous portion, surrounded by the vascular tissues of the penis. This canal is lined by a mucous membrane, which is a continuation of the mucous lining of the bladder. See also STRICTURE, in these Supplements.

URFA. See EDESSA, Vol. VII, pp. 652, 653.

URIA, a genus. See GUILLEMOT, Vol. XI, p. 262.

URIM AND THUMMIM, a mysterious contrivance in or on the Jewish high priest's "breastplate of judgment," either consisting of the four rows of precious stones upon which the names of the twelve tribes were engraved, or of two images personifying—most probably—"Truth" and "Revelation." The etymology of the two words, which, derived from Arabic words, would indicate "Brilliant Amulet," "Perfect Light," etc., is, in reality, no more satisfactory than the account of the manner in which the contrivance was used for sacerdotal and oracular purposes, or of the time when, in reality, it ceased to act. Josephus and the rabbins supposed that the stones on the breastplate gave out oracular answers to weighty questions asked of them by the high priests, by preternatural illumination. This interpretation has never been supported by any kind of evidence or Scriptural reading. It is never mentioned after Solomon's time.

URINARY CALCULI AND DEPOSITS. See VESICAL DISEASES, Vol. XXIV, p. 189.

URINARY ORGANS. See MAMMALIA, Vol. XV, p. 366.

UROCHORDA. See VERTEBRATA, Vol. XXIV, pp. 186, 187.

URODELA. See AMPHIBIA, Vol. I, pp. 770, 771; and SALAMANDRA, Vol. XXI, p. 205.

UROPELTIDÆ. See SNAKES, Vol. XXII, p. 192.

URQUIZA, a general. See ARGENTINE REPUBLIC, Vol. II, p. 492.

URSA MAJOR ("The Greater Bear") AND URSA MINOR ("The Lesser Bear") are two constellations in the northern heavens. Fanciful observers thought they could trace the figure of a great bear with an enormous tail in the constellation, hence its name, originally given to it by the Greeks. Homer mentioned it as *Arktos*, and also as *Hamaxa* ("the Wagon"), a rival figure. The Roman name, *Ursa*, is a translation of the Greek name. On account of its seven bright stars the Romans also gave it the name of *Septentriones*, which name came to apply generally to the north. Other common names for these seven stars are "The Plough," "Charles's Wain," "The Wagon," "The Car of David," "The Northern Car," "The Dipper," "The Butcher's Cleaver," and "Odin's Wain." "Charles's Wain" is a modern deviation from the older form of *carles wæn*, the carl's or churl's wain, or farmer's wagon. The word also came to be associated with the

name *Charles*, the group being referred to in middle English as *Charlemaynes Wayne*.—URSA MINOR is nearer the north pole, but is less prominent in the heavens. The figure of this constellation follows that of the former. It had also the distinctive name *Cynosura*, "The Dog's Tail," (the origin of the term "the cynosure of all eyes.") The curvature of the tail is in the opposite direction to that of the Great Bear. The star at the extremity of the tail of the Lesser Bear is the pole-star. It is in a line with two stars of the Greater Bear (constituting the corners of the fore part of the body), which are, on this account, called "the pointers." The pole-star is the brightest in the lesser constellation, though only of the third magnitude. The next brightest stars are seen over the tail of the Greater Bear, and are called "The Guards" of the Pole.

URSIDÆ. See BEAR, Vol. III, pp. 461, 462.

URSON, a name sometimes given to an American porcupine, *Erethizon dorsatus*. See PORCUPINE, Vol. XIX, p. 518.

URTICACEÆ. See NETTLE, Vol. XVII, p. 360.

URTICARIA. See NETTLE-RASH, Vol. XVII, p. 360.

URUGUAY, REPUBLIC OF. (For general article, see Vol. XXIV, pp. 14-16.) The area in 1898 was estimated at 72,110 square miles, and the population at 840,725.

Finances and Commerce. The revenue for 1898-99 was estimated at \$15,973,546, and the expenditure at \$15,799,231.

In Oct., 1898, the public debt was \$128,265,097. In 1896 the total value of the real property of the republic was \$280,945,721; and the numbers of live stock were: cattle, 5,881,402; horses, 392,246; mules, 15,589; and sheep, 16,397,484. In 1897 the wool clip was 33,000 tons.

The imports in 1897 aggregated \$19,512,216; exports, \$29,319,573, showing a steady increase of exports over imports. Until 1890 the reverse had been the rule. The chief exports are animal products, the value of these in 1897 being \$26,884,575.

Education. There were, in 1896, 533 public schools, with 1,041 teachers and 51,312 scholars. The number of private schools was 379, with 949 teachers and 22,689 scholars. In 1896 the cost of primary education defrayed by the state was \$677,000. There are, at Montevideo, a university and other establishments for secondary and higher education. In 1896 the university had 87 professors and 587 students. The Normal School for girls had 25 professors and 107 pupils. There is a school of arts and trades supported by the state, where 198 pupils received gratuitous instruction. At the military college, with 8 professors, there were 41 pupils between the ages of 14 and 18. There are also many well-attended religious seminaries throughout the republic.

The national library contains over 27,000 volumes, and more than 2,500 manuscripts. There is a national museum with 33,490 objects. Of over 126 newspapers and periodicals published, 120 are

in Spanish, 2 in English, 2 in Italian, 2 in Portuguese, and 1 each in German and French.

Army and Navy. The standing army is officially reported to consist of 223 officers and 3,222 men, including 4 battalions of infantry, 4 regiments of cavalry, and 1 of artillery. There is besides an armed police force of 3,200 men. The national guard numbers about 20,000. The soldiers are armed with Remington rifles, and there are 67 pieces of artillery. Uruguay has 3 gunboats and 1 small steamer, with a complement of 184 officers and men.

Shipping and Internal Communication. In 1897 there entered the port of Montevideo from abroad 1,126 sea-going vessels, of 1,904,626 tons, and cleared 1,024 vessels, of 1,796,529 tons. In the river and coasting trade there entered 2,439 vessels, of 621,406 tons, and cleared 2,447 vessels, of 621,244 tons.

There were, in 1896, 1,026 miles of railway open for traffic, and 190 miles under construction. The principal telegraph lines in operation in 1897 were of a total length of 4,380 miles. There were 97 offices, and 342,800 telegrams were conveyed.

The trade of the United States with Uruguay is small in comparison with her trade with other countries. In 1896 Uruguay imported goods worth \$1,776,255 from this country, and exported to it \$1,713,613. In 1897 the imports decreased to \$1,505,156, and the exports increased to \$2,886,792.

URUGUAY RIVER. See PLATE, Vol. XIX, p. 188.

URUMIAH, a lake and town. See URMIA, Vol. XXIV, p. 12.

URUS. See CATTLE, Vol. V, p. 245.

USAGE, a custom which has acquired the form of law, such, for example, as the custom of merchants' allowing days of grace on a bill of exchange or promissory note, which for a long time has been a part of the English common law. A custom need not be proved when once well established; courts and judges will take judicial notice of it, and contracting parties are unable to plead ignorance of the same, for it has in some respects the form of a law. A usage, on the contrary, must be proved by the party seeking to establish the same. The subject more properly falls within the province of a legal text-book, and can be found fully treated of in Clarke's edition of Browne's *Usages and Customs*, and Lawson on *Usage and Custom*.

USAGE OR USE. See GRAMMAR, Vol. XI, pp. 42, 43.

USCUP OR SCOPIA. See USKUP, Vol. XXIV, p. 17.

USE AND OCCUPATION. When one person occupies land or buildings belonging to another, either under express agreement or under circumstances amounting to one, but without any stipulation as to the amount of rent to be paid for the same, the owner may recover such compensation as is reasonable in the nature of rent. The action, under such circumstances, is said to be for the use and occupation. But if, on the contrary, the use of the land was wrongful, no action for use

and occupation can be maintained, because no promise to pay can be inferred. In such a case the remedy of the owner is an action for damages for unlawful trespass.

USEDOM. See ODER, Vol. XVII, p. 724.

USENER, HERMANN, a German educator; born at Weiburg, Germany, Oct. 23, 1834; studied at Bonn, Heidelberg, Göttingen and Munich; after short terms as a gymnasium teacher in Berlin (1858), and professor at Bern (1861) and Griefswald (1863), he was made professor of the Greek language and literature at Bonn (1866). Among his most esteemed works are *Analecta Theophrastea* (1858); *Scholia in Lucanum* (1869); *Ein Beitrag zur Geschichte Roms in Ostgothischer Zeit* (1877); *Zur Geschichte der heiligen Pelagia* (1879); *Epicurca* (1887); *Religionsgeschichtliche Untersuchungen* (1889); *Unser Platotext* (1892). He edited Kayser's *Homerische Abhandlungen* (1881).

USERTESEN OR USURTESEN, three kings of the twelfth Egyptian dynasty. See EGYPT, Vol. VII, p. 734.

USES, LAW OF. See TRUST, Vol. XXIII, pp. 596, 597.

USSHER. See USHER, Vol. XXIV, pp. 16, 17.

USTILAGINEÆ. See FUNGUS, Vol. IX, pp. 831, 832.

USUFRUCT, one of the most important of personal servitudes, consisting of the enjoyment of property either real or personal, without serious or material impairment or lessening of its substance. Thus the use of a library of books, of a collection of jewels or of a service of plate may be termed a usufruct. A usufructuary is a quasi-owner, giving at times security for the restoration of the things received, or if consumable, of their equivalent or value. The entire subject of servitudes and usufructs concerns the lawyer more than the layman, and is capable of delicate refinements which it is the province of a legal text-book to explain.

USUMACINTA, a river. See GUATEMALA, Vol. XI, p. 239.

USURY AND USURY LAWS. See INTEREST, in these Supplements.

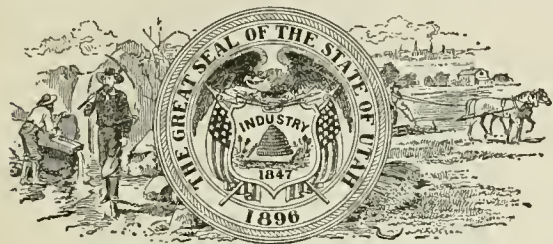
UTAH, the forty-fifth state admitted to the Union, had a population in 1900 of 276,749, that of 1890 was 207,905, the increase making a gain of 68,844. The density of population was 2.53 to the square mile. Two cities of the state had populations exceeding 8,000 each, and in these lived 59,732 of the inhabitants of the state, constituting 28.73 per cent of the whole number; the male citizens numbered 110,463, the females 97,442; 74.48 per cent of the population were native-born; the negroes numbered 588,—a gain of 356 within the ten years preceding; there were 806 Chinese, 4 Japanese and 608 civilized Indians.

The gross area of Utah is 82,190 square miles, of which 2,780 square miles are water surface.

The present state of Utah was included in the cession to the United States by Mexico in February, 1848, and was organized as a territory Sept. 9, 1850. Much of the early history of the terri-

tory will be found under MORMONS, Vol. XVI, pp. 825-828; and UTAH, Vol. XXIV, pp. 19-21.

The first territorial institution of an eleemosynary character to be established in Utah was the Deaf Mute Institute, located at Salt Lake City, which was opened for pupils in 1884. The following year an asylum for the insane was completed, the site being near Provo. In 1886 Congress authorized the erection of an industrial home for women renouncing polygamy, and their children, to be maintained in Salt Lake City. On Oct. 31, 1889, a reform school was opened at Ogden, and Sept. 4, 1890, an agricultural college at Logan. The same year witnessed the passage of a law making the public schools of the territory free, and a Methodist university was founded at Ogden. An act for the admission of Utah as a state became a law July 10, 1894. This en-



STATE SEAL OF UTAH.

abling act provided for the election of delegates to a constitutional convention, who were chosen in November, 1894, and met March 4, 1895, with 102 members. The constitution submitted to the votes of the people of the territory had some special provisions relating to forms of procedure in the courts, and the eligibility of electors and office-holders. Herewith is given a synopsis of the constitution:

The executive department shall consist of a governor, secretary of state, state auditor, state treasurer, attorney-general, and superintendent of public instruction, each of whom shall hold office for four years, beginning on the first Monday in January next after election, except that the terms of office of those first elected shall begin when the state is admitted into the Union, and shall continue until the first Monday in January, 1901. The secretary of state is first eligible for the office of governor, in the event of the governor's disability, the president of the senate being next.

The sessions of the legislature, which at first shall consist of 27 representatives and 12 senators, are to be biennial, beginning, except the first, on the second Monday in January next after the election of members. Members of the house are to be elected for two years, members of the senate for four years, but one half of the senators first elected shall be drawn by lot to serve two years only. No regular session, except the first, shall exceed sixty days in length, except in cases of impeachment, and no special session shall last more than thirty days. There are 13 provisions as to the prohibition of special legislation, not differing materially from like inhibitions in other states.

The supreme court is to consist of three judges, but may be increased to five after 1905. The term of office shall be for six years, after the first. The state is divided into seven judicial districts, and the office of probate judge in counties is abolished.

Among the unusual provisions of the constitution are the following:

Women are to hold equal rights with men as to eligi-

bility to office, and in the exercise of the right of suffrage.

A grand jury shall not be summoned unless, in the opinion of the judge of the district, the public interest demands it. The body, when drawn, shall consist of seven persons, five of whom must concur in the finding and presentment of an indictment.

Offenses not indictable are to be prosecuted by information, after examination and commitment by a magistrate, unless the examination be waived by the accused with the consent of the state.

Eight jurors may sit in judgment, and six may return a verdict.

Officers of counties, cities and townships are prohibited from borrowing money in excess of taxes for the current year, except under the authority of a majority of the citizens therein, who have paid a property tax for at least one year preceding.

A day's work, in public employment, is limited to eight hours.

Polygamy is forever prohibited.

Perfect toleration in religious matters is guaranteed, and the separation of church and state is decreed.

The following were the provisions as to the public school system: It should include kindergarten schools; common schools, consisting of primary and grammar grades; high schools; an agricultural college; a university; and such other schools as the legislature should in future provide, but the text-books to be used should never be prescribed; no religious tests are permitted; no public money shall ever be appropriated toward the maintenance of any institution of learning controlled, in whole or in part, by a religious sect or denomination; the general supervision of the public school system is vested in a state board of education, consisting of the superintendent of public instruction and such other persons as the legislature may provide.

Miscellaneous provisions were as follows: Prohibiting the consolidation of competing railway lines; providing against the employment of private armed bodies of men by corporations or associations for the purpose of suppressing domestic trouble or the preservation of the peace; making stockholders in corporations liable to double the amount of their holdings; prohibiting combinations to control prices, and disfranchising violating corporations; making it a crime for a corporation or a person acting as agent thereof to interfere with the obtaining or retaining of employment of any person; providing a board of labor conciliation and arbitration.

The following matters, relative to labor, are prohibited:

1. The employment of women, or of children under 14 years of age, in underground mines.
2. The contracting of convict labor.
3. The labor of convicts outside prison grounds, except on public works under the direct control of the state.
4. The political and commercial control of employees.
5. The exchange of black-lists by railroad companies or other corporations.
6. The abrogation of the right of action to recover damages for injuries resulting in death, or the limitation, by statutory provision, of the amount recoverable.

Exemptions to heads of families consist of one or more parcels of land, together with the improvements thereon of the value of at least \$1,500.

Women retain their property after marriage, in their own right, and are not to be liable for the debts or obligations of their husbands.

The constitution was adopted in November by a vote of 31,305 to 7,687, and on Jan. 4, 1896, Utah became one of the states of the Union, by proclamation of the President.

Insufficient rainfall is the great impediment to agriculture in Utah. In consequence of the arid conditions, artificial irrigation is resorted to, and there is a widely extended system of reservoirs, canals and ditches. The census reports of 1890 gave the following facts relative to the cultivation of the cereals:

	ACRES.	BUSHEL.
All cereals	122,878	2,395,744
Corn	5,782	84,760
Wheat	84,505	1,515,465
Oats	22,747	597,947
Barley	6,440	163,328
Rye	3,389	33,928
Buckwheat	15	316

The following table of facts are from the same source of information as the above:

	1880	1890
Number of farms	9,452	10,517
Average size of farms, acres	69	126
Total acres in farms	655,524	1,323,705
Percentage of improved lands	64	42
Value of farms, fences, buildings, machinery and live-stock	\$18,268,569	\$36,381,270
Number of horses	38,131	65,057
Mules and asses	2,898	1,554
Total number of cattle	95,416	200,266
Milch cows, included above	32,768	45,982
Number of swine	17,198	27,046
Number of sheep	233,121	1,014,176

In 1890 the farms of the state were divided, as to size, as follows:

Under 10 acres	637
10 and under 20 acres	1,354
20 and under 50 acres	3,555
50 and under 100 acres	2,096
100 and under 500 acres	2,734
500 and under 1,000 acres	101
1,000 acres and over	40

Cultivated by owners, 9,974; rented for a fixed money value, 121; rented for a share of the products, 422.

The Utah Sugar Company produced, in 1894, more than 4,500,000 pounds of beet sugar. In 1898 the number of horses returned for taxation was 71,780, their valuation \$1,207,941; the same annual appraisement also gave the number of mules at 1,648, value \$40,264; the number of oxen and other cattle 358,293, value \$4,933,162; milch cows numbered 56,698, of the value of \$1,017,729; the sheep numbered 1,998,441, and were valued at \$3,036,830; there were 53,790 swine, whose value was \$293,382, making a total of 2,540,048 head, of the aggregate value of \$10,529,044. The principal fruits are apples, peaches, plums, apricots, and grapes. The elevated portions of the state produce excellent grasses, and although not susceptible of cultivation, furnish desirable ranges for stock.

Utah stood tenth among the states in 1890 in the value of mineral products, the total output for 1889 being \$11,681,019, silver yielding \$9,057,014, and gold \$487,666. The copper produced during the year reached 65,467 pounds, and 12,908 tons of lead base bullion were reported. Many kinds of stone were quarried, the total value being given at \$84,574; the kinds, in the order of their value, being sandstone, limestone, gypsum, granite and sulphur. In 1891 natural gas was found at Salt Lake City, 900 feet below the surface, in quantity greater than at any point

west of the Mississippi River up to that time. There were 236,651 tons of coal mined, the value of which was \$377,456. The production of minerals in 1898, was given at \$10,723,067, other articles than those already mentioned being asphaltum, 3,200 tons, and salt, 108,570 barrels. In 1898 the silver produced amounted to 7,544,722 fine ounces, and the gold to 94,900 fine ounces. A copper plant and smelter erected in 1894 cost \$2,750,000, and from that date the output of that metal was much increased. In 1895 the value of the minerals produced aggregated \$14,195,000.

Utah had 531 specified manufacturing industries, as reported in the returns of the eleventh census, in which \$6,583,022 was employed as capital, 4,980 persons were engaged, whose annual wages amounted to \$2,715,805. The cost of the materials used was estimated at \$4,252,030, and the value of the finished products \$8,911,047. The only article exceeding one million dollars in value was flouring and grist mill products, which amounted to \$1,468,681. Next in importance came lumber, slaughtering at wholesale, and woolen goods.

The fisheries of the state showed the value of \$5,167 in the census reports of 1890. Carp-culture was then considerable, the number of pounds reported being 705.

The capital invested in commercial interests in 1895 was estimated at \$14,551,345, the sales at \$32,865,600, number of concerns at 1,964, number of employees 5,023, to whom \$2,785,790 was paid. The aggregate capital of the banks was reported at the same time at \$5,100,000, and the deposits at near \$10,000,000. There were also six building and loan associations, with 3,670 shareholders and 43,054 shares held.

In 1895 there were 1,347 miles of railroad in Utah. The state is crossed from east to west by the Union Pacific and the Central Pacific railroads; the Union Pacific operates a north and south line from Frisco, 236 miles south of Salt Lake City, into Idaho, Montana and Oregon, and many smaller systems afford excellent transportation facilities, especially in the northern and middle sections of the state.

The National Guard of Utah was made up, in 1895, of a brigade, consisting of two regiments of infantry, three troops of cavalry and two batteries of light artillery. There are 28 general and staff officers, 726 infantry, 140 cavalry, 105 artillery and 23 members of a mounted signal corps. The full authorized strength is 4,691. The annual state appropriation is \$15,000, the Federal appropriation \$3,000.

On Jan. 1, 1899, there were published in Utah 94 newspapers, of which 7 were daily, 1 triweekly, 6 semiweekly, 70 weekly, 3 semimonthly, and 7 monthly. Papers were published in 17 of the 27 counties of the state, and in 39 of the cities, towns, and villages, of which 22 are county seats.

In 1890 there were 427 church organizations in Utah, the number of edifices 280, and the number of members 128,115, constituting 61.62 per cent of the population. The value of all church

property was estimated at \$1,493,791. The Roman Catholics had 28 organizations; Congregationalists, 14; Latter-Day Saints, 307; all Methodists, 32; Presbyterians, 20; and Protestant Episcopal, 10.

The territorial auditor reported the assessed valuation of all property on Jan. 1, 1899, at \$100,241,331, and the amount of tax received \$489,917. The assessed valuation of 1897 had been \$102,435,714, and that of 1894, \$99,503,243, the depreciation being due to the failure to secure proper assessments. At the time of assuming statehood, Utah had a bonded indebtedness of \$700,000, and the total excess of liabilities over resources amounted to \$836,713. On Jan. 1, 1898, the net debt was \$703,508.

The Penitentiary is located on a farm of 200 acres, with a capacity for 500 prisoners. In 1896 it had 189 inmates. For the five years ending with 1895 the annual cost had been about \$40,000.

The Reform School is at Ogden, has a farm of 57 acres and two buildings that cost over \$100,000. The cost of maintenance for 1894 was \$15,000.

The Insane Asylum at Provo had connected with it 200 acres of land. The plant cost \$403,000, and had a capacity of 250 patients, the number in 1896 being 217, of whom 107 were women. The report for 1895 showed that the patients had been maintained for the year at a per capita cost of 38½ cents daily.

The School for the Deaf had been conducted as a department of the University until 1896, but the new constitution provided for its removal, together with the School for the Blind, to Weber County.

The school population of Utah in 1896 was 74,551. The apportionment in January, 1895, was \$152,829; that of the March following, \$126,695; and for December of the same year, \$225,240. Advanced education is freely supplied to residents of the new state. Logan College had an enrollment, at the beginning of 1895, of 400 students. The buildings and grounds cost more than \$210,000, and the appropriation from the territorial treasury for 1894 and 1895 was \$21,861. For special purposes the general government gives the college the sum of \$26,000 annually. The University of Utah, located at Salt Lake City, is co-educational and non-sectarian. It reported an enrollment for 1895-96 of 503 and a library of 15,000 volumes. The value of the grounds and buildings was estimated at \$250,000, and the annual expenditures from 1890 to 1896 were about \$35,000.

The following is a list of the principal cities and towns of Utah, with the populations of 1900: Salt Lake City, 53,531; Ogden, 16,313; Provo City, 6,185; Logan, 5,451; Park City, 3,759; Springville, 3,422; Mount Pleasant, 2,372; Spanish Fork, 2,735; Brigham City, 2,859; Payson, 2,636; Nephi, 2,208; and Eureka, 3,085.

The following is a list of the governors of Utah, with their respective terms of office: *Territorial*: Brigham Young, 1850-54; Edwin J. Step-

toe, 1854-57; Alfred Cumming, 1857-61; Stephen S. Harding, 1861-64; James D. Doty, 1864-65; Charles Durkee, 1865-69; J. Wilson Shaffer, 1870-71; George L. Woods, 1871-73; Samuel B. Axtel, 1873-75; George W. Emery, 1875-80; Eli H. Murray, 1880-86; Caleb W. West, 1886-89; Arthur L. Thomas, 1889-93; Caleb W. West, 1893-96. *State*: Heber M. Wells, 1896.

UTAH LAKE, in Utah County, central Utah, about ten miles east of the Oquirrh Mountains. Its length from north to south is 25 miles, and its extreme width 13 miles, its area being 150 square miles. Its altitude above sea-level is four thousand five hundred feet. It lies in the trough formed by the Wasatch mountains on the east and the Oquirrh Lake and Tintic ranges in the west. Its tributaries come from the eastern range. It is the largest sheet of fresh water in the state, and is well stocked with fish. Its outlet is the river Jordan, which issues from its north extremity.

UTES, a chief division of the linguistic stock of Shoshonean North American Indians. They comprehended about 15 tribes, and formerly occupied the entire central and western portions of Colorado and the northeastern portion of Utah (which name is derived from them), including the eastern part of the Salt Lake valley and the Utah valley. They extended into New Mexico, inhabiting much of the country tributary to the Rio San Juan, and intermarried with other tribes in the northeast and in the south. They were always warlike, and are still restless. They were not agriculturists, but now the Moache and Capote Utes in the south have developed a desire to till the soil on their own account. In the south, however, they are largely blanket Indians, the western Utes being also opposed to farming and education. The Utes of the Utah reservations are more peaceable, and are in an improving condition, industrially and educationally. The Utes have been confined to their present reservations since 1873, and are composed as follows: Southern Ute agency, Colorado, 998; Ouray reserve, Utah, 1,028; Uintah reserve, Utah, 840. Those not confined to reservations probably number about five thousand. See also INDIANS, Vol. XII, p. 827.

UTICA, a city of New York. The city's water-works have a daily capacity of 4,000,000 gallons. It has gas and electric light, electric street-railways, 47 churches; has 473 manufacturing establishments, representing 72 industries; the manufacturing output of 1895, representing a value of \$17,000,000. The mills in the city and vicinity use 38,500 bales of cotton annually; 94,000 barrels of beer are turned out annually; there are 7 banks, 3 daily, 1 tri-weekly, 8 weekly and other serial publications. Population 1890, 44,007; 1900, 56,383. See Vol. XXIV, p. 21.

UTILITARIANISM, the doctrine or theory which holds that the sole criterion of right is the promotion of the happiness of mankind. Jeremy Bentham first used the word *utility* in this sense, and John Stuart Mill adopted the form *utilitarianism* in his elaboration of the theory. In a cer-

tain form the doctrine is as old as or older than Christianity. With the earliest of the Greek Stoics, the school as founded by Zeno, it was maintained that practical knowledge or wisdom, and the virtue of soul, which is inseparable from it, is alone sufficient for complete human well-being; that the sole good of mankind lay within this knowledge or wisdom itself. This early school of Stoicism held that men might and did attain to wisdom, and thus realize the complete well-being. The Stoical interpretation of three hundred years later, as shown by the teachings of Seneca and Epictetus, marks an ethical advance, and a preponderance of moral over scientific reasoning—which was characteristic of the Roman mind. After the Greek had answered the question, "What is man's good?" by an elaborate exposition of perfect wisdom, the Roman would ask the other question; "How may men escape from the unhappiness of the world and attain unto wisdom?" Seneca did not claim to be a *Sage*, i. e., to have arrived at perfect wisdom, but was merely progressing toward wisdom. "The way toward it," he said, "is easy to find, but the life of him who treads it is a continual struggle with lusts and faults, wherein he finds no repose." Epictetus, whose motto was, "Endure and refrain," laid stress on the impossibility of finding the Stoic sage in actual experience. The well-being (happiness) which men were to find was in the *seeking* of the perfect wisdom; in continual practice, self-discipline, self-examination.

Less ascetic, and, therefore, somewhat more rational, was the doctrine of Pleasure as taught by Epicurus.

Unlike his forerunner, Aristippus, the founder of the Cyrenaic school, he did not hold that every act was, in itself, morally indifferent, and that man ought to devote himself entirely to the enjoyment of the present moment; neither regretting the past nor caring for the future. He taught that pleasure must be sought by the aid of reason, and that the highest point of pleasure, whether of mind or body, is to be attained by the removal of pain or want. He maintained that the satisfaction of want restores that tranquil, agreeable feeling which has, in the highest degree, the quality of positive pleasure.

Further, that the pleasures and pains of the mind are actually more important than those of the body, and that it would always be possible for one to redress any balance of bodily pain by mental pleasures, and thus bring about a net result of present good. Both systems, however, while not utterly lacking in altruistic principles, are notably egoistic in bearing. They enjoin the individual to look to his own happiness, rather than regard the well-being of others. This is especially true of the stoic, whose philosophy renders him apathetic, and causes him to condemn and despise pain. He holds in contempt all men who manifest suffering and sorrow, because in so doing they indicate that they have failed to lift themselves above pain and live conformably to reason.

Passing from ancient to modern times, the "greatest happiness" principle finds a definite expression in the doctrine of utility as set forth in Paley's *Principles of Moral and Political Philosophy* (1785). Paley holds that there is an *obligation* which directs the actions of all rational creatures with respect to each other's happiness. We are obliged to conform to the idea of virtue as a rule of life. Obligation can only arise from the authority of God. The authority or will of God is the criterion of virtue. God could have no other design in creating mankind than their happiness; therefore it is clear, as it also is attested by Scripture and by nature, that God wills the happiness of his creatures. We are obliged to render others happy, and to do so conformably to the idea of virtue. The command proceeds from God, and the motive lies in the expectation of reward or fear of punishment after this life. We therein find our own, and the happiness of others; which defines Paley's chief basis of utility or expediency.

Jeremy Bentham, in his *Principles of Morals*, does not take serious account of religious hopes and fears, except as motives which are in active operation on human minds, and must therefore be observed and measured as well as other motives. He does not try to connect logically individual and general happiness by means of the will of an omnipotent and benevolent being. He considers actions solely in respect of their pleasurable and painful consequences, expected or actual, and these consequences are all of a definite and ascertainable quality; such pleasures and pains as men feel and observe in others. The good or bad tendency of an action may be investigated, he thinks, by taking account of the value of each observable pleasure or pain which it produces upon all individuals who are concerned in it, and, in the summing up of these values, we may arrive at the good or bad tendency. But to the question of how a man is to be made to perform an action which would be the best in its consequences, Bentham has no adequate reply. In trying to simplify his system by avoiding Paley's scriptural and divine inferences, he impaired the logical strength of his standard of right and wrong, which asserts that the proper end of man's action is not only his own individual happiness, but the greatest happiness of the greatest number. His statement seems incomplete, unless we are to draw the inference that he regarded the world as still in a very imperfect state, and that therefore such conflicts as occur between private and general happiness need not have a place of undue prominence. It is, perhaps, reasonable to suppose that his chief desire was to impress upon men how greatly their happiness is promoted by what conduces to the general happiness; how honesty is the best policy, how a kindness done is a profitable investment; and that any casual estimate of the pleasures and pains arising from the acts of selfish and vicious men is very erroneous.

John Stuart Mill, in his *Utilitarianism* subor-

minated private happiness to the general good. He held that questions of ultimate ends do not admit of proof (in the ordinary sense), but that considerations may be presented which lead us to assent to the doctrine: e.g., 1. Each man desires pleasure (or absence of pain) to himself. 2. The only *proof* that anything is desirable is that men do actually desire it. 3. Each person's happiness is, therefore desirable or a good to himself. 4. The general happiness is therefore a good to the aggregate of persons. If the aggregate could perform a really collective act of volition, these considerations might perhaps induce it to aim in this volition at general happiness; but they seem hardly adapted to convince an individual that he ought to take his stand for the "greatest amount of happiness altogether," instead of the greatest amount of his own happiness, as the standard and supreme "directive rule" of his private conduct. It would seem, however, that Mill did not intend to rely wholly upon these arguments for a statement of his doctrine. When he raises the question, "What is the source of the obligation of the utilitarian morality?" his reply is a statement of sanctions; i.e., of private pleasures to be gained and pains to be avoided by the person who aims at happiness. But there is one sanction on which he lays special stress: "the feeling of unity with his fellow-creatures" which makes it a natural want of an individual of "properly cultivated moral nature" that his aims should be in harmony with theirs. This feeling, in most individuals, is generally inferior in strength to their selfish feelings, and is sometimes lacking entirely. But to the minds of those who have it, it presents itself as "an attribute which it would not be well for them to be without"; and "this conviction is the ultimate sanction of the greatest happiness—morality." Mill does not exactly mean that men always find their own happiness by promoting the general happiness; but rather that sometimes the complete sacrifice of his own, best conduces to the happiness of others. He combines elements derived from both Stoic and Epicurean sources, in thinking that the "conscious ability to do without happiness gives the best prospect of realizing such happiness as is attainable"; as it raises a person above the chances of life, and frees him from excess of anxiety concerning its evils.

Since the date of Mill's work, a new factor (a biological one) in the history of the sentiments has come into existence. The Darwinian theory of biological evolution has had an almost revolutionary effect upon ethical thought. It has tended to set aside the Bentham and Mill criterion and method for determining the good and bad tendencies of actions; first, by substituting for "balance of pleasure over pain" some more definite conception, such as the "preservation of human society" or of the human race; or, still more generally, "quantity of life," as the end by which actions and characters are to be estimated; and secondly, by substituting for empirical utilitarian reasoning an attempt to deduce moral

rules from biological or sociological laws. This has been characterized as "establishing morality on a scientific basis." Some evolutionist writers assume that happiness or pleasure is not scientifically important as an ultimate end. Mr. Herbert Spencer holds, on the contrary, that a survey of the actions of animate beings of all kinds shows us "quantity of life, measured in breadth as well as in length," as the end to which such actions tend to be more and more adjusted as development proceeds; but he considers that conduct tending to the preservation of life is only good on the assumption that life is attended with a "surplus of agreeable feelings." He contends that there is a preponderance of pleasure over pain.

In a letter to Mill repudiating the title of anti-utilitarian, which had been applied to him, Spencer says (*Data of Ethics*, pp. 57, 58): "Morality—the science of right conduct—has for its object to determine *how and why* certain modes of conduct are detrimental and certain others beneficial. These good and bad results cannot be accidental, and I conceive it to be the business of moral science to deduce from the laws of life what kinds of action necessarily tend to produce happiness and what kinds to produce unhappiness. Having done this, its deductions are to be recognized as laws of conduct, and are to be conformed to, irrespective of a direct estimation of happiness or misery." He then offers the following analogy: "During its early stages," he says, "planetary astronomy consisted of nothing more than accumulated observations respecting the position and motions of the sun and planets, from which it came, by and by, to be empirically predicted, with an approach to truth, that certain of the heavenly bodies would have certain positions at certain times. But the modern science of planetary astronomy consists of deductions from the law of gravitation—deductions showing why the celestial bodies *necessarily* occupy certain places at certain times. Now this relation," he says, "is analogous to the kind of relation which, I conceive, exists between the expediency—morality and moral science, properly so called. And the objection which I have to the current utilitarianism is, that it recognizes no more developed form of morality; does not see that it has reached but the initial stage of moral science." In the same work (p. 268) he says: "In conduct at large, including men's dealings with themselves, with their families, with their friends, with their debtors and creditors, and with the public, it usually happens that whatever course is taken entails some pain somewhere, forming a deduction from the pleasure achieved and making the course in so far not absolutely right. Further, they will show that, throughout a considerable part of conduct, no guiding principle, no method of estimation enables us to say whether a proposed course is even relatively right, as causing proximately and remotely, specially and generally, the greatest surplus of good over evil." Again (p. 284), he says: "As now car-

ried on, life hourly sets the claims of present self against the claims of future self, brings individual interests face to face with the interests of other individuals, taken singly or as associated. In many such cases the decisions can be nothing more than compromises, and ethical science, here necessarily empirical, can do no more than aid in making compromises that are the least objectionable."

As an illustration of the soundness of Spencer's process of reasoning, we need select only one of the many familiar economic changes which are taking place. In large cities everywhere there are coming into existence, from year to year, an increasing number of huge mercantile institutions known as department stores. These concerns undoubtedly owe their inception and establishment to the egoistic instincts of men, the determination to conduct a successful business irrespective of the effect upon the trade of smaller competitors. The large institutions, having immense capital, are able to buy at low rates direct from manufacturers, and can therefore sell at lower figures than the less favored small dealers, who in many instances are forced to close their stores through lack of trade. Viewed in this aspect, it would seem that such centralization entails unwarrantable pain, and that it should be the study of the public to frown upon it as a principle of ethics. But the other aspect is, that whole communities of wage-earners and people of moderate means are enabled to obtain with their daily earnings a larger portion of the necessities of life than before, and the result being the greatest good to the greatest number the process can only be regarded as having an ethical tendency, and therefore to be encouraged.

J. F. CARGILL.

UTOPIA, MORE'S. See COMMUNISM, Vol. VI, p. 212.

UTRAQUISTS. See HUSSITES, Vol. XII, p. 407.

UTRICULARIA. See INSECTIVOROUS PLANTS, Vol. XIII, p. 138.

UTUADO, an inland town in Porto Rico, 20 miles N. of Ponce. Pop. 1887, 31,209.

UVALDE, a town and the capital of Uvalde County, southwestern Texas, on the Southern

Pacific railroad, 93 miles W. by S. of San Antonio. It is in a farming, stock-raising and asphalt-mining region; wool, live-stock and pecans are shipped; it has two banks and three weekly newspapers. Population 1890, 1,265; 1900, 1,889.

UVIC ACID, a furfuran derivative known also as pyrotritaric acid. It is formed by boiling peruvic acid with baryta water, and has the composition, $C^7H^8O^3$.

UVULA OR PALATE. See ANATOMY, Vol. I, p. 837.

UXBRIDGE, a town of Worcester County, central Massachusetts, on Blackstone River, and the New York, New Haven and Hartford railroads, 19 miles S. SE. of Worcester. There are several cotton and woolen mills, two banks and one weekly newspaper. Population 1880, 3,111; 1890, 3,408; 1900, 3,599.

UXBRIDGE, a village of Ontario County, central Ontario, on Black River and the Grand Trunk railroad. It is in a farming region, and has woolen, flour, oatmeal and saw mills, foundries and machine-shops, furniture, piano and organ factory, a tannery, etc., and two weekly newspapers. Population 1891, 2,023.

UXMAL. See YUCATAN, Vol. XXIV, pp. 758, 759.

UZBEGS. See TURKS, Vol. XXIII, p. 661.

UZZIAH OR AZARIAH, a king of Judah (B. C. 810-758). He was chosen to succeed his father upon the murder of the latter by conspirators at Lackish. The son was in his sixteenth year when he came to occupy the throne, and proved a wise, active and pious ruler, and generally followed the advice of Zechariah, a prophet who receives mention in connection with this king only. During Uzziah's reign the kingdom was raised to a degree of prosperity not seen since the days of Solomon. The king was elevated by his success; and announced his intention of burning incense on the high altar, against much opposition from the high priest. The king, furious at the interference, pressed forward in his attempt and was smitten with leprosy. He was "buried with his fathers," but not apparently in the royal place of sepulture. A great earthquake occurred during his reign.

V

VACA—VALENTINE'S DAY

VACA, CABEZA DE. See ARGENTINE REPUBLIC, Vol. II, p. 489.

VACA DE CASTRO. See PERU, Vol. XVIII, p. 677.

VACCINIUM. See WHORTLEBERRY, Vol. XXIV, p. 556.

VACUUM. See PNEUMATICS, Vol. XIX, pp. 246, 247..

VÆRØ OR AASVÆR ISLANDS, a group of small islands near the southern end of the Lofoden Islands, within the Arctic Circle, on the west of the Vest Fjord, about sixty miles from the mainland of Norway and in lat. 67° 40' N. In the herring-fishing season, commencing in December, the islands are resorted to by thousands of fishermen, but at other seasons they are comparatively abandoned.

VAGANTES, same as GOLIARDS. See *Goliardi*, under RENAISSANCE, Vol. XX, p. 383.

VAGRANCY AND VAGRANTS. See AGRICULTURE, Vol. I, p. 298; GAMING, Vol. X, p. 67; LABOR, Vol. XIV, p. 168; POOR—LAWS, Vol. XIX, pp. 467-481; and WITCHCRAFT, Vol. XXIV, p. 662.

VAGUS OR PNEUMOGASTRIC NERVE. See PHYSIOLOGY, Vol. XIX, p. 43.

VAICESHIKA OR VAISESHIKA PHILOSOPHY. See SANSKRIT, Vol. XXI, p. 291.

VAIL, THOMAS HUBBARD, an American clergyman, born in Richmond, Virginia, Oct. 21, 1812; graduated from Trinity College, Hartford (1831); and the General Theological Seminary (1835); ordained priest in the Protestant Episcopal Church (1837); rector of Christ Church, Cambridge, Massachusetts (1837); of St. John's, Essex, New York (1839); of Christ's Church, Westerly, Rhode Island (1844); of St. Thomas Church, Taunton, Massachusetts (1858); of Trinity Church, Muscatelle, Iowa (1863). He was consecrated first bishop of Kansas in 1864. Founder of Bethany College, Topeka, Kansas. He was a forcible preacher, and the author of meritorious literary productions. He died at Bryn Mawr, Pennsylvania, Oct. 6, 1889.

VAILLANT, LE, FRANÇOIS (1753-1824), a French traveler in South Africa; born in Guiana. See ORNITHOLOGY, Vol. XVIII, pp. 8-11.

VAISHNAVISM. See HINDUSTANI LITERATURE, Vol. XI, pp. 843-845.

VAISYAS. See CASTE, Vol. V, pp. 188, et seq.

VALATIE, a village, part of Kinderhook town, Columbia County, N. Y., on the Kinderhook and Hudson railroad, 20 miles S. by E. of Albany. It has cotton, woolen, paper and tin-goods factories, and a weekly newspaper. Population 1880, 1,775; 1890, 1,437; 1900, 1,300.

VALCKENAER, LODEWIJCK KASPAR (1715-1785), a Dutch classicist. See WYTTEBACH, Vol. XXIV, pp. 714, 715.

VALDEZ, PIERRE, same as PETER WALDO. See WALDENSES, Vol. XXIV, p. 323.

VALDIVIA, a province in southern Chile, extending from the Pacific Ocean to the Andes; area, 8,315 square miles; population 1892, about 65,000, mostly Araucanian Indians. The grazing portion of the province is being utilized more and more for stock-raising. The natives are held in check by Chilean garrisons in the various forts, and are being gradually driven into Araucania proper, south of the province.—**VALDIVIA,** the capital city, was named in honor of its founder, Pedro di Valdivia (1551); it has 9,000 inhabitants, an excellent harbor, and an active trade in cattle, hides, lumber, etc. This was the last post occupied by the Spaniards during the war of independence. It was finally captured by Cochrane, Feb. 4, 1820.

VALDIVIA, PEDRO DE (died, 1554), lieutenant of Pizarro. See CHILE, Vol. V, p. 618.

VALDOSTA, a town and the capital of Lowndes County, southern Georgia, on the Savannah, Florida and Western and the Georgia Southern and Florida railroads, 18 miles E. by N. of Quitman. It is in a farming region, cotton, grain, sugar-cane, rice, corn and sweet-potatoes being cultivated. It has six churches, a collegiate institute, three banks and two weekly newspapers. Population 1880, 1,515; 1890, 2,854; 1900, 5,613.

VALENCIA, a small island on the southwest coast of Ireland, 38 miles S.W. from Killarney, forming part of the County Kerry, and separated from the mainland by a narrow arm of Valencia Bay. It is five and a half miles long and two miles broad. On the west side are valuable slate and flag quarries. On the north side is Valencia Bay, an inlet of Dingle Bay. Valencia harbor, the most western in Ireland, is a part of Valencia Bay. The first Atlantic cable (the project of Cyrus W. Field of New York) was landed there in 1858. It broke in midocean. There are now four cables landing there, and another one starts from Ballinskelligs Bay, a little to the south of Valencia. Population of the island, 2,050.

VALENCIENNES, ACHILLE. See ICHTHYOLOGY, Vol. XII, p. 633.

VALENTINE, a village and the capital of Cherry County, northwestern Nebraska, on the Fremont, Elkhorn and Missouri Valley railroad, about 5 miles from Niobrara, which is in the center of a military reservation. The village is in a farming region, has two weekly newspapers and a population in 1900 of 811.

VALENTINE'S DAY, SAINT, February 14th. The feast-day of St. Valentinus, a Christian martyr decapitated in Rome (270 A.D.), and famous for his acts of charity. The custom of sending on that day sentimental or comic love-messages has a much older origin, since the old Romans themselves observed the 15th of February in a peculiar fashion,

during the feast called Lupercalia (q.v., Vol. XV, p. 66). Even the pagans of northern Europe appear to have followed a similar custom.

VALENTINIANS. See **VALENTINUS**, Vol. XXIV, pp. 37-40.

VALERA, JUAN Y ALGALA GALIANO, a Spanish author and diplomat; born at Cabra, Spain, Oct. 18, 1824; graduated from a Malaga college and entered the diplomatic service; was successively attached at Naples and Lisbon; secretary at Rio de Janeiro, Dresden and St. Petersburg. Elected a deputy to the Cortes (1859), he was appointed Minister of Commerce and Husbandry in the Narvaez Cabinet; later, he was sent as minister plenipotentiary to the Frankfort Diet. He took part in the revolution of 1868, that overthrew Isabella II; was called to the chair of foreign literature at the Madrid University; was made a councilor of state, a minister to the court of Lisbon and one of the committee that offered the crown of Spain to Prince Amadeo of Italy (1871). His poems, novels and works of criticism are quite remarkable, and include *Poesias* (1858); *Estudios Críticos sobre Literatura, Política, y Costumbres de nuestros Dias* (2d ed. 1884); *Cuentos y Diálogos* (1882); *Pepita Jimenez* (8th ed. 1884); *Las Ilusiones del Doctor Faustino* (3d ed. 1883); *El Comendador Mendoza* (1877); and *Doña Luz* (2d ed., 1882). He was elected a member of the Spanish Academy.

VALERIC OR VALERIANIC ACID. See **VALERIAN**, Vol. XXIV, p. 40.

VALERIUS, ANTIAS. See **LIVY**, Vol. XIV, pp. 729, 730.

VALERIUS, FLACCUS. See **FLACCUS**, Vol. IX, pp. 274, 275.

VALERIUS, PROBUS. See **PERSIUS**, Vol. XVIII, p. 662.

VALETTE OR LA VALETTE, JEAN. See **ST. JOHN OF JERUSALEM**, Vol. XXI, p. 174.

VALHALLA, in Norse mythology, consisted of many magnificent halls in the palace of Odin at Asgard, and was the paradise of the brave who fell in battle. Odin entertained one half of the heroes; and Freija, his wife, received the other half. The roof of Valhalla was resplendent with gold. Spears, shields and armor adorned its walls. It had near 650 doors, each wide enough for 960 braves to enter side by side. Near the doors was the grove, Glaser, the leaves of whose trees shone like ruddy gold. High over rose the tree, Lerad, upon whose leaves the she-goat, Heidrum, fed. From the dugs of Heidrum flowed the mead handed round by the valkyrs to the warriors. The food of the braves (*einherjes*) was provided from the boar, Sæhrimner, which, cooked every morning, became whole each night. The valkyrs, or choosers of the slain, rode forth to the battles of men on invisible horses, and with their spears pointed out the heroes who should fall, whom they caught as they fell and bore to Valhalla in their arms. Out of Valhalla issued daily troops of *einherjes* to engage in combat and return at night to be entertained with the never-ending hospitality of Odin.

VALKYRIURS. See **ÆSIR**, Vol. I, p. 211.

VALLANDIGHAM, CLEMENT LAIRD, an Ameri-

can politician; born at New Lisbon, Ohio, July 29, 1820; after teaching school he became a lawyer at Columbus, Ohio (1842), and a member of the Ohio legislature (1845-46) and in 1857 he was elected to Congress, as a Democrat; became a persistent opponent of war measures in the North. After his three terms in Congress, he made numerous speeches, in which he attacked the government with great violence and bitterness and giving his full support to the "copperheads." General Burnside arrested him as a traitor, and a court-martial sentenced him to close confinement during the war; but President Lincoln changed the sentence to banishment across the lines. Vallandigham made his way to Canada. He returned home in June, 1864, and was the unsuccessful Democratic candidate for governor of Ohio. While arguing a murder case in court at Lebanon, and trying to illustrate the tragedy, he accidentally discharged a pistol, which he held in his hand, inflicting on himself a wound from which he died at Lebanon, Ohio, June 17, 1871.

VALLEJO, a town of Solano County, northwest central California, on the Bay of San Francisco, the bay terminus of the Napa Valley and the Pacific railroads, 27 miles N.N.E. of San Francisco. Near the city, on Mare Island, is a United States navy-yard, the only one on the Pacific Coast. It has a harbor suitable for the largest-sized vessels; it does an extensive shipping trade in grain; it has shipyards, iron foundries, terra-cotta works, etc., and has two daily and three weekly newspapers. Population 1880, 5,987; 1890, 6,343; 1900, 7,965.

VALLENTINE, BENJAMIN BENNATON, an English journalist; born in London, England, Sept. 7, 1843; studied for the bar, traveled extensively, settled in New York in 1876; founded (with Keppeler) *Puck*, and edited it (1877-84). Was dramatic critic of the New York *Herald*. Wrote the *Fitznoodle Papers* (1882); *Fitznoodle in America* (1888); *The Lost Train* (1894); also plays, in which his favorite caricature of the English snob was put on the stage with success.

VALLEY CITY, a village and the capital of Barnes County, southeastern North Dakota, on the Cheyenne River and the Minnesota, St. Paul, Sault Sainte Marie and the Northern Pacific railroads, 60 miles W. of Moorhead, Minnesota. It is in a farming region, has a state normal school, a bank and three weekly newspapers. Population, 1890, 1,089; 1900, 2,446.

VALLEY FALLS, a city of Jefferson County, northeastern Kansas, on the Atchison, Topeka and Santa Fé, the Union Pacific, and the Kansas City, Wyandotte and North-Western railroads, 24 miles N.N.E. of Topeka. It is in a farming region, has good water-power, some manufactures, three banks and two weekly newspapers. Population 1880, 1,016; 1890, 1,180; 1900, 1,078.

VALLEYFIELD, a town in Beauharnois County, southwestern Quebec, at the foot of Lake St. Francis, and at the commencement of the Beauharnois canal, and on the Grand Trunk, the St. Lawrence and Adirondack and the Canada Atlantic railroads. It has extensive water-power, cotton, paper, saw and grist mills. It has a Roman Catholic cathedral

and one French weekly newspaper. Population, 1891, 5,616.

VALLEY FORGE, a village 24 miles W. of Philadelphia, in Schuylkill County, Pennsylvania. See UNITED STATES, Vol. XXIII, p. 742.

VALLEYS. See GEOLOGY, Vol. X, pp. 373-375.

VALLISNERIA, a genus of aquatic monocotyledons, which grow entirely submerged, the fertile flowers only rising to the surface, the staminate ones breaking off and floating to the surface around the fertile ones. The plants have bright-green and grass-like leaves, sometimes a foot or two long, and often become excessively abundant in ponds and slow streams. *V. spiralis* is the name of the species, which is popularly known as tape-grass or eel-grass.

VALLOMBROSA, a Benedictine monastery in Tuscany, 15 miles E. of Florence, of which the monks were famed for their skill in forestry. See MONACHISM, Vol. XVI, p. 708.

VALMY, DUKE OF, AND BATTLE. See KELLERMANN, FRANÇOIS CHRISTOPHE, Vol. XIV, p. 29.

VALOIS, HOUSE OF. See FRANCE, Vol. IX, p. 545.

VALPARAISO, a city of Chile, with an estimated pop. of 139,038 in 1897. A statue to Admiral Cochrane is erected in one of the squares. In 1891 Viña del Mar, 3 miles N.E. of Valparaiso, was the seat of a desperate battle between President Balmaceda, who was besieged there with nine thousand men, and the congressional forces, twelve thousand strong, who stormed and captured the city, their victory concluding the war. In the early part of 1892 Valparaiso was the scene of a cowardly attack upon the crew of the American man-of-war *Baltimore*. After hostile demonstrations on the part of the United States, an apology was tendered by the Chilian government and an indemnity paid to the sufferers from the outrage. See Vol. XXIV, p. 44.

VALPARAISO, a city and the capital of Porter County, northwestern Indiana, on the Chicago and Grand Trunk, the New York, Chicago and St. Louis and the Pittsburg, Fort Wayne and Chicago railroads, 44 miles S.E. of Chicago. It is the trade-center of a rich agricultural district, contains many important manufactories, having flour and lumber mills, foundry and machine-shops and self-winding clock factories. It has the Northern Indiana Normal School, 6 churches, 3 banks and 3 daily and 3 weekly newspapers. Population 1880, 4,461; 1890, 5,090; 1900, 6,280.

VALPY, ABRAHAM JOHN, an English publisher; born at Reading, in 1787. Graduated from Pembroke College, Oxford; entered business in London as a bookseller and publisher (1808); founded *The Classical Journal* (1810); and *The Museum* (1822-25); published *The Family Classical Library*, a series of translations comprising 52 volumes; and a *Shakespeare* in 15 volumes, superbly illustrated. His *magnum opus*, however, was his edition of the Latin classics, 141 volumes (1819-30). He also published the books of his uncle, Edward, and his brother, Frederick, both classical scholars of reputation. He died in London, Nov. 19, 1854.

VALUATION or VALUED POLICIES, fire.

See INSURANCE, Vol. XIII, p. 164; life, Vol. XIII, pp. 175-178; and marine, Vol. XIII, p. 184.

VALUE OF INDUCED CURRENT. See ELECTRICITY, § 73, in these Supplements.

VALVES. Among improved forms of valves introduced within a few years are an Ashton water-relief valve for fire-engines, pumps, stand-pipes, hose, etc., which admits of shutting off steam without increasing the pressure, thus avoiding the danger of bursting hose. The Ashton Company also manufacture a marine pop-valve that is noiseless. It is not a muffled valve in the ordinary sense, the result being obtained by piping the outlet of the valve down the inside of the hull, and out into the water below the surface water-line, where the steam from the valve blows off not only noiselessly, but unseen and without back pressure. Locke makes a steam valve in which the soft-metal seat is drawn out of the line of steam when opened, thus avoiding one great cause of wear. Chapman builds a removable gate-valve made for steam-pressures of 150 to 200 pounds. The ribs are so arranged as to take the strain off the gate. Another new Chapman valve is made with an automatic drip that lets off water from a steam-pipe when shut. The Richardson balanced slide-valve is made with a series of bars, each having an independent place for wear on the balancing-plate, and each bar corresponding to a portion of the valve-face which wears in the same curve. The packing-bars are held in place by elliptical springs, and the result of this construction is that the valve keeps itself in order by its own wear, this design being adopted to meet the conditions of unequal wear to which slide-valves are subjected. The Allen slide-valve has ports which furnish an additional passage for the admission of steam when the engine is running at high speed with the valve cutting off early in the stroke. By this arrangement an effective steam passage of one inch can be made with the ports open only half an inch. The wire-drawing or reduction of pressure of the steam by friction is much reduced by this arrangement, with consequent economy of steam and coal.

C. H. COCHRANE.

VAMBÉRY, ARMINIUS, a Hungarian linguist, author and statesman; born at Duna-Szerdahely, in Hungary, in 1832, of very poor parents; studied in the Latin School of Pressburg, and devoted his leisure hours to the study of foreign languages. At the outbreak of the national revolution of 1848 the lad took sides with the insurgents and was severely wounded at Comorn, remaining a cripple for life. He finally settled in Constantinople, and devoted himself to the study of the oriental languages. He decided to visit the cradle of the human race, supposed to be in central Asia, and try to trace the transformation of the languages there spoken. In order to do that and live the lives of the people, he traveled in the disguise of a dervish, by routes unknown to Europeans, through the deserts of the Oxus to Khiva, and thence by Bokhara to Samarcand, in 1861-64. His *Travels and Adventures in Central Asia* was published in 1864. He was soon afterward appointed professor of oriental languages at

the University of Pesth. He spent much of his time exposing and opposing the Russian scheme of encroachments in the East. Among his other works are *Cagatai Language, Wanderings and Adventures in Persia* (1867); *Sketches of Central Asia* (1868); *History of Bokhara* (1873); *Central Asia and the Anglo-Russian Frontier Question* (1874); *Mohammedanism in the Nineteenth Century* (1875); *Sketches of Manners and Costumes in Oriental Countries* (1876); and *Primitive Civilization of the Turco-Tartar People* (1879). An interesting account of his *Life and Adventures*, written by himself, was published in English in 1889.

VAN BENE DEN, EDOUARD, naturalist, a son of PIERRE J. VAN BENE DEN (q.v. below); born in Louvain, March 5, 1846. After a voyage of exploration in Brazil and La Plata he became professor of zoölogy at the Liège University, devoted himself to the embryogeny of animals, and published several famous monographs on the subject.

VAN BENE DEN, PIERRE JOSEPH, a Belgian physician, surgeon, and naturalist; born at Mechlin, Dec. 19, 1809; received his degrees as Ph.D. and M.D. in 1832; in 1835 was appointed assistant professor of zoölogy at the Ghent University. In 1836 he went over to the Catholic University at Louvain; was elected a member of the Academy of Sciences of Brussels (1842), a corresponding member of the French Institute (1866), and a foreign associate of the French Academy of Sciences (1892). Wrote *Manuel d' Anatomie Comparée* (3 vols., 1852); *Recherches sur la Faune Littorale de Belgique* (1866); *Ostéographie des Cétacés Vivants et Fossiles* (1869-70, with an atlas); *Commensaux et Parasites dans le Règne Animal* (1875), and other highly valued monographs. Died in Louvain, Jan. 8, 1894.

VAN BUREN, a village and the capital of Crawford County, northwestern Arkansas, on the Arkansas River, and on the St. Louis, Iron Mountain and Southern and the St. Louis and San Francisco railroads, a few miles from the western boundary of the state. It has considerable trade, produces a variety of manufactures, has a foundry, cotton-gins, wagon, cigar and ice factories, and fruit canneries, has excellent public schools, two state banks, one daily and two weekly newspapers. Population 1880, 1,029; 1890, 2,291; 1900, 2,573.

VAN BUREN, a town of Aroostook County, northeastern Maine, on the St. John River and the Canadian Pacific railroad, 75 miles N. of Houlton and 12 miles from Grand Falls. It has St. Mary's College and a convent of the Good Shepherd. It has stage lines to Fort Fairfield and Fort Kent. The town was incorporated in 1881. Population 1890, 1,168; 1900, 1,878.

VANCE, ZEBULON BAIRD, American public man; born in Buncombe County, North Carolina, May 13, 1830; educated at Washington College, Tennessee, and at the University of North Carolina; studied law; was admitted to the bar in January, 1852; elected county attorney for Buncombe County the same year; member of the state legislature in 1854; was a representative from North Carolina in Congress from 1858 till the Civil War; entered the Confederate army in 1861; was made governor of North

Carolina in 1862; and re-elected in 1864; elected to Congress in 1870, but was not allowed to sit; became governor in 1876, and United States Senator in 1879, serving continuously until his death, April 14, 1894. He was opposed to secession, but went with his state when it left the Union.

VANCEBURG, a town and the capital of Lewis County, northeastern Kentucky, on the Ohio River and the Chesapeake and Ohio railroad, 30 miles above Maysville. It is in a farming, fruit-growing and lumbering section; has quarries in the vicinity; has flour and saw mills, a tannery, and manufactures wooden articles. It contains the Riverside Seminary, a state bank and a weekly newspaper. Population 1890, 1,110; 1900, 1,161.

VANCOUVER, a city and seaport of British Columbia, on Burrard Inlet, and on the Canadian Pacific railroad, about 85 miles N. by E. of New Westminster. It is in the center of an agricultural, mining and lumber territory, and contiguous to valuable salmon-fishing grounds. It was destroyed by fire and rebuilt on the American system in 1886. The city contains five banks, two daily and three weekly papers, religious organizations representing nearly every denomination, and many churches, schools, academies, hotels, hospitals, places of public resort and other features of municipal progress, including electric light and street-railway systems. In the way of manufactures there are five saw-mills, three sash, door and blind factories, foundries, iron-works and machine-shops, a baking-powder factory, fish-cannery, sugar-refinery, pork-packing establishment, etc. A permanent line of first-class mail steamers, suitable for service as armed cruisers, plies between the port and Hongkong and Yokohama. Population 1889, 11,000; 1891, 13,700.

VANCOUVER, a city and the capital of Clarke County, southwestern Washington, on the Columbia River and the Oregon, Portland and Vance Electric Street-railroad, 6 miles N. of Portland; founded by the Hudson Bay Company in 1828. It is in a dairy-ing, fruit and lumbering region; the city has a national bank and four weekly newspapers, St. James's Roman Catholic College, and is the headquarters of the military department of the Columbia. Population 1880, 1,722; 1890, 3,545.

VANDALIA, a city and the capital of Fayette County, southern central Illinois, on the Kaskaskia River, and on the Terre Haute and Indianapolis and the Illinois Western railroads, 68 miles E.N.E. of St. Louis. It was, previous to 1836, the capital of the state. It has six churches, two banks and three weekly newspapers, and manufactures brick-making machinery, wagons, carriages, plows, flour, woolen goods and paper. Population 1880, 2,056; 1890, 2,144; 1900, 2,665.

VANDAMME, DOMINIQUE JOSEPH, a French general; born in Cassel, department of Nord, Nov. 5, 1771. He served in the French army at Martini-que from 1788 till 1790, when he returned to France and organized a regiment of volunteers. In 1793 he was made a brigadier-general; in 1799 was made general of a division; took part in the battles of Eckmühl and Austerlitz, in which he distinguished himself; after the battle of Dresden

pursued the army of the allies, and was captured, together with ten thousand men, at Kulm, after which he was taken prisoner to Russia. He joined Napoleon during the Hundred Days, and was banished from France after the battle of Waterloo. After living in America he returned to France in 1824, and died at Cassel, July 15, 1830.

VAN DEN EECKHOUT. See EECKHOUT, Vol. VII, p. 692.

VANDERBILT, CORNELIUS, an American capitalist; born near the site of Stapleton, Staten Island, New York, in 1794; died in New York City in 1877. He had no education, but a great financial talent. At the age of 16 he bought a boat to carry farm produce to New York. At 23 he had amassed \$10,000. Then he became captain of a steamboat plying between New York and New Brunswick, New Jersey, where his wife aided him by keeping a hotel. He remained in the service of Thomas Gibbons till 1829. Then he embarked in building steamboats and running them on the Hudson River and in Long Island Sound. This gave him the popular title of "Commodore." In 1851 he started a line of steamers to San Francisco, California, by way of the isthmus, with a branch to New Orleans. He also established a line to Havre, France, but gave it up at the outbreak of our Civil War. One of his acts of generosity was in presenting to the United States government the steamer *Vanderbilt*, which had cost \$800,000. He rapidly amassed a fortune by investing in railroads. He established the New York Central railroad, and obtained control of a number of smaller lines. In 1873 he controlled 2,000 miles of track. Toward the close of his life he gave \$50,000 to Rev. Charles T. Deems to purchase the Church of the Strangers in New York City, and \$1,000,000 to found Vanderbilt University at Nashville, Tennessee.—He left his fortune of \$100,000,000 to his son, WILLIAM HENRY VANDERBILT, who was born at New Brunswick, New Jersey, May 8, 1821, and died in New York, Dec. 8, 1885. He was not permitted to take any part in the "Commodore's" enterprises till 1864, when he was associated in the management of the Harlem railroad. He soon showed himself fully able to carry on what his father had begun, as well as to hold what he had acquired. He spent his energies developing the Vanderbilt system of railroads, which included many of the leading lines east and west at the time of his death. One of his notable benefactions was the gift of \$500,000 to the New York College of Physicians and Surgeons in 1884. He also paid the expenses of moving the Egyptian obelisk now in Central Park, and gave \$200,000 to Vanderbilt University.—On his death the Vanderbilt fortune passed into the hands of his two sons, CORNELIUS, born in Nov. 27, 1843, and WILLIAM KISSAM, Dec. 12, 1849, the former of whom is the chief manager. He erected (1887), in New York City, a fine building for the benefit of his railway employees.—A third son, FREDERICK WILLIAM, established a free circulating library in New York City in 1888, also a manual-training school. Cornelius V. died at N. Y., Sept. 12, 1899.

VANDERBILT UNIVERSITY, a co-educational institution, situated at Nashville, Tenn. In

1872, representatives of the Methodist Episcopal Church South, from Tennessee, Alabama, Louisiana, Mississippi and Arkansas, undertook to establish a university, and it was in response to this movement that Cornelius Vanderbilt of New York gave \$500,000 to found such an institution. This happened in 1872, and before his death he had raised his donation to \$1,000,000, which was increased about \$500,000 by his son, William, and grandson, Cornelius.



VANDERBILT UNIVERSITY.

The school is controlled by a board of trustees, of which the bishops of the Methodist Episcopal Church South and the chancellor of the university are *ex officio* members. There are distinct courses in law, medicine, pharmacy, dentistry, engineering and theology, besides the regular academic department. In 1898 the productive funds amounted to \$1,100,000, and the total income to \$100,000; there were 90 instructors, 800 students, and 18,000 volumes in the library. Including 1898 the number of graduates since organization was 3,500.

VAN DER GOES, HUGO. See GOES, Vol. X, p. 721.

VAN DER HELST, BARTHOLOMÆUS. See HELST, Vol. XI, p. 641.

VAN DER HEYDEN, JAHN. See HEYDEN, Vol. XI, p. 784.

VANDERLYN, JOHN, an American painter; born at Kingston, Ulster County, New York, Oct. 15, 1776. He started in life as the apprentice of a wagonmaker, but Aaron Burr, having seen some of his drawings, induced him to go to New York, where, through Burr's assistance, he was enabled to study under Gilbert Stuart, and by the same help was enabled to study in Paris from 1796 to 1801. After making a reputation in New York, he returned to Paris in 1803 and remained 15 years. While there he painted *Marius amid the Ruins of Carthage*, which, by order of Napoleon, was given the medal at the Louvre in 1808, a medal which was several times pawned, and finally came into the hands of Bishop Kip of California, who owned the picture. On his return to America, he lost money in a panoramic venture, and, becoming discouraged, retired to his native place, where he spent the last part of his life in poverty. He was always fond of Aaron Burr, and supported him while in Paris, painting three pictures to get money to pay his passage home. Among his best-known pictures are *The Murder of Jane McCrea by the Indians*; *Ariadne*;

The Landing of Columbus, for the rotunda of the capitol; a portrait of Washington, for the Hall of Representatives; and portraits of John C. Calhoun, George Clinton, James Monroe, James Madison, Andrew Jackson and Zachary Taylor. He died at Kingston, Sept. 24, 1852.

VAN DER MEER, JAHN. See MEER, Vol. XV, p. 824.

VAN DER MEULEN, ANTONY FRANCIS. See MEULEN, Vol. XVI, p. 204.

VAN DER POORTEN-SCHWARTZ, J. M. W., a Dutch novelist; born in Holland in 1857. He was educated in England and Germany, and studied law at the University of Utrecht, but turned from law to literature. He spent much of his time in England, France and southern Europe, where he went for the sake of his wife's health. His works are published under the pseudonym of "Maarten Maartens," and are all close descriptions of Dutch life, being also, for the most part, psychological studies. He has been called by some a disciple of Tolstoi. His works were all originally written in the English language, which he used with much taste and facility. Among his works are *Joost Ave-lingh* (1890); *A Question of Taste* (1891); *God's Fool* (1892); *A Greater Glory* (1894); *My Lady Nobody* (1895); and *Her Memory* (1898); besides some earlier book reviews and essays.

VAN DER STUCKEN, FRANK, an American musical composer and conductor; born in Fredericksburg, Texas, Oct. 15, 1858. He received his musical education in Antwerp and Leipsic, and after completing them returned to America, where he was chosen leader of the Arion Society in New York, and later, the Arion Society of Newark, New Jersey. In 1895 he removed to Cincinnati, where he became leader of the orchestra. His compositions have been rendered successfully in Europe and America, and include both instrumental and vocal music.

VAN DIEMEN, ANTHONY (1593-1645), a Dutch admiral and governor-general of the East Indies. See TASMAN, Vol. XXIII, p. 72.

VAN DIEMEN'S LAND. See TASMANIA, Vol. XXIII, pp. 72-75.

VAN DORN, EARL, an American soldier; born at Port Gibson, Mississippi, Sept. 17, 1820. After graduating at West Point in 1842 he did garrison duty until the trouble with Mexico, when he was sent to Texas; served through the Mexican War, and was brevetted captain and major for meritorious behavior at Cerro Gordo, Contreras and Churubusco; and was wounded at the capture of Mexico. He took part in the war with the Seminole Indians (1849-50); was made captain in 1855; took part against the Comanche Indians in 1856, 1858 and 1859; and was promoted major in 1860. At the outbreak of the Civil War he raised a Texan regiment, and became colonel; and about the end of 1861 was made brigadier-general by the state of Mississippi and the next year brigadier-general in the Confederate service. While in command of the trans-Mississippi department he was defeated, after which he was transferred to the Department of the Mississippi and was again defeated, at Corinth. He was shot at Spring Hill, Tennessee, May 8, 1863, by

a man named Peters, on account of a private grievance.

VAN DYKE, HENRY JACKSON, an American clergyman; born at Abingdon, Pennsylvania, March 2, 1822. He was educated at the University of Pennsylvania and at Princeton Theological Seminary, after which he was pastor of churches in Bridgeton, New Jersey (1845-52); Germantown, Pennsylvania (1852-53); and of the First Presbyterian Church at Brooklyn in 1853. He was moderator of the General Assembly in 1876 and published *The Lord's Prayer; The Church, Her Ministry and Sacraments* (1890). He died in Brooklyn, May 25, 1891.—His son, HENRY JACKSON, author and clergyman, was born at Germantown, Nov. 10, 1852. He was educated at the Brooklyn Polytechnic Institute, Princeton College and Theological Seminary, and at the University of Berlin. He was pastor of the United Congregational Church at Newport, Rhode Island (1878); and of the Brick Presbyterian Church of New York City (1882). In 1876 he was corresponding editor of the *Philadelphia Presbyterian*, and wrote *The Reality of Religion* (1884); *The National Sin of Literary Piracy* (1888); *The Poetry of Tennyson* (1889); *Straight Sermons to Young Men and Other Human Beings* (1893); *The People Responsible for the Character of Their Rulers* (1895); *Little Rivers* (1895); and *The Story of the Other Wise Man* (1895).

VAN DYKE, JOHN CHARLES, an American author and art critic; born in Brunswick, New Jersey, April 21, 1856. He was educated at Columbia, and was admitted to the bar in 1877, but turned his attention to art and literature; has been librarian of Sage Library, New Brunswick, since 1877; has studied at different times in the art centers of Europe; was editor of the *Studio* in 1884, and is professor of the history of art in Rutgers College. He has written *Books and How to Use Them* (1883); *Principles of Art* (1887); *How to Judge a Picture* (1888); *Serious Art in America* (1889); *Art for Art's Sake* (1893); *History of Painting* (1894); and *Old Dutch and Flemish Masters* (1895).

VANESSA. See BUTTERFLIES, Vol. IV, p. 595.

VAN EYCK, family of painters. See EYCK, Vol. VIII, pp. 814, 816.

VAN GOYEN, JAN JOSEPHSZOON. See GOYEN, Vol. XI, p. 23.

VAN HELMONT, JEAN BAPTISTE. See HELMONT, Vol. XI, p. 638.

VANISHING-POINT. See PROJECTION, Vol. XIX, p. 805.

VAN LENNEP, JACOB. See LENNEP, Vol. XIV, p. 446.

VAN MARCKE, ÉMILE, a French painter; born at Sèvres, France, Aug. 20, 1827. He studied art under Troyan and made his début at the Salon in 1857; received medals at the salons of 1867, 1869 and 1870, and a first-class medal at the Paris Exposition of 1878. He was chosen a chevalier of the Legion of Honor. Among his more noted works are *Spring at Neslette, in Normandy* (1877); *The Cliff* (1876); *A Herd of French Cattle* (1876); *Landscape with Cattle*; and *The River Morte at Freport*. He died at Hyères, France, Dec. 24, 1890.

VAN OSTADE, Dutch painters. See OSTADE, Vol. XVIII, pp. 57-59.

VAN RENSSELAER, a distinguished family in the early history of New York, and known particularly through their connection with the patroonships granted by the West India Company. The first of the family connected with American history was KILLIAN VAN RENSSALAER, colonist; born at Amsterdam, Holland, in 1595. He was engaged in the pearl and diamond business, and when the West India Company was formed was one of its most active supporters. He never visited America, but through agents purchased vast tracts of land on both sides of the Hudson, and by sending out laborers in his own vessels to colonize the district, received the first and most extensive patroonship granted by the West India Company. His possessions embraced a tract of land 24 by 48 miles, including the present counties of Albany, Rensselaer and part of Columbia.—This vast tract he governed through agents, and at his death, in Amsterdam, in 1644, they descended to his eldest son, JOHANNES, who sent first (1652) his brother, JAN BAPTIST, and in 1658 his other brother, JEREMIAS, born in Amsterdam, in 1632. He took part in the government of the colony under Stuyvesant, and when the Duke of York took possession for England he swore allegiance to the latter country and retained nearly all his rights and privileges.—He was succeeded by his nephew, KILLIAN, son of Johannes, who secured an arrangement whereby the heirs in Holland gave up all claim to the possessions in America and the American heirs relinquished their claim to the Holland estate. He also, in 1685, received a patent under the title of first lord of the manor and third patroon.—His successor was KILLIAN, son of Jeremias, born in Rensselaerswick in 1662. He was a militia officer, and represented the manor in the assembly. He died in 1719.—His grandson, STEPHEN, improved the estate and built the present manor-house in 1765, and at his death was succeeded by his son, STEPHEN, known as the patroon; born in New York, Nov. 1, 1765. He was educated at Harvard, and after bringing his estate into order went into politics; was successively representative in the assembly (1789); state senator in 1790, and lieutenant-governor in 1795. In 1801 he had risen in the militia to be major-general, and in 1812 was appointed to command the United States forces on the northern frontier, but his soldiers were raw recruits and he was defeated at Queens-ton Heights. He was a regent of the University of New York in 1819, and afterward chancellor; paid the expenses of the geological survey of New York (1821-23); was member of the Constitutional Convention in 1821; a member of Congress (1823-29); president of the boards in control of Champlain and Erie canals (1811-25); and founder of the Rensselaer Polytechnic Institute at Troy, New York, in 1824. He died at Albany, Jan. 26, 1839.—He was succeeded by his son, STEPHEN, the last of the patroons; born in Albany, March 29, 1789. Under him occurred the land-rent troubles, during which several persons were killed. The tenants objected to the system of rentals, and the Van Rensselaers were compelled to reduce their estate in one way and

another until, at the death of Stephen, the manor passed from their hands. He died May 25, 1868.—Other members of the family were JEREMIAH VAN RENSSELAER; born in New York, in 1741. He worked hard for the colonists during the war; was a member of Congress (1789-91), and lieutenant-governor of New York (1800-1804). He died Feb. 22, 1810.—SOLOMON VAN RENSSELAER, soldier; born in Rensselaer County, Aug. 6, 1774. He entered the army in 1792; was with Anthony Wayne in the Miami campaign in 1794, during which he was shot through the lungs; was lieutenant-colonel of volunteers during the War of 1812, and received four severe wounds at the battle of Queenston. Was a member of Congress (1819-22). He died in Albany, April 23, 1852.

VAN SANTVOORD, GEORGE, an American lawyer and author; born at Belleville, New Jersey, Dec. 8, 1819. He was educated at Union College; studied law at Kinderhook, and was admitted to the bar in 1844. He practiced successively at Lafayette, Indiana; Kinderhook, New York, and Troy. In 1852 and again in 1856 he was chosen a member of the legislature. His published works include *The Indiana Justice: A Treatise on the Jurisdiction, Authority and Duty of Justices of the Peace in Civil and Criminal Cases* (1846); *Principles of Pleading in Civil Actions under the New York Code of Procedure* (1852); *Lives of the Chief Justices of the United States* (1854); *Practice in the Supreme Court of New York in Equity Actions* (1860-61); besides monographs, published at different times in the *Democratic Review*, on Calhoun, Robespierre, Danton, Oliver Cromwell, Carnot and others. He was killed in a railroad accident at East Albany, March 6, 1863.

VAN TROMP, two Dutch admirals. See TROMP, Vol. XXIII, pp. 587, 588.

VAN VEEN, MARTIN JACOBS. See HEEMSKERK, Vol. XI, pp. 611, 612.

VANVITELLI, LUIGI, an Italian architect; born in Naples, in 1700. He was a son of a Dutch painter. Gaspar van Witel (1650-1736), whose name was Italianized. He was perhaps the leading Italian architect of his day. His most important works were restorations at the Albani Palace, in Urbino; a palace at Caserta, for Charles III; and an aqueduct, having three rows of arches, one above the other, joining two mountains near the Caudine Forks. He was also architect of St. Peter's during his life. Died in Naples, March 1, 1773.

VAN WERT, a city, the capital of Van Wert County, western Ohio, 32 miles E.S.E. of Fort Wayne, Indiana, on the Cincinnati, Jackson and Mackinaw, and the Pittsburg, Fort Wayne and Chicago railroads, in an agricultural and lumbering region; produces a variety of manufactures, and has a good local trade. Population 1900, 6,422.

VAPEREAU, LOUIS GUSTAVE, a French author; born at Orleans, France, April 4, 1819; in 1838 carried off, in competition between all the colleges of France, the prize for philosophy, established by M. de Salvandy. In consequence of the restrictions with which the teaching of philosophy was fettered, in 1852 M. Vapereau repaired to Paris, completed his

law studies, and became an advocat e in 1854. About this time Messrs. Hachette intrusted to him the direction of the *Dictionnaire des Contemporains*, which occupied his whole attention for four years. The sixth edition of this work appeared in 1893. M. Vapereau subsequently brought out another important work, a *Dictionnaire Universel des Litt ratures*. He was prefect of the cantal in 1870, and of the department of Tarn-et-Garonne from March 26, 1871, to March 31, 1873; inspector-general of primary schools (1877-88); and then honorary inspector-general. He has also published *Ann e Litt raire et Dramatique* (1859-69); *El ments d'Histoire de la Litt rature Fran aise* (1883-85).

VAPOR DENSITY. See CHEMISTRY, Vol. V, pp. 547-549.

VARANGIAN. See HAROLD III, Vol. XI, p. 485; also RUSSIA, Vol. XXI, p. 87.

VARANID E, the Old World family of water-lizards. They are true lizards, which spend part of the time in water. The monitor of the Nile (*Varanus* or *Monitor niloticus*), is five feet in length. A closely related species (*V. acena*) is represented in India by numerous individuals. It is eaten by the natives. The above name of the family is synonymous with *Monitorid e*. See LIZARD, Vol. XIV, pp. 733, 734.

VARD E OR VARD O, a town and port on the island of Vard e, province of Troms e, district of Finmark, Norway, 175 miles E.S.E. of Hammerfest. It has no docks, but exports salt and dried fish, whale and cod oil, and guano, etc., to the annual value of \$400,000. West of the town is the fortress of Vard hus, built in 1310. The temperature ranges from 21  in February, to 47.1  in July. Population, about 3,000.

VARIABLE STARS. See SUN, Vol. XXII, p. 651; and ASTRONOMY, in these Supplements.

VARIATIONS, MAGNETIC. See METEOROLOGY, Vol. XVI, pp. 163-179.

VARICOSE VEINS OR VARIX. See SURGERY, Vol. XXII, p. 684.

VARIEGATED SANDSTONE. See GEOLOGY, Vol. X, p. 352; and BUNTER SANDSTEIN, in these Supplements.

VARIOLA. See SMALLPOX, Vol. XXII, pp. 162-164.

VAROLI, CONSTANTIO. See ANATOMY, Vol. I, p. 809.

VARUS, QUINTILIUS. See GERMANY, Vol. X, p. 478.

VASA, a Swedish dynasty, from Gustavus Vasa (q.v., Vol. XI, p. 333) to Charles XIII, inclusive. See SWEDEN, Vol. XXII, pp. 747-752.

VASARHELY. See HODMEZ -V S RHELY, Vol. XII, p. 41; and MAROS-V S RHELY, Vol. XV, p. 562.

VASCO DA GAMA. See GAMA, Vol. X, p. 57.

VASCONCELLOS, JOAQUIM ANTONIO FONSECA DE, a Portuguese scholar and author; born at Oporto, Portugal, Feb. 10, 1849. He was educated at Hamburg, and later at Coimbra; after which he traveled for four years (1871-75) in Spain, Portugal, Germany, France and England. In 1883 he became professor of German in the college of Oporto, and in 1889 director of the Museum of Trade and

Industry. He published *Os Musicos Portuguezes: Biographia-bibliographia* (1870); *Ensaio Sobre o Catalogo da Libreria de Musica de el-rei D. Jo o IV* (1873); *Reforma do ensino de Bellas Artes* (1877-79); *Franco-cisco de Hollanda* (1879); *Go siana* (1879-81); *O Faust de Goethe e a tradu o de Castilho* (1872); and *O Consummado Germanista* (1879). All his labors have been in the endeavor to raise the Portuguese scholarship to the level of the best ideals.—His wife, KAROLINA WILHELMA, the daughter of Gustav Michaelson, was born in Berlin, March 15, 1851. She received her education at the Luisenschule, in Berlin, and has written *Romancero del Cid* (1870); *Studien zur Romanischen Wortsch pfung* (1876); *Versuch  ber den Palmeiran da Inglaterra* (1883); *Studien zur Hispanischen Wortdeutung* (1886); besides contributions to various journals.

VASCULAR SYSTEM OF PLANTS. See HISTOLOGY, Vol. XII, p. 18.

VASEY, GEORGE, an American botanist; born near Scarborough, England, Feb. 28, 1822. His parents removed to New York when he was an infant, and he received his education at schools in Oneida, New York, and at the Berkshire Medical Institute in Pittsfield, Massachusetts. After practicing medicine in Elgin and Ringwood, Illinois, he accompanied the Powell expedition to Colorado as botanist; was one of the editors of the *American Entomologist and Botanist* (1869-70) and botanist in the Department of Agriculture at Washington (1872-93). His works include *A Catalogue of the Forest Trees of the United States* (1876); *A Synopsis of the Tribes and Genera of the Grasses of the United States* (1884); *Grasses of the Southwest* (1890-91); *Grasses of the Pacific Slope* (1892-93); and an unfinished *Monograph of the Grasses of the United States and British America*. He died in Washington, District of Columbia, March 4, 1893.

VASQUEZ DE CORONADO. See CORONADO, in these Supplements.

VASSALBORO, a town in Kennebec County, southern Maine, on the Kennebec River, and on the Maine Central railroad, 12 miles E. by N. of Augusta. It contains Oak Grove Seminary, has nine churches, and manufactures lumber, woolen goods, etc. Population 1890, 2,052; 1900, 2,062.

VASSAR, a village of Tuscola County, eastern Michigan, on the Cass River, and on the Michigan Central and the Flint and Pere Marquette railroads, 23 miles S.E. of Bay City. It is in a fine farming and lumbering region; has pump, sash and blind, lumber, woolen and other manufactures, foundries and machine-shops, two banks and two weekly newspapers. Population 1890, 1,682; 1900, 1,832.

VASSAR, MATTHEW, an American brewer, and the founder of Vassar College, was a native of Norfolk, England; born April 29, 1792, and accompanied his father to America in 1796, settling on a farm near Poughkeepsie, New York. Five years later the family removed to Poughkeepsie, where the father established the business of brewing ale, to which Matthew Vassar subsequently succeeded, and from which he derived large profits. In 1845 he decided to apply a portion of his fortune to the endowment of a school for the higher education of women. In 1861

he donated \$400,000 to the institution that became known as Vassar College, located at Poughkeepsie, New York. Its success was immediate. Its growth was rapid and permanent. Its offer of superior advantages for the acquisition of sound scholarship and a practical education was accepted by students in increasing numbers. Mr. Vassar died at Poughkeepsie, June 23, 1868, providing, in his will, for the further donation of \$400,000, the same to be appropriated to the



MATTHEW VASSAR.

support of the institution.—His nephew, MATTHEW, a philanthropist, born in Poughkeepsie, New York, May 11, 1809; became a partner of his uncle at the age of 22, in the brewing business. Much of his fortune was spent in philanthropic enterprises, his gifts amounting to \$500,000. Vassar College received \$100,000 as an endowment for two chairs, and he helped build Vassar Brothers' Laboratory, at a cost of \$20,000. He and his brother endowed the Vassar Brothers' Home for Aged Men in Poughkeepsie, the Vassar Brothers' Literary and Scientific Institute, and the Vassar Brothers' Hospital. He was the founder and president of the Society for the Prevention of Cruelty to Animals in his town. He died Aug. 10, 1881.—His brother, JOHN GUY, a philanthropist, born in Poughkeepsie, June 15, 1811, was also in the brewing business with his uncle. He spent thirty years traveling in all parts of the world. He was appointed one of the original trustees of Vassar College, to which he gave, besides part of the laboratory, \$20,000. Most of his later years were given up to the completion and development of the Vassar Brothers' Hospital. He published, in 1861, *Twenty Years Around the World*. He died Oct. 27, 1888.

VASSAR COLLEGE, an institution of higher education for young women, located at Poughkeepsie, New York. It was endowed by Matthew Vassar



VASSAR COLLEGE—MAIN BUILDING.

in 1861 and opened in 1865. His endowment amounted to over \$400,000, besides the grounds, which contain 210 acres. This, increased by later gifts from him and others, has reached the amount of \$1,000,000, besides buildings and equipments. The main building, which furnishes accommodations

for 300 students, besides having recitation-halls and teachers' quarters, is modeled after the Tuileries. In 1898 the productive funds were \$965,200, and the total income was \$308,800. The courses of study are such as are offered in the best colleges for men, and in addition there is a separate course in music, and another in painting, for which degrees are given. In 1898 there were 60 instructors and 614 students, and the library had 30,000 volumes. The site is a beautiful one, and is only three miles distant from the Hudson, with which it is connected by an electric railroad.

VATICAN CODEX OR CODEX VATICANUS. See PALÆOGRAPHY, Vol. XVIII, p. 147.

VATICAN PALACE, the winter residence of the Pope. (For architecture, see ROME, Vol. XX, p. 855.) This palace, besides containing the private living apartments and garden of the Pope, has, in connection with it, immense reception-halls, with a series of chapels, libraries, picture-galleries and museums of sculpture, antiquities and inscriptions, many of them unequaled in the world. There is the Sistine Chapel, noted for its fine music, furnished by the papal choir. It is here that the *Tenebræ* and *Miserere* are performed during Holy Week, and here also is sung the *Missa Papæ Marcellæ* of Palestrina, by many considered the finest piece of music ever dedicated to the church. This chapel, with the Capella Nicolina and Pauline Chapel, contain some of the finest frescoes extant, and, together with the vast art-galleries, possess some of the best work left by Michael Angelo, Raphael, Pinturricchio and Perugino, for the details of which see under these different names. Beside those mentioned, other masters have contributed pictures or small pieces of work of exceptional value, as the fresco by Ghulandajo representing *Christ Calling Peter and Andrew to their Apostleship*, the pictures *Life of Moses*, and the *Temptation of Christ*, by Botticelli, and the *Communion of St. Jerome*, by Domenichino; while the mosaic works are unexcelled, and possess as many as 17,000 distinct tints in their make-up. (See SCHOOLS OF PAINTINGS, Vol. XXI, p. 446.) The museums possess some of the finest collections in the world, especially rich in inscriptions from tombs and samples of ancient statuary. Among them are statues of *Mercury*; *Bacchus Riding on a Tiger*; *Diana* (a fighting Amazon); and *Faun Playing on a Flute*. In the sculpture-galleries, including the Museo Chiaramonte, the Braccio Nuova and the Pio-Clemente, are collections unrivaled in importance and splendor. Here may be found the originals of many groups known in all parts of the world, such as the *Laocœon*, mentioned by Pliny; the *Apollo Belvedere*; *Ariadne*; and the so-called *Antinous*, perhaps the most beautiful statue in the world. The world-famous Vatican Library is contained in two large halls. It is not well supplied with modern works, but in ancient manuscripts, and especially in ecclesiastical manuscripts, it far excels any other collection in the world (see Vol. XIV, p. 528). In closing, it can be said that not so much interest is excited by the buildings, which are additions of different ages, thrown together without any idea of architectural effect, as by what they contain.

VAUCANSON. See AUTOMATON, Vol. III, p. 142.

VAUDEVILLE. See PANTOMIME, Vol. XVIII, p. 215.

VAUDOIS, a sect. See WALDENSES, Vol. XXIV, pp. 324, 325.

VAUDREUIL (PHILIPPE DE REGAUD), MARQUIS DE, a governor of Canada; born in France in 1641. He had risen to the post of brigadier-general in the French army when he was sent to Canada as commander of the forces there. He received the title Chevalier de Vaudreuil, and after taking part in expeditions against the Onondaga, Oneida and Seneca Indians was made governor of Montreal in 1698 and governor-general of Canada in 1703. He brought about many reforms in the colony; fought, for the most part successfully, against the British, although they succeeded in capturing Acadia, and put a stop to the British influence in Canada. He died in Quebec, Oct. 11, 1725.—His fifth son, PIERRE FRANÇOIS, Marquis de Vaudreuil-Cavagnal, governor of Canada, was born in Quebec in 1698. After attaining the rank of major-general in the marine corps he was made governor of Three Rivers in 1733; governor of Louisiana in 1742; and in 1755 governor of Canada. He had some trouble with Montcalm, and, after the latter's surrender of Quebec to Wolfe and his own surrender at Montreal, charges were brought against him, and he was put on trial in France before the Châtelet de Paris, with the result that he was cleared of blame and released from prison. He died in Paris, Oct. 20, 1765.—His nephew, LOUIS PHILIPPE DE REGAUD, Marquis de Vaudreuil, a naval officer, was born at Rochefort, France, Oct. 28, 1724. He entered the navy as midshipman in 1840, and by 1854 had risen to a captaincy; was in several engagements, and in 1778 took charge of a squadron with which he stormed Fort St. Louis, in Senegal, besides capturing several rich prizes; transported troops to the West Indies; and then joined Count d'Estaing. With him he participated in the capture of Granada and the attack on St. Lucia. He took part in the action in Chesapeake Bay between Graves and De Grasse, and was with De Grasse when defeated by Rodney in 1782; in this action he saved his squadron from capture, but was blamed with the defeat by De Grasse. He was court-martialed, but his conduct was upheld; was a member of the States General in 1789; and in October, with some other officers, defended Versailles and the royal family against the mob until succor arrived. In 1791 he removed to London, but returned to Paris in 1800, where he died, Dec. 14, 1802.—A grandson of Philippe, JEAN LOUIS DE RIGAUD, Marquis de Vaudreuil, a soldier, was born in Cape Français in 1762. He entered the army; was aide-de-camp to the Chevalier Chastellux; took part in the siege of Yorktown in 1781; and during the French revolutions fought with the allies. After the restoration he had charge of the king's wardrobe. He died in Paris, April 20, 1816.

VAUGHAN, CHARLES JOHN, an English educator and clergyman; born at Leicester, England, in 1816. He was educated at Rugby and Cambridge;

was fellow at Trinity College (1839); took orders the Church of England; was rector at St. Martin's Leicester (1841-44); became head master of Harrow School, was vicar of Doncaster (1860-69); master of the Temple (1869-94); was appointed dean of Llandaff (1879); chancellor of the York Cathedral and chaplain in ordinary to the Queen (1882). Many volumes of his works have been published, but they nearly all consist of his sermons and lectures. He died at Llandaff, Oct. 15, 1897.

VAUGHAN, HERBERT, an English Roman Catholic prelate; born at Gloucester, April 15, 1832. He was educated at Stonyhurst College, and at Rome, where he attended the Accademia Dei Nobili Ecclesiastici; was ordained priest in 1854, returned to England, founded and became president-general of St. Joseph's Foreign Missionary College, Mill Hill, Middlesex, and in 1871 accompanied to Maryland the first detachment of priests who were sent on a special mission to the colored population of the United States. He was elected bishop of Salford in 1872. In March, 1892, he succeeded the late Cardinal Wiseman as archbishop of Westminster, and in 1893 was himself created cardinal. He identified himself with the movement against intemperance; took an active part in the rescue of children and in commercial education, in the interests of which he built St. Bede's College. He was made head of the Roman Catholic Church in England, and is proprietor of the *Tablet* and the *Dublin Review*.



CARDINAL VAUGHAN.

VAULT AND VAULTING. See ARCHITECTURE, Vol. II, pp. 465, 475.

VAUTIER, BENJAMIN, a Swiss painter; born in Morges, in Vaud, Switzerland, April 24, 1829; studied at the academy in Düsseldorf; received a second-class medal at the Paris exposition of 1867; a first-class medal at that of 1878, and the decoration of the Legion of Honor. His works include *Devout Singers in Church* (1858); *Spinning Woman* and *The Surprise* (1863); *Sunday Afternoon in Suabia* and *Cats in a Criminal Case* (1864); *Courtier and Peasants at Württemberg* (1865); *Wake in the Bernese Highlands* (1866); *The First Dancing Lesson* (1868); *A Village Funeral* (1871); and *Alsatian Women* (1882). Died in Düsseldorf, April 25, 1898.

VAUX, CALVERT, an Anglo-American landscape-architect; born in London, Dec. 20, 1824; educated at the Merchant Taylors' School and studied architecture under Lewis N. Cottingham; removed to America in 1848, where he became assistant to and ultimately partner of Andrew J. Downing, then at work on the grounds of the Capitol and Smithsonian Institution at Washington. In connection with Frederick L. Olmstead, he drew up the plans adopted for Central Park, and was afterward appointed consulting-architect to the department of parks. He and Mr. Olmstead afterward drew up plans for Prospect Park, Brooklyn, parks in Chicago,

Buffalo, the State Reservation at Niagara Falls, and the Riverside and Morningside parks, New York City. With Samuel Parsons, Jr., he drew up the plans for the grounds of Bryn Mawr College. He was appointed landscape-architect for the department of public works in New York City. Besides his landscape-work he designed a great many dwellings and several buildings in New York. He published *Villas and Cottages* (1860). He was accidentally drowned in New York bay, at Bensonhurst, Nov. 19, 1895.

VECELLI, a family of painters. See TITIAN, Vol. XXIII, p. 416.

VEDAS. See SANSKRIT, Vol. XXI, pp. 273-280; VEDANTA, Vol. XXIV, pp. 117-120.

VEDDER, ELIHU, an American artist; born at New York, Feb. 26, 1836; studied painting in New York, Paris and Italy, and finally settled in New York, being elected National Academician in 1865. His works include *The Death of Abel; A Venetian Dancing Girl; The Lair of the Sea Serpent* in the Boston Museum; *Young Marsyas; The Cumæan Sybil; Diana* (1897); his masterly illustrations for the *Rubaiyat* of Omar Khayyam; *Government* (5 mural decorations) and *Minerva*, in the Library of Congress; and *Art*, a mural decoration in the Walker Art Building, Bowdoin College.

VEDEL, ANDERS S. See DENMARK, Vol. VII, 90.

VEGA, GARCILASO DE LA. See GARCILASO DE LA VEGA, Vol. X, p. 74.

VEGA, GEORG, a mathematician. See LOGARITHMS, Vol. XIV, pp. 775-76.

VEGETABLE BUTTERS. See *Fats*, under OILS, Vol. XVII, pp. 746-47.

VEGETABLE CASEIN. See LEGUMIN, in these Supplements.

VEGETABLE HISTOLOGY. See HISTOLOGY, Vol. XII, pp. 10-18.

VEGETABLE IVORY. See Vol. XIII, 524-25.

VEGETABLE PHYSIOLOGY. See Vol. XIX, pp. 43-63.

VEGETABLE PARASITISM. See Vol. XVIII, pp. 264-69.

VEGETABLE SILK. See FIBRES, Vol. IX, 132.

VEGETABLE WAXES. See WAX, Vol. XXIV, pp. 459, 460.

VEGETATIVE MULTIPLICATION. See REPRODUCTION, in these Supplements.

VEHMIC COURT. See FEHMIC COURT, Vol. IX, pp. 63, 64.

VEINS. See ANATOMY, Vol. I, pp. 905, 906.

VEINS, CIRCULATION IN. See VASCULAR SYSTEM, Vol. XXIV, pp. 105, 106.

VEIT, PHILIPP, a German painter; born in Berlin, Feb. 13, 1793; a grandson of Moses Mendelssohn; was educated by his step-father, Friedrich Schlegel (see SCHLEGEL, Vol. XXI, p. 409); studied art at Dresden, and in company with Overbeck, Cornelius and Schadow at Rome (see OVERBECK, Vol. XVIII, p. 77). He became director of the Stadel Institute at Frankfort-on-the-Main in 1830, but because of the purchase of Lessing's picture of *Huss Before the Council of Constance*, resigned in 1843. Among his works, both in oil and fresco, are *Seven Years of Plenty*, one of the frescoes de-

scriptive of the life of Joseph, at the Bartholdy Villa, Rome; *Christianity Bringing the Fine Arts into Germany; Egyptian Darkness; Germany*; and several portraits of emperors of the middle ages. He died Dec. 18, 1877.

VEITCH, JOHN, a Scotch critic and philosopher; born at Peebles, Oct. 24, 1829; received his early education at the grammar school, and in 1845 entered the University of Edinburgh, where he gained honors, especially in logic and moral philosophy. In 1850 he published a translation of the *Discourse on Methods* of Descartes, and in 1853 a translation from the *Meditations*, and selections from the *Principles of Philosophy*, of Descartes, with notes. From 1855 to 1856 he acted as assistant to the late Sir W. Hamilton, professor of logic and metaphysics in the University of Edinburgh, and to his successor, Professor Fraser, until 1860, when he was appointed to the professorship of logic, metaphysics, and rhetoric in the University of St. Andrews. In 1864 Mr. Veitch was appointed to the professorship of logic and rhetoric in the University of Glasgow, and in 1872 he received the honorary degree of LL.D. from the University of Edinburgh. He wrote *The Tweed, and Other Poems; History and Poetry of the Scottish Border* (1892); and the article COUSIN in this ENCYCLOPEDIA. He died Sept. 3, 1894.

VEITH BOUNDARY PLAN. See COAL, in these Supplements.

VELA, BELASCO NUNEZ. See PERU, Vol. XVIII, p. 677.

VELA, VINCENZO, an Italian sculptor; born at Ligurnetto, in the Swiss canton of Ticino, in 1822. A son of poor parents, he worked, as a boy, in the quarries of Viggio; went to Milan in 1836, where he studied drawing and worked in the studio of Cacciatori, making models for jewelers; went to Rome in 1847, but was called to serve in the army; was also a volunteer in the Italian army in 1848; declined a membership in the Academy of Milan; was elected an officer of the Legion of Honor in 1867. Among his works are statues of Queen Maria Theresa and Queen Maria Adelaide, at Turin; *Harmony in Tears*, for the tomb of Donizetti (1855); *France and Italy* (1863); *Springtime; Columbus and America*, in the Corcoran Gallery, at Washington, District of Columbia; and in the same gallery a replica of *The Last Days of Napoleon*. He died at Bellinzona, Switzerland, Oct. 3, 1891.

VELASCO, a town of Brazoria County, southeastern Texas, at the mouth of the Brazos River, 20 miles S. of Columbia, on the Velasco Terminal railroad. It has a good harbor, made by jetty-work at the mouth of the river, at a cost of \$1,500,000, and is the principal shipping-point of that part of Texas for cotton and her other products. There are five churches, educational advantages, a national bank, an electric light and power plant and several manufacturing factories. Population, 475.

VELAZQUEZ, DIEGO (1465-1523), conqueror of Cuba. See CORTES, Vol. VI, pp. 441, 442.

VELDEKE, HEINRICH VON. See GERMANY, Vol. X, p. 523.

VELEZ, a town of Santander Department, northern Colombia, on a mountain side 7,185 feet above

sea-level, about 100 miles S.S.W. of Bucaramanga, the capital of the department; founded in 1539, for sake of defense, in a position surrounded by precipices, and accessible only by a dangerous road. It has since continued to retain its importance as one of the chief towns of the department. The neighboring country is all famous for its natural curiosities and scenery. Population, about 8,000.

VELIA, a Greek town. See ELEA, in these Supplements.

VELIGER, a larval stage which occurs in the life-history of the majority of gasteropodous mollusks. It has many similarities to the larva of the annelids known as the trochophore. The larva is called veliger, because it possesses a peculiar structure known as the velum. This consists of two large lateral wing-like expansions of the body, which are ciliated. It is an organ of locomotion, and exists only in the free-swimming larval stage.

VELLUM. See PARCHMENT, Vol. XVIII, p. 271.

VELOCIMETER, a chronograph. See GUNNERY, Vol. XI, pp. 297-301; and BALLISTICS, in these Supplements.

VELOCIPEDA. See TRICYCLE, Vol. XXIII, pp. 559-560.

VELOCITY. See ACCELERATION, Vol. I, pp. 79, 80.

VENABLE, CHARLES SCOTT, an American educator; born in Prince Edward County, Virginia, April 19, 1827; educated at Hampden-Sidney College and the University of Virginia, completing his studies at the universities of Berlin and Bonn. He was professor of mathematics at Hampden-Sidney College from 1848 to 1856; filled the chair of physics and chemistry in the University of Georgia during 1856, and that of mathematics and astronomy in the University of South Carolina from 1858 to 1861. In 1860 he viewed the solar eclipse in Labrador. During the Civil War he was lieutenant-colonel on the staff of Gen. R. E. Lee, and in 1865 became professor of mathematics at the University of Virginia. He became known as the author of a series of mathematical text-books.

VENANTIUS. See FORTUNATUS, Vol. IX, p. 469.

VENATION. See BOTANY, Vol. IV, pp. 109, 110.

VENDEAN INSURRECTION. See FRANCE, Vol. IX, pp. 605, 606.

VENDEMAIRE, the first month of the French Revolutionary calendar. See FRANCE, Vol. IX, p. 606.

VENDETTA. See SARDINIA, Vol. XXI, p. 309.

VENDÔME, a distinguished French family founded by a natural son of Henry IV by Gabrielle d'Estrées, CÉSAR, on whom was conferred the ancient countship of Vendôme. César was born in 1594, and during a great part of his career was engaged in various conspiracies and intrigues against Louis XIII and Richelieu, and later against Cardinal Mazarin, but having become reconciled to the court he was appointed great admiral of the French navy, and defeated the Spanish fleet in 1655, off Barcelona. He died in 1665.—His son, LOUIS, Duc de Vendôme, French soldier and cardinal, born in 1612; during the lifetime of his father was known

as Duc de Merceur; served in the wars of Louis XIII, and in 1649 was appointed by Mazarin viceroy of Catalonia. Upon the death of his wife, niece of Cardinal Mazarin, he entered the priesthood in 1656, and in 1667 was made a cardinal. He died Aug. 6, 1669.—His brother FRANÇOIS DE VENDÔME, Duc de Beaufort, a French politician and admiral; born in 1616; popularly known as *Roi des Halles*, "king of the markets," owing to his sympathy with the people during the disturbances of The Fronde. He, however, returned to allegiance to the crown, was appointed admiral of the French fleet in 1662, by Louis XIV, and in 1669 was killed at the siege of Candia.—A son of Louis, LOUIS JOSEPH, Duc de Vendôme, a French soldier; known during his father's lifetime as Duc de Penthièvre; born at Paris, July 1, 1654; entered upon his military career as a life-guardsmen during the Dutch campaign of 1672, afterward serving under Turenne in the Netherlands, Germany and Alsace, and under Créqui in Flanders. Released from service for a time by the peace of Nimwegen (1678), he retired to a life of indulgence in all kinds of pleasure, but on the outbreak of the war of the Palatinate in 1688, he was ordered to the Netherlands, and under Luxembourg participated in the sieges of Mons and Namur and at the battles of Leuze and Steenkerke. Under Catinat, in Italy, he commanded the left wing at the battle of Marsaglia, in 1693. Owing to Vendôme's indolent nature and careless habits, Louis XIV hesitated for a long time before giving him an independent command, but finally, in 1696, he was put in charge of the army in Spain, and after a series of brilliant successes captured Barcelona in 1697, enabling Louis XIV to make the favorable treaty of Ryswick. He superseded Villeroi in Italy in 1702, reorganized the army, gained the victories of Ustiano and San Vittorio, and at Luzzara fought an indecisive battle with Prince Eugene. After defeating the Austrians under Starhemberg repeatedly, and attempting unsuccessfully to pass through the Tyrol into Germany in the spring of 1703, he began the siege of Turin. In the spring of 1706, he defeated the Austrians again at Calcinato, and during Eugene's absence in Vienna drove them beyond the Adige. In the summer of 1706 he was called to supersede Villeroi in the Netherlands, but was defeated by Marlborough and Eugene at Oudenarde, July 11, 1708, and owing, it is said, to the intrigues of Madame de Maintenon, was removed from his command. In 1710 the French situation in Spain had become extremely critical; the Austrians and English were carrying everything before them, and in compliance with the urgent request of Philip V, Louis XIV sent Vendôme into Spain. The Duke raised and organized an army, defeated the English at Brihuega, the Austrians at Villaviciosa, thus finishing the war and carrying the King back to Madrid. Philip V made Vendôme a prince of the blood royal, and presented him with five hundred thousand livres, a gift which he distributed among his soldiers. After this he fell back into his old life of excessive indulgence, and died at Tifaroz, Valencia, June 11, 1712.—His brother, PHILIPPE DE VENDÔME, a French general; born Aug. 23, 1655; served under

his brother in Italy and the Netherlands; was great prior of the Knights Templars in France. Upon his death, Jan. 24, 1727, his family became extinct, and the duchy of Vendôme reverted to the crown.

VENDOR'S LIEN. See **LIEN**, in these Supplements.

VENEREAL DISEASES. See **SURGERY**, Vol. XXII, pp. 686, 687; and **SURGERY, AMERICAN**, in these Supplements.

VENETIAN ARTS. See **VENICE**, Vol. XXIV, pp. 148-157.

VENEZUELA, REPUBLIC OF. (For general article on VENEZUELA, see Vol. XXIV, pp. 139-141.)

AREA AND POPULATION. The latest reports of the area and population were those of 1894, viz.: Total area, 593,943; population, 2,444,816; density per square mile, 4.1. Of the total population in 1890, 326,000 were native Indians.

CONSTITUTION AND GOVERNMENT. The present constitution dates from 1830, revised March 28, 1864, and April, 1881. Its general model was that of the United States, but with numerous modifications. At the head of the central executive government stands a President, elected for the term of two years, exercising his functions through six ministers and a Federal Council of 19 members. The Federal Council is appointed by the Congress every two years; the Council chooses a president, who is also President of the republic. Neither the President nor members of the Federal Council can be re-elected for the following period. The President has no veto power. The legislation for the whole republic is vested in a Congress of two houses, called the Senate (three Senators for each of the eight states and the Federal district), and the House of Representatives (one to every 35,000 of population). The Senators are elected by the legislature of each state, and the Representatives by "popular, direct and public election." The congresses of states are elected by universal suffrage. Both the Senators and the Representatives are elected for four years. In 1898 there were 24 Senators and 52 Representatives.

Each province or state of the republic has its own legislature and executive, as well as its own budget and judicial officers, and the main purpose of their union is that of common defense. The administration of the territories and colonies is intrusted to the government of the Federation.

BOUNDARY DISPUTES. In 1891 the frontier dispute with Colombia was decided by the arbiter (Spain) in Colombia's favor, and the southwestern boundary is now formed by the rivers Arauca, Orinoco, Atabopo and Negro, while the whole peninsula of Goajira and the town and territory of San Faustino (on the Santander border) belong to Colombia. During 1880-82 a Venezuela-Brazilian commission had marked off a definite southern frontier. Venezuelan maps, moreover, extend the northeastern boundary along the coast as far as the mouth of the Essequibo River, instead of only to that of the Amacuro, and between lat. 1° and 4° N. push the frontier even beyond the Essequibo, cutting a large tongue-like territory out of British Guiana. Of this, however, the British colonial gov-

ernment formally took possession in 1892, and during the three succeeding years steadily refused all requests of the Venezuelan government for an arbitration of the disputed question. In the United States there was a popular feeling* that Great Britain was aiming to secure control of the mouth of the Orinoco by force, without the shadow of a legal claim, and efforts of the United States government, through its representative at London, to secure arbitration were warmly approved. This sentiment was strengthened early in 1895 by the reported discovery, in Hawaii, of a map sent out by the British foreign office in 1882—a map in which the boundary between Venezuela and British Guiana was defined in precise accordance with the claims made by Venezuela ten years later. Feeling in regard to the matter ran very high in the United States in the latter part of 1895 and early part of 1896, resulting in President Cleveland sending a message to Congress, in which he asserted anew the resolution of the United States to prevent any violation of the Monroe doctrine. In order that a clearer understanding of the matter might be arrived at on the part of the United States, a commission, known as the Venezuelan Boundary Commission, was appointed to collect all the facts in the case. In November, 1896, Lord Salisbury announced an agreement to arbitration by a board to consist of two representatives of Great Britain, two of the United States, and a fifth to be selected by King Oscar II of Sweden. For the terms of arbitration, see *Venezuelan Imbroglia*, under UNITED STATES, in these Supplements, p. 2999.

Since as early as 1846 the country has experienced spasmodic outbreaks of revolution. The last civil war of this character occurred in 1892, resulting in General Joaquin Crespo being proclaimed provisional President by a meeting of military and political leaders, Oct. 10. His government was formally recognized by the United States minister at Caracas, Oct. 25. At the next election, Oct., 1893, he was elected President for the term beginning Feb. 20, 1894. On March 1, 1898, he was succeeded by General Ignacio Andrade. Crespo was killed in a skirmish with the partisans of General Hernandez, April 17, 1898.

The population of Caracas, the capital, in 1888 was 70,466 (72,429 in 1891); Valencia, 38,654; Maracaibo, 34,284; Barquisimeto, 31,476; Barcelona, 12,785; Ciudad de Cura, 12,198; Merida, 12,018; Ciudad Bolivar, 11,686; Guanare, 10,880.

REVENUE AND EXPENDITURE. The revenue for 1896-97 was \$9,179,572; expenditure, \$19,741,190. The chief source of revenue is customs, \$5,000,000. In 1898-99 the sanctioned estimates were, revenue, \$6,562,980; expenditure, the same. The total external and internal debt in 1897 was \$47,885,212.

EDUCATION AND RELIGION.—*Education.* In 1870 education was made free and compulsory; at that time only ten per cent of the adult population was able to read and write. In 1891 there were, for primary instruction, 1,415 Federal and 151 state schools, with 100,026 pupils. Beside these, there were four normal schools, and one school of arts and trades. To support the schools directly de-

pending on the government, the sum of \$500,000 was spent in 1890. Higher education was given in 2 universities, 22 Federal colleges, 11 national colleges for girls, schools for fine arts, for music, 1 polytechnic school, 26 private colleges and a nautical school. In Caracas is the national library, with 32,000 volumes, and the National Museum.

Religion. The Roman Catholic is the state religion, but there is toleration of all others, though they are not permitted any external manifestations.

ARMY AND NAVY. In 1898 the army numbered 3,600 officers and men, dispersed in twenty towns of the republic, and in Federal garrisons and ships.

Besides the regular troops there is a national militia, in which every citizen, from his eighteenth to his forty-fifth year inclusive, must be enrolled. Recent intestine wars were chiefly carried on by the militia, which in times of civil war has been increased to 60,000 men. The number of citizens liable for military service, according to law, was 250,000 in 1889. The navy consists of 3 steamers, 2 sailing-vessels, and some small river gunboats.

COMMERCE. Nearly six-sevenths of the value in imports were subject to duty in 1898. The imports for 1889-90 amounted to \$16,725,000, and the exports \$20,180,000; for 1895-96 the exports were \$21,176,477, the chief items being coffee, \$16,954,000; cocoa, \$1,930,000; hides and skins, \$569,800; gold, \$2,358,000; other exports included gold and silver coin, cattle, caoutchouc, timber, and cocoanuts.

SHIPPING AND COMMUNICATIONS.—Shipping. In 1897, 730 vessels, of 813,487 tons, entered and cleared from the ports of LaGuaira, Maracaibo, and Ciudad Bolivar. Venezuela had, in 1898, 11 steamers, with total net tonnage of 2,185 tons, and 17 sailing-vessels, with total net tonnage of 2,760 tons.

Communication. There were, in 1898, 505 miles of railway in operation, and 1,000 miles under consideration. In 1889-90 there were conveyed 6,071,365 letters and parcels inland, and 343,936 abroad. In 1880 Venezuela joined the General Postal Union. In 1898 there were 214 post offices. In 1898 there were 3,882 miles of telegraph lines and 113 telegraph offices; 200,021 telegrams were sent in 1893; expenses (1895), \$183,992. In Dec., 1893, one company had in use 776 telephone instruments and 2,097 subscribers, while another company has established connections between various centers.

VENEZUELA, GULF OF. See *MARACAIBO, GULF OF*, in these Supplements.

VENEZUELAN BOUNDARY QUESTION. See *UNITED STATES*, in these Supplements.

VENIAL SINS. See *LIGUORI*, Vol. XIV, p. 637.

VENI CREATOR SPIRITUS. See *HYMNS*, Vol. XII, p. 583.

VENIRE FACIAS. See *WRIT*, Vol. XXIV, p. 696.

VENISANCTE SPIRITUS. See *HYMNS*, Vol. XII, p. 583.

VENN, JOHN, a Cambridge University logician; born 1834. See *LOGIC*, Vol. XIV, p. 801.

VENOM. See *PATHOLOGY*, Vol. XVIII, p. 399; *SNAKES*, Vol. XXII, pp. 191, 192.

VENOSA (ancient Venusia), a city of the province of Basilicata, in southern Italy, 100 miles

S.E. of Naples. The Norman Abbey of the Holy Trinity, founded by Robert Guiscard, though now in ruins, is imposing. But the un-failing interest of Venosa arises from its being the birthplace of Horace. In one of the streets is a column surmounted by a bust of the poet, and many of the localities of the vicinity can be identified with the places he has immortalized. It was also the scene of a defeat of the Romans by the Carthaginians under Hannibal, and of the death of the Roman Consul Metellus at that time.

VENOUS BLOOD. See *VASCULAR SYSTEM*, Vol. XXIV, pp. 105, 106.

VENTILATION, MINING. See *COAL*, in these Supplements.

VENTRICLES. See *ANATOMY*, Vol. I, pp. 870-872.

VENTRILOQUISM, a term literally meaning speaking from the belly, from which the sound of the voice appears to emanate. The name is thus founded on a misconception. The art depends upon producing sounds which the hearer refers to some place other than the source from which it really proceeds. Ventriloquists possess no peculiarities of the vocal organs. The main reliance of the ventriloquist in regard to disguising the voice is to take a deep inhalation of breath, while the air is expired slowly through the contracted glottis, the diaphragm being at the same time in a depressed condition, the thoracic muscles alone coming into use in expelling air from the lungs, the tones of the voice being further modified by the control of the muscles of the upper part of the throat and the palate. By availing himself of the tricks of prestidigitators, by the use of figures, etc., and other illusions, the ventriloquist is greatly aided in mystifying an audience.

VENUS. See *APHRODITE*, Vol. II, pp. 171-173.

VENUS, planet. See *ASTRONOMY*, Vol. II, pp. 791, 792, 796; and in these Supplements.

VENUS'S FLOWER-BASKET, a name given by collectors to the glass-sponges (*Hexactinella*) of the genus *Euplectella*. The six-rayed siliceous spicules are united into a long cylindrical tube of network, closed at one end. The skeletons are very delicate, and exceedingly beautiful. They are found near the Philippine Islands. See *GLASS-SPONGE*, in these Supplements.

VENUS'S FLY-TRAP. See *INSECTIVOROUS PLANTS*, Vol. XIII, pp. 136, 137.

VERAGUA OR VERAGUAS, a territory of the Republic of Colombia, in the western part of the Isthmus of Panama, discovered by Columbus in 1502, and named by him, supposedly, from a river or Indian town. He attempted to form a settlement there, but was driven off by the Indians. The dukedom of Veragua having been created for the heirs of Columbus, Maria de Toledo, acting for her son, Luis Columbus, sent an expedition to conquer it in 1535, but the country was abandoned.

VERAGUA (DON CRISTÓBAL COLON DE TOLEDO DE LA CERDA Y GANTE), DUKE OF, Marquis of Jamaica, and Admiral and Adelantado Mayor of the Indies, the thirteenth in descent from

Christopher Columbus. He was born in Madrid in March, 1837; educated at the University of Madrid, receiving a legal training. Entering political life as a Liberal, he was elected, in 1871, to the Cortes as the Representative of Arevalo, and for a short time, in 1874, was a member of

the municipal council of Madrid. In 1876 he was re-elected to the Cortes, and in 1878 was made a Senator. At different periods he was Minister of the Interior, Vice-President of the Senate, and Royal Commissioner of Agriculture. He was one of the presidents of the American Congress in 1881 at Madrid. He



DUKE OF VERAGUA.

is identified with the cattle-breeding industry in Spain, and has a reputation for his breed of fighting *toros*. The Duke and Duchess were guests of the United States in 1893, and were present at the opening ceremonies at the World's Columbian Exposition in Chicago, May 1st of that year. The Duke is a descendant of Francesca, sister of Diego Columbus, great-grandson of Columbus, with whom the male line became extinct on his death in 1578. Diego's father was Luis (born 1521, died 1572), who was the son of Diego (born 1476, died 1526), the son and successor of Christopher. In 1536, Luis, having abandoned his claims, inherited from his grandfather, to the viceroyalty of the Indies, received in return the titles that have descended to the present Duke, besides a grant of 25 leagues square, in Veragua, Panama, and the island of Jamaica, in fief. In 1556 these fiefs were withdrawn, being replaced by a pension, which has been payable out of funds derived from Cuban sources. On the death of Diego in 1578, the succession was contested; the lawsuit lasted thirty years, but was settled in favor of the descendants of Isabel, sister of Luis. In 1733, this line becoming extinct, fresh litigations arose, which settled the succession on the descendants of Francesca, sister of Diego, the great-grandson of Columbus, in which line it has remained.

VERATRINE. See **VERATRUM**, Vol. XXIV, p. 163.

VERAZZANO, GIOVANNI, an Italian navigator and explorer; born at Florence, Italy, about 1486. In 1522 he is said to have captured the rich treasure-ship in which Cortes was sending to Charles V of Spain the spoils of Mexico, valued at \$1,500,000. With a ship belonging to Francis I, king of France, he started from the island of Madeira westward in 1524, in order to reach "Cathay." He landed near Cape Fear, in North Carolina, and followed the shore to New York Bay; thence he sailed to Newport, Rhode Island, and Portsmouth, New Hampshire. After his return to France he made a second voyage to America, but was captured by Spaniards, and hanged as a pirate at Colmenar, Spain, in 1527.

VERB. See **GRAMMAR**, Vol. XI, pp. 41, 42; **PHILOLOGY**, Vol. XVIII, pp. 789, 790.

VERBECK, GUIDO FRIDOLIN, a Dutch-American missionary and official under the Japanese government; born at Zeist, Holland, Feb. 1, 1830; received his education at the Moravian Academy of his native place, and in America, at the Theological Seminary at Auburn, New York, after having been engaged as a mechanical engineer in Wisconsin from 1852 to 1856. On leaving Auburn in 1859 he went to Japan as a missionary of the Dutch Reformed Church. In Japan the government secured his services in educational work in 1863, and in 1869 he became superintendent of the foreign department in the University of Tokyo. From 1873 until 1879, when he resumed his missionary labors, he was engaged in translations for the government; in 1891 he was appointed teacher of theology in the Meiji Gakuin. All the while he was engaged in missionary work, in translating the Old Testament, and in work connected with the New Testament Revision Committee. His translations for the Japanese government included *The Code Napoleon; Two Thousand Legal Maxims; Bluntschli's Staatsrecht*; the constitutions of several foreign countries, etc. He also published, in 1883, a *History of Protestant Missions in Japan*. He received the third class decoration of the Rising Sun in 1877. Died in Tokyo, March 9, 1898.

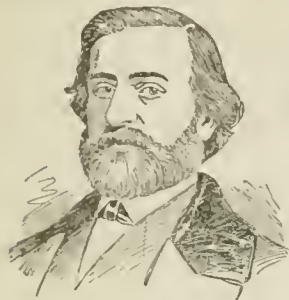
VERBENACEÆ. See **VERBENA**, Vol. XXIV, p. 163.

VERBOECKHAVEN, EUGÈNE JOSEPH, a Belgian animal-painter; born at Warneton, June 9, 1799; was trained under his father, Barthélemi Verboeckhaven. As a painter of animals his works are famed and greatly appreciated for their exquisite coloring. He essayed portraiture and sculpture, in the latter producing a well-known work, *Meditation*. He was elected a member of the academies at Brussels, St. Petersburg, Antwerp, Amsterdam and Ghent; was a chevalier of the Legion of Honor and commander of the orders of Leopold of Belgium, of Michael of Bavaria, of Christ of Portugal, and of Francis Joseph of Austria, and received the Iron Cross. Among his works are *Flemish Landscape and Cattle; A Frightened Bull; and Sheep and Twin Lambs, Scotch Highlands*, purchased for \$3,460 at the Latham sale in New York City (1878); *Sheep, an Interior*. He died at Brussels, Jan. 19, 1881.

VERD-ANTIQUE, a variety of marble, usually green, but frequently intermingled or veined with white, yellow, black or red. It consists chiefly of serpentine, with varying quantities of calcite and dolomite, as well as mixtures of iron or chromium oxides. It is a highly ornamental stone, and used for ornamental purposes. Fine specimens have been discovered in the ruins of Roman buildings, and it is yet much prized in Italy. The name has been given, in America, to green stones capable of receiving a polish, and to green marbles, varieties of the former being found at Roxbury, Vermont, and of the latter at Milford, Pennsylvania. Serpentine, clouded and

veined with gray or whitish limestone, found at New Haven, Connecticut, and Newbury, Massachusetts, have also received the name. The name was originally given to those varieties found in Italy, Greece and Egypt. Oriental verd-antique is green porphyry very similar in structure and texture to rosso antique.

VERDI, GIUSEPPE, an Italian composer, the son of an innkeeper at Roncole, in the duchy of



GIUSEPPE VERDI.

Parma, was born in 1814, and studied at Milan. His first work of any importance was the incidental music to a drama, *Oberto, conte di San Bonifazio*, but he quickly rose to supremacy on the opera stage with such works as *I Lombardi*; *Ernani*; *Rigoletto*; *Il Trovatore*; *La Traviata*; *Un Ballo in Maschera*; *Aida*; and *Montezuma*. A fine dramatic gift and a love for showy, taking melodies lie at the root of Verdi's remarkable success. In 1874 he composed the *Requiem* for Alessandro Manzoni. His noted work, *Otello*, was produced at Milan in 1886, and was reproduced in London in 1889. Verdi lived, of late, near the village where he was born; he died January 27, 1901. He celebrated his jubilee as a composer in November, 1889. In 1893 he scored a splendid success with his opera of *Falstaff*.

VERDICT. See JURY, Vol. XIII, p. 785.

VERDIGRIS. See COPPER, Vol. VI, p. 351.

VERDON, SIR GEORGE FREDERIC, an Australian public man; born in Lancashire, England, Jan. 21, 1834; went to Melbourne, Australia, in 1851, and engaged in commercial pursuits. He was one of the first members of the volunteer force established in 1854 for the defense of the colony, and in 1859 was elected member for Williamstown, and in the following year became a minister of the crown. As honorary secretary to the Astronomical Observatory, and as a member of the government, he was enabled to secure the satisfactory establishment of the observatory on a permanent footing. In 1866 he was sent to England to bring the subject of the defense of the colony before the home government, and carried out the mission successfully. He was general agent of the colony in England (1867-72); was nominated a K.C.M.G. in 1872, and has been for years president of the trustees of the Public Library, Museums and National Gallery of Victoria.

VERE, AUBREY THOMAS DE. See DE VERE, in these Supplements.

VERESTCHAGIN, VASSILI, a Russian painter; born Oct. 26, 1842, at Tcherepovets, in the government of Novgorod. He became a pupil of Gérôme at Paris. In 1867 he was with Kauffmann in the Turcoman campaigns, the fruits of which he put on canvas in Munich; and he reaped a richer artistic harvest from a visit to India in 1874.

Still more famous were his painfully realistic pictures of the battle-fields of the Russo-Turkish war of 1877. In 1884 he made another journey to India, visiting, by the way, Syria and Palestine, and subsequently produced a series of striking but anticonventional pictures of the life of Christ and other sacred themes. He also painted gigantic pictures of the execution of mutinous sepoy by English soldiers, and of Nihilists by the Russian authorities. As an author he has given us autobiographical sketches of his travels. A collection of his works was exhibited at New York and Chicago in 1888-89.

VERGA, GIOVANNI, a Sicilian novelist; born at Catania in 1840, and commenced his literary career in 1865 with two stories, which, in later life, he repudiated. Four years later he published *Storia di Una Capinera*, a psychological story in the form of letters. He next produced a series of society novels, including *Eva*, which reached a fifth edition in 1880; *Nedda* (1874); *Eros* (1875); *Tigre Reale* (1875); *Primavera* (1877); following these up with a series illustrating the humors and passions of sequestered rustic life, including *La Vita dei Campi* (1880), this collection containing the tale *Cavalleria Rusticana*, which Pietro Mascagni made the basis of his opera of that name. Among Verga's other works may be noticed *I Malavoglia* (1881); *Il Marito di Elena* (1882); *Il Come, Il Quando ed il Perché* (1882); *Pane Nero* (1882); *Novelle Rusticane* (1883); *Per le Vie* (1883); *Vagabondaggio* (1887); *Master Don Gesualdo* (1889); *I Ricordi del Capitano d'Arce* (1892); *Don Candeloro* (1893). *The House by the Medlar Tree* was translated, and appeared, with a preface by Howells, in New York in 1890; and *Under the Shadow of Etna*, Sicilian stories, including *Rustic Chivalry* (*Cavalleria Rusticana*), in Boston in 1896.

VERGENNES (CHARLES GRAVIER), COMTE DE, a French statesman; born at Dijon, Dec. 28, 1717; was educated at the Jesuit College, and from 1740 to 1774 engaged in the diplomatic service. When Louis XIV ascended the throne, Vergennes became his Minister of Foreign Affairs (1774), in which capacity he favored the cause of American liberty, and in 1777 secured the use of money and war materials for the colonial armies, and also the co-operation of the French army and navy. He lent the Americans steady and efficient support in their struggle for independence, at a time when success seemed improbable, and in opposition to the views of the Prime Minister and Secretary of the Treasury of France. Finally, he was a party to the treaty of peace signed at Paris, Sept. 3, 1783, by which American independence was definitely recognized. He died at Versailles, Feb. 13, 1787.

VERGIL. See VIRGIL, Vol. XXIV, pp. 248-255.

VERIFICATION, a term used in common-law, equity and code pleading to signify, in common law pleading, the concluding statement appended to a party's averments of new matter. It generally takes the form of "and this he is ready to verify." In equity and code pleading the word is used to signify the affidavit annexed to a plead-

ing, verifying the same upon information and belief. The subject belongs essentially to the legal profession, and is fully treated in Stephen's *Principles of Pleadings in Civil Actions* and Daniell's *Chancery Practice*.

VERJUICE. See APPLE, Vol. II, p. 212.

VERLAINE, PAUL, a French poet, born at Metz, March 30, 1844, and became a French citizen in 1873. He began his poetical career as an exponent of the forms of "symbolism" and "decadence," with *Poèmes Saturniens* (1865); *Les Fêtes Galantes* (1869); and *La Bonne Chanson* (1870). Then followed a dozen years of silence, of Bohemianism, of the hospitals, and of Villon-like adventures, round which legends enough have already clustered. His next work, *Sagesse* (1881), breathed penitence and devotion in verse of singular sweetness. *Les Poètes Maudits* (1884), a volume of literary criticism, was followed by *Jadis et Naguère* (1885); *Romances sans Paroles* (1887); *Amour* (1888); *Bonheur* (1889); *Parallèlement* (1890), the last a strange collection, the poet singing alternately perverse sin and religious repentance; and *Mes Hôpitaux* (1891), a collection of notes and conversations written in the various hospitals where he spent so much of his life. As a perfect mirror of human impressions, Verlaine's lyrics are unequaled in modern France, and many show a marvelous mastery over novel forms of rhythm. He died at Paris, Jan. 8, 1896.

VERMEJO, a river. See PLATE, Vol. XIX, p. 188.

VERMES. See WORMS, Vol. XXIV, pp. 677-684.

VERMICELLI. See MACARONI, Vol. XV, p. 125.

VERMILLION, a city and capital of Clay County, southeastern South Dakota, on the Vermillion River, 35 miles N.W. of Sioux City, Iowa, on the Chicago, Milwaukee and St. Paul railroad; situated in a stock-raising and agricultural region; it has flour-mills and also a brickyard, a good water-supply and two banks. Here is also located the University of South Dakota (non-sectarian), having an attendance, in 1895, of 300, with a corps of 14 instructors. The university was organized as the University of Dakota in 1882 and became the University of South Dakota in 1893. It has a campus of twenty acres, and grants four master and four bachelor degrees to students in the departments of art and science. The population of Vermillion in 1890 was 1,496; in 1900, 2,183.

VERMONT had a population, in 1900, of 343,641; that of 1890 was 332,422, the gain constitut-



SEAL OF THE STATE OF VERMONT.

ing an increase of 3.3 per cent. The density of population was given as 37.6 to the square mile in the twelfth census returns. Of the 14 counties of the State only 8 have increased in population dur-

ing the decade, while 6 show a decrease. The chief increase is shown in the counties of Washington, Grand Isle, and Chittenden. Essex shows the largest percentage of decrease. Of the incorporated cities and villages, the most populous of which are Burlington, Rutland, Barre, St. Albans, and Montpelier, only 13 had a population of more than 2,000 in 1900.

The gross area of Vermont is 9,565 square miles, of which 430 square miles is water surface.

The cereals are not extensively raised in Vermont, but the soil is productive, and agriculture is intelligently carried on.

The following table is derived from the census reports of 1890, giving the crops of 1889:

	ACREAGE.	PRODUCTION.
All cereals	185,004	5,916,782
Corn	41,790	1,700,688
Wheat	8,397	164,720
Oats	101,582	3,316,141
Barley	16,427	420,761
Rye	3,378	43,256
Buckwheat	13,429	271,216

Farm statistics for 1880 and 1890:

	1880	1890
Whole number of farms	35,522	32,573
Average number of acres	137	135
Total acres in farms	4,882,588	4,395,646
Percentage of improved land	69	60
Total value of farms, fences, buildings, machinery and live-stock	\$130,811,490	\$101,805,370
Number of horses	75,215	89,969
Number of mules and asses	283	330
Number of milch cows	217,033	231,419
Total number of cattle	403,105	395,288
Number of swine	76,384	92,083
Number of sheep	439,870	333,947

Division of farms according to size:

Under 10 acres	1,321
Over 10 and under 20	1,591
Over 20 and under 50	3,595
Over 50 and under 100	7,002
Over 100 and under 500	18,689
Over 500 and under 1,000	396
1,000 acres and over	69

The tenure under which the farms of the state are held is: Cultivated by the owners, 27,816; rented for fixed money value, 2,301; rented on shares, 43.

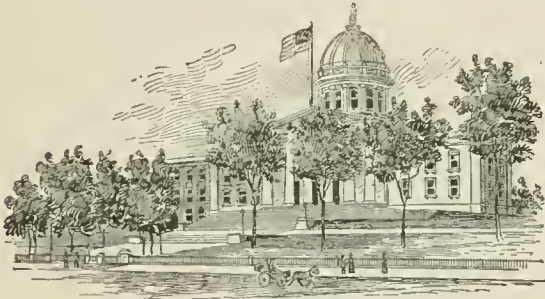
Vermont has always stood high in the production of sheep and wool, and in 1890 was three sheep to each square mile of land surface. Between 1880 and 1890 the weight of fleeces was increased from 5.80 to 6.72 pounds each. The state led in the percentage of full-blood sheep or grades of half-blood and upwards, having 91.01 per cent.

Of horses and cattle in 1890, the number of the former foaled was 9,009, and the number of milch cows to each hundred inhabitants, 69.6. In 1895 there were 190 public creameries in the state, utilizing the milk from one hundred thousand cows. In 1889 Vermont stood first among the states in the average yield of flaxseed per acre

and in the average value of products per acre. Maple sugar is produced in large quantities, the crop of 1889 being of the value of \$1,248,856, and in 1894 Vermont produced fully one third of the product of the United States for the year, the bounty alone yielding a return of \$81,270. Hops are among the farm products, the pick of 1889 being 51,705 pounds. The following returns are to Jan. 1, 1895:

Horses	93,877	\$4,304,596
Milch cows	253,403	6,925,504
Oxen and cattle	146,574	3,039,814
Sheep	226,938	363,464
Swine	77,031	730,007
Totals	797,823	\$15,363,385

The mineral products of Vermont for 1889 amounted to \$5,674,022. The output of stone was given at \$3,789,709. Slate led, with a return of \$596,997; granite came next, with \$332,548; limestone of the value of \$195,066 was quarried; and large quantities of soapstone were placed on



STATE CAPITOL BUILDING, MONTPELIER.

the market. Manganese and ocher gave large returns, and the value of the mineral waters sold was reported at \$11,975.

In 1895 there were 170 quarries in Vermont, from which products largely increased over those of the census year were reported. Two thirds of the marble produced in the United States came from Vermont during the year mentioned, and in the marble quarries and mills over \$19,000,000 were invested. From 1892 to 1896 the annual production reached an average of \$4,000,000. The granite output was, in 1895, a little in excess of \$1,000,000; slate, for roofing purposes, reached \$800,000; and many other minerals of lesser importance than those named were reported.

In 1894 the railroads of Vermont reported a total mileage within the state of 1,217. The business was almost entirely controlled by two lines—the Central Vermont and the Boston and Maine railway companies.

From the returns made for the eleventh census, it appears that there were 3,031 manufacturing industries in Vermont, in which the capital invested amounted to the sum of \$32,763,291, employing 24,894 persons, whose annual wages were \$10,096,549. The cost of the materials used was estimated at \$20,433,174, and the value of the finished products \$38,340,066. Lumber in all forms amounted to \$8,712,577; flouring and grist mill products, \$2,890,174; woolen goods, \$2,723,-

683; paper, \$2,289,901; and monuments and tombstones, \$1,492,384. Other industries were cheese, butter, condensed milk, hosiery, knit goods, and foundry and machine-shop products, all of which exceeded \$1,000,000 in the value of the output.

Subsequent to the reports given above, manufacturing interests in Vermont were much stimulated in 1892, 1893 and 1894, the new capital invested amounting to more than \$3,000,000, and the employees were increased by five thousand persons. The lines showing the most improvement and in which the largest investments were made were furniture and cotton goods.

The assessed valuation of all property in Vermont on Jan. 1, 1890, was \$157,265,133, estimated to be about one-half the true value. For the fiscal year ending June 30, 1898, the ordinary revenue was \$1,065,030; expenditure, \$952,598. For the biennial period 1894 to 1896, the appropriations for all expenses were \$1,020,000, and the estimated resources with which to meet the same, \$1,024,655. Within the five years immediately succeeding 1890 there were sold, under legal process, 909 deserted or abandoned farms. On Jan. 1, 1898, the net state debt was \$515,500.

The state furnishes aid to many institutions that are not under state control. Among the charitable, educational and penal institutions are the following: Reform School, for boys and girls, at Vergennes; House of Correction at Rutland, for adults convicted of minor offenses; State Prison, at Windsor; new Insane Asylum at Waterbury, with a farm of 60 acres adjoining; and at Westminster a Home for Friendless Boys. The Home for Disabled Soldiers at Bennington had, in 1895, 127 inmates, whose maintenance cost the state \$17,317. At Brattleboro is an insane asylum, partly supported by the state. The few blind, deaf and dumb of Vermont are sent to the institutions of adjoining states.

The public schools of the state numbered, in 1895, 2,292, with 3,798 teachers. The school population was 80,152; the enrollment of the schools 65,548. The total school expenditures were \$783,805, of which \$561,809 was for salaries. The total value of the school property of the state was given, at the beginning of 1896, at \$1,022,086.

In addition to the pupils of the public schools, there were 3,118 children reported as attending parochial schools and 1,865 attending academies. Institutions of higher education are many in Vermont, and well sustained. The principal institution of higher learning in the state is the University of Vermont (q. v., in these Supplements).

In 1890 Vermont had 904 church organizations and 802 edifices. The membership aggregated 106,315, which was 31.98 per cent of the population. Baptists numbered 143 congregations, Roman Catholics 79, Congregationalists 198, all Methodists 234, and Protestant Episcopal 63. The total value of all church property was \$4,643,800.

On Jan. 1, 1899, there were 96 newspapers published in Vermont, of which 9 were daily, 5 semi-

weekly, 72 weekly, 1 every third week, and 9 monthly. Papers were published in 13 of the 14 counties of the state, and in 57 of the cities, towns, and villages, of which 12 were county seats.

Vermont has a National Guard having an actual strength of 790, which is the full authorized force. The entire force is formed into one brigade, consisting of one regiment and three infantry battalions, a battery of light artillery and a partially independent command of artillery cadets. The annual appropriation had been about fifteen thousand dollars for several years prior to 1896, supplemented by an amount from the Federal government averaging about three thousand dollars.

There are 14 custom-houses in Vermont, on the Canadian frontier, the imports passing through which, in 1894, aggregated the sum of \$4,392,555, and the exports \$7,004,401.

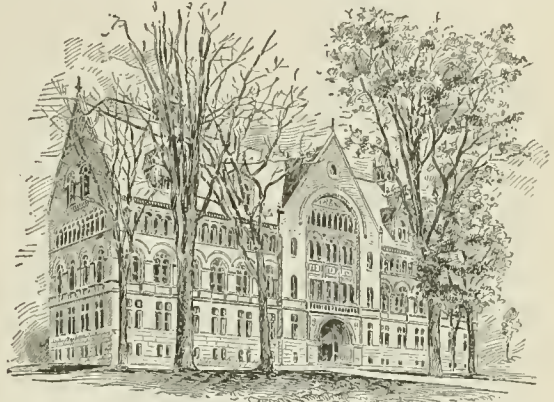
The following is a list of the principal cities and towns of Vermont, with the populations of 1900: Burlington, 18,640; Rutland, 11,499; St. Albans, 6,239; Brattleboro, 5,297; Barre, 8,448; St. Johnsbury, 5,666; Bennington, 5,656; Montpelier, 6,266; Bellows Falls, 4,337; Winooski, 3,783.

The following is a list of the governors of Vermont from 1791, the date of admission to the Union, together with their terms of office: Thomas Chittenden, 1791-97; Paul Bingham, 1797; Isaac Tichenor, 1797-1807; Israel Smith, 1807-08; Isaac Tichenor, 1808-09; Jonas Galusha, 1809-13; Martin Chittenden, 1813-15; Jonas Galusha, 1815-20; Richard Skinner, 1820-23; C. P. Van Ness, 1823-26; Ezra Butler, 1826-28; Samuel C. Crafts, 1838-31; William A. Palmer, 1831-35; S. H. Jenison, 1835-41; Charles Paine, 1841-43; John Mattocks 1843-44; William Slade, 1844-46; Horace Eaton, 1846-48; Carlos Coolidge, 1848-50; Charles K. Williams, 1850-52; Erastus Fairbanks, 1852-53; John S. Robinson, 1853-54; Stephen Royce, 1854-56; Ryland Fletcher, 1856-58; Hiland Hall, 1858-60; Erastus Fairbanks, 1860-61; Frederick Holbrook, 1861-63; J. Gregory Smith, 1863-65; Paul Dillingham, 1865-67; John B. Page, 1867-69; Peter T. Washburn, 1869-70; G. W. Hendee, 1870; John W. Stewart, 1870-72; Julius Converse, 1872-74; Asahel Peck, 1874-76; Horace Fairbanks, 1876-78; Redfield Proctor, 1878-80; Roswell Farnham, 1880-82; John L. Barstow, 1882-84; Samuel E. Pingree, 1884-86; Ebenezer J. Ormsbee, 1886-88; William P. Dillingham, 1888-90; Carroll S. Page, 1890-92; Levi K. Fuller, 1892-94; Urban A. Woodbury, 1894-96; Josiah Grout, 1896-98; Edward C. Smith, 1898. See VERMONT, Vol. XXIV.

VERMONT, a village of Fulton County, western Central Illinois, 15 miles N. E. of Rushville, on the Chicago, Burlington and Quincy railroad. It is in a stock-raising and agricultural section, and is engaged in the manufacture of wagons and clay products. Population 1900, 1,195.

VERMONT, UNIVERSITY OF, an institution of learning at Burlington, Vermont, chartered in 1791, organized in 1800, and graduated its first class in 1804. Lectures on medicine were given

from 1823 to 1834, but were suspended in the latter year, and resumed as a regular department in 1854. In 1865 the State Agricultural College was incorporated with the university, the official designation given being "The University of Vermont and State Agricultural College. The University has courses in arts; in civil, electric and mechanical engineering; in chemistry, medicine, and agriculture. The students' work may be specialized



WILLIAMS SCIENCE BUILDING.

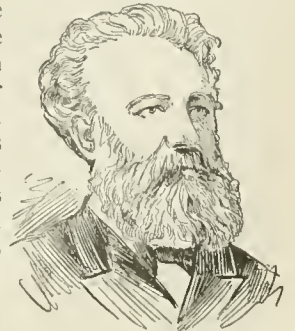
after the first year by taking elective courses. The institution is co-educational except in the medical department. It is a state institution, and not under any religious control. The buildings occupy a site overlooking Lake Champlain. The Billings library is a beautiful structure. A dormitory and science building were erected in 1895. The number of volumes in the library is 47,500. The productive funds amount to \$398,864; and the total income, including tuition fees, to \$70,214. The number of professors and instructors is 50; and the number of students (1895-96), 475. There are 32 scholarships in the academic department.

VERMUYDEN, CORNELIUS (1590-1660), a Dutch dyke-builder. See CAMBRIDGE, Vol. IV, p. 727.

VERNAL GRASS, a popular name of *Anthoxanthum odoratum*, an European grass which gives a very pleasant fragrance to drying hay. See also ANTHOXANTHUM, in these Supplements.

VERNATION. See BOTANY, Vol. IV, p. 115.

VERNE, JULES, a French author; born at Nantes, Feb. 8, 1828. He studied law, both there and at Paris. He began writing short pieces for the stage in 1850, and in 1863 commenced his series of marvelous stories, which have made his name almost a household word. The most famous of these were translated into English, and include *Five Weeks in a Balloon*; *Twenty Thousand Leagues Under the Sea*; *A Floating City*; *Adventures of Captain Hatteras*; *Trip to the Center of the Earth*; *The*



JULES VERNE.

Mysterious Island; *Michael Strogoff, the Courier of the Czar*; *Dick Sands, the Boy Captain*; and *Around the World in Eighty Days*. All these are characterized by a combination of scientific knowledge and imaginative power. An unsuccessful attempt on his life was made in March, 1886. Among his other works are *La Maison à Vapeur* (1880); *Le Rayon-Vert* (1882); *Christophe Colomb* (1883); *L'Étoile de Sud, le Pays des Diamants* (1884); *Château des Carpathes* (1892); *An Antarctic Mystery* (1898), etc.; also, with M. Lavallée, *Géographie Illustrée de la France* (1867-68); and, independently, a *Histoire Générale des Grands Voyages et des Grands Voyageurs* (1879). Among his works that have been dramatized are *Les Enfants du Capitaine Grant*; *Le Tour du Monde*; *Michel Strogoff*; and *Le Docteur Ox*. He also produced a drama in three acts, *Un Nèveu d'Amérique* (*A Nephew from America*; 1873).

VERNIER SCALE. See **VERNIER**, Vol. XXIV, p. 169.

VERNON, a town of Tolland County, northern central Connecticut, containing the city of Rockville (q.v., in these Supplements).

VERNON, a town and capital of Jennings County, southeastern Indiana, 23 miles S.E. of Columbus, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad. It is in an agricultural region, and has farm-machine and other manufacturing. There are also stone-quarries in this section. Population 1890, 613; 1900, 557.

VERNON, a city and the capital of Wilbarger County, northern Texas, on the Pease River, 165 miles N.W. of Fort Worth, on the Fort Worth and Denver City railroad. It is in a rich wheat-raising and cattle-grazing section, and has flour-mills, wheat-elevators and a cotton-gin. There are also five churches, a high school and a private bank. Population 1900, 1,993.

VERNON, GEORGE JOHN WARREN, BARON, the fifth of the title, an English scholar and philanthropist; born at Stapleford Hall, June 22, 1803. He was elected to Parliament in 1830, and supported the Reform Bill. On the death of his father in 1835, he went to the Upper House. Deprived of the incentive to political activity by this translation, he devoted himself to literary and philanthropic labors. In the former his exhaustive studies of Dante's works engaged him for over twenty years. In 1859 he produced a romance, *Febius e Brevis*, a notable achievement. His philanthropic spirit was evinced during the cotton famine in Lancashire, caused by the Civil War in the United States. His memory is also preserved in America by the town of Mount Vernon, Ohio, named in his honor, he having contributed largely to the endowment of Kenyon College, an Episcopal institution of learning at Gambier, near that place, the funds having been collected by Bishop Chase while on a visit to England. Died at Sudbury Hall, Derbyshire, May 31, 1866.

VERNON, ROBERT, an English patron of art; born in 1774. Originally he was a breeder of horses, at which he made a fortune, but having a natural taste for art, he collected the best specimens of British artists at his place, Ardington House, in

Berkshire. He bought directly from the artists. Sometimes he disposed of the works of an artist, but never without purchasing specimens in the improved style of the same artist. On Dec. 22, 1847, he presented the choicest select portions of this wonderful collection to the British government. It is known as the Vernon Gallery, and formed the nucleus of the National Gallery of British Artists, preserved in the South Kensington Museum, to which it was removed from Marlborough House. The collection consists of 162 pictures, all of which were the works of British artists, with two exceptions. Besides the paintings there were several pieces of statuary, including many busts, and Gibson's group of *Hylas and the Nymphs*. A portrait of Robert Vernon, by Henry W. Pickersgill, painted in 1846, and a bust by William Behnes, are in the National Gallery. He was elected an F.S.A., and died at London, May 22, 1849.

VERNON-HARCOURT, LEVESON FRANCIS, an English engineer; born at London in 1839; educated at Harrow, from which he went to Balliol College, Oxford, where he took a first-class in mathematics and natural science. For three years (1862-65) he was a pupil of Sir John Hawkshaw, and afterward his assistant. He established himself in business in London in 1875, and became engaged chiefly in hydraulic and maritime works. He was an expert witness before the Lords' committee on canals, rivers, water-supply, etc. He was appointed professor of engineering in University College, London; associate of the Institution of Civil Engineers in 1865, and member in 1871; and vice-president of the permanent committee of the International Maritime Congress of Paris. He received a Telford medal, three Telford premiums, and the Manly premium. He is the author of *Rivers and Canals* (1882); *Harbors and Docks: Their Physical Features, History, Construction, Equipment and Maintenance* (1885); *Achievements in Engineering* (1891); and of the articles RIVER ENGINEERING and WATER-SUPPLY in this ENCYCLOPÆDIA; besides important papers published in the *Proceedings of the Institution of Civil Engineers*, and read before the Royal Society.

VERNON LEE. See **PAGET, VIOLET**, in these Supplements.

VERONA, a town of Allegheny County, southeastern Pennsylvania, on the Allegheny River, and ten miles N.E. of Pittsburgh, on the Allegheny Valley railroad. It has manufacturing of explosives, tools and glass, and is the seat of the Allegheny Valley railroad-shops. Population 1890, 1,477; 1900, 1,904.

VERONA, CONGRESS OF. See **WELLINGTON**, Vol. XXIV, pp. 497, 498.

VERONICA. See **HORTICULTURE**, Vol. XII, p. 253.

VERPLANCK, GULIAN CROMMELIN, an American littérateur, was born in New York City, Aug. 6, 1786; graduated at Columbia College in 1801; practiced law a short time; traveled in Europe, and on returning to New York City became the center of a coterie of authors, and divided his

labors between literature and politics. He was elected a member of the New York legislature in 1820; professor of the evidences of Christianity in the General Protestant Episcopal Seminary, New York, from 1829 until the year of his death. He was a Democratic member of Congress (1825-33), and for some years from 1846 was president of the Board of Emigration Commissioners. He published *Evidences of Revealed Religion* (1824); *Doctrine of Contrasts* (1825); *Shakespeare's Plays, with his Life, with Critical Introduction and Notes* (1847), and other brochures, lectures and addresses. He died March 18, 1870.

VERRILL, ADDISON EMORY, an American naturalist, was born in Greenwood, Maine, Feb. 9, 1839; graduated at the Lawrence Scientific School, Harvard University, in 1862, and in 1864 became professor of zoölogy at Yale, in 1867 taking the additional duties of curator of the Peabody Museum, creating its zoölogical collection. He made a specialty of marine zoölogy, and since 1871 had charge of the dredging of marine invertebrates of the United States for the National Fish Commission. He contributed numerous papers to the *American Journal of Sciences*.

VERRIUS FLACCUS. See FESTUS, Vol. IX, p. 118.

VERSAILLES, a town and the capital of Ripley County, southeastern Indiana, on the Laughery Creek, 22 miles W. of Aurora, the nearest railway station being Osgood, on the Baltimore and Ohio Southwestern railroad. It is the center of an extensive farming region. Population 1900, 501.

VERSAILLES, a town and the capital of Woodford County, central Kentucky, 15 miles S.E. of Frankfort, on the Richmond, Nicholas, Irving and Beattyville and Southern railroads. It is in an agricultural and stock-raising section, and contains the Rose Hill Seminary, a co-educational institution with an attendance of 22 students in 1895. Population 1900, 2,337.

VERSAILLES, a town and the capital of Morgan County, central Missouri, 30 miles S.E. of Sedalia and 40 miles S.W. of Jefferson City, on the Missouri Pacific railroad. It is the center of a mining and farming region, and has excellent educational facilities. Population 1900, 1,240.

VERSAILLES, a village of Darke County, central western Ohio, on the Stillwater River, 41 miles N.W. of Dayton, on the Cleveland, Cincinnati, Chicago and St. Louis and the Cincinnati, Dayton and Chicago railroads, in an agricultural region. It has five churches and good educational facilities. Population 1900, 1,478.

VERTEBRÆ. See SKELETON, Vol. XXII, pp. 111, 112.

VERTEBRAL THEORY OF THE SKULL. See SEGMENTATION OF THE VERTEBRATE HEAD AND BRAIN, in these Supplements.

VERTEBRATE FOSSILS. See DISTRIBUTION, Vol. VII, pp. 281-283.

VERTEBRATE HEAD, THEORY OF THE CONSTRUCTION OF THE. See SEGMENTATION OF THE VERTEBRATE HEAD AND BRAIN, in these Supplements.

VERTUMNUS, a myth. See POMONA, Vol. XIX, p. 443.

VERUS, LUCIUS, a Roman emperor. See AURELIUS Vol. III, p. 87.

VERVAIN. See VERBENA, Vol. XXIV, p. 163.

VERY, JONES, an American poet and critic; born at Salem, Massachusetts, Aug. 28, 1813; graduated at Harvard in 1836; Greek tutor in the university for two years thereafter; licensed as a Unitarian minister by the Cambridge Association in 1843, but never undertook a charge. In his youth he made several voyages to Europe with his father, who was a sea-captain. In 1839 he published a volume of *Essays and Poems*. His essays are specimens of earnest, scholarly and sympathetic criticism, while his sonnets are regarded as among the best ever produced in America. In his temperament he was religiously melancholy and mystical. He lived a retired life at Salem from the time of leaving college, contributing to the Salem *Gazette* and the Unitarian periodicals. He died at Salem, May 8, 1880. An edition of his *Poems*, with an introductory memoir by William P. Andrews, was published in 1883, and an edition of his *Essays and Poems*, with a biographical sketch by J. F. Clarke, in 1886.

VESALIUS, ANDREAS. See ANATOMY, Vol. I, pp. 807, 808.

VESPERTILIONIDÆ. See MAMMALIA, Vol. XV, pp. 410-412.

VEST, GEORGE GRAHAM, an American public man; born at Frankfort, Kentucky, Dec. 6, 1830. He graduated at Centre College, Kentucky, in 1848, and at the law department of the Transylvania University at Lexington, Kentucky, in 1853; removed the same year to Missouri and began the practice of law in central Missouri; was a member of the Missouri house of representatives in 1860-61; was a member of the House of Representatives of the Confederate Congress for two years, and a member of the Confederate Senate for one year; was elected to the United States Senate, and took his seat March 18, 1879, and was re-elected in 1885 and 1890. In the Fifty-third Congress (1893-95), he was chairman of the Committee on Public Buildings and Grounds, and a member of the committees on finance, on commerce and on the transportation of meat products.

VESTAL VIRGINS. See VESTA, Vol. XXIV, pp. 193, 194.

VESTIBULE TRAIN. See RAILROADS, in these Supplements.

VESUNNA, a town. See PERIGUEUX, Vol. XVIII, p. 535.

VESUVIAN BOMBS OR IDOCRASE. See MINERALOGY, Vol. XVI, p. 410.



G. G. VEST.

VETCHES. See AGRICULTURE, Vol. I, pp. 376, 377.

VETILLART, MARIE MICHEL HENRI, a French civil engineer; born at Le Mans, Sept. 5, 1848; entered the École Polytechnique and the École de Ponts et Chaussées, Paris. He was the most distinguished member of his class when he ended his course at the latter school in 1874. From 1875 until 1886 he was resident engineer of the ports and canals of Calais, and from 1886 to 1892 was engineer-in-chief of the ports of Boulogne and Calais, and engineer-in-chief of Havre, and other ports of the lower Seine, from 1892. Among his works are the new port of Calais and the widening and the deepening of the canal of Calais. For the purpose of sinking the foundations for piers and lock-walls, he applied the water-jet successfully. He was present, as a delegate from France, at the International Congress at Washington, District of Columbia, in 1889. His published works include *Fonçage des Pieux par Injection d'Eau* (1877); *Le Port de Calais* (1889); *Fondations en Terrains de Sable des Quais et Écluses du Port de Calais* (1889); *La Navigation aux États-Unis* (1892).

VEUILLOT, LOUIS EUGÈNE, a French author; born at Boynes, Loiret, Oct. 7, 1818. He entered college at the age of 13, and after editing a provincial journal was engaged in the Department of the Interior. In 1844 he became associated with *L'Univers Religieux*, and during the war in Switzerland between the Sonderbund (a confederation of the Swiss Roman Catholic cantons), and the Swiss government he was intrusted with the distribution of a fund of one hundred thousand francs, raised by that journal. On his return he published a *Histoire des Guerres de la Vendée et de la Bretagne, 1790-1823*, which was written from the ultramontane standpoint, and designed to encourage the Sonderbund. In 1850 he was charged with conveying another subscription to the archbishop of Turin, and succeeded in escaping the surveillance of the Sardinian police, accomplishing his mission. He visited Rome, and was presented to the Pope, who named him Chevalier Saint-Sylvestre. He took an active part in the attacks of *L'Univers* against what he termed "the Sebastopols of impiety," the modern philosophical and socialistic tendencies. Among his works are *La Croix et L'Épée* (1856); *La Cochinchine et le Tonquin* (1859); *Critiques et Croquis* (1866); *Le Comte de Falloux et ses Mémoires* (1888); and collaborated in *Célébrités Catholiques*, to which he also contributed a biography of his elder brother, Louis Veillot, the famous journalist and pamphleteer.

VEVAY, a town and the capital of Switzerland County, southeastern Indiana, on the Ohio River, midway between Cincinnati and Louisville, and connected by steamboats with river ports. It is the trading-point of the surrounding agricultural district, and has some manufactures. Population 1890, 1,663; 1900, 1,588.

VEVEY OR VEVAY, a town of the canton of Vaud, Switzerland, on the shore of Lake Geneva, at the mouth of the Veveyse River, famous as

a health-resort and residence of foreigners. It contains the tomb of Ludlow, the regicide, at the Church of St. Martin, and is the gathering-place of the famous wine-dressers' *fête*. It has manufactories of watches and exports condensed milk. Population 1888, 8,144.

VEZIN, HERMANN, an American actor; born at Philadelphia, Pennsylvania, March 2, 1829, of German parents, his father being a merchant. He graduated at the University of Pennsylvania in 1847, taking the B.A. degree, and subsequently that of M.A. He was intended for the legal profession, but, going to England, and having a passion for the stage, he secured, through Charles Kean, an engagement at the Theatre Royal, York, and made his *début* at the Princess's Theatre in London under the management of Charles Kean. He visited America in 1857, and returning to England, after fulfilling engagements in the provinces, he appeared in London as Hamlet, Othello, Macbeth, Shylock, King John and Louis XI, and under Mr. Phelps's management of Sadler's Wells Theatre in 1860 he appeared as Orlando, Marc Antony, Romeo and Cassio. Four years later, Messrs. Phelps and Vezin produced Westland Marston's *Donna Diana* at the Princess's, and in 1870 the latter alternated Iago and Othello with the former, while in 1873 both played with Toole and Mathews at the Gaiety. In 1876 Mr. Vezin played Macbeth at Drury Lane for the benefit of the Philadelphia Centennial, and in the same year he made his first appearance at the Haymarket in W. S. Gilbert's *Dan'l Druce*, acting the title rôle 106 successive times. He created the character of De Taldé in an English adaptation of the *Dancicheffs*, and Dr. Primrose in W. G. Will's *Olivia*, founded on the *Vicar of Wakefield*.

VIADUCTS. (For a definition of the difference which distinguishes bridges from viaducts, as well as for a general article on this subject, see BRIDGES, Vol. IV, pp. 284-341. See also RAILWAY, Vol. XX, p. 234; and BRIDGES, in these Supplements.) Notwithstanding the technical distinction between bridges and viaducts, the world's usage has so frequently alternated—especially in the application of the term *viaduct* to structures which, specifically, are bridges—that they have become almost synonymous. This is particularly noticeable in the generally prevailing disposition to apply the term *viaduct* to many of the new and great railway bridge structures throughout the world. This comment applies to some of the following named, although they are known as viaducts. These are recently constructed, and are remarkable for their length or height, or for the difficulties of engineering connected with their construction, the figures for height being reckoned from top of foundation proper to top of pier, unless otherwise stated: St. Giustina, Tyrol, total length 197 feet, height above water 460 feet, one span, and therefore no pier; Du Viaur, France, length 1,508 feet, height 282 feet, iron arch; Kinzua, United States, length 2,052 feet, height 302 feet, highest pier 297 feet,

iron; Verrugas, Peru, length 575 feet, height 256 feet, highest pier 252 feet, iron; Moldau, Bohemia, length 886 feet, height 214.4 feet, highest pier 203.4 feet, stone; Malleco, Chile, length 1,140 feet, highest pier 248 feet, iron; Souleuvre, France, length 1,200 feet, height 247 feet, highest pier 200 feet, stone; Du Loup, France, length 1,050 feet, height 170 feet, stone. The St. Giustina is used as a highway, all the others being railway viaducts. The St. Giustina, Du Loup and Du Viaur have arched main spans, while the others are trussed bridges.

The Loa viaduct, completed in 1889, is believed to be the highest in the world, and is certainly the highest above the sea-level. It was built by the Autofagasta railway, in Bolivia, spanning the bed of the river Loa, in the Andes Mountains, at an altitude of 10,000 feet above the sea. The structure rests on seven piers, each formed of four hollow iron columns. The principal dimensions of this viaduct are: Length between abutments, 800 feet; height from water to rails, 316½ feet; height of longest column, 314 feet; length of main spans, 80 feet; weight of iron-work, 1,115 tons; rolling load, per foot, 1¼ tons; gauge of railway, 2½ feet.

The Pecos River railway viaduct, built in 1892, the highest in the world, except the Loa viaduct, which surpasses it by 8½ feet, is on a "cut-off line" which the Southern Pacific Company built from Helmet to Shumla, Texas. The viaduct is 2,180 feet long and 328 feet above the level of the river. It consists of 48 spans, alternately 65 and 35 feet long, supported on steel towers, with the exception of a few at the ends which rest on masonry. The central span over the river is a cantilever 185 feet long; the highest tower is 321 feet, and the towers are all 35 by 100 feet at the base and 10 by 35 feet at the top. The work was begun in November, 1891, and finished in the summer of 1892. The Pecos River is in Texas, and its cañon is nearly half a mile wide and 400 feet deep.

In recent years the problem of securing rapid transit in large cities of the United States, and preventing accidents at crossings, has led to the erection of numerous viaducts at the crossings of principal streets, carrying the roadways over the railroad tracks, which are sometimes partially depressed. In Rochester, New York, Jersey City, New Jersey, and Philadelphia, railroads have been compelled to elevate their tracks on viaducts from half a mile to several miles in length, sometimes built of iron or steel, and sometimes of earthwork inclosed by solid masonry, and always having openings for the streets. In Chicago, in 1893, the problem of securing rapid transit to the World's Columbian Exposition, without interfering with the entrance of visitors on foot or in carriages, was solved by the elevation of the tracks of the Illinois Central railroad on a solid earth embankment, with street openings, for a mile and a half, the entire length of the fair grounds. The elevation was eight feet and the streets were depressed six feet, the entire cost being over a

million dollars. In the following year the Lake Shore and Michigan Southern and Chicago, Rock Island and Pacific railroads elevated their tracks, and the city authorities began a campaign to compel all railroads to elevate their tracks, forced thereto by the popular indignation at the large number of fatalities at crossings, aggregating four hundred annually.

In many other cities the question of track-elevation is being earnestly agitated.

VIARDOT-GARCIA, MICHELLE FERDINANDE PAULINE, a French actress and singer, daughter of the great tenor, Emanuel Garcia, and sister of Madame Malibran, was born at Paris, July 18, 1821. She was reared in an atmosphere of genius, and became proficient in languages, painting and music. She was drilled by her father in the pianoforte, though her mother was her "singing-master." She traveled with her father in England, the United States and Mexico, and after his death in 1832, lived in Brussels, where she appeared, in 1837, as a singer, under De Beriot. In 1838 she made a brilliant success in a *Calcedne du Diable* at Paris. In 1839 she appeared at London, as Desdemona, in *Otello*, and in the same year she appeared in Paris, at the Théâtre Lyrique, under Louis Viardot, the impressario, critic and writer, whom she married in 1840. A tour of Europe followed, after which she returned to Paris for the special purpose of taking the part of Fidès in Meyerbeer's *Prophète*. For the next ten years she appeared annually in London. Her voice was a mezzo-soprano, with a compass of three octaves. Her face lacked regularity of feature, but her presence was picturesque, and her genius illumined her every movement on the stage. Her répertoire included Desdemona, Cenerentola, Rosina, Norma, Lucia, Maria de Rohan, Ninette, Leonora, Azucena, Donna Anna, Zerlina, Rahel, Iphigénie, Alice, Isabelle, Valentine, Fidès and Orphée. She retired in 1862, and in 1871 commenced to teach and compose; and was for several years professor of singing at the Conservatoire in Paris.

VIAUD, LOUIS MARIE JULIEN (PIERRE LOTI), a French sailor, author and academician; born at Rochefort, Jan. 14, 1850; was the descendant of an old Huguenot family. He entered the navy in 1867; became a midshipman (1873) and a lieutenant (1881), and was nicknamed "Loti" by his comrades, from the name of an Indian flower. He served with distinction in the Tonquin campaign, was retired from active service in 1883 for a time, because of the publication, in the Paris *Figaro*, of a series of letters describing the cruelties practiced by French soldiers at Hué, and was decorated with the Legion of Honor in July, 1887.



PIERRE LOTI.

As a writer he is a romancist of the romancists, and a bitter opponent of the realistic school; and his novels have the dreamy, sensuous beauty of the lotus-flower for which his comrades named him. He began publishing in 1879, with *Aziyadé* a romance of the East. His works include *Aziyadé*; *Le Mariage de Loti*; *Le Roman d'un Spahi*; *Fleurs d'Ennui*; *Mon Frère Yves*; *Pêcheur d'Islande*; *Japoneries d'Automne*; *Propos d'Exil*; *Madame Chrysanthème*; *Au Maroc*; *Le Roman d'un Enfant*; *Le Livre de la Pitié et de la Mort*; *Fantôme d'Orient*; *Matelot*; *Judith Renaudin* (a drama: 1898); etc. His sailor-life took him all over the world, and his vivid fancy and wonderful power of painting his impressions fill his books with charming and living pictures. He was elected to the French Academy, May 21, 1891, over M. Zola; and his admission as one of the Immortals, March 7, 1892, was made memorable by a protest against realism, of which he delivered himself, M. Zola himself being present. M. Loti afterward wrote to M. Zola, saying that had he been aware of his presence he would have refrained from uttering the passage referring to him.

VIBERT, JEHAN GEORGES, a French portrait and genre painter, was born at Paris, Sept. 30, 1840, and pursued his art-studies under the direction of François Picot, the eminent historical painter, and Barrias. Vibert was, in 1882, made an officer of the Legion of Honor. Among his most celebrated works are *The Apotheosis of Thiers*; *The Christian Martyrs among the Lions*; *Grasshopper and Ant*; *Committee on Moral Books*; *Theological Discussion*; *Coquelin as Mascarillo*; *The Missionary's Story*; etc., some of which are owned in the United States. He wrote a number of short plays and *The Science of Painting* (1891).

VIBRATION. For effect of, see IRON, Vol. XIII, p. 355. For inductive effect of, see MAGNETISM, Vol. XV, p. 268.

VIBRATION. See WAVE-THEORY, Vol. XXIV, pp. 421-459 (light); and ACOUSTICS, Vol. I, pp. 100-119 (sound).

VIBROGRAPHS OR VIBROSCOPES. See ACOUSTICS, Vol. I, p. 110.

VIBURNUM, a genus of shrubs or low trees of the family *Caprifoliaceæ*, or honeysuckles. The species have simple leaves, small white gamopetalous flowers in broad cymes, and a berry-like fruit. Among the numerous forms are sheep-berry (*V. Lentago*), black haw (*V. prunifolium*), arrow-wood (*V. dentatum*), dockmackie (*V. acrifolium*), cranberrytree (*V. Opulus*), hobblebush (*V. lantanoides*), and laurestinus (*V. Tinus*).

VICARS, ROMAN CATHOLIC, are of various kinds. A *vicar apostolic* was, formerly, a bishop or archbishop appointed by the Pope, generally to a remote see, and delegated with episcopal functions. In the present day a vicar apostolic, titularly a bishop, is stationed either in countries where there are no episcopal sees established, or where "the succession is interrupted." A *vicar forane* is a functionary appointed by a bishop, receiving limited jurisdiction, from whose decisions an appeal may be carried to the bishop.

To his duties were added the care of sick priests, and of looking after the church property. A *vicar-general* is a functionary who corresponds to the archdeacon of the mediæval church. He is appointed by the bishop as an assistant. In juridical matters he is regarded as the ordinary, his tribunal being identical with that of the bishop, so that there is no appeal from the one to the other. But the vicar-general cannot perform the specific functions of the episcopal order. The title, *vicar of Christ*, formerly applied to any bishop, is now confined to the Pope, who is regarded by Roman Catholics as the representative of Christ upon earth.

VICE-ADMIRAL. In the United States this rank was abolished in 1890, on the death of Vice-Admiral S. C. Rowan, having previously been held by D. D. Porter from 1866 until promoted admiral in 1870, and by Farragut, for whom it was created in 1866. See also ADMIRAL, Vol. I, p. 155.

VICE-PRESIDENT. See CONSTITUTION, in these Supplements.

VICKSBURG, a city of western Mississippi, 45 miles W. of Jackson, on the Queen and Crescent route and the Yazoo and Mississippi Valley railroad. It is the largest and most important city of the state, and the center of the cotton-shipping industry. It had, in 1895, 2 national banks with a total capital of \$250,000, 1 savings and 1 state bank, 3 daily papers, 10 churches, 4 of which were under the direction of colored residents, 1 high school, 4 grammar schools, and some manufacturing enterprises, including car-works, cottonseed-oil and planing mills, machine-shops and electric-light works. Street-railways were operated and efficient fire and police departments provided by municipal authority. Population 1900, 14,834. See also VICKSBURG, Vol. XXIV, p. 211.

VICKSBURG, THE SIEGE OF. Early in the Civil War the importance of Vicksburg as a receiving and distributing point, and as a position for controlling the navigation of the Mississippi, was recognized by the Confederates, who strongly fortified it by placing batteries on the river front and along the Yazoo River up to Haines's Bluff, and by constructing a line of works in the rear and surrounding the city: The capture of New Orleans in April, 1862, and of Memphis the following June, left Vicksburg as the only strong point on the Mississippi in the hands of the Confederates.

The first attempt to capture the place was made in the summer of 1862. Flag-Officer Farragut ascended the river from New Orleans with Flag-Officer Porter's mortar flotilla and began the bombardment of the city. June 26th, with two ships and five gunboats, he passed up the river in spite of the batteries, and was joined by Captain Davis's fleet. Meanwhile, a land force under Gen. T. Williams attempted to cut a canal across the peninsula, opposite the city, for the passage of gunboats; but this work was destroyed by high water. Farragut then ran down past the batteries, July 15th, and with Williams's troops returned to New Orleans. The bombardment

ceased July 22d, and no material damage was done the city or its fortifications.

Active operations preliminary to the second and successful attempt to capture Vicksburg began Nov. 2, 1862, the Union forces being under the command of General Grant and the Confederate under Gen. J. C. Pemberton. Holly Springs was captured by the Federal troops November 13th and made the base of supplies. On the 26th of November, General Grant's forces left Grand Junction to advance along the Yazoo River and approach Vicksburg in the rear. On the 8th of December, General Sherman was placed in command of the troops at Memphis, with orders to proceed to Vicksburg to act with Admiral Porter, stationed in the vicinity. Sherman started from Memphis and moved down the river, arriving at Milliken's Bend, 25 miles above Vicksburg, with 32,000 men; Pemberton's forces concentrated at Vicksburg and in the adjacent country. On the 29th of November, General Sherman made an attack upon Haines's Bluff, on the Yazoo, 11 miles north of Vicksburg, but was repulsed. On the 29th of December, General Grant's forces, to the number of fifty thousand, arrived at Young's Point, above Vicksburg. In January, 1863, Gen. J. A. McClernand took command of the army about Vicksburg, and General Sherman captured Arkansas Post, on the Arkansas River. McClernand was ordered to Young's Point and Milliken's Bend, where General Grant arrived from Memphis, January 29th, assumed command of the Union forces, and began the real work of the campaign. For the purpose of reaching the high ground to the rear of Vicksburg, General Grant attempted, in March, to cut a canal near the one made by General Williams the year before, but high water again stopped the work. General Grant then determined to run the batteries with the gunboat fleet, to convey his army through the swamps and bayous west of the river to New Carthage, cross over to Grand Gulf, and to reduce Vicksburg from that direction. General McClernand's forces reached New Carthage the first week in April, and on the 16th the gunboats passed the batteries, followed a week later by the supply-boats. On the 29th of April the gunboats attacked Grand Gulf, but unsuccessfully, whereupon Admiral Porter ran the batteries for the defense of that place and joined the land forces at De Schroons, Louisiana, proceeding thence to Bruinsburg, on the river, west of Port Gibson, Mississippi. On the 1st of May General Sherman was ordered to join the main army, and the same day General Grant captured Port Gibson. On the 3d of May Grand Gulf fell into the hands of the Union forces, where Sherman's army arrived the 6th, and the next day the forward movement began. Raymond was taken on the 12th of May, Jackson captured the 14th, the battle of Champion Hills followed on the 16th, and that of Big Black River on the 17th. On the 18th of May, General Grant was in front of Vicksburg, which was completely invested the following day by the victorious

Union army. On the 22d the siege began. By the middle of June, Grant's army numbered 71,000 men, with 220 field-guns, 6. 32-pounders and 8 heavy guns furnished by Admiral Porter. Numerous attempts were made by the Confederates under Johnston to relieve the beleaguered city, but unsuccessfully. The siege was conducted with vigor—mines and countermines were pushed in all directions, charged and exploded, but without advantage to either side. On the 2d of July the Union army had advanced to within a short distance of the enemy's lines and preparations were made for an assault. The next day General Pemberton asked for an armistice, with a view to arranging terms for the capitulation of the city. General Grant answered that the terms were an unconditional surrender of the city and garrisons. The terms were accepted, and at 10 o'clock on the 4th of July, 1863, the Union army took possession of the city. Prisoners to the number of 31,600, with 172 cannon and 60,000 muskets, fell into the hands of the victors. The Union loss during the campaign was estimated at eight thousand nine hundred, and that of the Confederates at nearly sixty thousand.

VICO EQUENSE, a town of the province of Castellamare, southern Italy, built by Charles of Anjou, about A. D. 1300, on a rocky eminence, and commanding a magnificent view of the city and Bay of Naples, Vesuvius and the neighboring islands. It was a famous resort of the Aragonese princes. It is now especially noted for its wines and fruits. Population about 11,000.

VICTOR AMADEUS, the name of a duke of Savoy and two kings of Sardinia. See SAVOY, Vol. XXI, p. 342.

VICTOR EMMANUEL, the name of three kings of Sardinia, the second and third being also kings of Italy. See SAVOY, Vol. XXI, p. 342; and VICTOR EMMANUEL, Vol. XXIV, p. 214. Also ITALY, p. 1722 in these Supplements.

VICTORIA, a British colony in southeastern Australia. (For general article, see Vol. XXIV, pp. 215-218.) The census of April 5, 1891, gave the area and population as follows: Area, 87,884 square miles, or 56,245,760 acres. The numerical progress of population from 1836 is shown by the following table:

DATE OF ENUMERATION.	MALES.	FEMALES.	TOTAL.
Nov. 8, 1836-----	186	38	224
March 2, 1846-----	20,184	12,695	32,879
March 29, 1857-----	264,334	146,432	410,766
April 7, 1861-----	328,651	211,671	540,322
April 2, 1871-----	401,050	330,478	731,528
April 3, 1881-----	452,083	410,263	862,346
April 5, 1891-----	598,414	541,991	1,140,405

Inclusive of the suburbs, the estimated populations of the principal towns were as follows in 1897: Melbourne, the capital, 458,610, or two fifths of the population of the colony; Ballarat, 46,137; Bendigo (Sandhurst), 43,075; Geelong 24,807; Castlemaine, 6,932. The estimated

population on June 30, 1898, was 1,169,434. During 1880-91 there was a large decrease in the Chinese and aboriginal population. In 1891 there were 9,377 Chinese and only 565 aborigines left. Ninety-seven per cent of the inhabitants were British subjects by birth, and 713,585 (63 per cent) were native Victorians. In 1892 and 1893 the emigration to other colonies exceeded the immigration.

CONSTITUTION AND GOVERNMENT. Under the provisions of the constitution first adopted by the Legislature of 1854 (and approved by Great Britain), the legislative authority is vested in a Parliament of two chambers, namely, a Council, composed, in 1898, of 48 members, and an Assembly, numbering 95 members.

According to an act which came into force in 1881, members must be in the possession of an estate of the annual value of \$500; and electors must be in the possession or occupancy of property of the ratable value of \$50 per annum if derived from freehold, or of \$125 if derived from leasehold or the occupation of rented property. No electoral property qualification is required for graduates of British universities, matriculated students of the Melbourne University, ministers of religion of any denomination, certified schoolmasters, lawyers, medical practitioners, and officers of the army and navy. One-third of the members of the Legislative Council must retire every two years. The members of the Legislative Assembly are elected by universal suffrage for the term of three years. Clergymen of any religious denomination are not allowed to hold seats in either the Legislative Council or the Legislative Assembly.

In 1898 the number of electors on the roll of the Legislative Council was 130,545; the number of electors on the roll of the Legislative Assembly was 252,560,—a decrease from 1890-91 of 18,536 and 26,566, respectively. Of the former all but 726 and of the latter all but 43,191 were ratepayers.

The executive is vested in a governor appointed by the crown. The governor is likewise commander-in-chief of all the colonial troops; and a sum of \$33,875 appeared on the estimates for 1898-99 for his salary and staff. In the exercise of the executive he is assisted by a cabinet of 11 ministers: the Premier, who is also Treasurer; Chief Secretary and Minister of Public Instruction; Attorney-General; Solicitor-General; Commissioner of Trade and Customs, President of the Board of Land and Works, and Commissioner of Crown Lands and Survey; Postmaster-General; Minister of Defense; Minister of Mines and Water-Supply; Minister of Agriculture and Commissioner of Public Works; Minister of Railways and Minister of Health; and one portfolio without office. The Premier has a salary of \$7,000, and the other ministers receive \$5,000 each. At least four of the ministers must be members of either the Legislative Council or the Assembly, but not more than eight may at any one time be members of the Assembly.

For purposes of local administration the colony

is divided into urban and rural municipalities. The former, called cities, towns, and boroughs, ought not to be of a greater area than 9 square miles, and in being constituted must contain at least 300 householders. The latter, called shires, are portions of country, of undefined extent, containing ratable property capable of yielding a revenue of \$2,500. In 1896 there were 58 urban and 150 rural municipalities, all but a very small portion of the whole area of the colony being included within their limits. Every ratepayer has one or more votes, according to the amount of his rates.

INSTRUCTION. Public education is compulsory between the ages of 6 and 13, with certain exceptions, and free to all in ordinary classes. In 1897 there were 1,877 state schools, with 4,617 teachers, a total enrollment of 238,308 scholars, and an average attendance of 140,593, or about 59 per cent of the number on the roll. About 85 per cent of the children of school age living in the colony are being educated at the state schools. Among persons aged 15 years and upward at the census of 1891, 95¾ per cent were able to read and write, and only 2½ per cent were entirely illiterate. In 1896-97 the total cost of public instruction, exclusive of expenditure on buildings, was \$2,409,080. Although the education given by the state is strictly primary, 8 exhibitions of the yearly value of \$200 each, and tenable for four years, and 127 scholarships of the annual value of \$50, tenable for 3 years, are awarded to the ablest scholars, to enable them to complete their education at the private grammar schools and at the university. Secondary education is entirely under the control of either private persons or proprietary bodies, usually connected with some religious denomination. There were, in 1896-97, 930 private schools in Victoria, with 2,357 teachers, and attended by 42,044 scholars. These numbers include 220 schools, 786 teachers, and 23,562 scholars in connection with the Roman Catholic denomination.

Melbourne University, opened in 1855, receives annually from the state revenue, as endowment, \$61,250. Affiliated with the university are 3 colleges, viz., Trinity, Ormond, and Queen's, conducted severally by the Church of England, Presbyterian, and Wesleyan churches. In 1896 there were 129 students who matriculated, 122 direct graduates, and 668 students attending lectures.

REVENUE, EXPENDITURE, AND FINANCES. The revenue in 1898 was \$34,433,320, and the expenditure \$33,505,500. The amount raised by taxation was \$13,225,935.

Victoria had a debt, incurred in the construction of public works, which amounted, on June 30, 1898, to \$237,790,440. The rate of interest on the public debt varies from 3½ to 5 per cent, and averages a small fraction below 4 per cent.

The estimated total value of the ratable property of the colony in 1896 was \$842,138,500, and the annual value \$51,965,000.

PRODUCTION AND TRADE. The total number of agricultural holdings (1897-98) was 34,990, of about 23,090,664 acres. Wheat is the principal crop, 10,580,000 bushels having been grown in 1898. On March 31, 1895, there were owned in the colony 431,547 horses, 1,833,900 cattle, and 13,180,943 sheep.

There were 2,855 manufactories in operation in March, 1897, with 50,754 employees. The goods manufactured were almost entirely for home consumption.

Gold-mining was still a principal industry, the steady annual decrease in the production having been checked in 1892 and 1894. In 1897 812,766 ounces were mined, their value being approximately \$16,255,320. About 32,820 miners were at work in the fields. The total quantity of gold mined from 1851 to 1897 was estimated at 61,847,448 ounces, worth \$1,236,948,960.

There were heavy tariffs on most articles of import, Victoria being committed to the policy of protection, the total customs duties collected in 1897 amounting to \$9,375,845. The total value of imports in 1897 was \$77,272,410, and of exports, including bullion, \$83,698,350. In 1897 Victoria imported from the United States goods to the value of \$2,953,720, exporting in return \$926,720. In that year, however, Victoria bought more goods from the United States than from any other countries except Great Britain and the other Australian colonies. The chief imports are wool and woollens, cottons, sugar, iron and steel, and live-stock; and the chief exports are gold and wool.

DEFENSES. The land forces of Victoria at the end of 1897 comprised an establishment of 4,969 men of all arms, of whom 379 were permanent, and 2,940 formed the militia, the remainder being volunteers. The naval force consisted of a permanent force of 158, and the Naval Brigade of 152 officers and men.

The naval flotilla of the colony consisted of the coast-defense ironclad *Cerberus* (3,480 tons), and two first-class, and three second-class torpedo-boats. Victoria is a considerable contributor to the support of the Australian auxiliary ships.

From 1886 to 1889 the colony experienced an unexampled period of prosperity. During the winter of 1888-89 a centennial exhibition was held in Melbourne, commemorating the first colonization of Australia. Following this year extensive legislation commenced to aid irrigation, improve technical and agricultural education, to extend civil service, and for increasing the tariff. Coal was discovered in Gippsland in 1890, thus disproving the assertion that that mineral did not exist in Australia. In 1891 the colony was overwhelmed by a financial panic, which continued until 1893. The government had to face heavy financial deficits. General retrenchments were inaugurated and government and other salaries reduced. In 1893 many of the bank officials, high in Victorian society, were implicated in the many failures and brought to trial; some were convicted, but the more prominent were acquitted. The phylloxera pest was finally eradicated,

thus improving the condition of the important vine and wine industry. In 1894 the free trade party was defeated at the general election, and in the following year a bill to increase the tariff passed the legislature. The agitation for the annexation of the colony of Tasmania to Victoria may also be noted.

VICTORIA, a city and the capital of British Columbia, at the southeast extremity of Vancouver Island, on the Strait of Fuca, on the Victoria and Sydney and Esquimalt and Nanaimo railroads. It has many wide streets, fully equipped with electric lights and railways, while the residence portion of the city is laid out in beautiful drives, lined by numerous handsome residences. The more noticeable public buildings are the provincial legislative assembly, the post-office, custom-house and supreme-court rooms, the government house, the city hall and the Roman Catholic cathedral. Besides 14 churches of five denominations, and a number of charitable institutions, including orphanages and hospitals, there is an excellent public school system, maintained at an annual expense of \$50,000, as well as several private institutions of learning. Having a good outer harbor, Victoria has regular connections by steamer with China and Japan, Australia, Alaska, San Francisco, and daily with New Westminster, Vancouver, Seattle and Tacoma. There are four banks and several manufacturing industries, including foundries, clay-works, flour-mills and chemical-works. Population 1891, 16,841. See also **VICTORIA**, Vol. XXIV, p. 218.

VICTORIA, a town. See **HONG KONG**, Vol. XII, p. 142.

VICTORIA, a city and the capital of Victoria County, southern Texas, on the Guadalupe River, 100 miles E. S. E. of San Antonio, on the Southern Pacific railroad. It has excellent educational advantages, including Nazareth Academy, a Roman Catholic diocesan seminary, and St. Joseph's College (Roman Catholic), the latter occupying property valued at twenty-five thousand dollars, and having an attendance of about twenty students. Population 1890, 3,064.

VICTORIA, **GUADALUPE**, a Mexican patriot, and the first President of the republic; born in Durango in 1780, and substituted the name "Guadalupe Victoria" for Manuel Felix Fernandez, his legitimate patronymic, to commemorate a victory over the Spaniards. The scene of his military operations was for some years limited to the province of Vera Cruz and vicinity. In 1821 he joined Iturbide, who, on becoming emperor imprisoned him. He subsequently escaped, and, joining Santa Anna, became commander of Vera Cruz and assisted in the overthrow of Iturbide. He was a member of the provisional government formed in March, 1823, and on Oct. 10, 1824, was elected President of the republic. The most notable feature of his administration was the abolition of slavery, Sept. 16, 1825. Upon the conclusion of his term of office, April 1, 1829, Victoria retired to private life and died at Perote, March 21, 1843.

VICTORIA, ALEXANDRINA, Queen of Great Britain and Ireland and Empress of India, only child of the Duke of Kent and of Princess Louisa Victoria of Saxe-Coburg, was born at Kensington Palace, May 24, 1819. The Duke of Kent died in 1820, and the general education of the young princess was directed, under her mother's care, by the Duchess of Northumberland. Until within a few weeks of her elevation to the



QUEEN VICTORIA.

throne her life was spent in comparative retirement, varied by tours through different parts of the United Kingdom. Queen Victoria succeeded her uncle, William IV, June 20, 1837, as Victoria I, and her coronation was celebrated in Westminster Abbey June 28, 1838. Her Majesty was married, Feb. 10, 1840, to Prince Albert of Saxe-Coburg-Gotha (see Vol. I, pp. 451-453), by whom she had issue: 1. Victoria Adelaide Mary Louisa, Princess Royal, born Nov. 21, 1840, married Jan. 25, 1858, to the Crown Prince Frederick William of Prussia; 2. Albert Edward, Prince of Wales, born Nov. 9, 1841, married March 10, 1863, the Princess Alexandra of Denmark; 3. Princess Alice Maud Mary, born April 15, 1843, married July 1, 1862, to Prince Louis of Hesse-Darmstadt, and died Dec. 14, 1878; 4. Prince Alfred Ernest Albert, born Aug. 6, 1844, created Duke of Edinburgh, May 24, 1866, married Jan. 23, 1874, the Grand Duchess Marie Alexandrovna, only daughter of the Emperor of Russia; 5. Princess Helena Augusta Victoria, born May 26, 1846, married July 5, 1866, to Prince Christian of Schleswig-Holstein; 6. Princess Louise Caroline Alberta, born March 18, 1848, married to the Marquis of Lorne, March 21, 1871; 7. Prince Arthur William Patrick Albert, Duke of Connaught, born May 1, 1850, married March 17, 1879, the Princess Louise Margaret Alexandra Victoria Agnes, third daughter of Prince Frederick Charles of Prussia; 8. Prince Leopold George Duncan Albert, Duke of Albany, born April 7, 1853, married April 2, 1882, the Princess Helen Frederica Augusta, daughter of the Prince of Waldeck and Pyrmont (he died March 28, 1884); and 9. Princess Beatrice Mary Victoria Feodore, born April 14, 1857, married July 23, 1885, to Prince Henry Maurice of Battenberg. The first domestic grief which Victoria suffered was the loss of her mother, the Duchess of Kent, after a short illness, March 16, 1861, followed by the sudden death of the Prince Consort, December 14th, in the same year. Other severe trials were the deaths of the Princess Alice (of Hesse), of the Duke of Albany, of the Duke of Clarence, her grandson, and more recently, of Prince Henry of Battenberg. These several family bereavements, together with her own failing health, limited her appearances in public

and on state occasions, though she never neglected any of her essential duties as Queen. The leading events of a political, legislative and administrative character that occurred during the later years of her reign will be found under the article on GREAT BRITAIN, in these Supplements.

By virtue of the power conferred by an act of Parliament passed in the previous session, Her Majesty was, on Jan. 1, 1877, proclaimed Empress of India, by the Governor-General, at the camp of Delhi. *The Early Days of His Royal Highness the Prince Consort*, compiled under the direction of Her Majesty, by Lieutenant-General the Hon. C. Grey, was published in July, 1867, and was followed in 1869 by *Leaves from the Journal of our Life in the Highlands*, and in 1874 by the first volume of Mr. (now Sir) Theodore Martin's *Life of H.R.H. the Prince Consort*; which she supervised, of which the fifth and concluding volume appeared in 1880. In 1885 Her Majesty published a second volume entitled *More Leaves from the Journal of our Life in the Highlands*. In 1887, the jubilee of her reign was celebrated throughout England and the empire with great rejoicings. In 1896 her reign surpassed in length that of any of her predecessors. In 1897 Her Majesty completed the sixtieth year of her occupation of the English throne, an event which was marked by the Diamond Jubilee celebrations, and by the rejoicings of her people. The opening of the twentieth century found the queen in failing health, though outwardly bearing well her eighty-odd years. To the burden of age she had to bear the griefs of many personal bereavements. Especially was she affected by the losses her armies had sustained in the War in South Africa. While at Osborne, in the Isle of Wight, she was on the 19th of January, 1901, stricken with paralysis, to the grief of the nation and of numberless peoples who revered her as woman and queen. She died on the 22nd inst., surrounded by many of her family, including her grandson, the Emperor of Germany. Her eldest son, Albert Edward, succeeded her on the throne as King Edward VII.

VICTORIA CROSS, a British decoration instituted Jan. 29, 1856, for the purpose of recognizing acts of signal bravery or devotion to "Queen and country" by soldiers or sailors in presence of the enemy. It originated in connection with the Crimean War, and the first general distribution of crosses earned therein, to the number of 62, was made in 1857. The decoration has been conferred for similar acts in subsequent campaigns. Volunteers serving against the enemy with the regular army are eligible for the decoration. The cross is of the Maltese form, and of bronze. The center bears the figure of the crown surmounted by a lion. Below, on a scroll, are the words "For Valour." The color of the ribbon is blue for the navy, red for the army. On the clasp are spread two branches of laurel. The cross is connected with the clasp by an initial "V."

VICTORIA UNIVERSITY, Toronto, Canada. This institution, which was founded in the interest

of the Methodist Church in what is now the province of Ontario, had its beginnings in the "Upper Canada Academy," which in 1841 changed its name, by provincial statutes to Victoria College, an art, and medical school located for many years at Cobourg, Ontario. The Rev. Dr. Egerton Ryerson, well known as chief superintendent of education in the province for over forty years, was the first president of Victoria, and the redoubtable champion of its interests when acedemical education in Upper Canada was attempted to be monopolized by the Anglican churchmen who composed the legislative council of the province. With the union of the Wesleyan Methodists and the New Connexion Methodists, some modifications of the constitution of Victoria became necessary, and these were effected by an act, which defeated the royal charter of 1835 and the later acts of 1841 and 1853, passed in 1874 by the Ontario legislature. The constitution was further amended in 1879, and again in 1883-84 on the union of the Methodist Church of Canada with the Methodist Episcopal Church of Canada. The name of the institution was at this time changed to Victoria University, and its removal took place to Toronto, where it is federated with the Provincial University. It is governed by a board of regents and a senate, on which are represented, besides the professors and a number of elected graduates, the general superintendents of the Methodist Church of Canada and a number of clergymen and laymen appointed by the General Conference.

VICTORIA UNIVERSITY, Manchester. See UNIVERSITIES, Vol. XXIII, p. 854.

VICUÑA OR VICUGNA. See LLAMA, Vol. XIV, p. 739.

VIDAL, PEIRRE, a Provençal troubadour; born at Toulouse about 1175, the son of a furrier. He was interesting no less for his rare poetical gifts than for his insane conceit. His vanity led him into extravagant, ridiculous amours; his natural weakness and credulity rendering him particularly liable to be deceived by his "friends." He set out with King Richard I of England in July, 1190, on the third crusade. In Cyprus he married a Greek woman who claimed alliance with the emperor at Constantinople. Becoming filled with the idea that he was entitled to the throne, he returned to Europe with the intention of prosecuting his claim. He career afterward is obscure. He is supposed to have died about 1215.

VIDOCQ, EUGÈNE FRANÇOIS, a French detective; born at Arras, July 23, 1775, the son of a baker. Employed by his father, he robbed the till, for which he was sent to the house of correction; on gaining his release he secured four hundred dollars, and proceeded to Ostend, where he was relieved of his plunder by a rogue cleverer than himself. He then engaged himself in a menial capacity to a traveling menagerie, becoming an acrobat; leaving this occupation, he enlisted in the army and attained the rank of corporal, serving creditably in Belgium. He was

discharged on account of a wound, and began a life of vagabondage. He was convicted of forgery in Paris in 1796, and was sent to the galleys for eight years. He escaped and joined a band of highwaymen. The latter, discovering the fact of his previous occupation, expelled him from their midst after exacting from him an oath, which was solemnly taken, not to betray them. He was no sooner free than he deliberately sought the authorities and delivered over to justice the companions with whom he had sought refuge. Reaching Paris, he volunteered his services to the authorities as a criminal detective. His services were eventually accepted (1809); a *brigade de sûreté* was organized, and Vidocq became its chief (1812). The brigade consisted of convicts and other disreputables, and was at first comprised of four members, but eventually included 28. It was marvelously—too marvelously—efficient. It was suspected that many of the remarkable burglaries that were discovered were really originated by the chief himself and gang, and he was dismissed (1825). He next failed as a paper-manufacturer. In 1834 he opened an office in Paris for the recovery of stolen goods, but coming into collision with the police, he again retired. He published four volumes of *Mémoires* in 1828, an English translation of which appeared the same year. An edition under the title *Les Vrais Mystères de Paris* appeared in 1844, but they are not regarded as authentic. He died in poverty in Paris, April 28, 1857.

VIENNA, the capital and largest city of the Austrian empire, had, in 1890, a population of 1,364,548,—an increase from 1880 of 281,736. (For general article, see Vol. XXIV, pp. 219-222.) For a number of years the city has been the scene of much social unrest, breaking out in the great street-car strike of 1889, when, the people sympathizing with the employees, the disturbance was only brought to an end by the intervention of the Emperor and the concession of the companies to the demands of the men. Another riot, in 1895, ostensibly anti-Semitic, but really caused by the failure of the government to grant an extension of the franchise, resulted in the suspension of the city charter and the appointment of an imperial commissary to administer the municipal affairs. Bills were pending in the Reichsrath in 1896, looking to a wide extension of suffrage.

VIENNA, a town and the capital of Dooley County, central Georgia, on Pennahatchee Creek, 30 miles E. of Americus, on the Georgia Southern and Florida railroad. It is in a farming country, having a luxuriant growth of natural forest. Population 1890, 536; 1900, 1,035.

VIENNA, a town and the capital of Johnson County, southern Illinois, on a branch of the Cache River, 34 miles N.N.E. of Cairo, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It is the center of an agricultural and lumber-producing region. Population 1900, 1,217.

VIENNA, CONGRESS OF. See CONGRESS, Vol. VI, pp. 270, 271.

VIENNA CONCORDAT. See POPEDOM, Vol. XIX, p. 503.

VIERGE, DANIEL, a Spanish-French book-illustrator, was the son of a Spanish engraver, under whom he began to draw when a child; at 13 he became a student in the Madrid Academy of Fine Arts; went to Paris and was employed in 1870 on *Le Monde Illustré* and *Vie Moderne* until stricken, in 1882, with paralysis. His recovery was slow, and he was forced to learn to draw with his left hand. His illustrations of *Don Pablo de Segovia* had a first and incomplete edition the year of his affliction, but in 1894 he was able to give to the world a finished edition. He was foremost among illustrators to find a technique suited to the modern "process" picture-making. His work was in pen and ink, India wash and water body-color, and is characterized by great freedom, expressiveness of line and transparency of shadow. His productiveness was immense. Among his best or latest works are his interpretation of scenes in the Franco-Prussian and Commune wars of 1870-71, and edition of *L'Espagnole* and *Le Cabaret des Trois Vertus*, both published in 1896, at which time he was at work upon Chateaubriand's *Le Dernier des Abencerrages*.

VIERSEN, a town of Rhenish Prussia, 18 miles N.W. of Düsseldorf. It has manufactories of velvet, plush and silk goods, cotton and flax spinning mills, and other industries. Population 1890, 22,200.

VIEUSSENS, RAYMOND. See ANATOMY, Vol. I, p. 813.

VIGFUSSON, GUDBRAND, an Icelandic scholar; born at Frakkanes, Iceland, March 13, 1827. He was educated principally at Copenhagen University; went to England in 1864, where for ten years he was busy completing the *Icelandic Dictionary* begun by Richard Cleasley; was appointed professor of Icelandic language and literature at Oxford in 1884. He published *Tímatat*, an essay on the chronology of the Icelandic sagas (1855); *Forn-sögur*, in connection with Thomas Möbius (1866); *Flateyrbok*, with Unger (1860-68); *Sturlunga Saga* (1878); *An Icelandic Reader* (1879); and *Corpus Poeticum Boreale* (1883), in conjunction with F. Yorke Powell. He died at Oxford, Jan. 31, 1889.

VIGNAUD, HENRY, an American diplomat and author; born in New Orleans, Nov. 27, 1830. From 1852 to 1856 he was engaged in teaching, being at the same time connected with several papers in New Orleans, and in 1857 he established *L'Union de Lafourcher* in Thibodeaux, Louisiana; was one of the founders of *La Renaissance Louisianaise*; served as captain in the Confederate army and as assistant secretary to their diplomatic commission in Paris. After the war he was secretary of the Roumanian legation in Paris (1869); official translator of the *Alabama* Commission at Geneva (1872); United States delegate to the international metric conference (1873); and to the conference for protection of submarine cables (1882). After 1875 he was secretary or *chargé d'affaires* in the United States embassy at Paris. He wrote *L'Anthropologie* (1861).

VIHARA, a retreat. See BUDDHISM, Vol. IV, p. 431.

VIKINGS. See NORWAY, Vol. XVII, p. 584.

VILAINE, a river. See ILLE-ET-VILAINE, Vol. XII, p. 703.

VILAS, WILLIAM FREEMAN, an American statesman; born in Chelsea, Vermont, July 9, 1840, removed with his parents to Madison, Wisconsin, in 1851; graduated from the Wisconsin State University in 1858; studied law in the Albany (New York) Law School, and was admitted to the bar in 1860, and served as an officer in the Union Army from the outbreak of the War of the Rebellion until August, 1863, when he resigned to practice law at Madison. He was one of the regents of the state university, and trustee of the University Law School; served one term as a member of the state legislature, and was chairman of the National Democratic Convention of 1884. When President Cleveland took office in 1885 he appointed Mr. Vilas Postmaster-General, and later made him Secretary of the Interior. In 1891 he was elected by the Wisconsin legislature to the United States Senate to succeed John C. Spooner, and in 1896 took an active and leading part in the sound-money movement of the Democratic party.

VILAYET, a division of the Turkish empire: See TURKEY, in these Supplements.

VILERS, CHARLES MARIE LE MYRE DE, a French diplomatist; born in 1833; entered the navy in 1849 and ten years later received the decoration of the Legion of Honor. He then entered the civil service, and was in 1877 promoted to be director of the civil and financial affairs of Algeria. He took part in the defense of Paris against the Germans, and for his gallantry received the rosette of the Legion of Honor. In 1879 he proceeded to the Court of Annam as plenipotentiary. From this post he was recalled in 1885, and in 1888 was sent to Antananarivo, Madagascar, as minister plenipotentiary. There he objected to the Hovas negotiating with an English syndicate for a loan with which they wanted to cancel an indemnity due to France. He was successful, and secured the advance from French sources, to be repaid by levies on the customs of certain selected ports. He was hostile to the British. He brought affairs to a climax by preparing to leave the island upon the refusal of the Hovan government to accede to his demand claiming the right to grant the exequator to representatives of foreign powers. The Malagasy Prime Minister hastily acceded to his demands. In 1888 M. de Vilers returned to France and received the grand cross of the Legion of Honor. He returned to Madagascar, but soon resigned, and was elected



W. F. VILAS.

deputy from Cochin China in September, 1889. In 1893 he successfully negotiated the convention with Siam. In 1894 he was once more sent to Madagascar, the French government having decided to take decided action in view of the hostility of the Hovas government to France. As a result, diplomatic relations were broken off, November 10. French troops were dispatched; the French eventually entered Antananarivo on Sept. 30th, 1895, first placing the island under their protection, and finally annexing it.

VILLA FRANCA, TREATY OF, of 1859. See ITALY, Vol. XIII, p. 490.

VILLAGE COMMUNITIES. See LAND, Vol. XIV, pp. 260, et seq.

VILLAIN OR VILLEIN. See SLAVERY, Vol. XXII, p. 137.

VILLANOVA, ARNOLDUS DE. See ARNAUD, Vol. II, p. 620.

VILLARD, HENRY, originally GUSTAVUS HILGARD, an American financier; born in Spire, Bavaria, April 11, 1835. He went to the United States in 1853; was a journalist in Chicago; visited Colorado as a newspaper correspondent in 1859; published the *Pike's Peak Gold Region* in 1860; was an army correspondent during the war; married a daughter of William Lloyd Garrison; was European correspondent of the *New York Tribune*; was secretary of the American Social Science Association; went to Europe in 1870, and there became interested in railroad securities; became president in 1875 of the Oregon and California railroad and of the Oregon Steamship Company, and after many vicissitudes became president of the board of directors of the Northern Pacific railroad in 1881, and again in 1888. He gave large sums of money to various important educational institutions, including the University of Washington and the State University of Oregon. Died at Dobbs Ferry, N. Y., Nov. 12, 1900.

VILLA RICA. See PARAGUAY, Vol. XVIII, p. 244.

VILLARI, PASQUALE, an Italian author and statesman; born at Naples, Italy, Oct. 3, 1827. He took part in the Neapolitan revolution of 1848-49, and was then obliged to flee to Florence. He spent the next few years there in study, and in recognition of his work *Storia di Girolamo Savonarola e de' suoi Tempi*, was appointed professor of history in the University of Pisa (1859); took an active interest in Italian politics, writing many works concerning them, and was professor of history in the Istituto di Studj Superiori at Florence after 1866, except when holding some public office. He was general Secretary of Public Instruction in 1869; Senator in 1884; Minister of Public Instruction in 1891; and at different times a deputy in the Italian Parliament. He has published *La Civiltà Latina e Germanica* (1861); *Leggende che Illustrano la Divina Commedia* (1865); *Dispacci di Antonio Giustiano, Ambasciatore Veneto in Roma dal 1502 al 1505* (1876); *Niccolò Machiavelli e i suoi Tempi* (1877-82); *Arte Storia, e Filosofia* (1884); *Le Origini del Comune di Firenze* (1890); and *I Primi due Secoli della Storia de Firenze* (1893-94).

VILLEGAGNON, NICHOLAS DURAND DE. See BRAZIL, Vol. IV, p. 229.

VILLELE, JEAN BAPTISTE SERAPHINE, JOSEPH COMTE DE (1773-1854), French Premier. See CHARLES X, Vol. V, p. 412.

VILLENA, ENRIQUE DE. See SPAIN, Vol. XXII, p. 355.

VILLIERS, CHARLES PELHAM, long known as the "Father of the House of Commons," was a brother of the fourth earl of Clarendon, and was born in England Jan. 3, 1802. He was called to the bar at Lincoln's Inn in 1827, was examiner of witnesses in the Court of Chancery from 1833 to 1852, and in 1835 was elected member of Parliament for Wolverhampton, which he continuously represented, latterly as a Union Liberal. He was a free-trader, the colleague of Cobden and Bright in the fight for the repeal of the Corn Laws, and filled the offices of judge-advocate-general (1853) and president of the poor-law board (1859-66). He was raised to the rank of an earl's son in 1839, and in 1853 became a member of the Privy Council. The honor of a peerage was offered to him in 1885, but was declined. He had the reputation of being one of the best of present-day conversationalists. Died in London, Jan. 16, 1898.

VILLIERS, FREDERIC, a war correspondent and artist; born in London in 1850, and educated in France; studied in the schools of art at South Kensington, and became a student of the Royal Academy in 1870. In 1876, as special artist and correspondent of the *London Graphic*, he went through the Servian campaign with Mr. Archibald Forbes. In the war between Turkey and Russia he was present at all the chief engagements. In June, 1878, he went to Malta, and in November he left England for Afghanistan. He went through the first part of that campaign till the signing of the treaty of Gundamuk; then left for Australia, traveled through New Zealand, and returned to England via San Francisco and New York, thus making a journey round the world. He was on H.M.S. *Condor* during the bombardment of Alexandria; was present during the Egyptian campaign. In 1884 was with General Graham in the operations against the Arabs; in the autumn of 1884 and the spring of 1885 was with the Nile expedition for the relief of Khartoum, being present at the battles of Abu-Klea and the advance upon Metemneh; in November, 1885, started for Servia; and was with the Servian forces at all the chief encounters with the Bulgarians. He accompanied Lord Dufferin on his tour of India, lectured in the United States in 1890 on his varied experiences, and added to them in 1894 and 1895, as representative of *Black and White* in China, during the war with Japan.

VILLIERS, GEORGE. See BUCKINGHAM, DUKE OF, Vol. IV, pp. 417-419.

VILLIERS, GEORGE WILLIAM FREDERICK. See CLARENDON, Vol. V, pp. 807-809.

VILLISCA, a town of Montgomery County, southwestern Iowa, 65 miles E. of Council Bluffs, and on the Chicago, Burlington and Quincy railroad. The town is in an agricultural, dairying and

stock-raising district, and has manufactories of tile and fire-brick, as well as building-brick. It contains two banks, three weekly newspapers, seven churches, high and grammar schools; has water-works, and is lighted by electricity. Population 1890, 1,744; 1900, 2,211.

VIMIERO, BATTLE OF. See WELLINGTON, Vol. XXIV, p. 495.

VINALHAVEN, a town of Knox County, upon an island in Penobscot Bay, southern Maine; about 15 miles E. of Rockland. It has granite quarries, two hotels, two churches, high-school and public library. Population 1900, 2,358.

VINCENNES, the oldest city of Indiana, settled in 1702 (see VINCENNES, Vol. XXIV, p. 234), and named for Jean Baptiste Bissot Vincennes (q.v., in these Supplements). It is the capital of Knox County, in the southwest of the state; has four railways, the Cairo division of the Cleveland, Cincinnati, Chicago and St. Louis, the Ohio and Mississippi, the Evansville and Terre Haute and the Indianapolis and Vincennes roads; while the Wabash River affords a navigable route to the Ohio and other southern waterways. It contains a courthouse, three national banks with a total capital of \$300,000, eleven Protestant churches, two Catholic churches, two daily and two weekly papers, several packing-houses, flour and woolen mills, breweries, manufactories of plumbers' supplies, agricultural implements, carriages, furniture, brick and tile, etc. The city is lighted with gas and electric lights, and has four miles of electric railways. It has two high-schools, five other public-school buildings, and Vincennes University with 300 students, besides a Catholic academy and parochial schools. Its population, which was 7,080 in 1880, was returned in 1890 at 8,822. Population 1900, 10,249.

VINCENNES, JEAN BAPTISTE BISSOT, SIEUR DE, a Canadian explorer; born in Quebec, Canada, in January, 1688; was present as a boy at a battle between the French and Indians at Mackinaw, and in 1701 entered the French army as an ensign. In 1712 he preserved Detroit from an Indian invasion, and later was busy in the French service in Ohio and Michigan, locating about 1725 at the French settlement in Indiana, subsequently named Vincennes, after him, where he built an earth fort and established a trading-post. In 1736 he engaged in an unsuccessful expedition against the Chickasaw Indians, in Illinois, in which nearly all the invaders were either killed or captured, and he, with other prisoners, was burned at the stake.

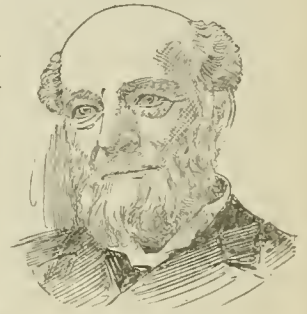
VINCENT, CHARLES EDWARD HOWARD, an English statesman; born at Slinfold, Sussex, England, May 31, 1849. He was educated at the Westminster School and the Royal Military College, Sandhurst; entered the army as ensign in 1868, but retired as lieutenant in 1873 to take up the study of law; was captain of the Royal Berkshire Militia (1873-75); and lieutenant-colonel of the Central London Rangers (1875-78); began practicing law in 1876; was director of criminal investigations, (1878-84), during which time he reorganized the detective service; resigned

to become a member of Parliament; was elected to the Metropolitan Board of Works for St. George's in 1889; and was appointed in 1884 colonel-commandant of the Queen's Westminster Volunteers. He was three times re-elected to Parliament, and was identified with the fair-trade movement, United Empire trade and British labor questions; was Berlin correspondent of the *Daily Telegraph* (1871), and military commissioner of the *Daily Telegraph* at the outbreak of the Russo-Turkish War in 1877. He traveled all over the world, and wrote *Elementary Military Geography, Reconnoitring and Sketching* (1872); *The Improvement of the Volunteer Force* (1878); *The Law of Criticism and Libel* (1876); *Procédure d'Extradition* (1880); and *A Police Code and Manual of Criminal Law*.

VINCENT, JOHN HEYL, an American clergyman, bishop of the Methodist Episcopal Church; was born in Tuscaloosa, Alabama, Feb. 23, 1832.

His education was received at academies in Lewisburg and Milton, Pennsylvania, and at the Wesleyan Institute. His pastoral duties were performed in Illinois and New Jersey. He established the *Sunday School Quarterly* in Chicago in 1865, and the *Sunday School Teacher*, containing the first issues of his modern lesson system, which has become international, in 1866. He was also the author of a large number of Sunday-school publications, but is best known as the chief organizer of the Chautauqua series of educational institutions and the Chautauqua Assembly, which he established in 1874. He became corresponding secretary of the general Sunday School Union and Tract Society of the Methodist Episcopal Church, and editor of the Sunday-school and tract periodicals of that church, in 1868. He was elected bishop at the General Conference of 1888, his episcopal residence being at Topeka, Kansas. He has written *Chautauqua Text-Books* in history and many other works, including *Studies in Young Life* (1890); *My Mother* (1892); *The Story of a Letter* (1893); and *Earthly Footsteps of the Man of Galilee* (1894).

VINCENT, MARVIN RICHARDSON, an American clergyman and educator, born at Poughkeepsie, New York, Sept. 11, 1834. He was educated at Columbia College; then assisted in directing the Columbia grammar-school for four years, after which he became professor of Latin in Troy University. Having studied theology in private, he was ordained as minister of the Methodist Episcopal Church, but his views changed, and he entered the ministry of the Presbyterian Church. He was pastor of the First Presbyterian Church in Troy (1863-73), of the Church of the Covenant in New York (1873-88), and then accepted the chair of sacred literature in Union Seminary. He has



BISHOP VINCENT.

written *Amusement a Force in Christian Training* (1867); *Stranger and Guest* (1879); *Faith and Character* (1880); *In the Shadow of the Pyrenees* (1883); *Word Studies in the New Testament* (1887-90); and *That Monster, the Higher Critic* (1895).

VINEGAR EELS, a popular name for the minute worms of the nematode class found in vinegar: They are long, slender worms, with the typical nematode organization. They feed on the fungi which grow in vinegar, especially in vinegar which contains sugar for the nourishment of the fungi. They are known to science as *Anguillula aceti*.

VINELAND, a town of Cumberland County, southern New Jersey, 34 miles S.S.E. of Philadelphia, on the West Jersey and the Jersey Central railroads. It is nicely laid out, with broad, shaded streets, has water-works on the drive-well system, and gas. It is surrounded by farms which produce grapes, berries and truck. Vineland is noted for the large quantities of unfermented wine which it exports. It has large shoe factories, Smyrna-rug factories, machine-shops, glass and bottle factories, button, chenille curtain, paper-box and linoleum factories, a foundry and large lumber-mills. It is the seat of the New Jersey Home for Feeble-Minded Women and of an endowed Home for Feeble-Minded Children. It has good public schools, with a large high-school and library. Its climate is very healthy, and it has some favor as a summer and health resort. Population 1890, 3,822; 1900, 4,370.

VINER, CHARLES (died, 1756), author of *Abridgment of Law and Equity*. See BLACKSTONE, Vol. III, p. 801.

VINE-RAPES, a popular name sometimes given to plants of the family *Rafflesiaceae*, notable as root-parasites. They are rare tropical plants, and the best known form, *Rafflesia*, a native of Java, has huge, yellowish-red malodorous flowers, three or four feet in diameter, which grow almost directly upon the roots of the host-plant.

VINES, SYDNEY HOWARD, a British botanist; born in London, Dec. 31, 1849. His education was conducted in private until he began the study of medicine at Guy's Hospital in 1869. He then took a course at Cambridge, where, in 1876, he became a fellow and lecturer at Christ's College; was elected to a readership in 1884, and in the same year took his Doctor of Science. He is a fellow of the Royal Society, and has written *Lectures on the Physiology of Plants* (1886); and contributed the articles in this ENCYCLOPEDIA ON VEGETABLE PHYSIOLOGY, VEGETABLE REPRODUCTION and VEGETABLE KINGDOM. He was also one of the founders and one of the editors of *Annals of Botany*.

VINEYARDS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

VINEYARD SOUND, a channel off the southeast coast of Massachusetts, which divides Martha's Vineyard from the Elizabeth Islands, through which vessels bound from Boston to southern ports usually pass. It is six miles broad and about twenty long.

VINLAND. See AMERICA, Vol. I, p. 706; and NORUMBEGA, in these Supplements.

VINTON, a city and the capital of Benton County, eastern central Iowa, 23 miles N.W. of Cedar Rapids, on Red Cedar River, and on the Burlington, Cedar Rapids and Northern railroad. It is in an agricultural and stock-raising district; contains Iowa College for the Blind and Tilford Collegiate Academy, three churches and two public-school buildings. There are steel-works, mineral-paint works, a creamery and flour-mills. It has two weekly and one semiweekly paper, and a semimonthly, *Railroad Telegrapher*. Pop. 1890, 2,865; 1900, 3,499.

VINTON, DAVID HAMMOND, an American soldier; born in Providence, Rhode Island, May 4, 1803. He was a graduate of the United States Military Academy. After several years of garrison and special duty he was sent to Florida in 1836; became quartermaster-general of Florida in 1837; chief quartermaster on the staff of General Wool, with rank of major, in 1846; served through the Mexican War; was chief quartermaster of the Department of the West (1852-56); and of the Department of Texas till 1861. When the war broke out he was taken prisoner by the Confederates, but exchanged in a few months, and during the rest of the War served as deputy quartermaster-general and chief quartermaster of New York. In 1864 he was brevetted brigadier-general; was appointed assistant quartermaster-general in 1866, and retired in the same year. He died at Stamford, Connecticut, Feb. 21, 1873.—His brother ALEXANDER HAMILTON, an American clergyman, was born in Providence, May 2, 1807. He was educated at Brown University and Yale Medical School. After practicing in Pomfret (1828-32) he took up the study of theology at the Protestant Episcopal Seminary in New York; was pastor at Portland, Maine (1835-36); Providence (1836-42); Boston (1842-58); Philadelphia (1858-61); New York (1861-70); and Boston (1870-77). He was one of the leaders of the Low Church party, and published *Lectures on Evidences of Christianity* (1855), besides a couple of volumes of sermons. He died in Philadelphia, Pennsylvania, April 26, 1881.—Another brother, FRANCIS, soldier and clergyman, was born in Providence, Aug. 29, 1809. He was educated at West Point, and after doing duty at Fort Snelling, Minnesota, he was stationed at Boston, where, during his leisure hours, he studied law at Harvard. Then he served against the Indians in Alabama and Florida; resigned in 1836 to study for the ministry; after taking the course at General Theological Seminary, New York; was ordained a priest (1839); was rector in Providence and Newport (1840-44); Brooklyn (1844-56); assistant at Trinity Church, New York (1855-59); and professor of ecclesiastical law and polity at General Theological Seminary (1869). He published *Arthur Tremaine; or, Annals of Cadet Life* (1830); *Lectures on the Evidences of Christianity* (1865); and a *Manual Commentary on the General Canon Law of the Protestant Episcopal Church in the United States* (1870). He died in Brooklyn, Sept. 29, 1872.

VINTON, FREDERICK PORTER, an American painter; born in Bangor, Maine, Jan. 29, 1846. He received his training under Bonnat in Paris, under Duveneck, Wagner and Diez in Munich and again

in Paris under Laurens. He located in Boston on his return, and is a National Academician. He has painted more portraits than anything else, but has painted some fine pictures, including the *Little Gypsy*; *Head of a Neapolitan Boy*, and the *Head of an Old French Peasant Woman*.

VIOLA OR VIOL FAMILY. See VIOLIN, Vol. XXIV, pp. 243, 244.

VIOLET FAMILY, the well-known family *Viola*, especially represented in the tropics, but species of the principal genus, *Viola*, are common throughout temperate regions. The flowers are mostly irregular, a spurred petal forming a place for nectar secretion. Several species are cultivated, but none so extensively as the pansy (*V. tricolor*). The species of *Viola* are herbs, but in the tropics certain species of *Ionidium* are shrubs, and a few are high-climbing vines (*lianes*).

VIOLLE, JULES, a French physicist; born at Langres, France, in 1841. He received his education at the École Normale Supérieure in Paris; was appointed professor of physics at Lyons in 1883; occupied the same chair at the École Normale, 1890; and in the Conservatory of Arts and Trades in Paris, 1891. He carried on much original investigation in the laws of radiation and the measurement of high temperatures with important results, and invented the absolute standard of light which the second Paris congress of electricians adopted. He published *Cours de Physique* in installments, beginning with 1881.

VIOLONCELLO. See VIOLIN, Vol. XXIV, p. 245.

VIOMÉNIL, ANTOINE CHARLES DU HOUX, BARON DE, a French soldier, born at Fauconcourt, Vosges, France, Nov. 30, 1728. He served in the French army in Holland, Hanover and Corsica, and attained the rank of field-marshal; was in Poland, and aided the confederation of Bar against Russia in 1770, and after this captured the castle of Cracow. He went to the United States during the Revolutionary War, under Rochambeau, in 1780; led his troops in storming the redoubt at Yorktown; then returned to France, and in 1782 was appointed governor of La Rochelle. During the assault upon the Tuileries, Aug. 10, 1792, he was wounded while defending the royal family, and died of his wounds November 9th of the same year.

VIONVILLE, same as MARS LA TOUR, in these Supplements.

VIPERIDÆ. See VIPER, Vol. XXIV, pp. 247, 248.

VIRCHOW, RUDOLF, a German pathologist; born at Schivelbein, Pomerania, Oct. 13, 1821. In 1843 he graduated in medicine at the University of Berlin, and began to lecture on anatomy, being also prosecutor of the Charité Hospital. Aroused by the revolution of 1848, he entered the political arena as a liberal leader, and was elected to the Prussian House of Deputies. His liberal politics served to deprive him of his lectureship in 1849. Upon this he accepted a call to the chair of pathological anatomy in the University of Würzburg, where he obtained fame by his lectures on cellular pathology. In 1856 he was recalled by the University of Berlin to assume

the chair of pathological anatomy and to become director of the Pathological Institute at Berlin, which he soon raised to the first rank among such establishments. In 1880 he entered the Reichstag, where he soon became famous by his coinage of the watchword "Kulturkampf," a phrase signifying the conflict of the state with a reactionary church. In the wars of 1866 and 1870 Professor Virchow was director of the German hospital service. The cancerous disease that carried off Frederick III in 1888 brought Virchow prominently before the world as the ultimate authority on the pathological problem. He wrote *Cellular Pathology of Tumors*, and many other technical works, besides *Freedom of Science in the Modern State* (1877). Prof. Virchow's other important works embrace a treatise *On Post-Mortem Examinations* (1880); *On Famine Fever* (1868); *A Collection of Treatises on Scientific Medicine* (1856); *Four Lectures on Life and Illness* (1862); *Alimentation and Well-being* (1889); and *The Function of Science in the New National Life of Germany* (1871). Beside his discoveries in physiological science, he rendered important services to anthropology in connection with the lake-dwellings and the Egyptian tombs. In politics he was a bitter opponent of Bismarck and a friend of the workingmen. He always labored hard for sanitary reforms, and as alderman in Berlin took a deep interest in all municipal work.

VIRDEN, a city, of Macoupin County, west southwest Illinois, about 20 miles south by west from Springfield, and on the Chicago and Alton and the Jacksonville Southeastern railroads. Coal-mining is the principal industry; there are also extensive brick and tile manufactures and poultry packing establishments. It has a high-school, two banks and three weekly newspapers. Population 1900, 2,280.

VIRGINIA had a population in 1900 of 1,854,184, that of 1890 was 1,655,980, the increase constituting a gain of 198,204; the gain during the previous decade having been 9.5 per cent. The density of population was in 1890 41.27 to the square mile, a gain from 37.70 in 1880. The eleventh Federal census gave Virginia nine cities having a population of 8,000 or over; the number of their inhabitants was 221,965, constituting 13.40



SEAL OF THE STATE OF VIRGINIA.

per cent of the whole number of the people in the state. In 1890 the number of male citizens was 824,278, the number of females 831,702; the percentage of native-born inhabitants was 98.89; the negroes numbered 635,438, an increase of 3,822 within the ten years preceding; there were 55 Chinese, 16 Japanese and 349 Indians.

The gross area of Virginia is 42,450 square miles, of which 2,325 square miles is water surface.

Virginia is chiefly an agricultural state. The table given below is the report of the cereals as made in the census returns of 1890 for the preceding year:

	ACREAGE.	PRODUCTION.
All cereals-----	2,892,992	41,251,260
Corn-----	1,600,690	27,172,493
Wheat-----	737,510	7,904,092
Oats-----	495,508	5,695,100
Barley-----	2,051	40,982
Rye-----	52,063	397,394
Buckwheat-----	5,170	41,199

The following agricultural statistics are for 1880 and 1890:

	1880.	1890.
Total number of farms-----	118,517	127,600
Total acreage of farms-----	19,835,785	19,104,951
Value of farms, fences, buildings, machinery and live-stock-----	\$247,476,536	\$294,488,569
Number of horses-----	218,838	242,512
Number of mules and asses-----	33,598	37,533
Whole number of cattle-----	686,184	747,334
Number of milch cows (included above)-----	243,061	273,634
Number of swine-----	956,451	796,691
Number of sheep-----	497,289	495,313

Divisions of farms as to size:

Under 10 acres-----	8,284
10 and under 20 acres-----	11,566
20 and under 50 acres-----	21,708
50 and under 100 acres-----	24,667
100 and under 500 acres-----	54,903
500 and under 1,000 acres-----	5,077
1,000 acres and over-----	1,395

The tenure under which the farms of the state are held is as follows: Cultivated by the owners, 93,311; rented for a fixed money value, 11,985; rented on shares, 22,304. The average size in 1880 was 167 acres, decreased in 1890 to 150 acres.

Virginia led the states of the South Atlantic division in 1889 in the number of colts foaled, 25,956; 71.30 per cent of the hogs reported in 1889 were slaughtered for use on the farms; the weights of fleeces of wool were increased between 1879 and 1889 from 3.69 to 4.07 pounds. In 1826, Virginia reached the high-water mark of her history in the production of cotton, 25,000,000 pounds. In 1889, only one acre out of every 655 was devoted to cotton, and the only counties producing any considerable amount were those bordering on North Carolina. The counties raising cotton then numbered 12, but almost one half of the entire amount grown in the state was raised in the counties of Brunswick and Southampton. The products of 1889 included 929 tons of seed, valued at \$8,294. In the year named, Virginia stood second in the area devoted to tobacco, 110,579 acres, and occupied the same position in product, 48,522,655 pounds. There was a decrease of 30,212 acres as compared with the area in 1879, and the product was less by 31,466,213 pounds. At both periods mentioned Kentucky and Virginia combined had more than one half of the total area under tobacco in the United States. Once an important flax-growing state, Virginia fell in 1889 to

the twenty-second place in acreage, the same position in production of seed, but held fourth place in the production of fiber and third in the average value of products per acre.

The appraisement of 1895 for the purpose of assessing the taxes of 1896, showed the following farm animals, with their value:

	NUMBER.	VALUE.
Horses-----	241,046	\$ 9,808,229
Mules-----	38,248	2,134,133
Milch cows-----	265,635	4,818,619
Oxen and other cattle-----	386,675	6,138,896
Sheep-----	426,889	894,760
Swine-----	985,748	3,768,514
Total valuation-----		\$27,563,151

The United States Department of Agriculture reported for 1895 the following:

	ACRES.	PRODUCT.	VALUE.
Corn-----	1,753,073	32,607,158 bu.	\$12,064,648
Wheat-----	699,525	6,505,583 bu.	4,228,629
Oats-----	459,043	8,125,061 bu.	2,437,518
Rye-----	45,141	496,551 bu.	258,207
Potatoes-----	41,525	3,031,325 bu.	1,151,904
Hay-----	685,488	774,601 tons	8,853,689
Total valuation-----			\$28,994,595

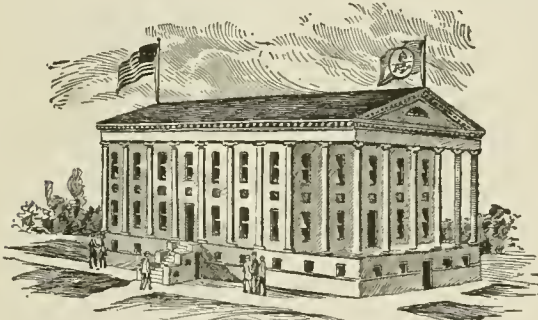
Virginia is rich in minerals, the value of the output of 1889 being given at \$6,023,076. In the statistics relative to iron-ore the production of Virginia and West Virginia are combined. The number of mines producing was given at 34, the value of the ore, \$935,290. The aggregate capital invested in the two states was reported at \$3,905,249. Gold to the value of \$4,100 was mined in 1889, but the gold mines of Virginia, numbering only 3, are not profitable. Some silver is also found, but not in sufficient quantities to pay. Lead is smelted and refined, but the production is given in the census reports combined with those of New Jersey and Pennsylvania. The value of the spelter and oxide of zinc for the year mentioned is combined with that produced in Tennessee, the total amount being \$141,560. Manganese to the amount of 14,616 tons was mined, the value of which was \$156,257. The coal-fields of Virginia are extensive and valuable, 58 mines reporting an output of 865,786 tons, valued at \$804,475. Reports from 31 stone quarries gave the value of their combined output for the year at \$658,650, of which more than one half came from granite. Other minerals of value are slate, limestone, sandstone, gypsum, soapstone, barytes, ochers, pyrites and quartz pebbles. Mineral waters from 22 springs were sold, to the amount of \$141,476. In 1895 the value of the coal mined was \$933,576, and 1,635 persons were engaged in the collieries of the state. At the same time Virginia stood fourth among the states in the production of iron-ore. The quarries of Virginia yielded, during the same year, granite to the amount of \$123,361; slate to the value of \$138,151, and limestone valued at \$284,547. The clay products, brick, fire-brick, tile, sewer pipes, etc., gave a return of \$937,593.

The census reports for 1890 show the fisheries of Virginia to stand third in rank, according to value, which was given at \$4,816,225. There are about three thousand miles of fishing-shores on the tide-waters of the state, and over two thousand miles of oyster-grounds. The following table gives the different industries connected with the business:

Menhaden	1,028	434,629	351,177
Shad and alewife.....	4,422	332,981	1,278,820
Oysters.....	19,070	2,603,058	2,776,733
Atlantic and gulf boat..	1,215	56,883	405,475
Inland.....	74	1,918	4,020

The number of vessels employed was 1,225, their value \$882,909.

By the eleventh decennial census Virginia had 5,915 specified manufacturing industries, in which \$63,456,799 was invested as capital; 59,591 persons were employed, to whom \$19,644,850 was paid as annual wages. The cost of the material used was \$50,148,285, and the value of the finished products \$88,363,824. The principal industry was the manufacture of tobacco in its various forms, which, all combined, amounted to the sum of \$22,020,298. Following in order of importance came flouring and grist mill products, \$11,716,356; lumber, in



CAPITOL BUILDING, RICHMOND.

different forms, \$7,892,106; iron, steel and nails, \$6,173,584; foundry and machine-shop products, \$2,739,695; and cotton goods, \$1,732,648. Other important industries were boots and shoes, brick and tile, car construction and fertilizers.

Reports to Oct. 31, 1895, on banking institutions in Virginia showed that there were 37 national banks, with a capital stock of \$4,796,300; loans and discounts of \$15,677,095; deposits of \$13,829,545. There were 85 state banks, with a total capital of \$6,503,896; loans and discounts, \$17,898,196; resources, \$25,040,095; deposits, \$14,604,673.

The total school population between the ages of 5 and 21 years, in 1898, was 665,865, made up of 397,230 white and 268,635 colored, an increase of almost twenty thousand among the white, and a decrease of nearly seven thousand among the colored, as compared with the returns for 1894; 8,562 schools were open during the year, of which 6,035 were for white pupils and 2,243 for colored. Of graded schools, the whites had 1,490, the colored pupils 505. The number of white pupils enrolled in the public schools was 235,533; the number of colored children, 120,453. The average daily attendance was, white, 137,830; colored, 64,700. White pupils

to the number of 5,323 were supplied with text-books at public expense; colored pupils to the number of 2,949 were similarly supplied. Of the total white school population, 59 per cent were enrolled, and of these 74 per cent were in daily attendance. Of the colored school population, 45 per cent were enrolled, and 71 per cent of these were in daily attendance. There were 2,141 white male teachers, 4,070 white female teachers, 898 colored male teachers, and 1,183 colored female teachers, making a total of 8,292 in the state. The average school term was 5.95 months, the average age of pupils 11 years. The average monthly salary of male teachers was \$32.82; of female teachers, \$26.95. The total number of schoolhouses in the state was 6,873; the estimated value of school property owned by districts, \$2,982,828. The school revenue for the year 1898 amounted to \$1,824,287, and the expenditure to \$1,832,525. The state school fund, used exclusively for teachers' salaries, was \$962,482. The Literary fund derived from fines and escheats gave \$193,100 to be apportioned. From these sums the salaries of school superintendents are deducted.

In addition to the children attending the public schools, the attendance at private schools was as follows: 22,486 white pupils and 3,484 colored pupils.

Virginia has many state institutions for higher and technical education, such as the University of Virginia, Washington and Lee University, Virginia Military Institute, Agricultural and Mechanical College, State Female Normal School, William and Mary College, Institution for the Education of the Deaf, Dumb, and Blind, Medical College of Virginia, Miller Manual Labor School of Albemarle, Virginia Normal and Collegiate Institute, and the Hampton Normal and Agricultural Institute.

The Methodist Episcopal Church South maintains the Randolph Macon College at Ashland, with a branch for women at Lynchburg; the Dunker Church controls the Bridgewater College, at the town of the same name; the Methodist Episcopal Church has the Emory and Henry College, at Emory; the Baptists have the Richmond College, at Richmond; the Lutherans control the Roanoke College, at Salem; Washington and Lee University, at Lexington, is non-sectarian, as is Hampden-Sidney College.

In 1890 Virginia had 4,998 church organizations and 4,894 edifices. The membership was 569,235, constituting 34.37 per cent of the population. The value of all church property was estimated at \$10,473,943. Baptists, all bodies, aggregated 2,038 organizations; Congregationalists numbered 104; Disciples of Christ, 161; all Lutherans, 157; all Methodists, 1,737; Presbyterian, 290; and Protestant Episcopal, 247.

The re-assessment of property for taxation, made in 1895, fixed the total valuation of land, town lots and buildings at \$189,571,619 in the counties and \$112,496,521 in cities, making a total of \$302,068,140. The personal property amounted to \$83,132,476. Of the entire amount of property assessed for taxation the negroes of Virginia owned in personality \$3,174,450 and in realty \$10,428,730. The total tax assessed was \$1,983,042, of which \$174,808 was

against negroes. The receipts from all sources for the fiscal year ending Sept. 30, 1895, was \$3,333,257, which, with a balance remaining over from the preceding year, made available the sum of \$3,465,493. The disbursements for the year were \$3,404,097, leaving in the treasury at the beginning of the fiscal year, Oct. 1, 1895, the sum of \$61,395. The largest item of receipts was \$1,059,339, from railroad companies; and the largest item of disbursement was \$947,634, for the support of public education. Other expenditures were: \$722,331, interest on the public debt and bonds held by educational institutions; \$337,868 for the support and care of lunatics; \$362,682 for the account of criminal charges; \$118,497 for the Penitentiary; and \$113,553 for expenses connected with the new library building. On Jan. 1, 1898, the total state debt, including all liabilities on which interest was paid, amounted to \$26,746,387.

The institutions supported by the state, educational, correctional and penal, are the Institution for the Education of the Deaf, Dumb and Blind, located at Staunton; the Industrial Reform School, at Laurel; and the State Penitentiary, at Richmond. There are four asylums for the care of the insane, one, known as the Western, at Staunton; the Southwestern, at Marion; the Eastern, at Williamsburg, and the Central, near Petersburg.

Virginia has a National Guard consisting of one brigade of infantry, one regiment of cavalry and one battalion of artillery. The authorized strength in 1895 was 5,176. The actual force was made up of 10 general and staff officers, 336 other officers, 2,391 infantry, 191 cavalry, 167 artillery and 204 naval militia. The appropriation for 1895 was \$11,242 from the state, supplemented by \$10,351 from the Federal government.

On Jan. 1, 1899, there were 247 newspapers published in Virginia, of which 32 were daily, 4 tri-weekly, 2 semi-weekly, 172 weekly, 3 semi-monthly, 30 monthly, and 4 bimonthly. Papers were published in 79 of the 100 counties of the state, and in 128 cities, towns, and villages, of which 67 were county seats.

The following is a list of the principal cities and towns of Virginia, with the populations of 1900: Richmond, 85,050; Norfolk, 46,624; Petersburg, 21,810; Lynchburg, 18,891; Roanoke, 21,495; Alexandria, 14,528; Portsmouth, 17,427; Danville, 16,520; Manchester, 9,715; Staunton, 7,289; Charlottesville, 6,449; Winchester, 5,161; Fredericksburg, 5,068; and Newport News, 19,635.

The following is a list of the governors of Virginia from 1788, the date at which the Federal Constitution was ratified: Beverly Randolph, 1788-91; Henry Lee, 1791-94; Robert Brooke, 1794-96; James Wood, 1796-99; James Monroe, 1799-1802; James Page, 1802-5; William H. Cabell, 1805-8; John Tyler, 1808-11; James Monroe, 1811; George W. Smith, 1811-12; James Barbour, 1812-14; Wilson C. Nicholas, 1814-16; James P. Preston, 1816-19; Thomas M. Randolph, 1819-22; James Pleasant, 1822-25; John Tyler, 1825-26; William B. Giles, 1826-29; John Floyd, 1829-33; Littleton W. Tazewell, 1833-36; Wyndham Robertson, 1836-

37; David Campbell, 1837-40; Thomas W. Gilmer, 1840-41; John Rutherford, 1841-42; John M. Gregory, 1842-43; James McDowell, 1843-46; William Smith, 1846-49; John B. Floyd, 1849-51; John Johnson, 1851-52; Joseph Johnson, 1852-56; Henry A. Wise, 1856-60; John Letcher, 1860-64; Francis H. Pierpont, 1864-67; Henry H. Wells, 1867-69; Gilbert C. Walker, 1869-74; James L. Kemper, 1874-78; F. W. M. Holliday, 1878-82; W. E. Cameron, 1882-86; Fitzhugh Lee, 1886-90; Philip W. McKenney, 1890-94; Charles T. O'Ferrall, 1894-98; Janus Hoge Tyler, 1898. See also VIRGINIA, Vol. XXIV, pp. 255-61.

VIRGINIA, a city, the capital of Cass Co., Ill., on the Jacksonville Southeastern and the Springfield Division of the Ohio and Mississippi railroads; has 2 national banks, 2 newspapers, 5 churches, a flour-mill, several factories, 3 banks, and a public high-school. Pop. 1900, 1,600.

VIRGINIA, a Roman girl. See CLAUDIUS, APPIUS CRASSUS, Vol. V, p. 816.

VIRGINIA, UNIVERSITY OF, an institution of learning at Charlottesville, Albemarle County, Vir-



ACADEMICAL BUILDING, UNIV. OF VA.

ginia, four miles from Monticello, the home of Thomas Jefferson, by whom it was planned. Jefferson drew up the statutes relating to it, and when the charter was granted was its first rector, followed by James Madison. The university is governed by a board of eight visitors appointed by the governor of the state, and a rector chosen by themselves. These in turn choose an academic head to the university, who is chairman of the faculty. The state makes an annual appropriation, increased from \$15,000 in 1825 to \$40,000 in 1884, which, together with the income from its productive funds (\$412,300) and tuition fees, gave an income in 1893 of \$125,787. The university has 23 distinct schools, as follows: Analytical and agricultural chemistry, anatomy and surgery, applied mathematics, astronomy, biology, English language and literature, historical sciences, Greek, Latin, law, mathematics, modern languages, moral philosophy, natural philosophy, physiology and materia medica, and practice of medicine. There is no general curriculum, each student choosing among the different schools; though certain prescribed work must be done to secure a degree. In 1898 the library had 51,000 volumes, and there were 43 instructors and 600 students. On Oct. 27, 1896, the rotunda and public hall were burned, with two-thirds of the library and several valuable paintings.

VIRGINIA CITY, the capital of Madison Co., Montana, an outfitting point for the Yellowstone National Park. It has fine churches, good schools, and attractive homes. Alder Gulch, upon which the city is located, is one of the most famous min-

ing-camps in the world, having yielded probably \$20,000,000 in gold alone. The nearest railroad station is Dillon, on the Union Pacific, about fifty miles west. It has a weekly newspaper. Population 1890, 675; 1900, 568.

VIRGINIA CITY, a city and the capital of Storey County, Nevada, and the largest and most important city of the state. It is on the Virginia and Truckee Railroad. The city has a magnificent water-supply, brought from the Sierras, a distance of thirty miles, with gas and electric plants, two daily and one weekly newspapers, two banks, a county courthouse (cost \$250,000), two public-school buildings (cost \$80,000), and four churches. The great Sutro tunnel, four miles long, taps the bases of the principal mines for the purpose of drainage. Owing to the decrease in the output of the Comstock mines the population decreased from 10,917 in 1880 to 8,511 in 1890. Population 1900, 2,695. For description, see **VIRGINIA CITY**, Vol. XXIV, p. 261.

VIRGINIA CREEPER. See **VINE**, Vol. XXIV, p. 237.

VIRGINIA NIGHTINGALE. See **GROSBEEK**, Vol. XI, p. 209.

VIRGIN'S BOWER. Same as **CLEMATIS**, in these Supplements.

VIRGO, a sign. See **ZODIAC**, Vol. XXIV, pp. 791, et seq.

VIRIATHUS. See **SPAIN**, Vol. XXII, p. 306.

VIROQUA, a city and the capital of Vernon County, in southwestern Wisconsin, 32 miles south of Sparta, and on the Chicago, Milwaukee and St. Paul railroad. It has a machine-shop and an axe-handle factory, and is a point of shipment for grain, wool, tobacco, ties and hoop-poles. It also has a state bank, a high-school and two weekly newspapers. Population 1890, 1,270; 1900, 1,950.

VIRUS, living organisms or their products generated in diseased conditions of animals, and capable of producing disease when transmitted to other animals. Thus, if a person be inoculated with the virus, or matter of a pustule, of smallpox, he will have smallpox; the virus of hydrophobia will cause hydrophobia; and so for others of the infectious diseases. These organisms (bacilli), when introduced into the body of an animal, feed upon its tissues and rapidly increase in numbers. For a time, called the period of incubation, they seem dormant, but are in fact multiplying. When a sufficient number has developed, the symptoms of disease appear. The disease is the result of an effort of the tissues to resist the action of the bacilli. Different tissues have different powers of resistance, and bacilli attack those organs least able to withstand their assaults. Thus, the virus of goitre acts only on the thyroid gland; in smallpox, on the skin and mucous membranes; in whooping-cough and hydrophobia, on the pneumogastric nerves. In this way the different kinds of virus produce each its specific disease. The tissues, having acquired a tolerance of the presence of a certain virus, retain this property for a longer or shorter period, and give immunity from a subsequent attack of the same virus. This is true with scarlatina, measles, smallpox, whooping-cough, and to a less extent with typhoid and typhus fevers.

With some of the zymotic diseases there seems to be no immunity from a second attack. See **ZYMOTIC DISEASES**, Vol. XXIV, p. 834; **VACCINATION**, Vol. XXIV, p. 23; and *Specific Infections*, under **PATHOLOGY**, Vol. XVIII, p. 402.

VISALIA, a city and the capital of Tulare County, in southern central California, 40 miles S. of Fresno, 18 miles N.E. of Tulare, on the Kaweah River, and on the Visalia and Tulare railroad. It has three state banks, flour and planing-mills, iron-works, fruit-canning works and six churches. Population 1890, 2,885; 1900, 3,085.

VISCACHA. See **MAMMALIA**, Vol. XV, p. 420.

VISCELLINUS, **SPURIUS CASSIUS**. See **AGRICULTURE**, Vol. I, p. 289.

VISCHER, **FRIEDRICH THEODOR**, a German critic and poet; born in Ludwigsburg, Würtemberg, June 30, 1807. He was educated at the University of Tübingen, where he studied philosophy and theology, and in 1837 was appointed professor of German literature and æsthetics there. But his religious views were of such a radical nature that they led to his suspension. In 1848 he was elected a member of the national assembly of Frankfort-on-the-Main; was chosen a professor of the Zurich Polytechnic School in 1855, and professor of German literature and æsthetics at the Stuttgart Polytechnic School. He published *Æsthetik oder Wissenschaft der Schönen* (1846-57), which had previously been outlined in his *Ueber das Erhabene und Komische* (1837); essays under the titles *Kritische Gänge* (1846-66) and *Altes und Neues* (1881-82); *Goethe's Faust*, *Neue Beiträge zur Kritik des Gedichtes* (1875); the poetical works *Auch Einer* (1879); and *Lyrische Gänge* (1882). He died in Gmunden, Sept. 14, 1887.

VISCHER FAMILY. See **SCULPTURE**, Vol. XXI, pp. 565, 566.

VISCOMETER. The determination of the viscosity of mineral oils is important when they are to be used for lubrication, and many devices have been invented for measuring this with accuracy. The Phillips viscometer is a plate containing six cups and graduated grooves, with apparatus for inclining the plate at any desired angle. The plate is maintained at an even temperature by means of hot water and a thermometer. A piece of glass serves as a protection against air-currents, and the sides of the plate prevent the entrance of the hot water in which it is partially immersed. By timing the flow of various oils across the grooves of the plate, at certain angles and temperatures, their comparative viscosity is ascertained.

The Redwood viscometer has a small oil-cylinder furnished with an agate jet. The cylinder is fixed in a bath of hot water or hot oil, and a stirrer is provided to insure an equal temperature throughout the oil. The oil is timed as it flows out of the agate jet into a graduated flask, and, the minor devices of the instrument being very complete, accurate results are obtained.

The Engler viscometer uses an oil-cup set in an oil bath, and every instrument is made of exact size. The time of the oil in flowing out of the cup, as compared with the flow of water at 20° C., affords data for determining the viscosity of the oil tested.

A. Kunkler has devised a modification of the Engler viscometer for use at low temperatures. He has also devised an instrument for comparing the consistency of machine greases or very stiff oils. The grease is placed in a tube, and bears the weight of a piston which assists the flow. Various small weights may be hung on the piston-rod to expedite the operation.

In the viscometers of Napier and Cockrell the speed of a paddle rotated in the oil serves to test its viscosity. In Doolittle's apparatus a series of concentric rings are rotated in the oil and the torsional strain brought to bear upon the wire which turns the rings is measured, to determine the viscosity of the oil. There are numerous other kinds, but those described will serve to give a general idea of the principles which they employ. C. H. COCHRANE.

VISCONTI FAMILY. See MILAN, Vol. XVI, p. 293.

VISCOSITY. See ELASTICITY, Vol. VII, pp. 801, 802.

VISCUM ALBUM. See MISTLETOE, Vol. XVI, p. 527.

VISES. In the manufacture of vises it is necessary that good wrought-iron and steel should be used, as soft metal or castings are of very little value in a tool that is subjected to much hard usage. The parallel vise is the most common form, in which one jaw approaches the other with a parallel motion, being mounted on a stout slide, within which turns a screw or screws. The grasping-faces are properly of hardened steel. A shoulder is often provided on which small blacksmith work can be done. The blacksmith's vise, so called, however, has a hinged jaw, which describes an arc in approaching the stationary jaw. The carpenter's vise is made of wood, on a similar pattern. Small vises for use in the hand, to give a good grip on small objects, are used by jewelers and others. One form is called pin-vise, another tail-vise, and another balance-vise. When a bench-vise has a part extending to the floor, it is called a leg-vise, and if there are two legs, adjustable to parallel action with two screws, it is a parallel leg-vise. The screw-motion is necessarily slow, therefore some vises are made with a lever device, which operates very quickly though affording less grip. Special forms of vises are made for use with machines, as the planer-vise and shaper-vise, for grasping the work.

VISHNU. See BRAHMANISM, Vol. IV, pp. 207, 208.

VISIBLE SPEECH. See SPEECH-SOUNDS, Vol. XXII, p. 385.

VISIGOTHS OR WEST GOTHS. See GOTHS, Vol. X, pp. 849-851.

VISION. See EVE, Vol. VIII, pp. 821-828; LIGHT, Vol. XIV, pp. 578, 579.

VISION, DEFECTS OF. See OPHTHALMOLOGY, Vol. XVII, pp. 785, 786.

VISITATION AND SEARCH. See SEARCH, RIGHT OF, Vol. XXI, p. 608.

VISITATION NUNS, a religious order founded in 1610, at Anney, by Jane Frances de Chantal (who was canonized in 1767), under the direction of St. Francis de Sales. At first no inclosures were

built, as St. Francis wished the sisters to be free to visit the sick and the needy in their homes. There was no mother superior provided for, but they were to be under the direct supervision of the bishop. The rules governing them were mild but minute in detail. The order was sanctioned by the pope in 1627, and has spread into nearly all the European countries as well as the United States, where it was introduced in 1808, by Teresa Lalor.

VISTULA, river. See POLAND, Vol. XIX, p. 307.

VITALIS, ORDERICUS. See ORDERICUS, Vol. XVII, p. 821.

VITAL STATISTICS, a division of statistics which deals with certain facts concerning the population of one or more countries; as, its rate of increase or decrease at various times, the proportion of the sexes, age at marriage, birth-rate, death-rate, causes of death, mortality in different occupations at different ages, etc. The data of vital statistics are derived chiefly from official reports; as, the census, the reports of boards of health, etc. Most European countries have an efficient system of organized bureaux, for districts, cities, towns, etc., for the collection of data. In the United States many states have made no provision for such work. But the principal cities collect and publish statistics of births, marriages, deaths, etc., more or less correct, from which certain conclusions are drawn. In such statistics are sought the laws of vital development—the influence of climate, occupation, wealth, poverty and political institutions as factors in determining the rate of marriages, births, deaths, suicides, insanity, etc., of a people. The conclusions resulting from the study of these statistics shape, in a large measure, sanitary legislation and the policy of economic and industrial enterprises.

MARRIAGES. The marriage-rate is usually stated as so many per one thousand of the population. For example, the marriage-rate in England and Wales, from 1870 to 1890, was 15.6; that is, 15.6 persons in every 1,000 married annually. For the same time in Ireland the rate was 9, and in Austria 16.3. For forty years, ending with 1890, the annual marriage-rate in Massachusetts was 19.08, and for thirty years, ending at the same time, in Rhode Island, it was 18.9. A comparison of the marriage-rates in England and Ireland naturally leads to a study of the causes of their great difference. Is it poverty, or some prudential reason, that operates in Ireland to make the rate a low one? The marriage of persons related by ties of blood, as of first cousins, so far as observed, results in a greater liability to insanity, idiocy, physical weakness and deformity of children. Whether the real cause is in the consanguinity itself, or in a hereditary force acting in a certain line and intensified in such marriages, is a question yet unsettled.

BIRTHS. For twenty years (1870-90) the birth-rate per 1,000 of population in England and Wales was 34; in Ireland, 24.9; in Austria, 38.6; for 40 years (1830-90), in Massachusetts, 26.5. Comparing the marriage and birth rates of England and Ireland, it appears that there were 2.18 births to each marriage in England, and 2.97 in Ireland—an evidence of greater prolificness in Ireland. The

general rule is, that the birth-rate is a little more than twice as great as the marriage-rate. A comparison of the birth-rate of 1890 with that of 1880 in a number of European countries shows an increasing tendency to voluntary avoidance of child-bearing on the part of married people. The birth-rate in the United States decreased from 36 in 1880 to 31 in 1890.

DEATHS. The death-rate per 1,000 of population for 20 years (1870-90) in England and Wales was 20.03; in Ireland, 18; in France, 22.8; in Prussia, 25.6; in Austria, 30.6; in Italy, 28.6; in Switzerland, 22.1; in Sweden, 17.6. The death-rate of those under 5 years of age was 56.9; from 5 to 9 years of age, 4.9; from 10 to 15, 2.8; from 15 to 20, 4.1; from 20 to 25, 5.35; from 25 to 30, 7.1; from 35 to 45, 11.1; from 45 to 55, 17.2; from 55 to 65, 32; from 65 to 75, 66.9; from 75 to 85, 140.4; from 85 and over, 295. A study of mortality statistics shows that the death-rate for males is greater than that for females, and in infancy and old age greater than in middle life. The rate is least between the ages of 10 and 15. The following table shows the death-rate per 1,000 of population in the larger cities of the United States in 1890:

Allegheny	18.17	Minneapolis	13.54
Baltimore, white	21.05	Newark	27.40
Baltimore, colored ..	32.94	New Orleans, white ..	23.57
Boston	23.44	New Orleans, colored ..	33.65
Brooklyn	23.89	New York	26.45
Buffalo	18.38	Omaha	9.43
Chicago	19.05	Philadelphia	21.29
Cincinnati	21.00	Pittsburg	20.13
Cleveland	20.21	Providence	21.12
Denver	23.00	Rochester	17.32
Detroit	18.70	St. Louis, white	16.50
Indianapolis	17.32	St. Louis, colored	31.11
Jersey City	25.63	St. Paul	14.88
Kansas City	17.30	San Francisco	22.46
Louisville, white	18.16	Washington, white ..	18.57
Louisville, colored ..	28.98	Washington, colored ..	34.03
Milwaukee	18.78		

The death-rates of different races differ greatly. Compare that of the colored and whites in the cities of Baltimore, New Orleans, Louisville, St. Louis and Washington. The death-rate of those born in the United States is less than that of foreign birth. The Jewish race has a lower death-rate than that of any other. It has been estimated from the records of mutual-insurance companies and from other sources that for every death in a community there are two persons sick.

It is difficult to estimate the influence of race, body-structure, hereditary tendencies, place of residence and mode of life in determining the death-rate. Certainly, unusual temperature, as found in mines and furnace-rooms, the presence of noxious gases in many occupations, the infections of a district by micro-organisms, the material used in manufactures and the trades, the danger from the use of machinery and explosives—all these must affect the death-rate. The beneficial influence of sanitary drainage and a pure water-supply has been satisfactorily shown from statistics from European and American cities.

From the foregoing statistics it will be seen that nearly fifty-seven out of every thousand of population die before reaching the age of five years—a greater percentage than

in older persons. Life-insurance companies have constructed tables showing the "expectation of life" at different ages. In the construction of these tables all the ascertainable elements that may contribute to the shortening of life are taken into consideration. The Mutual Life of New York estimates that at 20 years of age the expectation of life is 42.8 years; at 30, 36 years; at 40, 28.9 years; at 50, 21.6 years; at 60, 14.6 years; and at 70, 8.6 years. The estimate of 17 English companies makes the average expectation about 5 per cent less. The Massachusetts tables (1883-87) make the expectation at birth 40.87 years; at the age of 5, 52.7 years; at 10, 49.6 years; at 15, 45.5 years; at 25, 38.7 years; at 35, 32.3 years; at 45, 25.6 years; at 65, 13 years.

The following table shows for the years 1885 to 1889 the average annual death-rate per 1,000 in certain occupations for males in Paris between the ages of 30 and 50, beginning with the lowest death-rate, and, consequently, the most healthful occupation:

Clergymen	8.6
Physicians and surgeons	10.5
Lawyers	11.3
Tanners and curriers	13.2
Founders and heavy-metal workers	13.4
Jewelers, watchmakers and fine-metal workers	14.4
Barbers, hairdressers and wigmakers	16.1
Horticulturists	17.6
Machinists	18.7
Boot-and-shoe makers	19.8
Masons and stone-cutters	19.8
Bakers	20.3
Carpenters and joiners	21.5
Liquor-dealers and eating-house keepers	23.4
Plumbers and plasterers	23.7
Drivers and carmen	24.1
Printers and engravers	25.2
Painters and decorators	25.9

It has long been observed that an expenditure of physical force is followed by enervation. The theory has been advanced that sickness and death among adults are in direct proportion to the demands upon the muscular powers. A careful study of the above table, with some few exceptions, seems to confirm the theory.

VITELLIN, a name given by chemists to a protein body occurring in the yolk of egg. It has been stated by Lehman that this substance is merely a mixture of casein and albumen.

VITI, TIMOTEO (1469-1523). See **SCHOOLS OF PAINTING**, Vol. XXI, p. 436.

VITICULTURE. The grape-vine (*Vitis*) was early discovered to be a native of America, the Norse discoverers calling the country "Vinland," from the abundance of grapes which they found there. It was not until recently that any definite effort to cultivate the native grape was made. Vines were planted in Virginia about 1620, at a later date in Delaware, and in 1683 by William Penn in Pennsylvania. Many subsequent efforts to introduce the European vine were made, but were all unsuccessful on account of the sudden changes of the weather. Experiments with native species were not made until 1835. At that time Major Adlum, of Georgetown, District of Columbia, brought the Catawba variety into notice. Its culture was ardently taken up by Nicholas Longworth, of Cincinnati, and with such success that by 1867 there were two thousand acres of Catawba vines planted near Cincinnati. The lack of hardiness of the Catawba caused the development of other varieties at the same time, especially of the Concord and Norton's Virginia, and the total acreage in vines in 1870 was about two million.

On the Pacific Coast *Vitis vinifera* was introduced by Spanish Franciscans about 1771. After California became part of the United States and the gold fever had subsided, agriculturists began the culture of the "Mission Grape," vines of which they found about the old mission-stations, encouraged by the fact that these would grow without irrigation. But the wine made from their fruit proved of poor quality, and other varieties of the European grape, and recently of the American grape, were introduced in California with much improvement to the wine product.

In the United States wine cannot profitably be produced north of southern New York, Pennsylvania and northern Ohio. In the Southern states, where the climate is very favorable for the culture of the grape-vine, this branch of agriculture has hitherto not been extensively prosecuted, though it is probable that good wines could be produced throughout that region.

Raisins for the market are produced in California only. The yield of raisins in 1889 was 1,372,195 boxes, containing 20 pounds each. The market value per box was \$1.60. The product of California, in 1890, was estimated by schedules sent directly to the census office at 16,500,000 gallons of wine and 2,197,463 boxes of raisins, with young raisin vineyards enough to increase the yield of raisins within the next five years to 8,000,000 or 10,000,000 boxes.

The census investigation of viticulture shows that outside of the regular districts included in the returns there are probably 45,000 acres of bearing and 15,000 acres of non-bearing vines, an aggregate of small vineyards from one fourth of an acre upward, grown to supply a home demand for this healthful and delicious fruit, and a like demand for wine. This class of vineyards is to be found in every state and territory of the Union, producing, in 1889, 67,500 tons of table grapes and 22,500 tons of wine grapes, or 1,875,000 gallons of wine. These small plantings are more or less experimental, and when proven a success in a small way will doubtless lead to larger enterprises. In localities where the industry has thrived in past years and has been abandoned on account of mildew and black-rot, now that the United States Government, through its Department of Agriculture, is so successfully experimenting in regard to the causes of the diseases and the remedies to be applied to save the vines, and the favorable results are being known, a new interest is being manifested, and no doubt, when another decade has passed, the grape industry will be greatly increased in many of the now comparatively small grape-growing sections. In 1889, it was shown that 307,000 acres of bearing and 93,000 of non-bearing vines existed in the United States. California produces by far the largest quantities, followed by New York, Ohio and Missouri in the order named. One half the total acreage was in California, while of the wine made, California produced 14,000,000 gallons out of 24,000,000.

See VINE, Vol. XXIV, pp. 237-240; WINE, Vol. XXIV, pp. 604-611; and AGRICULTURE, in these Supplements.

VITASCOPE. This is a device, logically follow-

ing upon the kinoscope, for exhibiting upon a large screen a series of practically continuous pictures, the result to the eye being that of a person or scene in motion. The vitascope has been called an improved kinoscope. It is more than that: it is a kinoscope enormously enlarged, showing its subject in the desired colors, and without the indistinctness that is a troublesome feature of the kinoscope. As a matter of fact, the latter instrument was never considered seriously by its inventor (Edison), but only as something paving the way for the more perfect instrument he had in mind, and which he later perfected and appropriately named the vitascope—meaning, literally, the exhibition of life. The machine, as it now stands, differs materially from the original model of the inventor, which cost months of labor and an expenditure of about twenty thousand dollars. In the discarded model he had used a shutter on the principle of the one employed in the kinoscope, but it gave blurring effects, which, of course, were unsatisfactory. In the later model he dispensed with a shutter, and secured the effects he desired by the use of lenses and an arc light. The vitascope, as finally completed and put in public operation, notably upon the vaudeville stage, consists, as to its mechanism, of a small lens such as is used in a small camera. This lens is nearest the exhibition-screen. Just behind it is a metal frame about an inch and a half square, over which the picture to be reproduced passes. Behind this is a large lens, and just back of this lens is an arc light of two thousand candle-power. The pictures reproduced have been previously photographed on kinoscope-films, and are in size about as large as one's finger-nail. The films, as prepared for scenic reproduction, are each fifty feet in length, and contain several hundred pictures, that make up a panorama. In use, the film passes over a series of wheels at a very rapid rate, propelled by electric power, and as the picture passes the frame, behind the small lens above mentioned, the light from the arc lamp, passing through the large lens, and being focused upon it, throws the picture through the smaller lens upon the screen, magnified six hundred times. In this manner the miniature picture taken by the kinoscope is reproduced, life-size, or larger, with every minute detail of life and action, on the screen. In the operation of the machine, the problem of how to prevent the film from being melted by the focused light from the arc lamp, which is intense, has been solved by suspending a magnet before the frame over which the film passes. Close to this magnet is a small dynamo. When the current is turned into the vitascope, and its wheels, carrying the film, are set in motion, the magnet is drawn toward the dynamo so that the light may strike the moving lens and send its picture through the smaller lens. The film, being at this time in motion, of course, is not in danger of being melted. When the current is turned off, the magnet falls from the dynamo again to its former place in front of the film, resuming its protective function. What to many is the most surprising feature of the vitascope is that it throws, in the pictures exhibited, any and all colors upon the screen. But the explanation of this is

quite simple. The colors are not obtained by any photographic process—the film produced by the kinetograph is in monochrome. They are painted on the films later by hand, in such a way that the colors will not rub off as the film passes over the wheels of the vitascope. In subsequent machines it is designed to increase the size of the films to something like five hundred feet for the purpose of displaying such scenes as Niagara Falls, an ocean steamer leaving port, etc. See KINETOSCOPE, in these Supplements.

C. H. COCHRANE.

VITIS. See VINE, Vol. XXIV, p. 237.

VITTORIA, COLONNA. See COLONNA, VITTORIA, Vol. VI, pp. 157, 158.

VIVERRIDÆ. See MAMMALIA, Vol. XV, p. 435-437.

VIVIAN, SIR HENRY HUSSEY, LORD SWANSEA, an English statesman; born in Swansea, Wales, July 6, 1821; educated at Eton and Trinity College, Cambridge; studied metallurgy and took charge of his father's works at Swansea, which he developed to such an extent that 5,000 men were regularly employed; introduced, among other things, the extraction of silver and gold from copper, and added to his works nickel and cobalt works, copper-smelting, and bismuth-manufacture. He was first sent to Parliament from Truro in 1852-57; from Glamorganshire in 1857-85, which he represented till the redistribution, when he was elected from Swansea, 1885-93. In 1882 he was created a baronet, and in 1893 raised to the peerage as Lord Swansea. Died in Swansea, Nov. 29, 1894.

VIVIEN DE SAINT-MARTIN, Louis, a French geographer and author; born at St.-Martin-de-Fontenoy, France, May 17, 1802. He removed to Paris, and in 1823 published *Carte Électorale et Administrative*; in 1845 he became editor of the *Nouvelles Annales de Voyages*; and later, the editor of the *Année Géographique*, which position he held till 1867, when he retired to take charge of *Nouveau Dictionnaire de Géographie Universelle*, but also resigned from this position after two volumes had been published. Among his best works are translations of Scott's novels, *Histoire Générale de la Révolution Française* (1840-42) and *Histoire de Napoléon* (1843); two volumes of a *Histoire Universelle des Découvertes Géographiques des Nations Européennes dans les Diverses Parties du Monde* (1845-47); *Histoire de la Géographie et des Découvertes Géographiques* (1873); and *Nouveau Dictionnaire de Géographie Universelle*, of which he was one of the editors from 1876 to 1893. From 1863 to 1876 he published *L'Année Géographique*, and in 1888 turned over to the Academy an immense amount of matter prepared for *Dictionnaire Historique Universel de Géographie Ancienne*.

VIVISECTION, a term meaning, literally, the cutting of a living body. The term is used to designate all operations upon living animals for the purpose of physiological or pathological investigation. Nearly all the knowledge we possess of the physiology of the human body has been acquired by means of the vivisection of the lower forms of animal life. Galen discovered, about A.D. 150, that

the arteries, instead of containing air, as the name would imply, contain blood, which came from the heart. William Harvey, in 1628, discovered that the blood, after passing from the heart through the arteries, returns again to the heart, through the veins, and that the heart is a centrally located propelling organ for the blood. The transfusion of blood from the blood-vessels of one animal to those of another in danger of death from hemorrhage, and the consequent saving of life, was first demonstrated in 1665, and afterward in 1824, by means of experiments upon living animals. The facts that in respiration the oxygen of the air is absorbed by the blood in the lungs and carbon dioxide eliminated at the same time, together with the whole *rationale* of respiration, have been, from time to time, discovered since 1670, chiefly through vivisection. The modern science of ventilation is based largely upon the facts thus discovered. From very early times the functions of the nervous system have been the subject of experimental investigation upon living animals. In this way nearly everything that is known of motor and sensory nerves, nerve-centers, reflex nerve-action, the localization of certain psychological functions in certain parts of the brain, the causes and treatment of insanity, etc., has been acquired. The rapid advancement in abdominal surgery, and in the treatment of specific diseases by inoculation, in recent years, is due chiefly to vivisection.

There is a common belief among non-scientific persons that vivisection in any form is cruel, and that it should be prohibited by law. Agitation for its prohibition has resulted, in England, in the passage, by Parliament, of an act for its regulation. The act requires that every one performing vivisection with the view of advancing physiological knowledge, or of acquiring knowledge for saving or prolonging life, must hold a license from the Home Secretary, and must be under the supervision of inspectors. Nevertheless, the practice is strongly objected to by individuals, and by societies for the prevention of cruelty to animals. Objection has been made to Pasteur's inoculation of animals for the prevention and cure of hydrophobia. Numerous articles in the *Nineteenth Century*, the *Fortnightly Review*, *Nature*, and the *Spectator* have been written against the practice. A number of volumes have also been published in opposition to it, as Miss F. P. Cobbe's *Modern Rack* (1889), Nicholson's *Rights of Animals* (1879), and Lawson Tait's *Uselessness of Vivisection* (1883). On the other hand, properly regulated vivisection has been advocated in Dr. G. Gore's *Utility and Morality of Vivisection* (1884), and in *Physiological Cruelty; or, Fact vs. Fancy* (1883). Both the British Medical Congress and the International Medical Congress were unanimously in favor of vivisection, as valuable to physiological science, and to medical and surgical practice. See also PHYSIOLOGY, Vol. XIX, p. 22.

VIZETELLY, HENRY RICHARD, an English publisher and author; born in London, June 30, 1820. He started in life as a wood-engraver on the *Illustrated London News*, whose correspondent he was during the siege of Paris. In 1843 he founded

the *Pictorial Times*; later was editor of the *Illustrated Times*; remained on the Continent for several years as correspondent, and on his return took up publishing again. It was due very largely to his efforts that the newspaper stamp duty and the duty on paper were abolished. He was the first to publish the works of Poe, Longfellow and Mrs. Stowe in England; introduced to English readers the novels of Count Tolstoy; and in 1883 began publishing the works of Émile Zola in England, for which he was prosecuted, until finally imprisoned for three months in 1889. He wrote *Story of the Diamond Necklace* (1867); *Berlin Under the New Empire* (1879); *Paris in Peril*; *History of Champagne* (1882), he having become a connoisseur of wine; translated Topin's *Man with the Iron Mask*; and while in prison started his *Glances Back Through Seventy Years* (1893). He died at Tilford, near Farnham, Jan. 1, 1894.

VLAARDINGEN, a town of the province of South Holland, in the Netherlands. It has a good harbor, and the people are chiefly engaged in the herring-fishery. Population 1894, 14,388.

VLADIMIR, a Russian ruler. See **RUSSIA**, Vol. XXI, p. 89.

VLADIVOSTOK, a town of Asiatic Russia, and chief naval station of Russia on the Pacific, on the Gulf of Peter the Great, in the Sea of Japan, near the frontier of Korea. The harbor is well sheltered, and from thirty to seventy feet in depth, but, owing to the intensely cold winters, is ice-bound for a considerable part of the year. It was founded in 1861, and in 1870 was made the naval station for the Siberian fleet. The naval workshops are here, and docks, repair-shops and extensive machine-shops for steamers have been established. It is connected by submarine cable with Nagasaki and Shanghai, and the telegraph line from Irkutsk and Kiachta terminates here. The Siberian railway, with Vladivostok as its eastern terminus, when complete, will render the station of prime importance. (See **ASIA**, in these Supplements). The City on the Golden Horn (the Russian title for the harbor) is strongly defended by batteries. It has two naval schools, a progymnasium, a girls' high-school, and a scientific society. There is but one street, which lies along the harbor. Population 1897, 28,896, about half of which is Korean and Manchurian.

VOANDZON. See **GOBBE**, in these Supplements.

VODENA, the modern name for the town which occupies the site of the ancient capital of Macedonia. See **EDESSA**, Vol. VII, p. 652.

VOGEL, SIR JULIUS, K. C. M. G., British Colonial statesman and late premier of New Zealand; was born in London, Feb. 24, 1835, and died Mar. 13, 1899. He emigrated in 1852 to Melbourne, and in 1861 went to New Zealand, where he at first engaged in journalism. He entered politics in 1866 and in 1873 became premier of the New Zealand legislature. He subsequently represented the colony as agent-general in England, where he served its interest in obtaining financial loans, etc., for its use. He was created a C. M. G. in 1872, and a K. C. M. G. in 1875.

VOGELWEIDE. See **WALTHER VON DER VOGELWEIDE**, Vol. XXIV, pp. 340, 341.

VOGT, CHARLES, a German naturalist; born at Giessen, Germany, July 5, 1817. He studied chemistry at Giessen under Liebig, and medicine under his father at Bern, and was afterward associated with Agassiz (1839) in the publication of *L'Histoire naturelle des Poissons d'Eau douce de l'Europe centrale*; became professor of zoölogy at the University of Giessen in 1847, but on account of some political utterances in the Frankfort Parliament, considered it advisable to retire to Geneva, where he held the chair of geology at the university until his death. Besides numerous articles on geology, anthropology, anatomy and zoölogy, he published *Physiologische Briefe* (1845-46); *Lehrbuch der Geologie und Petrofaktenkunde* (1846); *Ocean und Mittelmeer* (1848); and *Die Säugethiere in Wort und Bild* (1883). Died in Geneva, May 6, 1895.

VOGÜÉ (CHARLES JEAN MELCHIOR), MARQUIS DE, a French archæologist; born in Paris, Oct. 18, 1829. He traveled in Syria and Palestine (1853-54), studying the religions, history and the arts of the East; was French ambassador to Turkey from 1871 to 1873, and at Vienna from 1875 to 1879, when he resigned; was elected a member of the Academy in 1868, and a commander of the Legion of Honor in 1879. Among his works are *Les Églises de la Terre Sainte* (1859); *Le Temple de Jérusalem* (1864-65); *L'Architecture, Civile et Religieuse, dans la Syrie Centrale* (1865-77); *Mélanges d'Archéologie Orientale* (1866); *Inscriptions Sémitiques* (1869-77); and edited, for the Historical Society, the *Mémoires du Maréchal de Villars* (1884).

VOICE, of verbs. See *Verb*, under **GRAMMAR**, Vol. XI, pp. 41, 42.

VOICE, in music. See **VOICE**, Vol. XXIV, pp. 274-276.

VOIGHT, JOHANNA. See **AMBROSIUS**, in these Supplements.

VOIR DIRE. See **WITNESS**, Vol. XXIV, p. 624.

VOISIN BEY, FRANÇOIS PHILIPPE, a French civil engineer; born at Versailles, France, May 20, 1821. He was educated as an engineer at the École de Ponts et Chaussées; became a chief engineer in 1866, and inspector-general in 1880. Besides this he was director-general of the Suez canal works (1861-70), professor of maritime works at the École de Ponts et Chaussées (1873-81), and an officer of the Legion of Honor. He published *Ports de Mer* (1883) and *Notice sur les Travaux à l'Embouchure du Danube* (1893).

VOIVODE OR **WAIWODE**, a Slavonic title equivalent to herzog, or duke. See **ROUMANIA**, Vol. XXI, p. 16.

VOKES, a family of actors, consisting of Frederick, Victoria, Jessie, Rosina and Fawdon Vokes, whose real name was Fawdon. They traveled as a family and played with success in every large city in England and America. Their best-known piece was *The Belles of the Kitchen*.—**ROSINA**, the youngest, was born in London in 1854. In 1877 she married Cecil Clay, a barrister and playwright, and retired from the stage, but in 1886 organized a com-

pany for farces and comedies, which played annually in England and the United States. She was a good dancer and always a popular player. She died at Torquay, England, Jan. 27, 1894.

VOLAPÜK ("world-speech"), an artificial language for international use, invented about 1878 by Johann Martin Schleyer, a Catholic priest, who was born in the Oberland of Baden, Germany, and took up his residence in Switzerland. He was an ardent student of philology, and had some knowledge of about fifty languages and dialects. His studies were mostly devoted to the formation of a language which could be used as a medium of intercommunication between all civilized nations. In 1878 he published an outline of such a language, and in 1880 he issued a grammar and dictionary for it. He afterward published numerous works on the subject. His proposed world-language has been warmly welcomed in Germany, and has attracted a good deal of attention in England, France and the United States.

Schleyer recognized that all existing languages have irregularities of grammar, orthography, pronunciation and syntax, which render them troublesome to learn. He therefore aimed to produce an artificial language which should be perfectly regular and simple, and consequently easy to learn.

Volapük, as invented, had, in all, thirty-seven letters. To the five pure vowels are added the German "umlauts" ä, ö, and ü. The consonants are the same as in English, with the omission of the "q" and "w". To these are added ten new signs to supply deficient sounds. There are no diphthongs, the vowels have the Continental sounds, and certain of the consonants have arbitrary sounds, c being like j in joy, and j like the English sh. Thus *jip* is pronounced "sheep."

In forming the vocabulary, a basic series of roots was chosen, these being mostly monosyllabic. The root-words are always nouns. They were taken from the English language whenever a proper word could be found in that language. Thus the English "man" forms an unobjectionable root; but the English "house," containing a diphthong, could not be utilized, therefore the Latin "dom" is taken instead. All roots begin and end with a consonant. The prefixes are ordinary or abbreviated prepositions. For suffixes *el*, *ik*, *am*, are commonly used. *El* forms nouns which designate the doer. *Ik* is the termination of all adjectives except the numerals. *Am* corresponds to the English termination "ing" or "tion." The oblique cases of nouns are formed, in the singular, by adding the terminations *a*, *e*, and *i*. To form the plural, *s* is added.

Other inflectional forms have been invented, and many improvements have been offered by later students, but as the language seems destined to have no practical existence, it is not necessary to enumerate these details.

In forming sentences, the words are arranged in the following order: First, the subject; second, the predicate; third, the object. Each principal word is followed by its modifiers; only the adverbs, when modifying adjectives or other adverbs, precede the principal word. The negative *no* also precedes the

negative verb. This is a radical departure from the German method, in which the negative "nicht" follows the verb.

Volapük has made considerable progress in Germany and Austria.

The first congress of volapükians was held in Switzerland in 1886; a second at Munich, in 1887; and an international one at Paris, in 1889. Numerous societies have been formed throughout Europe and America; but, while at first volapük was greeted as a world language, interest in it has died out, and its supporters are only striving to introduce it as a commercial language. Over twelve hundred books have been published, and several hundred thousand people have studied it. Its chief advantage is that it can be learned in a few weeks.

VOLCANOES AND VOLCANIC ACTION. See GEOLOGY, Vol. X, pp. 240-254.

VOLITION. See PSYCHOLOGY, Vol. XX, p. 85.

VOLKELT, JOHANNES, an Austrian philosopher and pedagogist; born in Liprik, Galicia, Austria, July 21, 1848. He received his education at the universities of Vienna, Jena and Leipsic, and was successively docent at Jena (1876-79), professor extraordinary at Jena (1879-83), professor of philosophy at Basel (1883-89), at Würzburg (1889-94), and then became professor of philosophy and pedagogy at Leipsic. He is a leader in the school of liberal educational thought, as his lectures and works show. He published *Das Unbewusste und der Pessimismus* (1873); *Der Symbol-Begriff in der neuesten Ästhetik* (1876); *Kritische Grundlegung der Erkenntnistheorie* (1886); *Franz Grillparzer als Dichter des Tragischen* (1888); and *Vorträge zur Einführung in die Philosophie der Gegenwart* (1892).

VOLLON, ANTOINE, a French painter; born at Lyons, France, April 20, 1833. He received his training in the Academy at Lyons, and made his *début* at the Paris Salon in 1864. He is noted for his skill in painting pictures of still life, although his landscape and figure paintings are remarkably fine. His technique is unexcelled, and his pictures are especially in demand for their strength and depth of coloring. Among his best-known works are *Art et Gourmandise* (1864); *Intérieur de Cuisine* (1865); *Après le Bal* (1869); *Le Jour de l'an* (1873); *Coin de Halle* (1874); *Femme du Pollet* (1876); *Courges* (1880); *Poteries, Vue du Tréport* (1886); and *Pêcheurs, Armures*. He received medals in 1865, 1868, and 1869; a first-class medal at the Universal Exposition in Paris, 1878; and was promoted an officer of the Legion of Honor in the same year.

VOLSCIANS. See ITALY, Vol. XIII, p. 445.

VOLSINII, a city. See BOLSENA, Vol. IV, p. 20.

VOLT. See ELECTRICITY, § 110, in these Supplements.

VOLTAIC CELL. See ELECTRICITY, § 98, in these Supplements.

VOLTAMETER. See VOLTMETERS, in these Supplements.

VOLTERRA, DANIEL DA. See RICCIARELLI, Vol. XX, pp. 537, 538.

VOLTMETER, an instrument for measuring electromotive force. See ELECTRICITY, §§ 40, 69, 70, in these Supplements.

The voltmeter in common use may be classed as follows: 1. Special form of galvanometers; 2. Voltmeters depending upon the expansion of a wire; 3. Electrostatic instruments.

1. SPECIAL FORMS OF GALVANOMETERS. If any galvanometer of high resistance be connected between two points of a circuit, the flow of current through the galvanometer is proportional to the E.M.F. caused by the difference of potential between the two points. The instrument properly calibrated and provided with a divided circle or scale becomes a voltmeter. It is true that the insertion of the voltmeter-resistance lowers the resistance between the points, and hence, also, the difference of potential. In case the voltmeter is connected directly with the terminal of an open-circuit battery cell or generator, the resistance is infinite before, and that of the voltmeter after, insertion; but as the resistance of the instrument is high (usually several thousand ohms), this lowering of the E.M.F. between the points, due to the resistance of the voltmeter, may be neglected. It is obvious that the E.M.F. indicated is that due to the potential difference between the points after the insertion of the instrument.

The galvanometer best suited for a portable voltmeter is that known as the D'Arsonal, or suspended-coil galvanometer.

In this type of instrument the coil is suspended between the poles of a powerful magnet by two fine wires, one above and the other below; these are connected with the terminals of the coil, and serve as conductors of the current to and from the coil. The elasticity of the suspending wires also serves to bring the coil back to the zero-point after it has been deflected. (See Fig. 1.)

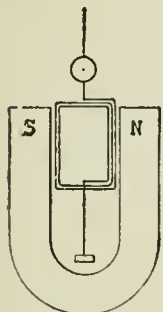


Fig. 1.

This form of instrument has the advantage over the ordinary form, in that it is not necessary to place it in a certain position. It is not sensibly affected by the presence of other magnets.

In the portable form, or commercial voltmeter, the coil is provided with an axis, which is pointed at each end and rests in two delicate jeweled bearings. The axis is provided with two spiral springs similar to the hair-spring of a watch; these springs conduct the current to the movable coil and bring the coil to its initial position after deflection.



Fig. 2.

2. EXPANSION - VOLTMETER. This form of voltmeter consists, essentially, of a long fine wire, usually of platinum, which is stretched between suitable supports, one of which is movable. The whole is inclosed in a suitable case, provided with terminals. Upon connecting the instrument between the points to be measured, the current set up in the wire causes it to expand, and the movable end actuates a pointer over a dial graduated to read volts. (See Fig. 2.)

These instruments are suitable for alternating as

well as direct currents. The well-known Cardew voltmeter is of this class.

3. ELECTROSTATIC VOLTMETERS. These instruments are essentially modifications of the quadrant electrometers (see ELECTRICITY Vol. VIII, p. 122). In the use of the latter instrument the movable vane is kept charged at a constant high potential, in order that the force between the vane and quadrants may be as great as possible. In the portable form, or voltmeter, the vane and quadrants are connected directly to the points between which it is desired to measure the difference of potentials. The rotation of the vane caused by the mutual attraction of the two charges is read from a suitable scale graduated to read volts.

The electrostatic instruments are not suited to measure low voltages. However, voltmeters of this class have been recently constructed which, it is claimed, measure as low as a single volt. As the resistance of these instruments is practically infinite, they do not require any current for their operation. They may be used with alternating currents, for it is obvious that as long as the vane and quadrants are charged oppositely there is an attraction between them.

Fig. 3 shows the instrument as constructed to measure 1,000 volts or higher. The light metal vane, V, is supported by knife-edges at its center. The center of gravity of vane is slightly below the point of support. The vane is connected with one conductor, and the quadrants, which are both in front and behind the vane, are connected with the other.

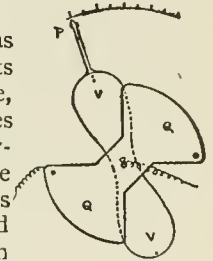


Fig. 3.

In Lord Kelvin's multicellular voltmeter the system shown above is duplicated several times. The vanes are suspended horizontally by a fine vertical conducting-wire (see Fig. 4). In this form the instrument is quite sensitive, reading as low as 75 volts.

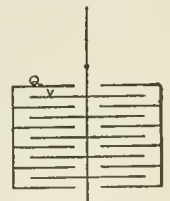


Fig. 4.

If the vanes are made very light, and the suspending wire one of very little torsion, the sensitiveness may be still further increased, but it then becomes a laboratory instrument.

S. W. STRATTON.

VOLTRI, a seashore town nine miles W. of Genoa, Italy. It has fine churches and beautiful residences, many of which are situated on a hill which commands a wide view. There is a fine water-power, which is utilized in the manufacture of paper, leather, wool, linen and hemp. It is most famous for its paper, which is regarded as insect-proof, on account of the water used, which is strongly impregnated with sulphur. Population, 6,000.

VOLTS AND AMPERES. See ELECTRICITY, § 87, in these Supplements.

VOLTURNO, a river. See ITALY, Vol. XIII, p. 440.

VOLUME, DETERMINATION OF. See CHEMISTRY, Vol. V, p. 468.

VOLUMETRIC ANALYSIS. In chemical analysis the most accurate results are obtained by the method of weighing,—gravimetric analysis. In this the constituents of a mixture or compound are separated and weighed, either directly or indirectly. This process, however, usually takes much time, as the various processes to be gone through, such as collecting and drying, before weighing, are often rather laborious. The much more rapid methods of volumetric analysis are therefore employed to a very large extent, particularly in commercial work, and are frequently little inferior to the others in point of accuracy. Certain solutions of known strength, called standard solutions are used. The *volume* of one of these which may be required to neutralize or complete a precipitation in or produce a definite change of color in a solution under examination gives us the means of calculating the quantity of a certain constituent which may be present in the latter. Thus in estimating iron, the metal is brought into solution as ferrous salt, and a standard solution of potassium permanganate is run in. The oxygen contained in the latter is used up in converting the ferrous salt into the ferric condition. While this is going on, the dark purple color of the permanganate is constantly destroyed and the mixture remains colorless. The instant all the iron has been oxidized, the purple color permanently tinges the solution. The volume of the permanganate solution used up to this point gives us at once a measure of the amount of iron originally present.

VOLUNTEERS. See SALVATION ARMY, in these Supplements.

VOLUTIDÆ, a family of gasteropodous mollusks, containing some of the most beautiful shells. They are mostly tropical, chiefly from the Indo-Pacific. Some species of *Voluta* are highly prized, and specimens of these shells formerly sold for enormous prices. Some species of *Marginella* are found on the coast of some Southern states.

VOMER. See ANATOMY, Vol. I, p. 825.

VOMITING. See NUTRITION, Vol. XVII, pp. 670, 671.

VONDEL, JOOST VAN DER. See HOLLAND, Vol. XII, p. 94.

VOORHEES, DANIEL WOLSEY, American lawyer and public man; born in Butler Co., O., Sept. 26, 1827; graduated at the Indiana Asbury University in 1849; studied law, and commenced its practice in 1851; was United States district attorney for Indiana in 1858-61; was elected to the 37th, 38th, 39th, 41st, and 42d Congresses; was appointed to the United States Senate and took his seat, Nov. 12, 1877, and was subsequently elected by the legislature for the unexpired term and for the full term ensuing, and was reelected in Jan., 1885, and again in 1891. His speeches were published as *Forty Years of Oratory* (1898). Died in Washington, D. C., April 10, 1897.



DANIEL W. VOORHEES.

VORMEN, a river. See NORWAY, Vol. XVII, p. 575.

VOROSMARTY, MICHAEL (1800-55). See HUNGARY, Vol. XII, p. 378.

VORSTIUS, CONRAD (1569-1622), a German theologian, deposed by the synod of Dort in 1619. See GOMARUS, Vol. X, p. 769.

VORTICELLA, a genus of small one-celled animals (*Protozoa*). Owing to their shape they are commonly known as BELL-ANIMALCULES; q.v., in these Supplements.

VOSMAER, CAREL, an art critic (1826-88). See HOLLAND, Vol. XII, p. 98.

VOSS, RICHARD, a German dramatic poet; born at Neugrab, Pomerania, Sept. 2, 1851. His early years were devoted to agricultural pursuits, but on the outbreak of the Franco-Prussian war, too weak for active service on the field, he entered the ambulance corps and served as a nurse. Saddened by his experiences in the hospital and on the field of battle, he returned to Germany and entered upon the study of philosophy, first at Jena and later at Munich. Shortly after this he devoted himself to literary work, living a lonely life until his marriage, in 1878, to a clever woman, with whom he went to Italy, from this time dwelling alternately at Frascati, near Rome, and upon his German estates. Novelist and romancist, Richard Voss has been assigned to a distinguished place among German dramatic authors, both for the quality and number of his works, which include *Unfehlbar* (*Infallible*) (1874); *Savonarola* (1878); *Magda* (1879); *Der Patricier* (1881); *Regula Brandt* (1883); *Unchrlich Volk* (*Dishonest People*) (1885); and *Mutter Gertrud* (1886); all plays. Some of his romances, drawn largely from popular life in Italy, are *Helen* (1879); *Römer Dorfgeschichten* (*Roman Village Stories*) (1883); *Rolla: Die Lebenstragödie einer Schauspielerin* (*Tragedy of an Actress*) (1883); *Messalina* (1884); *Die neuen Römer* (1885); and *Michael Cebula* (1886).

VOTE. There are four modes of voting practiced in legislative bodies. There are the *viva voce*, where the members utter the *ay* or *no* successively in response to the question; the rising vote, where, by show of hands or standing, each member is counted, as the affirmative or negative vote is called for; roll-call vote, in which each member responds to his name, and states the side of the question for which he votes, and a division; where each side passes between tellers in succession. Every body has its special rules governing the mode of vote under different circumstances. See also BALLOT, Vol. III, pp. 288-292, and in these Supplements; and PARLIAMENT, Vol. XVIII, p. 312.

VOTING-MACHINE, a mechanism for recording votes, as of candidates at a general election; also called vote-recorder. The first of these machines was invented by John W. Rhines of St. Paul, and is called the votograph. The mechanism is in a covered box, which, when open, displays a series of finger-keys, bearing the names of candidates in the election. All the Republicans appear in a perpendicular row, and are of one color; the Democratic names are in a parallel row, but of a different color;

and other similar rows are provided for special parties that may have candidates in the field. The names of the offices to be filled appear on the left, opposite the horizontal rows bearing the names of the candidates for that position. There are also "yes" and "no" keys, for voting on amendments, and other keys which may be voted for special purposes. When a key is pushed, it prints a number on a strip of stout paper below, the printing-mechanism being similar to that of a numbering-stamp, printing an added unit every time the key is depressed. To avoid repeating, the keys are automatically locked down as soon as struck, and the pressing of another key for that candidate, or for that office, produces no result. By no manipulation of the keys can a voter record more than one vote for each candidate, for when that is done the series is so locked that the printing of numbers ceases. Before another candidate can be voted for, it is necessary to close the lid of the votograph and open it again. This releases all the keys and sounds a large gong. This raising and lowering of the lid may be done by the voter or by an election officer. The printed strips of paper are run upon rollers, and when the voting is done they can be removed by the election officers, and the totals read off at once, so that no time is lost in figuring up the results. A set of figures at the foot of the machine records the number of persons who have voted during the day. Ink-ribbons, somewhat similar to those used on typewriters, are employed to ink the type of the numbering-stamps, and are operated by a pawl-and-ratchet device, which is a more reliable mechanism than those used in typewriters. It will be noted that such a machine disfranchises the ignorant voter, who cannot read, and as it is proposed that the votograph be used in separate booths, a secret election is provided for. No disputes can arise as to the intent of voters, and it would appear to be very difficult to make any erroneous returns. The machine is indorsed by John H. Wigmore, the well-known advocate of the Australian secret ballot, and by numerous public men and mechanics. Several similar machines have also been patented, possessed of more or less merit. As yet none of them have been adopted by any of the United States of America.

C. H. COCHRANE.

VOUCHING. See WARRANTY, Vol. XXIV, p. 373.

VOURLA, a town of Asia Minor, on the south side of the Gulf of Smyrna, near by the site of the ancient city of Clazomenæ (q.v., Vol. V, p. 818). The harbor is resorted to by European war-vessels on

account of the shelter afforded by the Ourlac islands and neighboring peninsula. It has large exports of olives and raisins. There are warm springs in the neighborhood, which are resorted to for bathing. Population, 25,000.

VOUSSOIR. See BRIDGES, Vol. IV, pp. 305, 306-309.

VOWELS. See SPEECH-SOUNDS, Vol. XXII, p. 382.

VOYSEY, CHARLES, an English theologian; born in London, England, March 18, 1828. He was educated at St. Edmund's Hall, Oxford, and after graduating took orders in the Church of England; was successively curate of Hessle, near Hull (1855-59); of Croughton, Jamaica (1860-61); St. Mark's, Whitechapel, London (1861), from which he was ejected for preaching a sermon against the doctrine of endless punishment; Victoria Dock Parish, London, and vicar of Healough, Yorkshire, 1864. He soon after started out as a church reformer by publishing *The Sling and the Stone*, a monthly paper, each number containing two sermons. In 1869 he was prosecuted for heresy in the chancery court by the Archbishop of York, and expelled from his curacy. On appeal, this decision was upheld by the Privy Council. From that time he preached on his own responsibility, and in 1885 founded the Theistic Church in London. His sermons were printed continually in England, and often in America and India. His publications include a great many controversial papers and pamphlets, besides *The Mystery of Pain, Death and Sin*, and *Theism; or, The Religion of Common Sense*.

VULCANISTS. See LYELL, Vol. XV, p. 102.

VULCANITE. See INDIA RUBBER, Vol. XII, p. 842.

VULCANO OR VULCANELLO. See LIPARI ISLANDS, Vol. XIV, p. 682.

VULGATE VERSION, by the Council of Trent made the standard of the Roman Catholic Church, even to the exclusion of the original text. See BIBLE, Vol. III, p. 647.

VULPIUS, CHRISTIANE, the wife of GOETHE; q.v., Vol. X, p. 731.—Her brother, CHRISTIAN AUGUST, an author, was born at Weimar, Germany, Jan. 23, 1762. He was connected, during his life, with the library at Weimar, and wrote a great deal, including dramas, operas, tales and romances. The best known of his works is probably *Rinaldo Rinaldini, der Räuberhauptmann*. He also edited *Curiositäten der Physisch-litterarisch-artistisch-historischen Vor-und Mitwelt* (1810-23); and *Die Vorzeit* (1817-21). He died June 26, 1827.

W

WAAGEN—WADDELL

WAAGEN, GUSTAV FRIEDRICH, a German art critic and writer; born in Hamburg, Germany, Feb. 11, 1794. He served in the army for two years as a volunteer, and then took up the study of art at Breslau, Heidelberg, Dresden, and Munich; was director of the art gallery in the museum of Berlin from 1830 to 1844, and professor of the history of art from that time in the University of Berlin. *Kunstwerke und Künstler in England und Paris* (1837-39); *Kunstwerke und Künstler in Deutschland* (1843-45); *Die Gemäldesammlung der kaiserlichen Eremitage in St. Petersburg* (1864); and *Die vornehmsten Kunstdenkmäler in Wien* (1866-67). He died in Copenhagen, Denmark, July 15, 1868.

WAAL, a river. See HOLLAND, Vol. XII, p. 63.

WABASH, a town, the county seat of Wabash County, Indiana. It contains numerous mills, factories and machine-shops, and has excellent educational facilities. Pop. 1890, 5,105; 1900, 8,618.

WABASHA, a city and the capital of Wabasha County, Minnesota, on the Mississippi, about 33 miles N.N.W. of Winona, and on the Chicago, Milwaukee and St. Paul railroad. It contains a shipyard, flour-mills, boiler, threshing-machine and furniture factories. It is an important grain-shipping point. It has 4 churches, a national and a state bank, and 2 weekly newspapers. Population 1890, 2,487; 1900, 2,528.

WABASH COLLEGE, an educational institution located at Crawfordsville, Indiana. It was founded at Crawfordsville in 1832, and, although non-sectarian, has always been under the influence of the Presbyterian Church. There are five buildings, including a museum, a laboratory, a science building, Custer Hall containing recitation-rooms and society halls, Peck Hall for physics and chemistry, and the Yandes Library containing 34,000 volumes. The courses are literary and scientific. There are about 250 students and 26 instructors. The productive funds amount to about \$375,000, which, with all charges, gives an income of \$33,000 annually.

WABASH RIVER. See INDIANA, Vol. XII, p. 813.

WACCAMAW, a river which rises in southeastern North Carolina, drains Waccamaw Lake, in Columbus County, and flows southwesterly into South Carolina, almost parallel to the coast-line, unites with the Great Peedee and discharges into Winyaw Bay. It is about 125 miles in length, and is navigable for upward of 50 miles.

WACE, HENRY, an English clergyman and educator; born in London, Dec. 10, 1836. He was educated at King's College, London, and Brasenose College, Oxford; was ordained rector, and was then, successively, curate at St. Luke's, Berwick Street (1861-63); at St. James, Piccadilly (1863-69); lecturer at Grosvenor Chapel (1870-72); chaplain to the benchers of Lincoln's Inn (1872-80); and then

preacher of Lincoln's Inn (1880). In 1881 he was made a prebendary of St. Paul's; a chaplain to the archbishop of Canterbury (1883); select preacher to Cambridge (1878 and 1890); and at Oxford (1880-82); and was appointed chaplain in ordinary to the Queen in 1889. From 1875 to 1883 he was professor of ecclesiastical history in King's College, London, and was then appointed principal. He edited, in conjunction with Sir William Smith, the *Dictionary of Biography, Literature, Sects and Doctrines During the First Eight Centuries* (1877-87); was editor of *The Speaker's Commentary on the Apocrypha*; published the lectures on *The Principal Facts in the Life of Our Lord and the Authority of the Evangelical Narratives* (1881); *Some Central Points of Our Lord's Ministry* (1890); and *The Christian Faith, and Some Recent Agnostic Attacks*, a series of essays (1894).

WACHUSETT MOUNTAIN. See MASSACHUSETTS, Vol. XV, p. 611.

WACO, a city and the capital of McLennan County, central Texas, 95 miles N.E. of Austin, at the junction of the Brazos and Bosque rivers, and on the Missouri, Kansas and Texas, the St. Louis South-Western, the San Antonio and Aransas Pass, the Texas Central and the Waco and North-Western railroads. It is in a productive agricultural district and contains five cotton-compresses, flour, woolen, planing and cottonseed-oil mills, foundry and machine-shops, creamery, cannery, mattress factories, etc. It has 2 daily, 5 weekly and 7 monthly papers, 29 churches, 14 public schools and a high school, Baylor University, Paul Quinn College (African Methodist, for both sexes, having 200 students), a Roman Catholic Seminary (the Sacred Heart), and Waco Female College. Waco has 24 flowing artesian wells, with a temperature of about 100° F., and a pressure of 65 pounds, yielding upward of 1,000,000 gallons daily. It is used not only for public and domestic purposes, but replaces steam for manufacturing. The city has finely paved streets, many handsome buildings, is lighted by both gas and electricity, has a good water system, and more than thirty miles of electric railway. Population 1890, 14,445; 1900, (12th census), 20,686.

WADAI OR WADAY. See AFRICA, in these Supplements.

WADDELL, JAMES IREDELL, an American naval officer; born at Pittsboro, Chatham County, North Carolina, July 13, 1824. He entered the navy in 1841 and served until 1860, attaining the rank of lieutenant in 1855. At the outbreak of the war he went with the Confederates, entered their navy early in 1862, and, after serving on different missions, was finally sent to take command of the steamer *Shenandoah*, which had been bought from a British firm, and was turned over to Waddell, near the island of Madeira, Oct. 19, 1864. In her he sailed completely round the world and kept up his war on the

Federal shipping until several months after the Rebellion had ceased. In all, he sailed about 58,000 miles and captured 38 American ships, without receiving any injury himself. After he found that the war was over, Captain Waddell turned his ship over to the British government, which, in turn, handed her over to the United States consul at Liverpool. He returned to his native country several years after the close of the war, and was a captain in the service of the Pacific Mail Steamship Company. He died at Annapolis, Maryland, March 15, 1886.

WADDINGTON, WILLIAM HENRY, a French archæologist and statesman; born in Paris, Dec. 11, 1826, the son of a naturalized English cotton-manufacturer. He was educated at Rugby and Trinity College, Cambridge, returned to France and devoted himself to the study of antiquities, extending his journeys to Asia Minor, Syria and Cyprus. In 1865 he was elected to the Academy of Inscriptions and Belles-Lettres. In February, 1871, he was returned by Aisne to the National Assembly, giving a steady support to Thiers. From 1876 to 1885 he sat as Senator for Aisne. He served as Minister of Public Instruction in 1873, for a few days, and in 1876-77; as Minister of Foreign Affairs in 1877; as plenipotentiary at the Berlin Congress in 1878; as president of the Council in 1879, and as ambassador at London from 1883 to 1892. He published *Voyage en Asie Mineure au Point de vue Numismatique* (1850); *Mélanges de Numismatique et de Philologie* (1861); *Édit de Dioclétien* (1864); and continued the publication of Le Bas's *Voyage Archéologique en Grèce et en Asie Mineure* (1868-77). He died Jan. 12, 1894.

WADE, BENJAMIN FRANKLIN, an American statesman, was born in Feeding Hills parish (now West Springfield), Massachusetts, Oct. 27, 1800. In 1821 the family arrived in Ashtabula County, Ohio, and found a home in the maple woods of Andover. In 1823, Frank Wade, as he was called, hired to a cattle-drover, and they took a herd "over the mountains" to the neighborhood of Philadelphia, the then only outlet. Governor Clinton's great canal was then being constructed, and for a time he worked on it as a laborer, and lived to hear this episode celebrated by Seward in the United States Senate. He returned home to study law, and was admitted to the bar in 1827. In 1831 he entered into co-partnership with Joshua R. Giddings, at Jefferson, the county seat of Ashtabula County. In 1835, Wade was elected prosecuting attorney for Ashtabula County. From 1837 to 1843, with one intermission, he served in the Ohio state senate. In 1847 he was elected a judge in the third Ohio district, and in 1851, while serving as judge, he was elected to the United States Senate. There his long years of service won for him a lasting reputation. He was in the advance in the antislavery movement, while his indomitable pluck and hard-hitting speech rendered him a most conspicuous and effective champion. "As chairman of the committee on the conduct of the war, no words," says Whitelaw Reid, "can give an idea of the value of his services, the energy with which he helped to inspire the government, of the zeal, the courage, the faith which he strove to infuse." Wade

was undoubtedly the leader in the Senate, of which he was elected president and, consequently, acting Vice-President of the United States, shortly after Mr. Johnson's accession to the Presidency. Thus, had the attempt at Johnson's impeachment been successful, Wade would have become President. His public career closed with the end of the Forty-ninth Congress. He died at Jefferson, Ohio, March 2, 1878.

WADE, DECIUS S., an American jurist, the first chief justice of the United States court in the Territory of Montana, and one of the authors of the Montana Code, was born at Andover, Ashtabula County, Ohio, Jan. 23, 1835. He was the son of Charles H. Wade, the grandson of a Bunker Hill hero, and nephew of Senator Benjamin Franklin Wade (see the preceding entry). Adding to his store of knowledge at Kingsville Academy, he studied law and was admitted to the bar at Jefferson, Ohio, in 1857. When the first call came for troops in 1861, and President Lincoln asked for 75,000 men, Decius Wade was among the earliest to respond. He was elected first lieutenant of his company, and afterward, upon the call of Governor Tod for volunteers to defend Cincinnati, which was menaced by Kirby Smith, he was one of the famous "squirrel-hunters" who caught up any gun that came handy and went to the defence of their state. He had been elected probate judge of Ashtabula County in 1860, in which capacity he served seven years. In 1869 he was elected a state senator. He was appointed chief justice of Montana Territory, March 17, 1871, serving until May, 1887. After his retirement from the bench, Decius Wade was one of the Code Commissioners of Montana, in connection with Governor B. Platt Carpenter and Judge F. W. Cole. He was a frequent contributor to law magazines. He also wrote and published an interesting novel, entitled *Clare Lincoln*.

WADE, JAMES FRANKLIN, an American soldier, son of B. F. Wade above-named, was born at Jefferson, Ohio, April 14, 1843. Entering the Union army May 14, 1861, as 1st lieutenant of the 6th United States (colored) Cavalry, he was rapidly promoted for gallant and meritorious services in action. He was mustered out with the volunteer rank of brevet brigadier-general, and, entering the regular army again as a captain of cavalry, saw much service against Indians, being promoted lieutenant-colonel of the Tenth Cavalry in 1879, and colonel of the Fifth Cavalry, April 21, 1887. On May 26, 1897, he became a brigadier-general, U. S. A., and on the outbreak of the war with Spain he took command (May 16, 1898) of the Third Corps at Chickamauga Camp, with the rank of major-general of volunteers. On Aug. 16 he was appointed a member of the Cuban Evacuation Commission, and participated in the formal transfer of the island to the United States.

WADENA, a village and the capital of Wadena County, northwest central Minnesota, 162 miles W. of Duluth, and on the Northern Pacific and Great Northern railroads. It is in a farming and lumbering region. It has three weekly newspapers. Population 1890, 895; 1900, 1,520.

WADESBORO, a town and the capital of Anson

County, southern North Carolina, 52 miles E.S.E. of Charlotte, and on the Seaboard Air Line and Cheraw and Salisbury railroads. It has a national bank, two weekly newspapers, Anson Institute, and is in an agricultural district. Population 1890, 1,198; 1900, 1,546.

WADSWORTH, a village of Washoe County, in western Nevada, 34 miles E.N.E. of Reno, and on the Southern Pacific railroad. It has a machine-shop, a railroad car-shop and roundhouse, and a semiweekly newspaper. Pop. precinct, 1900, 1,309.

WADSWORTH, a village of Medina County, northern Ohio, 32 miles S. of Cleveland, and on the New York, Lake Erie and Western railroad. The district contains coal-mines, and tobacco-growing is one of the important pursuits. There are also sandstone-quarries and deposits of fire-clay and salt in the vicinity. Wadsworth has manufactories of carriages and wagons, doors and window-screens and steam-injectors; also flour-mills, a weekly and a semiweekly newspaper, 7 churches, 12 public schools and a normal school. Population 1900, 1,764.

WADSWORTH, JAMES SAMUEL, an American general; born at Geneseo, New York, Oct. 30, 1807. He was educated at both Yale and Harvard, and upon completing his legal studies in the office of Daniel Webster, about 1833, was admitted to the bar. Inheriting from his father an immense area of land in western New York, he devoted his time to its care, paying particular attention to the promotion of educational interests. When the Civil War broke out he enlisted in the army, and became brigadier-general. He participated in the battles of Fredericksburg, Chancellorsville and Gettysburg, and, when Grant took charge of the Army of the Potomac was assigned to the command of a division. He was wounded at the battle of the Wilderness, Virginia, May 6, and died May 8, 1864.

WADY-HALFA. See NILE, Vol. XVII, p. 507.

WAGER POLICY. See INSURANCE, Vol. XIII, p. 184.

WAGES FUND THEORY. See WAGES, Vol. XXIV, pp. 307-309.

*WAGES IN THE UNITED STATES. Statistics of wages are more perfectly compiled in the United States than in any other country, and it is possible to determine their relations, in the several industries and the several sections of the country, with comparative accuracy.

From about the beginning of the century, and with temporary interruptions due to special conditions, the tendency has been steadily in the direction of higher rates of wages in all the industries, accompanied by a nearly corresponding increase in the purchasing power of wages. This is in harmony with the wage movement in all European countries where machinery is largely employed. Robert Giffen, the English statistician, calculated in 1883 that the rise in English wages had been fully 100 per cent in the preceding fifty years; and this advance he attributed to the direct and indirect influence of machinery in increasing the productive capacity of the individual laborer working in concert with the machine.

That an equal, if not greater, rise in wages has

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simultaneously occurred in the United States has been scientifically demonstrated in the investigation of prices and wages, made by the Finance Committee of the United States Senate in 1891. For data relating to the earlier years of the century, we depend chiefly upon family and business account-books, bills, etc. The Massachusetts Bureau of Labor Statistics, after an exhaustive examination of many such sources of evidence, reported in 1885 that the upward tendency in the wages of all kinds of skilled and unskilled labor began to make itself distinctly evident about the year 1815, corresponding with the gradual spread of the factory system. The development of manufactures created a new demand for labor throughout the Eastern and middle states, and wages responded to this demand to such an extent that they are calculated to have nearly doubled in 1830, as compared with 1800. Cotton-mill operatives, for instance, who were paid 44 cents a day, on the average, in 1820 and prior, were averaging about 90 cents in 1830 and 1840. For the decade ending 1860, the Massachusetts report calculated the general increase in wages at 52 per cent, as compared with the decade ending 1830.

The Senate Finance Committee report is based upon the actual pay-rolls, covering, in many instances, the period since 1840. Taking the year 1860 for a starting-point, and calling the average wages of that year 100, this report shows that the average wage of 1891 stood at 160.7, and the average wage of 1840 at 87.7. If the wages of 1840 are taken as the standard, at 100, the wages of 1891 stood at 183.2. Rearranging the tables to accord with the importance of the industries represented, as determined by the relative number of persons employed, calling the average rate of 1840, 100, the average wage of 1860 stood at 168.6, and the average wage of 1891 at 204.4. Average wages in 1891 were thus more than double wages in 1840.

These conclusions are confirmed by the statistics of the Federal census. In 1850 the average annual earnings of the persons employed in manufacturing establishments, comprising 4.13 per cent of the total population, were \$247.38; in 1880, representing 56 per cent of the population, they were \$346.91. In 1890, when they represented 7.53 per cent of the population, the average annual earnings had increased to \$444.83, or 80.2 per cent, as compared with 1850.

These averages are subject to the limitations which apply generally to all averages based upon the grouping together of a great variety of conditions, and are of value for comparison with each other. The last Federal census attempted a classification of wage statistics, which permits a more intelligent analysis of the figures. It separates employees into their natural groups of males, females and children, excluding all officers, clerks and firm members. Taking the 15 industries which employed the largest proportion of females, it obtained the following results:

In 15 other industries, in which the proportion of females employed is the smallest, the results show average annual earnings very much the same, except that among piece-workers they are almost uni-

AVERAGE ANNUAL EARNINGS PER EMPLOYEE, BY CLASSES, IN FIFTEEN INDUSTRIES, SHOWING A LARGE PROPORTION OF FEMALES—1890.

INDUSTRIES.	AVERAGE ANNUAL EARNINGS PER EMPLOYEE.							
	Officers, Firm Members and Clerks.		Operatives—Skilled and Unskilled.			Piece-Workers.		
	Males Above 16 Years.	Females Above 15 Years.	Males Above 16 Years.	Females Above 15 Years.	Children.	Males Above 16 Years.	Females Above 15 Years.	Children.
Boots and shoes, factory product.....	\$1,075	\$442	\$535	\$320	\$147	\$495	\$347	\$165
Boxes, fancy and paper.....	1,081	428	497	251	150	287	254	163
Clothing, men's.....	914	439	580	282	149	499	223	90
Clothing, women's, factory product.....	1,280	595	621	350	150	503	262	254
Corsets.....	1,633	602	633	333	156	364	267	121
Cotton goods.....	1,305	456	381	272	130	368	290	152
Furnishing goods, men's.....	1,100	425	585	322	163	337	217	127
Gloves and mittens.....	934	482	528	296	136	463	206	115
Hosiery and knit goods.....	1,080	435	419	257	138	363	238	130
Millinery and lace goods.....	1,463	610	573	358	205	581	359	---
Shirts.....	1,037	508	587	289	137	366	245	120
Silk and silk goods.....	1,327	486	545	277	153	505	272	178
Tobacco, chewing, smoking, and snuff.....	1,110	375	322	193	83	260	193	63
Woolen goods.....	981	363	404	277	153	423	279	153
Worsted goods.....	1,574	406	440	287	166	480	335	160

formly higher. There is an increasing tendency toward payment by the piece; 16 per cent of the employees reported in 1890 being so paid, and the evidence shows higher average earnings where this method of payment is adopted.

These statistics confirm the proposition that in the United States, as in England, the average yearly earnings of persons employed in manufacturing establishments have doubled in fifty years. But they convey no intelligent impression of the general situation as to wages. In any large mill, whatever its product, the rates of wages vary with almost every process for which they are paid. Thus in cotton-mills, the daily wage will range from \$5 to \$10 for supervising employees, down to 50 cents for the children who doff the spindles. As a rule, the rate is governed by the degree of skill and intelligence required in the particular work of the operative. Certain influences operate to modify the application of the rule. One is the increasing employment of females in machine manufacture at rates of wages lower than those paid to men. As machinery grows more perfect, it calls for a constantly lessening exertion of physical strength on the part of the operative, thus increasing the competition of female labor, and tending to restrain the natural advance in wages. In all the textile industries, rates of wages are lower than elsewhere, chiefly because the nature of the machinery permits the utilization of female and child labor. In 1890, women constituted 48 per cent and children 10.5 per cent of all the labor employed in cotton-mills.

It is noticeable, however, that between 1880 and 1890 the number of children employed decreased in all industries and in all sections, chiefly owing to the adoption of laws in the various states forbidding or closely regulating child-labor. The percentage of females employed in all manufacturing industries reported in 1890, exclusive of children, was 14.48,—a slight increase over 1880.

The average rate of wage above indicated is largely reduced by the larger proportion of the com-

paratively unskilled employees included in the enumeration. The detailed pay-rolls published by the Senate Finance Committee established the fact that the greatest increase in wages has occurred in the group of foremen, bosses and employees representing the highest skill and intelligence, whose wages have, as a rule, much more than doubled since 1840. Not so large an increase has occurred in the wages of the average skilled employees, representing a second classification; a third classification, representing the average workmen of ordinary skill, and including both men and women, shows a rate of increase less than the second; while fourth, comprising the common laborer, shows the lowest ratio of increase.

The real situation as to wages in the United States is fairly stated by M. Émile Levasseur, the French economist and statistician, the results of whose exhaustive personal investigation in 1893 have recently been published, and from which we translate as follows:

“The scale of wages rises by degrees from the daily pay of young boys, which averages from 33 to 66 cents; passing to the wage of farm-laborers, which varies from 33 cents to \$1.33; to that of spinners and weavers, which one may call between \$1 and \$2; that of common laborers, between \$1.25 and \$2; that of skilled workmen, between \$1.50 and \$3; that of mechanics, between \$2 and \$3; that of men in the building trades, between \$2.50 and \$4; to the wages of the foremen of the forge, rolling-mills and glass-works, which is between \$5 and \$10,—without including workmen in certain occupations, who are really artists. Between these degrees, which only show an approximation and in a manner a little vague, we may place the wages of all the other occupations. If some one demands what is the general mean of wages, it can only be replied that no such thing exists; but if an answer is still insisted upon, the reply may be made that the average wages of men employed in the industries of the United States probably gravitate between \$1.75 and \$2 a day. This scale of wages is higher than that which prevails in any other country.”

There is, then, no such thing as a general mean of wages in the United States, and the rates paid are largely determined by the relative skill and intel-

ligence required in each special branch of each industry, and by the qualifications of the individual workman.

Two results of the development of machine manufacture in the United States are clearly discernible in our wage statistics; viz., it has at one and the same time augmented the wages of the lowest grade of labor, and reduced the proportion of this description of labor to the total mass.

The wages statistics of manufactures may be accepted as a key to the movement of wages for all classes of labor throughout the United States. This regulating power of factory wages is due to the fact, first, that the standards of wage which prevail in the mills of any locality necessarily determine outside wages, and as the one rises, the other rises with them; and second, that as manufactures increase and diversify, the number of posts requiring superior skill, and commanding high wages, increases rapidly, and there is a constant moving upward in the scale of wages, on the part of a class which formerly occupied a lower wage-level. This is particularly observable in the textile industries, which are now almost wholly deserted, in the lower grades of work, by native-born labor, and recruited by French Canadians and immigrants from Europe.

Diversification of industry increases the field for skilled labor, and thus affects the average wage standard. This is shown in every community where there is a large concentration of diverse occupations, as in Philadelphia, where the standards of wage are perceptibly higher than in most other localities. Isolated mills usually maintain scales of wages slightly lower than those prevailing in cities where there are many mills making the same description of goods.

Woolen-mills, which are comparatively few in the Western states, secure their help for lower rates than are paid in the East. The average earnings of male employees in the woolen-mills of Indiana in 1890 were \$353, of females \$200, while in Massachusetts the males averaged \$426 and the females \$294.

In the cotton manufacture, by the same census, the average weekly earnings of men in the New England states were \$7.82, of women \$5.74; in the Middle states, men \$8.68, women \$5.76; in the Western states, men \$8.21, women \$4.72; and in the Southern states, men \$5.49, women \$3.71.

The rates of wages are more uniform throughout New England than in any other part of the country,—a fact attributable to the highly organized state of factory labor.

At several periods in our history the steadiness of the upward wage curve has been violently disturbed by external conditions. The great commercial crises of 1837 and 1857 brought about a temporary reduction, which was general, though not universal, and the recovery was so rapid as not to modify the wage averages of the decades of 1840 and 1860, respectively. (Massachusetts Report 1885, p. 462.) The most serious effect upon labor, in both instances, was the general closing of establishments and the running on short time. During the Civil War, influenced by the depreciated currency, the relative scarcity of labor and the heavy demand for products,

the nominal wages advanced rapidly, but not so fast or so far as the simultaneous advance in the prices of all the necessities of life. The highest currency rates of wages were reached about 1868-69, when a gradual decline set in, greatly accelerated by the business depression of 1873. The stationary point was reached about 1880, from which date wages again began to rise slowly,—a trend which continued without interruption until the business depression of 1893, when the wage-reduction in the large and well-organized industries was general, and almost invariably acquiesced in without strikes, because of the presence everywhere of large bodies of unemployed workmen. The temporary business revival which followed in 1895 was marked by a general, although not universal, return to the wages which had prevailed prior to 1893. These restorations were, as a rule, voluntarily made by the manufacturers. These wage readjustments of 1893 and 1895, so promptly and harmoniously effected in each year, indicated the growing recognition, on the part of both employers and employees, of a certain definite relationship between wages and the prices of the products which wages produce, which has not hitherto received any such striking confirmation in the United States. This fact lends encouragement to the idea that definite progress is making toward the establishment of recognized wage standards, by which these constant shiftings of rates, necessitated by the changes in business conditions, may ultimately be largely regulated without the friction which shows itself in strikes and lockouts, and the enormous losses to employer and employed accompanying these collisions.

In the iron and steel industries of Pittsburg and the Western states, something in the nature of a sliding scale of wages, based upon the method now quite common in the north of England, has been successfully applied in many establishments. By this arrangement wages are made to rise and fall upon a fixed principle, at intervals of six months or a year apart, in accordance with the rise and fall of the price of the material or the product of the industry.

In the cotton manufacture, all the elements of cost are so well known, their variations are so easily measured and the margin of profit is so small that it is comparatively easy to fix a definite ratio between wages and product, and this ratio undoubtedly exists, with a certain approximation to accuracy, in the present wage scales. Strikes have frequently occurred in this industry, which were foredoomed to failure, because existing market conditions left no alternative between the wage readjustment proposed and the closing of the mills.

As industry develops and competition increases, the margin of profit everywhere tends to diminish; and this tendency, coupled with the tendency of wages to increase, is constantly acting in the United States to bring the question of the rate of wages into a definite relationship to the actual conditions of trade. It follows, that, as time passes, slight fluctuations in wages are likely to become more frequent, because they will stand in more intimate sympathy with general market conditions.

The increasing concentration of labor in large manufacturing centers has naturally tended to make the organization of labor more complete and more effective in these centers, although trade-unionism in the United States is still far behind that of Great Britain in scope and organization. In the great industries of the Eastern states, more particularly, trade-unionism has been a perceptible factor in both the regulation and the maintenance of wage standards.

Rates of wages vary widely in different sections of the United States, governed by the varying conditions of supply and demand in each section. They vary, also, as between different occupations, in accordance with the degree of the regularity of the employment offered. In some industries, regularity of employment is greater than in others. In the building trades, for instance, and in all occupations where weather conditions prevail, the work of the year is apt to be concentrated largely into the more favorable months; and hence it happens, that the rates of wages in these trades are uniformly higher than in those in which all the year round work is to be expected.

The hours of labor is a material factor in estimating the true value of wages. In all the great manufacturing states of the Union, ten hours now comprise a legal day's labor for women and children in manufacturing and mechanical establishments, and as their labor is necessary to the successful use of the machinery in many industries, the regulation, in effect, applies to men as well. In the Southern states, where the cotton manufacture is rapidly extending, 11 hours constitute a day's work. In Massachusetts the law makes 56 hours a week the legal limit. In certain of the trades, like carpentry and house-painting, in sections of the East, the nine-hour day is successfully enforced by the trades-unions.

In 1840 the average hours of labor for the occupations included in the Senate report were 11.4 per day. In 1860, 11 per day. In 1891, 10 per day. In the early history of the country, factory wages were frequently paid in due-bills, often redeemable for goods only at the stores of the employer. In nearly all the states of the Union this method of payment is now forbidden by law, and in many of them laws enforcing weekly payments are in vogue.

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S. N. D. NORTH.

WAGNER, FORT, in South Carolina, was held by the Confederates in 1863, and its capture was unsuccessfully attempted by the Federal troops, who believed that their operations against Fort Sumter would be facilitated by its capture. The

fort was assaulted by General Strong with eleven thousand five hundred Federal troops, assisted by Admiral Dahlgren of the navy with the frigate *Iron-sides* and six monitors. The Confederate works on the south end of Morris Island were captured by the Federal troops, which had been secretly landed. Assaults were made on the fort on July 17th and 18th, the Federals suffering severely, after which the assaults on Fort Wagner ceased, operations being concentrated upon Fort Sumter.

WAGNER, ALEXANDER, a Hungarian painter; born at Pesth, in 1838; studied under Theodor von Piloty at Munich, and at the age of 28 was appointed professor at Munich. Among his works are *An Episode of the Siege of Belgrade*; *Departure of Queen Isabella Zapolya*; *Baptism of Stephen I, King of Hungary*; *Hussar Life*; *Mädchenraub*; and the *Roman Chariot Race*. A second picture of the *Chariot Race* was exhibited at the Philadelphia Centennial, from which he received a medal. His *Racing Among the Horse-Herders of Debreczin* is a study from life in a district famed for taming the wild horses of the Putzta.

WAGRAM, BATTLE OF. See AUSTRIA, Vol. III, p. 134.

WAHABEES. See ARABIA, Vol. II, pp. 260, 261.

WAHOO, a city and the capital of Saunders County, eastern Nebraska, 54 miles W. of Omaha, on Cottonwood Creek, and on the Union Pacific, the Burlington and Missouri River and the Fremont, Elkhorn and Missouri Valley railroads. It is in a farming and grazing district; has two flour-mills, two national banks, four weekly newspapers, eleven churches and two public schools. Population 1890, 2,006; 1900, 2,100.

WAHOO OR WHAHOO, a native Indian name now applied to two very different plants: (1) *Ulmus alata*, the winged elm, a small tree ranging from Virginia to Illinois and southward, so named from the conspicuous, corky wings upon its branches; and (2) *Euonymus atropurpureus*, a fine shrub of the family *Sapindaceae*, with oval leaves, small, dark-purple flowers, and a rough, warty fruit, crimson when ripe, from which last character it is more commonly called burning-bush.

WAHPETON, a city and the capital of Richland County, southeastern North Dakota, 45 miles S. of Fargo, on the Red River of the North, and on the Chicago, Milwaukee and St. Paul, the Northern Pacific and the Great Northern railroads. It has a wagon factory, flour-mill, grain-elevators, warehouses, and does an important business in the shipment of grain and produce. It has a good water-works system, three weekly newspapers, is lighted by electricity; has six public and four parochial schools, eight churches, and Red River Valley University. Population 1900, 2,228.

WAIBLINGEN, a town of Würtemberg, on the Rems, seven miles N.E. of Stuttgart and in the circle of Neckar. It was formerly called *Wibelingen*, and originally was a station on the Roman road to Germany. The retainers of the house of Hohenstaufen, into whose possession it passed, were known as *Wibelingen* (Italianized into *Ghi-*

bellines), whence the name. It manufactures pottery, silk goods, embroidery, and bricks. Pop. 1890, 4,786.

WAIHU, same as RAPANUI, Vol. XX, p. 273.

WAINWRIGHT, JONATHAN MAYHEW, an American Protestant Episcopal clergyman; born in Liverpool, Eng., of American parents, Feb. 24, 1792; in 1803 went with his parents to the United States; graduated at Harvard in 1812, where he was tutor of rhetoric and oratory 1815-17; ordained in the Protestant Episcopal Church, 1816; and rector of various parishes in Boston and New York; made two visits to Europe, during one of which he visited the Holy Land; and in 1852, on his second visit, was made D. C. L. at Oxford; consecrated provisional bishop of New York in 1852; made D. D. at Union College and at Harvard; assisted materially in establishing the University of New York. He wrote *Chants Adapted to the Protestant Episcopal Church* (1819); *Music of the Church* (1828, 1850); *Sermons on Religious Education and Filial Duty* (1829); *Short Family Prayers* (1850); *The Pathways and Abiding Places of Our Lord* (1851); *The Land of Bondage: Journal of a Tour in Egypt* (1852); *Our Saviour, with Prophets and Apostles* (1850); edited a *Life of Bishop Heber, by His Widow* (1830); and published his controversy with Dr. George Potts, entitled *There Cannot Be a Church Without a Bishop* (1844). Died in New York, Sept. 21, 1854. His widow edited *A Memorial Volume of Thirty-four Sermons* (1856). In 1858 his *Life*, by Rev. John N. Norton, appeared, and a church was erected in New York to his memory.

WAINWRIGHT, RICHARD, American naval officer, was born in Washington, D. C., Dec. 17, 1849. On Sept. 28, 1864, he entered the Naval Academy; graduated in 1868; and in 1868-69 was attached to the brig *Jamestown*, on the Pacific station. In 1869 he was made ensign, and in 1870, master, being on duty in the Hydrographic Office. In 1870-72 he was attached to the *Colorado*, the flagship on the Asiatic station. In 1873 he was commissioned as lieutenant, and in 1875-78 was in command of the coast-survey vessel *Arago*. From 1878 to 1881 he was flag-lieutenant to Rear-Admiral Thomas H. Patterson, commanding on the Asiatic station; in 1881-84 he was employed on special duty in the Bureau of Navigation; and in 1885-86 he was secretary to Rear-Admiral James E. Jouett, commanding on the North Atlantic station. In 1887-88 he was on Inspection duty; in 1888-90 on duty at the Naval Academy; in 1890-93 on special service on the *Alert*; and in 1893-95 again on duty in the Hydrographic Office. On Sept. 16, 1894, he was made lieutenant-commander; and he was executive officer on the *Maine* (q. v., ante, p. 1974) when she was destroyed in Havana harbor, Feb. 15, 1898; and for two months thereafter he remained in charge of the wreck, making his headquarters on the dispatch-boat *Fern*. During the war with Spain (April-August, 1898) he was lieutenant-commander of the *Gloucester*, a gunboat which had previously been the *Corsair*, a steam pleasure yacht owned by Mr. Pierpont Morgan. On board this vessel he did splendid service at the battle off Santiago de Cuba, July 3, 1898, taking a chief part in the destruction of the Spanish torpedo-boat destroyers *Pluton* and

Furor; and it was to him that Admiral Cervera surrendered when taken on board the *Gloucester*.

WAITE, MORRISON REMICK, an American jurist; born at Lyme, Conn., Nov. 29, 1816; son of Henry M. Waite, an eminent jurist, and is believed to have descended from Thomas Waite, one of the judges who signed the death-warrant of Charles I; graduated at Yale in 1837; was admitted to the bar in 1839; removed to Maumee, Ohio; was a state legislator in 1849; removed to Toledo in 1850, and became prominent as a lawyer; was sent to Geneva in 1871 as United States counsel in the Alabama case; was president of the Constitutional Convention of Ohio in 1873, and Chief Justice of the Supreme Court of the United States in 1874. He was urged, in 1876, to stand for the Presidency, but declined on the ground that a chief justice should leave the office as honorable as he found it, and affirmed that the Constitution might wisely have rendered a chief justice ineligible as President. He was made LL. D. at Yale. Died in Washington, D. C., March 23, 1888.

WAKE, a watch over the body of a dead person, which may be kept up for several nights before the burial; is common among the lower class of Irish, and usually accompanied by free conviviality. It was formerly a festival to celebrate a saint's day or the dedication of a church, and was carried over to the next day, which became a day of feasting and drinking in the churchyard. The name became perverted from its original application, to refer to these after-wake celebrations, which gradually assumed the character of fairs or markets; and so great nuisances did they become, that in 1285 Edward I issued a prohibition against holding them in churchyards; and about two centuries later, Henry VI ordered that no displays of merchandise should be made on such days. In the reign of Henry VIII a further change resulted in the eventual abolition of the church celebration. The observance of saint's days continued, however, and became known as country wakes.

WAKE, WILLIAM, an English prelate; born at Blandford, Dorset, in 1657; ordained, and became chaplain to William III; rector of St. James, Westminster (1693); dean of Exeter (1701); bishop of Lincoln (1705); and primate of England (1716). While in France he had a controversy with Bossuet as to the doctrines of the Church of England, out of which grew his *Exposition of Doctrines of the Church of England*; in 1718 he corresponded with Louis Elies Dupin regarding the possible union of the Anglican and Gallican churches. He is remembered chiefly by his *Genuine Epistles of the Apostolic Fathers* (1693), wherein he maintained the authenticity of the whole Scriptures. Died at Lambeth, Jan. 24, 1737.

WAKEENEY, a city, the capital of Trego Co., Kansas, 32 miles W.N.W. of Hays City, in a grain-, cattle-, and sheep-raising district. Pop. 1900, 394.

WAKEFIELD, a town of Middlesex Co., Mass., 10 miles N. of Boston; contains the villages of Montrose, Wakefield, and Greenwood; manufactures shoes, rattan goods, and pianos; has iron and brass foundries, an electric street-railway, electric lights, 3 banks, a daily and a weekly newspaper, 26 schools, and a public library of 12,000 volumes. Pop. 1890, 6,982; 1900, 9,290.

WAKEFIELD, a village of Washington Co., R. I., on an ocean inlet, 30 miles S. by W. of Providence; has a newspaper office and woolen and cotton mills, and is in a farming district. Population 1890, 1,431.

WAKE FOREST, a college town of Wake Co., N. C., 17 miles N. N. E. of Raleigh; the college is a Baptist institution, with 14 instructors, 254 students, and a library of 13,000 volumes. Population 1900, 823.

WAKE ISLANDS, a group of three uninhabited coral islands in the north Pacific ocean, in $19^{\circ} 25'$ N. lat., and $166^{\circ} 20'$ E. long., about 2,500 miles west of Honolulu, and about 3,000 miles east of the Philippines; total area about 12 square miles. The chief island is about six miles long by about a mile and a half wide. In 1866 the German bark *Libelle* was wrecked on the coral reef off its east coast. On July 4, 1898, during the war between Spain and the United States, some officers and men of the second American expedition from San Francisco to Manila landed on the islands and raised the United States flag; and shortly afterward the United States government issued orders to take possession of them, as a suitable coaling and cable station.

WAKEMAN, a post village in Huron Co., Ohio, on the Vermilion river, 11 miles E. of Norwalk, in a fruit- and grain-growing district; has 4 churches, a newspaper office, a bank, and some factories. Population township (1900), 1,240.

WALCHEREN EXPEDITION. See LONDON-DERRY, MARQUIS OF, Vol. XIV, p. 154.

WALCOTT, CHARLES DOOLITTLE, an American paleontologist; born at New York Mills, N. Y., March 31, 1850. In 1876 he was appointed assistant geologist to the state of New York; assistant geologist to the United States Geological Survey in 1879; paleontologist to the same, 1883; chief paleontologist, 1891; geologist, in charge of geology and paleontology, 1893; and director, 1894. His writings to the bulletins of the Survey include *Paleontology of the Eureka District, Nevada* (Monograph 8, 1884); *The Cambrian Fauna of North America* (Bull. 10, 1885); *Second Contribution to the Studies of the Cambrian Fauna of North America* (Bull. 30, 1886); *The Fauna of the Lower Cambrian or Olenellus Zone* (10th Ann. Rept., 1890); *Correlation Papers, Cambrian* (Bull. 81, 1891). His contribution on *The Trilobite: New and Old Evidence Relating to its Organization* appeared as a bulletin in Mus. Com. Zool., Vol. viii, 1881.

WALD, a town in Düsseldorf government, Rhenish Prussia, 7 miles S. W. of Elberfeld; has hardware, cotton, linen, and woolen factories. Pop. 1895, 15,055.

WALDECK, JEAN FRÉDÉRIC DE, a French traveler and archæologist; born in Paris, March 16, 1766. His first experiences of travel were obtained in South Africa with Levaillant. He visited the Mauritius, accompanied Cochrane to Chili in 1819, and in Central America made a painstaking study of the ruins of southern Mexico and Guatemala. In 1837 he published *Voyage Archéologique et Pittoresque dans le Yucatan*. In 1866 appeared his *Monuments Anciens du Mexique*. He died April 29, 1875.

WALDECK-ROUSSEAU, PIERRE M., premier of France, was born at Rennes, Dec. 2, 1846, and

studied law. His parliamentary career dates from 1879, when he entered the legislative chamber as a follower of Gambetta. He subsequently held the office of Minister of the Interior, and in 1889 was elected to the Senate. In June 1899, the Dupuy ministry resigned, French politics being in a greatly perturbed condition, and M. Waldeck-Rousseau was entrusted by President Loubet with the task of forming a new cabinet. This was done, and French affairs have since considerably steadied.

WALDEN, a village of Orange Co., N. Y., 12 miles N. W. of Newburg; has foundries, woolen-mills, cutlery works, and engine and soap factories, 2 newspapers, a national bank, and a savings bank. Population 1890, 2,132; 1900, 3,147.

WALDERSEE, COUNT VON, a German soldier; born at Potsdam, April 8, 1832; entered the army in 1850, served with distinction through the war of 1866 and the Franco-German campaign, became quartermaster-general in 1882, and succeeded Von Moltke on his resignation in 1888. In 1891 he became commander of the Ninth Army Corps. At the annual maneuvers near Stettin in 1895, he succeeded in reversing the whole prearranged programme, receiving high praise from the emperor, who promoted him to the rank of field-marshal. On April 14, 1874, he married Princess Maria von Noer (widow of Prince Frederick of Schleswig-Holstein), whose maiden name was Mary Esther Lee, and who was born in New York. In Aug. 1900, Count Waldersee was appointed to the chief command of the allied armies in China during the Boxer disturbances.

WALDHEIM, a town in Saxony, beautifully situated on the Zschopau river, 32 miles W. of Dresden; has linen, woolen, fustian, furniture, and cigar factories. Population 1895, 9,935.

WALDOBORO, a town of Lincoln Co., Maine, on Medomak river, 19 miles W. of Rockland, and on the Maine Central railroad; was originally settled by Germans in 1749, and was incorporated in 1773; is a port of entry for customs, manufactures shoes and clothing, and has a shipyard, a weekly newspaper, and a national bank. Population 1900, 3,145.

WALDRON, a city, the capital of Scott Co., Ark., on Poteau river, about 40 miles S. S. E. of Fort Smith, to which point there is a stage line. The nearest railroad station is Mansfield, about fifteen miles distant. The district is agricultural. Population 1900, 487.

WALDSEEMÜLLER, MARTIN, a German historian (1470?–1523?). See GEOGRAPHY, Vol. X, 182.

WALDSTEIN, CHARLES, an American archæologist; born in New York city, March 30, 1856. After traveling in Europe with tutors and studying at schools in Switzerland and Germany, he entered Columbia College, New York, in his fifteenth year. In 1873 he proceeded to the University of Heidelberg, where he took the Ph. D. degree in philosophy, archæology, and political science in 1875. Thence he went to Leipsic. In 1876 he studied in the British Museum, where in 1878 he gave a course of lectures on Greek art. He published his first work the same year. In 1880 he lectured on Greek art at the University of Cambridge; was appointed lecturer in the university; and in 1883 reader in the newly-appointed chair of classical archæology. In the same year he became director

of the Fitzwilliam Museum at Cambridge; and after six years resigned that position on his appointment to the directorship of the American archaeological school at Athens, which position he resigned in 1892 (though he retained that of professor in the same school), on his appointment as Slade professor of art at Cambridge. He directed extensive excavations in Greece at Plataea, Eretria (where he found the supposed tomb of Aristotle), and at Heræum. He is the author of *The Balance of Emotion and Intellect* (1878); *Essays on the Art of Phidias* (1885); *Catalogue of Casts in the Museum of Classical Archaeology* (1889); *Excavations at the Heron of Argos* (1892); *The Work of John Ruskin* (1894); *The Study of Art in Universities* (1895).

WALES. See ENGLAND, Vol. VIII, pp. 220, 221; and GREAT BRITAIN, in these Supplements.

WALES, PRINCE OF, ALBERT EDWARD, heir-apparent to the British crown, eldest son of Queen Victoria and the late Prince Albert; was born at Buckingham palace, Nov. 9, 1841; studied for a session at Edinburgh, entered Christ Church, Oxford, visited the United States and Canada in 1859, and traveled in the East and visited Jerusalem in 1862. He married, March 10, 1863, the Princess Alexandra of Denmark, by whom he had five children, the eldest and heir presumptive, Prince Albert Victor, Duke of Clarence, born Jan. 8, 1864, dying Jan. 14, 1892. His second son, George, Duke of York, born June 3, 1865, became the heir presumptive, and married July 6, 1893, Princess Victoria Mary of Teck, who had been betrothed to Albert Victor. A son, Edward Albert, was born to them June 23, 1894. The Prince of Wales was elected grand-master of the Freemasons in England in succession to the Marquis of Ripon in 1874, and on April 28, 1875, was admitted to the office at a lodge held in the Albert Hall, South Kensington. On May 5, 1875, he was installed at the Freemasons' Hall as first principal of the Royal Arch Freemasons. He traveled in India (1875-76), and in 1885 he made a tour through Ireland. He succeeded in establishing the Imperial Institute, as a memorial of the Queen's jubilee, the formal inauguration of the institute taking place in May, 1893. In this year he became a member of the Poor Law Commission. In May, 1895, he accepted the chancellorship of the new University of Wales. The prince was a devoted sportsman. In yachting he was very successful with the *Britannia*; and on the turf scored several victories in 1896, chief among which was his winning the Derby with *Persimmons*. He took, upon many notable occasions, a great interest in fostering a friendly feeling between Great Britain and the United States. On Sept. 23, 1896, he received the Czar and Czarina of Russia on their arrival on British shores, at Leith, Scotland, on their visit to Queen Victoria at Balmoral. The Princess of Wales, Alexandra Caroline Marie Louise Julie, is the daughter of Christian IX, King of Denmark, and was born at Copenhagen, Dec. 1, 1844. Besides the children mentioned above, and the Duchess of Fife (q. v.,

DUKE OF FIFE, in these Supplements), the Prince and Princess have two other daughters, Victoria Alexandra Olga Marie, born at Marlborough House, July 6, 1868, and Maud Charlotte Marie Victoria, born at Marlborough House, November 26, 1869, and married, July 22, 1896, Prince Charles of Denmark. Early in the twentieth century, on the death of his beloved mother, Queen Victoria, which occurred at Osborne, Isle of Wight, Jan. 22, 1901, the Prince of Wales was called to the exalted station of England's monarch. In assuming the crown of Great Britain and of the Empire the Prince chose for his title as King that of Edward the Seventh.

WALHALL. See VALHALLA, in these Supplements.

WALKE, HENRY, an American naval officer; born in Princess Anne County, Virginia, Dec. 24, 1808; moved with his parents to Ohio, receiving his education at Chillicothe Academy, and in 1827 became a midshipman in the navy. He was present at the bombardment of Vera Cruz, and at the close of the Mexican War was transferred to the Mediterranean squadron in (1855). During the Civil War he prevented the capture of Fort Pickens by the Confederates, enabling the Federals to recapture the navy-yard at Pensacola and the neighboring forts. In 1861 he was present at the battle of Belmont, and commanded the *Carondelet* at the battles of Fort Henry and Fort Donelson. At the bombardment of Island No. 10 he was the first to run the gauntlet of its guns, finally capturing the batteries below the island. He led the Union fleet at the battle of Fort Pillow, and in June, 1862, played an important part at the battle of Memphis, and with the *Carondelet* overcame the Confederate ram *Arkansas*. He was present at the siege of Vicksburg, at Yazoo, at the battle of Grand Gulf, and blockaded the mouth of Red River, June, 1863. He thereafter cruised for two years after the *Alabama* on the *Sacramento*. He was commissioned commodore in 1866 and rear-admiral in 1870. He retired in 1871, and died in Brooklyn, March 8, 1896.

WALKER, AMASA, an American political economist; born in Woodstock, Connecticut, May 4, 1799. From 1814 to 1842 he was engaged chiefly in commercial pursuits. From 1842 to 1848 he lectured on political economy in the college at Oberlin, Ohio. In 1848 he became a member of the Massachusetts Assembly, and in 1849 of the Senate, where he carried a bill for placing Webster's Dictionary in the common schools of the state. In 1851-52 he was secretary of state, and in 1862-63 a member of Congress. From 1859 to 1869 he delivered annually a course of lectures on political economy in Amherst College. Mr. Walker was an advocate of new and reformatory measures; was president of the Boston Temperance Society; was active in the anti-slavery movement; and was one of the founders of the Free-Soil party. In 1857 he began the publication of a series of articles on political economy, and was accepted as an authority on questions of finance, He published *Nature and Uses of Money* (1857); and

Science of Wealth (1866). He died in Brookfield, Massachusetts, Oct. 29, 1875.

WALKER, FRANCIS AMASA, an American statistician, son of the preceding; born in Boston, Massachusetts, July 2, 1840. He graduated at



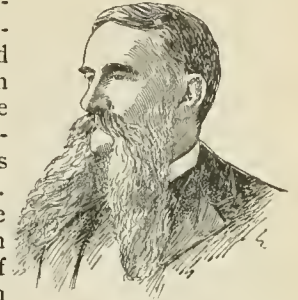
FRANCIS A. WALKER.

Amherst in 1860; served in the War of the Rebellion; was severely wounded at the battle of Chancellorsville; was taken prisoner and confined in Libby prison, and was brevetted brigadier-general in March, 1865. He taught Latin and Greek at Williston Seminary (1865-67). In 1869 he was appointed chief of the Bureau of Statistics at Washington, and was superintendent of the ninth and tenth censuses in 1870 and 1880, becoming a recognized authority on statistical questions in the United States. He was United States Indian commissioner (1872); and professor of political economy in the Sheffield Scientific School of Yale College (1873-81); and in 1881 became president of the Massachusetts Institute of Technology in Boston. He was United States commissioner to the international monetary conference in Paris in 1878; was elected in 1878 to the National Academy of Sciences; and was elected an honorary fellow of the Royal Statistical Society of London. His writings include his census reports, and *The Indian Question* (1874); *The Wage Question* (1876); *Money* (1878); *Money, Trade, and Industry* (1879); *Land and its Rent* (1883); *Political Economy* (1883); *History of the Second Army Corps* (1886); and *Bimetallism* (1896). Died in Boston, Jan. 5, 1897.

WALKER, JAMES, an American clergyman and educator; born in Burlington, Massachusetts, Aug. 16, 1794. He graduated at Harvard in 1814; was pastor of the Unitarian church in Charlestown, Massachusetts, twenty-one years; became professor of moral and intellectual philosophy in Harvard in 1839, and its president in 1853, which office he held till his resignation in 1860. He left his library and \$15,000 to Harvard. He published numerous sermons, lectures and addresses, including lectures on *Natural Religion* and *The Philosophy of Religion*. Among his writings are a *Memoir of Josiah Quincy* (1867); and *Discourses* (1876). He also edited a number of college text-books. He died in Cambridge, Massachusetts, Dec. 23, 1874.

WALKER, JOHN, an English lexicographer; born at Colney Hatch, near London, March 18, 1732. He had the faculty of turning with ease from one occupation to another and taking up various lines of thought, being by turns a schoolmaster, actor, teacher of elocution, etc. His well-known *Rhyming Dictionary* first appeared in 1775. His *Critical Pronouncing Dictionary* was published in 1791, and was popular after forty editions and sixty years. He died in London, Aug. 1, 1807.

WALKER, JOHN GRIMES, a United States naval officer; born in Hillsboro, New Hampshire, March 20, 1835. He graduated at the Naval Academy in 1856; served during the Civil War on the Atlantic Coast, the Gulf blockading squadron, and in the battles on the Mississippi River.



J. G. WALKER.

He was secretary of the lighthouse board from 1873 to 1878; chief of bureau of navigation from 1881 to 1889; acting rear-admiral commanding the South Atlantic station from 1889 to 1893; and rear-admiral and president of the naval retiring board in 1895.

WALKER, ROBERT JAMES, an American publicist; born in Northumberland, Pennsylvania, July 19, 1801. He graduated at the University of Pennsylvania in 1819 with the highest honors; was admitted to the bar in Pittsburg in 1821; removed to Natchez, Mississippi, in 1826, and practiced law. In 1833 he opposed nullification and secession, and was in favor of the coercion of rebellious states. In 1836 he was elected to the United States Senate. In 1845 he was appointed Secretary of the Treasury by President Polk, which office he held till 1849. While Secretary he prepared and carried the "Walker Tariff" of 1846, various loan bills, the Mexican tariff, and the bill to organize the Department of the Interior. In 1857 he was appointed by President Buchanan, governor of Kansas. He opposed the Lecompton constitution, resigned, and in Congress defeated the attempt to force this measure on the territory. In 1861 he advocated vigorous measures for the suppression of the rebellion, and throughout the war sustained the Federal government. In 1863 he was appointed financial agent of the United States, in Europe, and negotiated \$250,000,000 of the 5-20 United States bonds. In the latter years of his life he practiced law in Washington, District of Columbia, where he died Nov. 11, 1869. During a public life of forty years Mr. Walker exercised a strong and controlling influence on national affairs.

WALKER, SEARS COOK, an American astronomer; born in Wilmington, Massachusetts, March 28, 1805. He graduated at Harvard in 1825; was a teacher in Boston and Philadelphia for eight years; established an observatory in connection with the Philadelphia High School in 1837; was connected with the Washington Observatory from 1845 to 1847, where he made a practical application of telegraphy in determining longitude. He was in charge of the longitude department of the Coast Survey from 1847 to his death. He was the author of a number of works relating to astronomy, some of which were published by the Smithsonian Institution. He died in Cincinnati, Ohio, Jan. 30, 1853.

WALKER, WILLIAM, an American adventurer, born in Nashville, Tennessee, May 8, 1824. After

studying law in Nashville, and medicine in Heidelberg, Germany, he became a journalist in New Orleans and San Francisco, and finally settled as a lawyer in Maryville, California. In 1853-54, with 170 followers, he undertook the conquest of the Mexican state of Sonora, but failed. In 1855 he landed with 62 followers at Realejo, Nicaragua, raised a native force, captured Granada, and in September, 1856, had himself elected President of the country. His minister, sent to Washington, was recognized by President Pierce, but Walker's arbitrary and ill-considered measures soon provoked an insurrection. He was defeated in several encounters, burned the City of Granada, and surrendered at San Juan del Sur to the United States naval forces, which conveyed him to Panama. At New Orleans he was tried for filibustering and escaped conviction, but in his attempt to recover Nicaragua was prevented by the intervention of the United States. In June, 1860, he invaded Honduras, but was captured in September by the British man-of-war *Icarus*, delivered to the Honduras authorities, tried by court-martial, and shot in Trujillo, Honduras, Sept. 12, 1860. He wrote an account of his Nicaraguan expedition, which was published in 1862, under the title of *War in Nicaragua*.

WALKERTON, a town and the capital of Bruce County, western Ontario, Canada, 117 miles W. N. W. of Toronto, on the Saugeen River, and on the Grand Trunk railroad. It is in an agricultural region, has good water-power, and contains woolen and planing mills, foundry and machine-shop, a tannery, and chair and turning factories. Population 1891, 3,061.

WALKERVILLE, a village of Essex County, extreme southwestern Ontario, on the Detroit River, opposite Detroit, two miles N. of Windsor, and on the Grand Trunk and the Lake Erie and Detroit River railroads. It is noted for its large distilleries and warehouses, the latter having a capacity of four million gallons. Population, about 600.

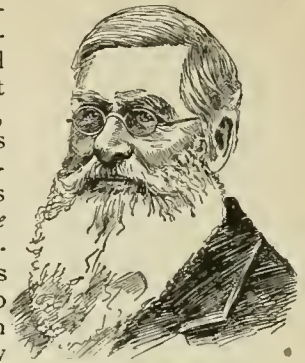
WALKING-LEAF, botanical. See FERNS, Vol. IX, p. 103; entomological INSECTS, Vol. XIII, p. 152; MIMICRY, Vol. XVI, p. 343; and LEAF-INSECT, in these Supplements.

WALKING-STICK. See INSECTS, Vol. XIII, p. 152.

WALLABY, kangaroo. See AUSTRALIA, Vol. III, p. 111.

WALLACE, ALFRED RUSSEL, an English naturalist and traveler; was born at Usk, Monmouthshire, Jan. 8, 1822, and was educated at Hertford Grammar School. After studying land-surveying with a brother, his fondness for travel led him, in 1848, to make a voyage to South America, in company with Mr. Bates, a naturalist. Returning to England in 1852, he published his *Travels on the Amazon and the Rio Negro*, followed by a small volume on the *Palm Trees of the Amazon, and Their Uses*, and one on *The Malay Peninsula* (1869). While sojourning in the Malay Islands he made extensive zoölogical collections, and, unaware of Mr. Dar-

win's contemporaneous theorizings on the Origin of Species, he forwarded to the famous English naturalist a paper containing his theory of development by natural selection, though not using the term. Darwin, finding his own researches partly anticipated, honorably forwarded Wallace's paper to the *Journal of the Linnean Society*, accompanied by a letter of his own, addressed in 1857 to Dr. Asa Gray; and both communications first saw the light in July, 1858.



ALFRED R. WALLACE.

Wallace's share in the honors of discovery of a working hypothesis to account for the differentiation of plants and animals on the globe is thus manifested, while his claims to joint discovery are substantiated by the work he published separately in 1870, entitled *Contributions to the Theory of Natural Selection*. For his writings on this and other important subjects, and for the series of valuable publications appearing in the *Transactions of the Linnean, Zoölogical, Ethnological, Anthropological and Entomological Societies*, Mr. Wallace was awarded, in 1868, the medal of the Royal Society, and in 1870 the gold medal of the *Société de Géographie* of Paris. In 1876 he became president of the Biological Section at the meeting in Glasgow, of the British Science Association, and in the same year he published, in two volumes, *The Geographical Distribution of Animals*. In 1878 appeared *Tropical Nature*, an interesting treatise on the colors of bird, animal and insect life, on sexual selection, and on the geographical distribution of plants and animals; and in 1880 *Island Life*, in which the principles established in his earlier writings with reference to animals are applied to the fauna and flora of the chief islands of the globe. His later writings in his special field embrace *Darwinism: An Exposition of the Theory of Natural Selection, with Some of Its Applications* (1879), a work in which he takes issue, in part, with the views enunciated by his great co-laborer in Evolution; and *Australia and New Zealand* (1893), issued in Stanford's *Compendium of Geography and Travel*. Dr. Wallace took an ardent interest in social and political problems, and issued a work on *Land Nationalization* (1882), a sketch of the subject of land-tenure, with a practical scheme for occupying ownership under the state. To this he added *Forty Years of Bad Times* (1885), and a work, issued in the same year, in which he opposes compulsory vaccination, entitled *Forty-five Years of Registration Statistics*. He also wrote *On Miracles and Modern Spiritualism* (1875), which met with little favor; and *The Wonderful Century* (1898). In 1881 he was awarded a civil-list pension of \$1,000, in recognition of his scientific researches. He was also awarded the Darwin Medal of the Royal Society, and was made a D. C. L. of Oxford. He also wrote the

articles on ACCLIMATIZATION (see Vol. I, pp. 84-90), and on DISTRIBUTION OF ANIMALS (see Vol. VII, pp. 267-286), in this ENCYCLOPÆDIA.

WALLACE, SIR DONALD MACKENZIE, K. C. I. E., director of the foreign department of the London *Times*, is the son of Scottish parents and was born Nov. 11, 1841. He was educated at Edinburgh, Berlin, Heidelberg, and at the École de Droit, Paris. For twenty years he travelled widely, chiefly in Germany, France, Russia, and Turkey, and between 1884 and 1889 was secretary to the Marquises of Dufferin and Lansdowne while these noblemen filled the office successively of Governor-General of India. In 1890-91 he accompanied the Czarewitch of Russia as political officer on the occasion of his visit to India and Ceylon. He is the author of one of the best books on *Russia*, published in 1877, and also of an able work on *Egypt and the Egyptian Question* (1883).

WALLACE-HERTFORD ART COLLECTION. The magnificent collection of paintings, porcelains, bronzes, bric-à-brac, and armor gathered by the third and fourth Marquises of Hertford and by the late Sir Richard Wallace—a collection valued at from twenty to twenty-five million dollars—was in 1900 made a bequest to the English nation. The rare treasures are housed in Hertford House, Manchester Square, London, the palatial metropolitan home of the now defunct line of the Marquises of Hertford, which has been acquired by the nation. The gathering of the Hertford Collection has been the work of a century or more, being seriously begun by the third Lord Hertford—the Lord Yarmouth of the Court of George IV and the Marquis of Steyne of Thackeray's *Vanity Fair*—and continued by the fourth Marquis (the last of his line), better known perhaps to Paris under Louis Napoleon than to London or to the English and Irish tenants of his vast native estates. These two noblemen, it is said, "ransacked the ages" to gratify their taste for the beautiful, and spent their ample fortunes in surrounding themselves in a foreign capital with the rarest and costliest masterpieces of art. The additions to the collection, chiefly of enamels, ivories, bronzes, rare tapestries, French furniture, and suits of armor, were made by Sir Richard Wallace, who inherited the wealth of the last Marquis of Hertford, and gained a baronetcy as well as a seat in Parliament as the reward of his services to the English colony in Paris during the horrors of the Commune. His wife, who was of American birth, died in 1897 in England, her only child having pre-deceased her. It is to Lady Wallace that the English nation immediately owes the almost priceless gift that has been so lavishly bestowed upon it.

So extensive is the collection, which has now become a national heirloom in England, that merely to catalogue it would take many pages. All that here can be attempted is to indicate a few only of its treasures, which include many of the masterpieces of the great painters of the English, Dutch, French, Italian, and Spanish schools, together with some incomparable specimens of jewelled arms and

armor, magnificent cases of Sèvres porcelain, artistic metal work in silver and gold, ivories and jewels, costly enamels of Limoges, rare examples of Italian majolica, vases of jasper and onyx, each the work of famous craftsmen, and a hitherto unmatched gathering of French furniture, of the reigns of Louis XIV, XV, and XVI, priceless clocks, marbles, candelabra, bronzes, cabinets, and other costly garniture. The historic interest of the collection is no less notable than is its rare artistic beauty, while the arrangement of the collections in the reconstructed salons and galleries facilitates inspection of even the minutest treasure.

The notable paintings in the great halls and salons naturally form to the art-lover the chief attraction. There few painters of supreme distinction lack representation. Among them are to be found examples of the famous canvases of Van Dyck, Velazquez, Rubens, Rembrandt, Cuyp, Wouverman, together with many of the English school, including Reynolds, Gainsborough, and Romney, and the chief masters of French art of the eighteenth century. The later schools of both British and French art are also represented with one or two examples of American portrait work, and some fine bits from Flemish and Dutch easels. The collection is perhaps without a rival in bric-à-brac of all sorts, representing the skilled craftsmanship of many ages and nations. As a whole, the collection is unique and almost without a rival, even among the famous galleries and museums of the Old World. The collection is vested in a body of trustees appointed by the British Treasury, consisting among others of Lord Rosebery and Sir Edward Malet, while Mr. Claude Philips has been appointed Keeper. G. M. A.

WALLACE, HORACE BINNEY, an American author and law-editor; born in Philadelphia, Pennsylvania, Feb. 26, 1817; graduated at Princeton in 1835; studied in succession medicine, chemistry, and law. In 1838 he published anonymously a novel entitled *Stanley*; edited with Judge Hare seven law volumes of *Leading Cases* (1847-52). During the years of 1849, 1850 and 1852 he traveled in Europe, studying questions of philosophy. As the result of over-work, he died by his own hand, in Paris, Dec. 16, 1852. Two volumes of his miscellaneous writings were published after his death: *Art and Scenery in Europe*, and *Literary Criticisms* (1856).

WALLACE, JAMES, a British naval officer; born about 1730. He was made post-captain in 1771; commanded the *Rose* in 1775, in Newport, Rhode Island, and shortly afterward bombarded Bristol. In 1777 he ascended the Hudson and burned the town of Kingston; in 1779 was captured by Count D'Estaing; in 1782 commanded the *Warrior* in Rodney's victory over De Grasse. He was governor of Newfoundland (1793-95); rear-admiral in 1794; vice-admiral in 1795; and admiral of the blue in 1801. He died in London. March 6, 1803.

WALLACE, LEWIS, an American lawyer, soldier and author; was born in Brookville, Indiana, April 10, 1827. He was first-lieutenant of a com-

pany of Indiana Volunteers in the Mexican War. From 1848 to 1861 he practiced law in Covington and Crawfordsville, Indiana.



GEN. LEW. WALLACE.

At the beginning of the Civil War he was appointed adjutant-general of Indiana; became colonel of the Eleventh Indiana Volunteers; defeated the Confederates at Romney, West Virginia; brigadier-general September, 1861; led a division at the capture of Fort Donelson, February, 1862; major-general of volunteers, March, 1862; was in the second day's fight at Shiloh. In 1863 he prepared the defences of Cincinnati, which saved the city from capture by General Kirby Smith; July 9, 1864, he was defeated by the Confederates at Monocacy, but, by thus detaining the enemy, prevented the capture of Washington by General Jubal Early. He was a member of the court that tried the assassins of President Lincoln, and also of that which tried Captain Henry Wirz, commandant of Andersonville prison. In 1881-85 he was United States minister to Turkey. When not in public service he practiced law and engaged in literary work. He published *The Fair God*, a story of the conquest of Mexico by the Spaniards (1873); *Ben-Hur, a Tale of the Christ* (1880), (of which more copies have been sold than any other American romance except *Uncle Tom's Cabin*); *Commodus: A Tragedy* (1889); *The Prince of India* (1893); *The Life of Benjamin Harrison* (1888); and *The Wooing of Malkatoon* (1898).

WALLACE, ROBERT, M. A., D. D., member of the English Parliament, and for some years (1876-80) editor of the Edinburgh *Scotsman*; was born at St. Andrews, June 24, 1831, and died June 6, 1899. He was educated at St. Andrews and Edinburgh, and for a time was minister of Trinity College Church and subsequently of Old Greyfriars Church, Edinburgh. Later on he became a barrister and entered Parliament. He was a voluminous writer on theology, politics, and economics, wrote a work on *Church Tendencies in Scotland* and contributed the article on CHURCH HISTORY to the *ENCYCLOPÆDIA BRITANNICA*.

WALLACE, ROBERT, F. R. S. E., F. C. S., etc., Professor of Agriculture and Rural Economy, University of Edinburgh; was born in 1853 and educated at Edinburgh University. He visited Canada and India, Australia and New Zealand, Egypt, South Africa, and the United States pursuing agricultural investigations and has acted at times for Colonial governments with reference to cattle plagues and other diseases, on which he is an authority. His chief publications embrace *Farm Live Stock of Great Britain* (3rd ed. 1893); *Indian Agriculture* (1898); *The Agriculture and Rural Economy of Australia and New Zealand* (1891); *Farming Industries of Cape Colony* (1896), etc.

WALLACEBURG, a village of Kent County,

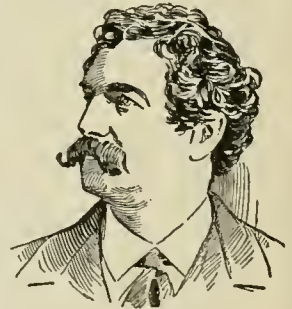
southwestern Ontario, at the head of navigation on the Sydenham River, 24 miles N.W. of Chatham, and on the Erie and Huron railroad. It is an important lumber-shipping point, and has saw, planing and flour mills, hub and spoke factory and canning factory. Population 1891, 2,726.

WALLACHIA, one of two provinces (Moldavia is the other) that form the kingdom of Roumania. Roumania's independence of Turkey was proclaimed at Bucharest, May 21, 1877, and was confirmed by Art. 43 of the Congress of Berlin, signed July 13, 1878. See Vol. XXI, pp. 16-18, 20, 21.

WALLACK, JAMES WILLIAM, an English actor; born in Lambeth, London, England, Aug. 24, 1795. He appeared on the stage when a child, at the Surrey Theater, London, and at Drury Lane; at 18 appeared as Laertes in *Hamlet*. He went to the United States in 1818, and appeared as Macbeth, Romeo, Shylock and Hamlet at the Park Theater, New York; became stage-manager at Drury Lane in 1820. For a number of years he played alternately in the theaters of the United States and England. He conducted the National Theater in New York (1837-39); assumed the management of Wallack's Lyceum, New York, in 1852, and established Wallack's Theater in 1861. He was a comedian of fine personality, and his eminent success was owing largely to an intuitive and felicitous use of stage technique. He died in New York City, Dec. 25, 1864.

WALLACK, JOHN LESTER, an American actor, son of the above; born in New York City, Jan. 1,

1820. He made his first appearance in the United States at the New York Broadway Theater, Sept. 27, 1847, as Sir Charles Coldstream in the play of *Used Up*. He was first known as John W. Lester and afterward as Lester Wallack. He appeared at the Bowery, Burton's, Niblo's and Brougham's Theaters, and in 1852 became a



J. L. WALLACK.

permanent member of his father's company, playing leading parts. On the death of his father (1864), he became proprietor of Wallack's Theater, which he conducted 24 years. Among pieces for the stage, he wrote *The Veteran* and *Rosedale* and prepared three papers of *Theatrical Reminiscences*, published in *Scribner's Magazine* shortly after his death. His qualities as an actor were similar to those of his father, but he excelled in genteel comedy, and in the rôle of youthful characters in romantic compositions. He died in Stamford, Connecticut, Sept. 6, 1888.

WALLA WALLA, a city and the capital of Walla Walla County, southeastern Washington, 245 miles N.E. of Portland, Oregon, on the Walla Walla River, and on the Washington and Columbia River, and the Oregon railway and Navigation Company's railroads. It is the trade and

shipping center of a region producing large quantities of grain, fruit, vegetable and live-stock. The city, formerly known as Wailatipa, takes its name from the Indian word meaning "many waters," applied on account of the many springs flowing down the sides of the surrounding mountains; has numerous churches, public schools and several private institutions for secondary and higher education, including Whitman College (Congregational), a co-educational institution established in 1882, and having, in 1895, 9 instructors, 100 students and a library of 4,000 volumes. Walla Walla is also the seat of a United States military post, of the state penitentiary, is lighted with gas and electricity, and has manufactories of wire-fence, iron, hardware novelties, lumber, sash, doors and blinds, leather, flour, cheese and beer. Population 1890, 4,709; 1900, 10,049.

WALL-FLOWER, the common name of the cultivated *Cheiranthus cheiri*, a plant of the mustard (*Cruciferae*), very common in old gardens, and recognized by its woody stem, crowded narrow leaves, variously colored flowers (orange, yellow or brownish red), and long, slender, square pods. The name is also given to the native American *Erysimum asperum*, an allied plant of the central and western United States, with similar habit and showy flowers.

WALLHOFEN, MADAME PAULINE, LUCCA, an Austrian singer of Jewish parentage; born in 1842, in Vienna, where, as a child, her beautiful voice attracted attention, and was instrumental in securing for her a musical training under Uschmann and Lévy. Her début was made at Olmütz in 1859, and followed by her appearance at Prague in *Norma* and *Les Huguenots*. The admiration and friendship of Meyerbeer secured for her an engagement in Berlin in 1861; two years later she made her first appearance at Covent Garden, and in a short time became famous in all the European capitals, receiving the appointment of court singer at Berlin, a position which she resigned in 1872. She immediately started upon a two-years' tour of the United States, and upon her return to Europe took up her residence in her native city. She married the Baron von Rohden in 1865; was later divorced, and married Herr von Wallhofen.

WALLIN, OLOF. See SWEDEN, Vol. XXII, p. 757.

WALLINGFORD, a borough of New Haven County, southwestern Connecticut, on the Quinnipiac River, and on the New York, New Haven and Hartford railroad, 12 miles N.N.E. of New Haven. In the same town as Wallingford are the villages of East Wallingford and Yalesville, each having manufactories of importance. The borough has manufactories of britannia, nickel, sterling silver, plated silver and brass goods, rubber goods, wheels and ironware. Population town and borough, 1900, 9,001.

WALLINGFORD, a town of Rutland County, south central Vermont, 59 miles S. of Montpelier, on Otter Creek, and on the Bennington and Rutland railroad. It contains the villages of Wal-

lingford, East Wallingford and South Wallingford, all engaged in manufacturing; the chief products of the various industries being coffins and caskets, harness, ox-bows, snow-shovels, stoves, tinware, and hay and manure forks. Population 1890, 1,733; 1900, 1,575.

WALLON, HENRI ALEXANDRE, a French historian and statesman; born at Valenciennes, Dec. 23, 1812; was a member of the Faculty of Letters, Paris, in 1840, and successor to M. Guizot at the Sorbonne in 1850, where he lectured on history and geography. He was a member of the National Assembly, 1849-50, and after the fall of the Empire was again returned as a moderate Conservative by the department of the Nord, and to his moderation and vigor was largely due the definite establishment of the Republic by the constitution of 1875. He is still commonly called the Father of the Republic. He was a Minister of Public Instruction in 1875, and a member of the Senate in 1876. Among his writings are: *De l'Esclavage dans les Colonies* (1847); *Histoire de l'Esclavage dans l'Antiquité* (1848); *Jeanne d'Arc* (1860); *La Vie de Jésus et son Nouvel Historien* (1864); *Richard II, Episode de la Rivalité de la France et de l'Angleterre* (1864); *Saint Louis et son Temps* (1875); and *Les Représentants du Peuple en Mission, etc.* (1888-90).

WALL-PAPERS. See MURAL DECORATION, Vol. XVII, pp. 38, 39.

WALL-PEPPER. Same as STONECROP, q.v., in these Supplements.

WALPOLE, a town of Norfolk County, eastern Massachusetts, eight miles S.E. of Dedham, and 19 miles S.W. of Boston, on the New York and New England and the New York, New Haven and Hartford railroads. It includes the villages of Walpole, East Walpole and South Walpole, and is extensively engaged in the manufacture of paper, cotton goods and school furniture. Population 1890, 2,604; 1900, 3,572.

WALPOLE, a town of Cheshire County, extreme southwestern New Hampshire, four miles below Bellows Falls, on the Connecticut River, and on the Fitchburg railroad. It is in a rich agricultural region, and is a noted summer-resort. Population 1890, 2,163; 1900, 2,602.

WALSH, ROBERT, an American journalist and author; born in Baltimore, Maryland, in 1784; educated at the Roman Catholic College, Baltimore, and at the Jesuit College, Georgetown, District of Columbia. In 1811 he began the publication of *The American Review of History and Politics*, the first quarterly issued in the United States. In 1819 he established the *National Gazette* in Philadelphia, which he published till 1836. He also edited the *Magazine of Foreign Literature* and the *American Review*. He removed to Paris in 1837, and was United States consul from 1845 to 1851. He died in Paris, Feb. 7, 1859. He wrote prefaces to an edition of the English poets, in fifty volumes, and biographical sketches for the *Encyclopædia Americana*. While in Paris he was the correspondent of the *Journal of Commerce* and the *National Intelligencer*. Among his

publications are *Letters on the Genius and Disposition of the French Government* (1810), four editions of which were republished in England; *Correspondence* (with R. G. Harper) *Respecting Russia* (1813); *Appeal from the Judgment of Great Britain Respecting the United States* (1819); and *Didactics: Social, Literary and Political* (1836).

WALSH, WILLIAM J., a Roman Catholic prelate and Primate of Ireland; born in Dublin in 1841; educated at St. Lawrence O'Toole's Seminary in Dublin, at the Catholic University of Ireland, at Maynooth College, and at the Dunboyne Establishment. In 1867 he was professor of theology at Maynooth; in 1878 vice-president of the college, and in 1880 its president. In 1885 he was appointed archbishop of Dublin. He interested himself in the political and industrial condition of Ireland; advocated some system of arbitration for the settlement of disputes between landlords and tenants; urged an equality between Catholics and Protestants in Ireland in educational privileges; and actively intervened in the settlement of strikes in Dublin and on the Great Southern and Western railway in 1890. His work in the cause of sobriety resulted in temperance organizations in all the dioceses of his official province. He contributed to the *Contemporary Review*, the *Dublin Review*, and to the *Irish Ecclesiastical Record*. Among his published works are *Human Acts*; *Harmony of the Gospel Narrative of the Passions*; *Plain Exposition of the Land Act of 1881*; a *Statement of the Chief Grievances of the Catholics of Ireland in the Matter of Education, Primary, Intermediate and University*; *Bimetalism and Monometallism* (1894).

WALTER, JOHN, an English journalist; born in England, in 1739.



JOHN WALTER, [THE THIRD]. As an underwriter at Lloyd's he acquired a fortune, which he lost by the capture by the French of a number of merchantmen on which he had a large risk. In 1785 he established a newspaper, *The London Daily Universal Register*, in which he attempted to make use of a patent for employing entire words instead of single letters in the composition. The experiment was not a success, but after the title was changed to *The Times*, in 1788, the journal prospered. Mr. Walter died Nov. 16, 1812. In 1803 the management of *The Times* was transferred to his son JOHN, who was born in 1784. He had unusual talent and enterprise, and organized a system of press dispatches from abroad more reliable and rapid than those furnished by the government. Through this agency the victory of Waterloo and other important events were printed in advance of the government dispatches. In 1814 he printed his paper by steam-power—an important event in the history of newspaper-printing. He

raised *The Times* to eminence by the excellence and strength of its editorials; and by inducing men of talent to contribute to its columns rendered it an organ of public opinion and a reflection of the ideas of the best society in London. He died in 1847, and was succeeded by his son JOHN, born in London, in 1818, who was educated at Eton and graduated with honors at Exeter College, Oxford, in 1843. In 1847, the day after his father's death, he was returned member for Nottingham, which he represented for 12 years, and then from 1859 till 1885 for Berks, with the exception of the election in 1865. After the dissolution in 1885 Mr. Walter did not offer himself for re-election. In the conduct of *The Times* he availed himself of the new conditions brought about by the railway and telegraph, and in 1860 brought to perfection, at great expense, the art of printing from stereotypes. Under his administration *The Times* maintained its high reputation as the leading newspaper in England. Died at Bearwood, Berkshire, Nov. 3, 1894.

WALTER, THOMAS USTICK, an American architect; born in Philadelphia, Pennsylvania, Sept. 4, 1804. He received his professional education in the office of William Strickland, the architect of the mint and the custom-house, Philadelphia, and in 1830 began practice as an architect. He designed Girard College, which was completed in 1847, and which is claimed to be the finest specimen of classic architecture on the American continent. One of his important works was the breakwater at Laguayra for the Venezuelan government. He designed the extension of the capitol at Washington in 1851, and later, while serving as government architect, the extension of the patent-office, treasury and post-office buildings, the dome on the old capitol, the Congressional Library and the Government Hospital for the Insane. Mr. Walter was a member of the Franklin Institute, in which he held the professorship of architecture, and of the American Philosophical Society. At the time of his death he was president of the American Institute of Architects. In 1853 he was given the degree of D.C.L. by the University of Lewisburg, Pennsylvania, and in 1857 that of LL.D. by Harvard. Died in Philadelphia, Pennsylvania, Oct. 30, 1887. See ARCHITECTURE, in these Supplements.

WALTERBORO, a town and the capital of Colleton County, southern South Carolina, 45 miles W.N.W. of Charleston, on a branch of the Ashepoo River, and on the Charleston and Savannah and the Walterboro and Western railroads. It is in an agricultural district, has large naval stores, important lumber manufactories, a dry kiln, planing and flour mills. Population 1890, 1,171; 1900, 1,491.

WALTHALL, EDWARD CARY, a United States Senator; born in Richmond, Virginia, April 4, 1831; admitted to the bar in 1852; district attorney for the tenth judicial district of Mississippi (1856-61); entered the Confederate service as a lieutenant in the Fifteenth Mississippi Regiment (1861); soon after promoted lieutenant-colonel of

that regiment. In the spring of 1862 was elected colonel of the Twenty-ninth Mississippi regiment; promoted to brigadier-general in December, 1862, and major-general in June, 1864. After the war he practiced law at Coffeerville and Granada; was appointed to the United States Senate March 12, 1885; to succeed L. Q. C. Lamar; was elected Senator by the legislature in Jan., 1886; reelected twice. Died at Washington, D. C., April 29, 1898.

WALTHAM, a city of Middlesex County, eastern Massachusetts, 10 miles W. of Boston, on both sides of the Charles River, and on the Boston and Maine and the Fitchburg railroads, and connected with Boston and Newton by electric railways. The city has numerous churches, excellent public schools, parochial and Swedenborgian schools, a public library of over twenty thousand volumes, a hospital, and daily and weekly papers. The assessment valuation of the city is over eighteen million dollars. Besides the manufacture of watches, for which Waltham is famous, having probably the largest watch-making establishment in the world, there is a large cotton-mill, erected in 1814, combining with it a bleaching and dye works; and numerous other industries. Population 1890, 18,707; 1900, 23,481.

WALTHER, CARL FERDINAND WILHELM, a German-American theologian; born in Saxony, Oct. 25, 1811; graduated at the University of Leipsic in 1833; pastor at Bräunsdorf in 1837. With the Reverend Martin Stephan and a number of religious followers he emigrated to the United States in 1839 and settled in Missouri. He was pastor of Altenburg, and in 1841 of a congregation of Lutheran Saxons in St. Louis, and became the recognized leader of his countrymen, who had settled in large numbers in Missouri. In 1846 he organized the synod of Missouri, which became the largest Lutheran synod in America, numbering in 1890, 344,000 communicants. He was president of the Theological Seminary in St. Louis from 1849 till his death. He was a classical scholar, a profound theologian, and an able organizer and leader. He was the author of numerous works, among which are *Kirche und Amt* (1875); *American-Lutheran Pastoral Theology* (1872); *Amerikanisch-Lutherische Epistel-Postille* and *Amerikanisch-Lutherische Evangelien-Postille* (1871), and a number of volumes of sermons, addresses and criticisms. He died in St. Louis, May 7, 1887.

WALTON, a village of Delaware County, southeastern New York, 17 miles S.W. of Delhi, on the Delaware River, and on the New York, Ontario and Western railroad. It is situated in an agricultural and dairying region; has water-power, and various industries, including a tannery, foundries and machine-shops, manufactories of iron castings, baby carriages and toys. Population 1890, 2,299; 1900, 2,811.

WALTON, GEORGE, a signer of the Declaration of Independence and United States Senator; born in Frederick County, Virginia, in 1740, and when young was apprenticed to a carpenter. Un-

aided he acquired a fair education, was admitted to the bar, and commenced the practice of law in Savannah, Georgia, in 1774. He was one of four persons who signed a call for a public meeting, July 27, 1774, for the consideration of political grievances, and one of a committee appointed on that occasion to correspond with other provinces in North America concerning the arbitrary exercise of power by the British government. He was a delegate to the Continental Congress from 1776 to 1781, and signed the Declaration of Independence and the Articles of Confederation. A colonel of militia at the defense of Savannah in 1778, he was dangerously wounded. He was governor of Georgia in 1779; chief justice in 1783; again governor in 1789; United States Senator (1795-96). He died in Augusta, Georgia, Feb. 2, 1804.

WALVISH BAY, a district. See AFRICA, p. 75, in these Supplements.

WALWORTH, REUBEN HYDE, an American jurist; born at Bozrah, Connecticut, Oct. 26, 1789; admitted to the bar in 1809, and commenced the practice of law at Plattsburg, New York. He was acting adjutant-general of New York in 1814; member of Congress (1821-23); circuit judge (1823-28); chancellor of the state of New York (1828-48), residing in Albany. As chancellor he ranked high in equity jurisprudence. He was the author of *Rules and Orders of the Court of Chancery of the State of New York*, and prepared the *Hyde Genealogy* (2 vols., 1864), said to be the most elaborate work of its kind at that time. His court decisions are found in Cowen's *Reports* (9 vols., 1824-30); Paige and Barbour's *Reports* (14 vols., 1830-49); and the *Reports* of Wendell, Hill and Denio. He died at Saratoga, New York, Nov. 21, 1867.

WAMEGO, a city of Pottawatomie County, northeastern Kansas, 37 miles W.N.W. of Topeka and 15 miles E. of Manhattan, on the Kansas River, and on the Union Pacific railroad. It is an important shipping-point for a region producing corn, the cereals, broom-corn, sorghum, potatoes, hay, wool and live-stock. Population 1890, 1,473; 1900, 1,618.

WAMPUM, a name given to shells and shell-beads used as money and worn for ornaments in strings and belts by the North American Indians. The favorite material was round clam-shells, which were drilled through lengthwise, and strung upon a thread. The usual color of these shells was white, although some of a black or violet purple color were used and especially prized.

WANAMAKER, JOHN, an American merchant; born in Philadelphia, Pennsylvania, July 11, 1837; educated in the public schools. In 1861 he commenced business for himself, and in 1876 became the head of the John Wanamaker and Company, an immense dry goods, clothing and miscellaneous business in Philadelphia. In 1858 he founded Bethany Presbyterian Church and its great Sunday-school, and for many years was president of the Young Men's Christian Associa-

tion of Philadelphia. In 1889 he was appointed Postmaster-General of the United States by President Benjamin Harrison, to which office he brought his great organizing and executive abilities. In the conduct of his commercial business he introduced the profit-sharing system, distributing in 1888-89 more than one hundred thousand dollars among his employees.

WANDALA. See MANDARA, in these Supplements.

WANDERING JEW. See JEW, THE WANDERING, Vol. XIII, pp. 673, 674.

WANDEROO (*Macacus silenus*), an Asiatic monkey which is noted for the greatly developed beard around the face. See Vol. II, pp. 151, 152.

WANKLYN'S ANALYSIS. See WATER, Vol. XXIV, p. 399.

WANKS, river, Nicaragua. See COCO, in these Supplements.

WAPAKONETA, a village and the capital of Auglaize County, western Ohio, 12 miles S.W. of Lima, and 59 miles N. of Dayton, on the Auglaize River, and on the Cincinnati, Hamilton and Dayton railroad. It is in a region rich in agricultural products, natural gas and petroleum, and has manufactories of churns, wheels and furniture. On the ground where Wapakoneta now stands, the Seneca and Shawnee Indians in 1831 signed a treaty by which they ceded to the United States their lands, thus giving up the last foothold of the Indian in Ohio. Population 1900, 3,915.

WAPELLO, a town and the capital of Louisa County, southeastern Iowa, on the Iowa River, 6 miles W of the Mississippi River, 30 miles N. of Burlington, and 21 miles S.S.W. of Muscatine, and on the Burlington, Cedar Rapids and Northern railroad. It is in the trade center for a region producing grain, vegetables and fruits, and raising live-stock, and has fruit and vegetable canneries, flour-mill and plow and wagon factories. Population 1890, 1,009; 1900, 1,398.

WAPITI. See DEER, Vol. VII, p. 724.

WAPPERS, ÉGIDE CHARLES GUSTAVE, a Belgian painter; born in Antwerp, Aug. 23, 1803. He studied painting in the Academy of Antwerp, of Herreyns and of Honor, and then went to Paris, where he adopted the manner of the romantic school. From 1846 to 1853 he was director of the Academy of Antwerp, where he was the representative and founder of the romantic school of painting in Belgium. In 1847 he was made baron. In 1853 he resigned the directorship of the Academy, in which he was followed by De Keyser, and removed to Paris, where he died, Dec. 6, 1874. His pictures are chiefly of historical subjects, and include *The Devotion of the Burgomasters of Leyden*, which attracted much attention in 1830; *Charles I Taking Leave of His Children*; *Charles IX During St. Bartholomew's Massacre*; *Execution of Anne Boleyn*; *The Defense of Rhodes by the Knights of Saint John of Jerusalem* (for Louis Philippe, now at Versailles); *The Great Fishing at Antwerp* (for Queen Victoria); and the *Neuvaines of the Family of Count Egmont Pre-*

vious to His Execution by the Duke of Alva (painted in 1866, and now in the collection of Mr. Probasco, Cincinnati, Ohio). He also painted numerous portraits. The recent development of Belgian art is largely attributed to his influence.

WAPPINGER'S FALLS, a village of Dutchess County, southeastern New York, on Wappinger Creek, two miles from the Hudson River and eight miles S. of Poughkeepsie, with which it is connected by electric railway. It is two miles from New Hamburg, its nearest railroad station, on the New York Central and Hudson River railroad; has good water-power, print-works, overall and sheeting factory. Population 1900, 3,504.

WAR, DEPARTMENT OF, an executive department of the United States government, presided over by the *Secretary of War*, who is a member of the President's Cabinet, and whose general duties are a supervision of the estimates of the expenses of the department, the purchasing of army-supplies, and of all expenditures for the support and transportation of the army. He has also supervision of the United States Military Academy at West Point, of the national cemeteries, of the publication of the official records of the Board on Ordnance and Fortification and of the War of the Rebellion. He has charge of river and harbor improvements, the prevention of obstruction to navigation, the establishment of harbor-lines, and of the construction of bridges over navigable waters in the United States. He is assisted by an *Assistant Secretary of War*, who performs such duties as the secretary may prescribe or the law enjoin. The Secretary has a *chief clerk*, who has charge of the official mail and correspondence, and who performs such other duties as are assigned him by the Secretary.

The work of the War Department is distributed among 11 bureaus, as follows, the chief of each being an officer of the regular army of the United States and having the relative rank of brigadier-general while holding the office, except the chief of the record and pension office.

The Adjutant-General promulgates all military orders of the President, Secretary of War and the major-general commanding the army, conducts the correspondence between the latter and the army, prepares commissions, appointments and consolidated reports of the army and the militia, receives all muster-rolls, and has charge of the recruiting service.

The Inspector-General inspects all military commands and stations, the Military Academy, the military department of all schools at which officers of the army are detailed, and the money accounts of all disbursing officers of the army. To him are referred the material, personnel, discipline, instruction, uniform and outfit of the army, and the character, quality and adequacy of its supplies.

The Quartermaster-General provides transportation for the army; also, clothing and equipage, horses, wagons, forage and all other things required by the soldiers in barracks or in the field. He also constructs all necessary buildings, roads,

bridges, military posts, pays guides, interpreters, etc., and has charge of the national cemeteries.

The Commissary-General of Subsistence has control of the subsistence department, which furnishes rations to the army; the purchase and distribution of articles which may be sold to officers and enlisted men; and the examination and settlement of returns of supplies.

The Surgeon-General has charge of the medical department of the army. He stations medical officers and instructs them in their professional duties. He has charge of the purchase and distribution of all medical supplies. With this department is connected the entire hospital work of the service. The Army Medical Museum and the publications of the office are under his direct control.

The Paymaster-General is charged with the payment of the officers and enlisted men; examines the accounts of army officers, and pays Treasury certificates for bounty, back pay, etc.

The Chief of Engineers commands the corps of engineers, which constructs and repairs fortifications, military roads, bridges, etc., and is in charge of the torpedoes for coast-defense. He also has charge of harbor and river improvements, and of all military and geographical explorations and surveys.

The Chief of Ordnance commands the ordnance department, which provides all the munitions of war required for the fortifications, the armies in the field and the militia of the Union, and determines the form and construction of all military weapons employed in war.

The Judge-Advocate-General reviews the proceedings of all courts-martial and other military courts, and, in general, attends to all legal matters pertaining to the army.

The Chief Signal-Officer has charge of all military signal duties, and books, papers, etc., connected therewith, including telegraph and telephone service and meteorological instruments for army use.

The Chief of the Record and Pension Office has charge of the military and hospital records of the volunteer armies, and transacts the pension and other business of the War Department connected therewith. The records include those of the Bureau of Refugees, Freedmen, and Abandoned Lands; also the Confederate archives. This office furnishes the Commissioner of Pensions, the officers of the Treasury and others information for the settlement of claims against the national and state governments, and adjustment of the individual records of officers and enlisted men, under the general and special legislation of Congress relating thereto.

SECRETARIES OF WAR. The following is a complete list of the Secretaries of War from the organization of this department of the government, with dates, severally, of their appointment:

Henry Knox	1789
Timothy Pickering	1795
James McHenry	1796, 1797
John Marshall	1800
Samuel Dexter	1800

Roger Griswold	1801
Henry Dearborn	1801
William Eustis	1809
John Armstrong	1813
James Monroe	1814
William H. Crawford	1815
*Isaac Shelby	1817
John C. Calhoun	1817
James Barbour	1825
Peter B. Porter	1828
John H. Eaton	1829
Lewis Cass	1831
Benjamin F. Butler	1837
Joel R. Poinsett	1837
John Bell	1841
John McLean	1841
John C. Spencer	1841
James M. Porter	1843
William Wilkins	1844
William L. Marcy	1845
George W. Crawford	1849
Edward Bates	1850
Charles M. Conrad	1850
Jefferson Davis	1853
John B. Floyd	1857
Joseph Holt	1861
Simon Cameron	1861
†Edwin M. Stanton	1862, 1865
John M. Schofield	1868
John A. Rawlins	1869
William T. Sherman	1869
William W. Belknap	1869
Alphonso Taft	1876
James Don Cameron	1876
George W. McCrary	1877
Alexander Ramsey	1879
Robert T. Lincoln	1881
William C. Endicott	1885
Redfield Proctor	1889
Stephen B. Elkins	1891
Daniel S. Lamont	1893
Russell A. Alger	1897
Elihu Root	1899

WARASDIN. See VARASD, Vol. XXIV, p. 69.

WARBECK. See ENGLAND, Vol. VIII, p. 329.

WARD, ADOLPHUS WILLIAM, an English historian; born at Hampstead, Dec. 2, 1837; was educated in Germany, at Bury St. Edmunds, and at St. Peter's College, Cambridge, becoming a fellow thereof in 1860. In 1866 he was appointed professor of history and English literature at Owens College, Manchester, and its principal in 1888. He held various examinerships in the universities of Cambridge and London, and received the degree of LL.D. from Glasgow in 1879, and Lit.D. from Cambridge in 1883. He took an active part in the movement for the foundation of the Victoria University, Manchester (1880), and afterward successively held, in the new university, the offices of chairman of the General Board of Studies, and of vice-chancellor. He contributed a number of articles to this ENCYCLOPÆDIA, on DRAMA, GARRICK, FORD, GREENE, PANTOMIME, etc.; translated Curtius's *History of Greece* (5 vols., 1868-73); wrote a learned and valuable *History of English Dramatic Literature* (2 vols., 1875); and edited *Pope's Poems* (Globe ed., 1869), and *Byron's Poems* (Chetham Society's ed., 1894). Among his other works are *The House of Aus-*

* George Graham was Acting Secretary of War during Shelby's term.
 † Suspended from office in 1867 by President Johnson, with whom he differed, and Gen. U. S. Grant appointed Secretary *ad interim*. The Senate refusing to concur in the suspension, Grant retired and Stanton resumed the office in January, 1868. The President again attempted to remove him, and appointed Lorenzo Thomas Secretary *ad interim*, but Stanton refused to relinquish the office. The President was impeached, but acquitted by the Senate, when Stanton resigned.

tria in the Thirty Years' War (1869); *Lives of Chaucer* (1879); and *Dickens* (1882) in English Men of Letters Series; Marlowe's *Faustus* and Greene's *Friar Bacon* (1878), for the Clarendon Press.

WARD, ARTEMAS, an American soldier and jurist; born at Shrewsbury, Massachusetts, Nov. 27, 1727; graduated at Harvard in 1748; was lieutenant-colonel in the French and Indian wars; was made commander-in-chief of the Massachusetts troops, May 19, 1775, and the Continental Congress placed him first on the list of major-generals, June 17, 1775; was commander-in-chief at the siege of Boston until the arrival of Washington. He resigned on account of ill health in April, 1776. In 1776 he was elected chief justice of common pleas of Worcester County, Massachusetts, and in 1777 he became president of the Massachusetts executive council. For sixteen years he was a member of the state legislature of Massachusetts, and its speaker in 1785. From 1791 till 1795 he was a member of Congress. He died at Shrewsbury, Oct. 28, 1800.

WARD, ARTEMUS. See BROWNE, CHARLES F., Vol. IV, p. 389.

WARD, ELIZABETH STUART PHELPS, an American authoress, was born Aug. 13, 1844, at Andover, Massachusetts, where her father, Austin Phelps (q.v., in these Supplements), was a professor in the Theological Seminary. She was educated at Andover, but credits her father with her best discipline and literary impulses, and in her early girlhood contributed to periodical literature. She became actively interested in reformatory enterprises for the amelioration of human wretchedness, especially in her native town.

On such themes she addressed the students of Boston University in 1876, in a course of lectures. In 1888 she married her cousin, Rev. Herbert D. Ward, son of William Hayes Ward of *The Independent* of New York, and afterward made her residence near Gloucester, Massachusetts. Her books are numerous, and generally have an ethical or religious purpose. Some of them are juvenile reading, and among them is some verse. Her style is animated, earnest, simple and fluent. Her first book, *Ellen's Idol* (1864), was published in her twentieth year. It was followed by *Up Hill* (1865), and two series for the young, of four volumes each, namely, the Tiny Series and The Gypsy Series. *Mercy Gliddon's Work* (1866) and *I Don't Know How* (1867) preceded her *Gates Ajar* (1868), which sold with remarkable rapidity. It was in a vein of her own, and aimed to make heaven attractive by likening its occupations to those of the earth. Among her other books the best known are *Men, Women and Ghosts*



ELIZABETH S. P. WARD.

(1869); *The Silent Partner* (1870); *Hedged In* (1870); two *Trotty* books (1870-73); *The Story of Avis* (1877); *My Cousin and I* (1879); *Old Maids' Paradise* (1879); *Scaled Orders* (1879); *Beyond the Gates* (1883); *Dr. Zay* (1884); *The Gates Between* (1887); *Fourteen to One* (1891), a collection of short stories; a memoir of her father (1891); *The Supply at St. Agatha's* (1896), with an aged pastor for its hero; and *The Story of Jesus Christ* (1897). In verse she has published *Poetic Studies* (1875) and *Songs of the Silent World* (1885). In 1896 she contributed a series of autobiographical reminiscences to *McClure's Magazine*. With her husband she wrote *Struggles for Immortality* (essays, 1890); *The Master of Magicians*, a tale of Nebuchadnezzar's time (1890); and *Come Forth*, a story of Lazarus (1891).

WARD, FREDERICK TOWNSEND, an American soldier of fortune; born in Salem, Massachusetts, Nov. 29, 1831; educated at Salem high school. He served as lieutenant in the French army in the Crimean War, and was with Walker in Nicaragua. In 1860 he entered the service of the Chinese emperor in the war against the Taiping rebels, and offered to capture cities from the rebels at a fixed price each. He organized bands of various nationalities, trained and armed them like European soldiers, and captured the city of Sungkiang, held by ten thousand rebels. In recognition of his services he was made a mandarin of the fourth degree, and admiral-general. He won many victories over the rebels, cleared the country for thirty miles around Shanghai, and saved the city from capture. In 1861 he captured Ningpo, a strongly fortified place. He adopted the Chinese nationality and married the daughter of an influential native. His brilliant career was cut short at the age of 31, in an assault on Tse-ki near Ningpo, where he was killed, Sept. 21, 1862. He was succeeded in his command by Charles G. Gordon (q.v., in these Supplements). The Chinese buried him in the Confucian cemetery at Ningpo and erected a great mausoleum in his honor. A large amount of money and negotiable securities which he had on his person disappeared at the time of his death.

WARD, GENEVIEVE, the stage-name of GUERBEL, COUNTESS LUCIA GENOVEVA TERESA; q.v., in these Supplements.

WARD, HENRY AUGUSTUS, an American naturalist; born in Rochester, New York, March 9, 1834; educated at Williams College and at the Lawrence Scientific School of Harvard University, and afterward studied zoölogy at Paris and mineralogy at Freiberg. He traveled in the Holy Land and Egypt, ascended the Niger, and visited the West Indies and Central America. From 1860 to 1875 he was professor of natural sciences in the Rochester University. As naturalist he accompanied the United States expedition to Santo Domingo in 1871. He made a large collection of animals and minerals, for which purpose he traveled extensively, and established, in connection with the Rochester Univer-

sity, a laboratory for the production of casts of fossils, and mineralogical and geological cabinets, which are extensively used in the educational institutions of the United States.

WARD, JOHN QUINCY ADAMS, an American sculptor; born in Urbana, Ohio, June 29, 1830. In 1857-61 he resided in Washington, District of Columbia, modeling busts of Alexander H. Stephens, Hannibal Hamlin, and other leading public men. In 1861 he modeled *The Freedman*, a work of excellence, and popular at that time. Since 1861 he has resided in New York City. He made a personal inspection and study of the American Indian on the Western frontier, and in 1864 his *Indian Hunter* was cast in bronze, and placed in Central Park, New York City. In the same city are, also, his *Seventh Regiment Monument*, the statues *Shakespeare*, in Central Park; *Horace Greeley*, for the *Tribune*; *Roscoe Conklyn*, in Madison Square; *Washington*, in Wall street, in front of the Subtreasury; and *The Pilgrim*. Brooklyn has his *Henry Ward Beecher*; Washington, District of Columbia, his *James A. Garfield*; Boston, *The Good Samaritan*; Hartford, Connecticut, *Israel Putnam*; Burlington, Vermont, *General Lafayette*; Gettysburg, Pennsylvania, *General Reynolds*; etc. His works are original, and distinctively American in subject and spirit. He visited Europe in 1872 and 1887. He was for one term president of the National Academy of Design.

WARD, LESTER FRANK, an American geologist and botanist; born in Joliet, Illinois, June 18, 1841; was in the Union army during the Civil War; graduated at Columbian University, Washington, District of Columbia, in 1869. In 1881 he was connected with the United States Geological Survey, and for a time was curator of fossil plants in the United States National Museum. In 1883 he published, in two volumes, a work on *Dynamic Sociology*, and in 1893 *The Psychic Factors of Civilization*. Among his scientific papers, which number more than four hundred, are *Heckel's Genesis of Man* (1879); *The Geological Distribution of Fossil Plants* (Report United States Geological Survey, 1889); *The Course of Biological Evolution* (1890); *Neo-Darwinism and Neo-Lamarckism* (1891).

WARD, MARY AUGUSTA ARNOLD (Mrs. Humphry Ward), an English novelist, niece of Matthew Arnold, and granddaughter of Dr. Thomas Arnold of Rugby; was born in Tasmania, where her father held, at the time, an educational position. In 1856 the latter returned with his family to England, and became professor in the Roman Catholic University at Dublin, and wrote, among other works, his excellent *Manual of English Literature* (1862). In 1872 Miss Arnold married Mr.



MRS. HUMPHRY WARD.

Thomas Humphry Ward, a contributor on art subjects to the *London Times*, and editor of *The English Poets* (4 vols., 1880-81); *Men of the Reign* (1885); and *The Reign of Queen Victoria* (1887), a résumé of fifty years' progress, in England, of art, science and literature, designed as a memorial of Her Majesty's jubilee. Early in her career Mrs. Humphry Ward wrote a number of critical articles for *Macmillan's Magazine*, and for Sir William Smith's *Dictionary of Christian Biography*. With *Miss Bretherton* (1884), a pleasing story of an actress's life, she made her first venture in fiction. This was followed by an admirable translation of Amiel's *Journal Intime* (1885). Three years later appeared her notable purpose-novel, *Robert Elsmere*, a work whose success was immediate and phenomenal. The book was translated into German, Dutch and Danish, and appeared in numberless American reprints. The work deals with the subject of conventional *versus* ethical religion, and represents the struggle of an aspiring soul toward a newer theistic faith and a creed, which, however, is hardly distinguishable from philosophic skepticism. In 1892 appeared *The History of David Grieve*, another *tendenz* novel, "a study in self-education, and in freeing the life from conventional social restraints." In *Marcella* (1894) Mrs. Ward ventured upon a phase of present-day social reform. The heroine of the novel, who gives the name to the book, is a socialist, but one who owes her socialism more to an impulse than to either fact or reason. In these creations there is a seriousness of purpose which is inimical to artistic effect, and the touch is heavy to ponderousness. In this respect Mrs. Ward resembles George Eliot in her later writings, and though she has the latter's culture, she lacks her gift of story-telling and humor. Mrs. Ward published in 1896 *Sir George Trevelyan*, her best novel and a work of remarkable power; and in 1898 *Helbeck of Bannisdale*. In 1890 she took an active part in founding University Hall in London, a sort of Elsmere shrine and residence, where provision is made for supplying human souls with spiritual food and some specific for the mental ailment and social turbulence of the time.

WARD, NATHANIEL, an English clergyman and author; born at Haverhill, Suffolk County, England, about 1578; graduated at Emmanuel College, Cambridge, in 1601. In 1626 he was a preacher at St. James, London, and soon after rector of Standon Massey, in Essex, where he had difficulties with Archbishop Laud, who silenced him in 1633. He emigrated to Massachusetts in 1634, and was pastor at Ipswich for three years, where he bore a leading part in founding Haverhill, on the Merrimac. In 1638 he was appointed by the general court to draw up, for the consideration of the freemen a law system which was, for the most part, incorporated in the *Body of Literature* of 1641. He returned to England and settled at Shenfield, in Essex, where he died in 1653. He wrote, while in America, *The Simple Cobbler of Agawam* (1647), a satire on the politics, fashions, religions and current opinions of the day,—a work

marked by bigotry, and a style so original, forceful and witty as to raise it out of the imitative manner of provincial literature. His second satire, *Mercurius Anti-Mechanicus; or, The Simple Cobbler's Boy and His Lapful of Caveats* (1648) was addressed to London tradesmen.

WARD, THOMAS HUMPHRY, an English author and art-critic; born at Hull, in 1845; graduated at Brasenose College, Oxford, 1868. In 1880-81, with the aid of the principal critical writers of the day, he brought out *The English Poets: Selections, with Critical Introductions*; in 1884 he published *Humphry Sandwith*, a memoir; in 1885 he edited *Men of the Reign*; and in 1887 the twelfth edition of *Men of the Time*. In 1886, with the help of various writers on art, he brought out *English Art in the Public Galleries of London*, a work sumptuously illustrated with 120 photogravures; and in 1887 he published *The Reign of Queen Victoria: A Survey of Fifty Years of Progress*. In this work he had the assistance of Matthew Arnold, Professor Huxley, Lord Wolseley, Sir Henry Sumner Maine, and other experts. He is an art-critic on the staff of the *Times*.

WARD, WILLIAM HAYES, an American Orientalist; born at Abington, Massachusetts, June 25, 1835; graduated at Amherst College (1856), and at Andover Theological Seminary (1859); pastor of a church at Oskaloosa, Kansas (1859); instructor in natural sciences in Beloit College, Wisconsin (1857-58); professor of Latin in Ripon College, Wisconsin (1865-68); superintending editor of the *New York Independent* (1870). He gave special attention to Assyrian and Babylonian archaeological studies, and in 1884 was director of the expedition to Babylonia which was sent by Miss Catherine L. Wolfe of New York City. He contributed to the *Bibliotheca Sacra*, and to the proceedings of oriental societies. With Mrs. Lanier he edited Sydney Lanier's *Poems* (1884). In 1889 he was elected president of the American Oriental Society.

WARE, a town of Hampshire County, western central Massachusetts, 25 miles N.E. of Springfield, on the Ware River, and on the Boston and Albany and the Boston and Maine railroads. The town is situated upon an elevation, is provided with water-works, gas and electric lights, numerous churches and schools, large public library, a savings bank with deposits of \$3,500,000, an assessed valuation of over \$4,000,000, and extensive manufactures of cotton and woolen goods. Population 1890, 7,329; 1900, 8,263.

WARE, HENRY, an American theologian; born in Sherburne, Massachusetts, April 1, 1764; graduated at Harvard (1785); pastor at Hingham, Massachusetts (1787-1805); Hollis professor of divinity, Harvard (1805-40); in charge of the Harvard Divinity School (1826-45). With others, was the founder of Unitarian orthodoxy in New England. He published *Letters to Trinitarians and Calvinists* (1820); *Answer to Dr. Wood's Reply* (1822); *Postscript to an Answer* (1823); *An Inquiry into the Foundation, Evidences and Truths of Religion* (2 vols., 1842); and, also, single sermons.

He died at Cambridge, Massachusetts, July 12, 1845.—His son, HENRY, a clergyman, was born in Hingham, Massachusetts, April 21, 1794, and graduated at Harvard in 1812. In 1817 he was ordained pastor of the Second Church (Unitarian), Boston, and took an active part in organizing the Unitarian body, editing its organ, the *Christian Disciple*, changed afterward to the *Christian Examiner*. He visited Europe in 1829, and in 1830 was appointed Parkham professor of pulpit eloquence in the Divinity School of Harvard University, which chair he resigned in 1842. He published *Hints on Extemporaneous Preaching* (1824); *On the Formation of Christian Character* (1831); *The Life of the Saviour* (1832); *Scenes and Characters Illustrating Christian Truth* (2 vols., 1837); and miscellaneous poems and single sermons. He died at Framingham, Massachusetts, Sept. 22, 1843.—The second Henry's son, JOHN FOTHERGILL WATERHOUSE, a clergyman, was born in Boston, Aug. 31, 1818. He graduated at Harvard in 1838, and at the Divinity School in 1842; pastor of the Unitarian Society at Fall River, and at Cambridgeport, Massachusetts; in 1864, at Baltimore, Maryland; in 1872 of the Arlington Street Church, Boston; and afterward at Swampscott, Massachusetts. He published *The Silent Pastor* (1848); *Home Life: What It Is, and What It Needs* (1873); and other works. He died in Milton, Massachusetts, Feb. 26, 1881.—Another son of the second Henry, WILLIAM ROBERT, an architect, was born at Cambridge, Massachusetts, May 27, 1832; graduated at Harvard, and at the Lawrence Scientific School in 1856; professor of architecture in the Massachusetts Institute of Technology (1865-81); and in 1881 was elected to a similar professorship in the School of Mines of Columbia College, New York. He published *Modern Perspective: A Treatise on Plane and Curvilinear Perspective* (1883).—JOHN, a brother of the second Henry, a physician, was born in Hingham, Massachusetts, Dec. 19, 1795; graduated at Harvard in 1813 and in medicine in 1816; professor of the theory and practice of medicine in the medical department of Harvard (1832-58.) He published *Hints to Young Men* (1850); *Philosophy of Natural History* (1860); and other works. He died in Boston, April 29, 1864.—WILLIAM, another brother of the second Henry, an author, was born in Hingham, Massachusetts, Aug. 3, 1797; graduated at Harvard in 1816, and at the Divinity School in 1819; pastor of the First Congregational Church, New York (1821-36); preached at Brookline, Massachusetts (1836-37); and at Waltham (1837-38); editor *Christian Examiner* (1839-44); pastor at West Cambridge (1844-45); resigned on account of failing health. He published *Letters from Palmyra* (2 vols., 1837); *Probus* (2 vols., 1838); *Julian; or, Scenes in Judea* (2 vols., 1841); *Sketches of European Capitals* (1851); *Lectures on the Works and Genius of Washington Allston* (1852); *Life of Nathaniel Bacon* (1848); and other works. He died at Cambridge, Massachusetts, Feb. 19, 1852.—The first Henry's nephew, ASHUR, a jurist, was born in Sherburne, Massachusetts, Feb. 10, 1782;

graduated at Harvard in 1804; admitted to the Boston bar in 1816; secretary of the state of Maine in 1820, and judge of the United States district court of Maine (1822-66). He contributed to Bouvier's *Law Dictionary*, and published *Reports of Cases, United States District Court of Maine* (1839.) He died in Portland, Maine, Sept. 10, 1873.

WAREHAM, a town of Plymouth County, southeastern Massachusetts, on Buzzard's Bay, on the New York, New Haven and Hartford railroad, 49 miles S. E. of Boston. It contains the villages of Wareham, West, South and East Wareham, and Onset; has large interests in the raising of cranberries, and contains brass foundries and nail-works. Population 1890, 3,451; 1900, 3,432.

WAREHOUSING. The warehouse business, as distinct from private storage houses, began in Great Britain in the early part of the nineteenth century. Its purpose is to allow importers of merchandise to deposit their goods in a government or authorized storehouse, and in the custody of government officials, for a fixed period of time, during which the custom duties may remain unpaid. A like system exists under internal revenue or excise acts, in which the payment of the tax is suspended during a definite period, while the goods are in the custody of a government official. The system was first introduced into the United States in 1846, and after several modifications came into its final form under the Wilson Tariff Act of 1894.

There are certain classifications of these warehouses, under two groups. In the first group are the storehouses owned or hired by the government, and these are located in seaports where private storehouses are inadequate for the transaction of business. They are under the entire control of the collector of the port, who assesses a charge at fixed rates for the storage of goods, and this charge, with the import duty, becomes a lien upon them. If the goods are not removed at the expiration of a specified time, usually three years, and all the government liens upon them paid, they are forfeited, sold at auction, and the proceeds paid into the public treasury. There is no right of redemption, but it is in the power of the Secretary of the Treasury to pay over to the owners or consignees any balance resulting from the sale, after all duties, expenses and charges are paid.

The second group consists of private bonded warehouses, which must obtain authority for receiving goods on which taxes are unpaid from the Secretary of the Treasury. Such warehouses must be entire buildings devoted to that purpose, and in charge of a custom-house officer, whose services the owner or importer must pay, or they may be parts of a storage-house so arranged that the government may retain control over the goods. Provision is also made for yards for the reception of heavy or bulky goods, to avoid the cost of transportation from the pier or dock. Such places must conform to the regulations prescribed by the Treasury Department.

Still another class of private warehouses comprises cellars and vaults solely for the deposit of alcoholic products. As the tariff laws of the United States prescribe that an importer may bring foreign goods into bond here for the purpose of completing their manufacture, and sending them again out of the country, or with a view simply to exporting, there are warehouses especially for the reception of such goods.

Goods placed in bonded warehouses under the Internal Revenue Act are under the exclusive control of the revenue collector for the district in which they are located. It is the usual practice to require bonds of persons availing themselves of this warehouse privilege, which bonds cover all charges, expenses and duties. As the goods pass into the control of the government, receipts are given to the consignee, on the indorsement and surrender of which, and the payment of all charges, the goods are released. These receipts may be assigned, somewhat like a commercial note, but they do not guarantee that the person who is named therein is the real or *bona fide* owner of the goods specified in them. However, they extinguish the vendor's right to the property. The charges which the custodian of bonded goods may levy upon them are the taxes which were in force at the time of their being placed in his charge. No subsequent legislation, either in the way of reducing or increasing taxes, will modify the original lien, unless the goods are specifically included in the terms of the statute. Thus in the whisky bonded warehouses, the Wilson Act of 1894 virtually doubling the taxes on distilled spirits, all the spirits stored in them when the act went into force were included in the statute, and the goods became liable for the increase.

The business of private warehousing of goods not subject to taxes is carried on extensively in the cities of the United States. In this case the storekeeper is a bailee for hire, and must take ordinary care of the property placed in his custody. In some instances, where it has been held that the public interest was involved, state legislatures have taken control of private warehouses, in the way, for example, of fixing charges and making regulations. In this way, also, the United States courts have upheld a law regulating the use of grain-elevators and fixing the scale of charges, even though the elevators are private property, and not controlled by any corporation deriving privileges from the state. When goods have been placed in bond with a view to treating them and then exporting them, they may be temporarily withdrawn from the warehouse for the purpose of modifying their commercial form, and then returned without payment of the duty. Such cases are not numerous; as, for example, the privilege of withdrawing sugar from bond for the purpose of refining it and then returning it for export, is not allowed.

The system is one of great convenience, for it is practically an extension of credit by the government to the importer or owner of bonded

goods to the extent of the taxes and other charges. When goods under bond are sold, the purchaser may either leave them in the warehouse subject to government liens, or the vendor may deliver them with an assignment of the receipt by releasing them from all charges.

WARFIELD, BENJAMIN BRECKENRIDGE, an American educator and author; born in Lexington, Kentucky, Nov. 5, 1851; graduated at Princeton College (1871) and at Princeton Theological Seminary (1876). After studying at Leipzig University in 1877, he became pastor of the First Presbyterian Church at Dayton, Ohio, and at Baltimore, Maryland. In 1878-79 he was instructor in New Testament literature and exegesis in the Western Theological Seminary, Allegheny, Pennsylvania, and from 1879 to 1887 professor. He became professor of didactic and polemical theology in Princeton Theological Seminary in 1887. Among his published works are *The Divine Origin of the Bible* (1881); *Introduction to the Textual Criticism of the New Testament* (1886); *On the Proposed Revision of the Westminster Confession* (1891); *The Development of the Doctrine of Infant Salvation* (1891); *The Canon of the New Testament* (1892); and *The Gospel of the Incarnation* (1893). In 1890 he became managing editor of *The Presbyterian and Reformed Review*.

WARFIELD, ETHELBERG DUDLEY, an American educator; born in Lexington, Ky., March 16, 1861; graduated at Princeton College in 1882; post-graduate courses in England and Germany; graduated at the Law School of Columbia College, New York, and practiced for a number of years. In 1888 he became president of Miami University, Oxford, Ohio, and in 1891 of Lafayette College, Easton, Pa. He contributed to various periodicals, and published *The Kentucky Resolutions of 1798* (1887).

WARING, GEORGE EDWIN, American sanitary engineer; born in Poundridge, N. Y., July 4, 1833; educated at College Hill, Poughkeepsie; studied agriculture and lectured on that subject during the winter of 1854 in Maine and Vermont. He was drainage engineer of Central Park, New York, from 1857 until 1861; and after the opening of the Civil War served as major of the Garibaldi Guard. General John C. Frémont appointed him major of cavalry in August, 1861; and from Jan., 1862, to the end of the war, he was colonel of the 4th Missouri Cavalry. In 1879 he was appointed expert and special agent of the 10th census of the United States, with charge of the social statistics of cities; and in 1882 became a member of the National Board of Health. He devised the system of sewage adopted in Memphis after the yellow-fever epidemic of 1878; also many improvements in the drainage of houses and towns. In 1895-98 he was commissioner of street-cleaning in New York. In Oct., 1898, he went to Cuba as head of a commission to improve the sanitary condition of Havana and other cities. He wrote *Draining for Profit and Draining for Health* (1867); *Sanitary Drainage of Houses and Farms* (1876); *How to Drain a House* (1885); *Sewerage and Land-Drainage* (1888); etc. Died in New York, Oct. 29, 1898, of yellow fever contracted in Cuba.

WARNER, a town of Merrimack County, southeastern New Hampshire, 18 miles N.W. of Concord, on the Boston and Maine railroad. The town, which contains the villages of Warner, Roby's Corner, Melvin's Mills, Waterloo and Davisville, is a summer resort, has important lumber interests, evaporates fruit, and manufactures gloves and mittens. Population 1890, 1,383; 1900, 1,358.

WARNER, CHARLES DUDLEY, an American author; born in Plainfield, Mass., Sept. 12, 1829, and died at Hartford, Conn., Oct. 20, 1900; graduated at Hamilton College and in the law department of the Univ. of Penn., and practiced in Chicago, Ill., till 1860; became editor of the *Press*, Hartford, Conn., in 1861, and of the *Hartford Courant* in 1867. After traveling extensively in Europe he became, in 1884, co-editor of *Harper's Magazine*, to which he contributed *Studies in the South*; *Mexican Papers*; and *Studies in the Great West*. In these articles he carefully discussed the educational, political and social condition of these states. He delivered lectures before educational and others societies, many of which have been published. Among his writings are *My Summer in a Garden*, with introduction by Henry Ward Beecher (1871); *Backlog Studies* (1872), in which are lauded the kindly influences of the fireside circle, and current topics are discussed in the author's characteristic vein of humor; *Baddeck*, and *That Sort of Thing* (1874); *In the Levant* (1876); *In the Wilderness* (1878); *Washington Irving* (1881); *Their Pilgrimage* (1886); *A Little Journey in the World* (1892); *The Golden House* (1894); *That Fortune* (1899). He conducted the "Editor's Drawer" in *Harper's Magazine* (1884-92), and afterward the "Editor's Study." In 1896-98 he edited the *Library of the World's Best Literature* (30 vols., 1896-98).

WARNER, SETH, an American soldier; born in Roxbury, Connecticut, May 17, 1743. In 1765 he settled at Bennington, Vermont, then in the "New Hampshire Grants," and in the dispute between New York and the people of the Grants, over whom that state claimed jurisdiction, Warner was one of the leaders, and was outlawed. As second in command he assisted in the capture of Ticonderoga, and on the following day he took Crown Point with its garrison, for which Congress gave him a colonel's commission. He joined General Montgomery in Canada; was in the battle of Bennington; afterward joined the forces of General Gates, and continued in the service until 1782, when ill health caused him to retire. He died in Roxbury, Vermont, Dec. 26, 1784.—His great-grandnephew, OLIN LEVI, an American sculptor, was born in Suffield, Connecticut, April 9, 1844. He began life as a telegraph-operator, but afterward turned his attention to sculpture as a profession. At the age of 25 he went to Paris, where he studied for three years at the *École des Beaux-Arts*, under Fran-



CHARLES DUDLEY WARNER.

çois Jouffroy. Returning to New York he established studio. In 1877 he was elected a member of the Society of American Artists, in 1888 an associate of the National Academy, and a member in 1889. Among his works are *May* (1872) and *Twilight* (1878), statuettes; a colossal medallion of Edwin Forrest (1876); *Dancing Nymph* (1879); *Diana* (1888); portrait-statues of Governor William H. Buckingham (1883) and William Lloyd Garrison (1885); and numerous portrait-busts, including those of Rutherford B. Hayes (1876) and the Rev. William F. Morgan (1887). Died in New York, Aug. 14, 1896.

WARNER, SUSAN, an American novelist; born in New York City, July 11, 1819. Under the pen-name of "Elizabeth Wetherell" she published, in 1851, her first novel, *The Wide, Wide World*, which reached a sale of 250,000 copies in the United States, and was almost as popular in Europe. This work was followed, in 1852, by *Queechy*; *The Hills of the Shatemuc* (1856); *The Old Helmet* (1863); *Melbourne House* (1864); *Daisy* (1868); *A Story of Small Beginnings* (1872); *Wych Hazel* (1876); *The Kingdom of Judah* (1878); *My Desire* (1879); *Nobody* (1883); *Daisy Plains* (1885); and others. *The Law and the Testimony* (1853) is of the nature of a theological treatise. She died in Highland Falls, New York, March 17, 1885.

WARREN, a village of Jo Daviess County, northwestern Illinois, 27 miles E. by N. from Galena, and on the Illinois Central and Chicago, Milwaukee and St. Paul railroads. It is in a tobacco-growing district, and lead is extensively mined. It has a flour-mill, stone-quarries and creamery; and there are five churches, high school, academy, public library and two weekly newspapers. Population 1890, 1,172; 1900, 1,327.

WARREN, a town of Huntington County, northeastern Indiana, 35 miles S.S.W. of Fort Wayne and 14 S.E. of Huntington, the county capital, on the Salamonie River, and on the Toledo, St. Louis and Kansas City railroad. The surrounding district is agricultural, and contains deposits of natural gas, oil and coal. The town is an important shipping point, and has manufactures of flour, lumber and hoops. Population 1890, 1,120; 1900, 1,523.

WARREN, a town of Knox County, southern Maine, nine miles W. of Rockland, the county capital, on the St. George's River, and on the George's Valley and Maine Central railroads. It was, as early as 1631, known as a trading-post, later as the Upper Town of St. George, and contains the villages of Warren, North, South and West Warren, Pleasantville, Highlands and East Waldoboro. The town is in a limestone region, has good water-power and several manufactures. Pop. 1900, 2,069.

WARREN, a town of Worcester County, central Massachusetts, on the Quaboag River, and on the Boston and Albany railroad, 73 miles W.S.W. of Boston and 26 miles N.E. of Springfield. It contains the villages of Warren and West Warren, is engaged chiefly in dairying and in the manufacture of stationary engines, steam pumps, cotton and woolen goods. Population 1890, 4,681; 1900, 4,417.

WARREN, a city and the capital of Trumbull County, northeastern Ohio, an extensive manufac-

turing center, is situated on the Mahoning River, 14 miles N.W. of Youngstown, and 52 miles S.E. of Cleveland, and on the New York, Lake Erie and Western, Pittsburg, Youngstown and Ashtabula, and the Pittsburg and Western railroads. It is located in the midst of a rich agricultural and lumber country, also contiguous to mines of bituminous coal, petroleum and iron ore, also to quarries of what is commercially known as "Berea grit," valuable for grindstones, the output from all of which sources of supply is shipped from Warren. There are foundries and machine-shops, and manufactures of stoves, boilers, oil-tanks and pumps, gratings and hardware specialties generally, flour, lumber and woolen mills, paints, carriages, furniture, gloves, cigars, etc. Gas and electric light are utilized, and the city otherwise offers substantial and desirable inducements for business or residence purposes. Trumbull is the most important dairying county in the State, and is famous for its blooded live-stock. Pop. 1890, 5,973; 1900, 8,529.

WARREN, a borough and the capital of Warren County northwestern Pennsylvania, at the junction of the Allegheny and Conewango rivers, and on the Dunkirk, Allegheny Valley and Pittsburg, the Pennsylvania, and the Western New York and Pennsylvania railroads, 20 miles S. of Jamestown, New York, and 35 miles N.E. of Titusville. The city is on the direct route from Lake Erie to the coal-fields of Pennsylvania, in close proximity to the oil regions of the State, and otherwise advantageously situated for purposes of trade. Its manufactures consist of carriages, chairs, carpets, harness, lubricating oils, lumber, the industries including, in addition, iron-works, petroleum refineries, electric-light works, and other productive enterprises. Pop. 1890, 4,332; 1900, 8,043.

WARREN, a town of Bristol County, eastern Rhode Island, on the east shore of Narragansett Bay, 10 miles S.E. of Providence, and on the New York, New Haven and Hartford railroad. It is situated on an excellent harbor, and has important manufactures. Pop. 1890, 4,489; 1900, 5,108.

WARREN, LT.-GENERAL SIR CHARLES, R. E., G. C. M. G., was born in North Wales, Feb. 7, 1840, and entered the British army in 1857. He was for a time instructor of surveying in the school of military engineering, and in 1867-70 conducted excavations in Palestine for the Palestine Exploration Fund. He commanded the Diamond Fields Horse in the Kaffir war of 1877-78; served also in Griqualand, and was with the Bechuanaland expedition in 1884-85. He was in command of the Straits Settlements in 1889-94, and at the outbreak of the Boer war in South Africa he was appointed (Nov. 13, 1899) to the command of the Fifth Division of the British Field Force. Has published a work on *Trigonometrical Surveying*, and a number of works on *Underground Jerusalem*, *Surveys of Palestine*, with plates, and results of excavations.

WARREN, FRANCIS E., an American public man; born in Hinsdale, Massachusetts, June 20, 1844. He received a common-school and academic education; enlisted in 1862 in the Forty-ninth Massachusetts Regiment, and served as private and non-

commissioned officer in that regiment till it was mustered out of the service; was afterward captain in the Massachusetts militia; in 1868 he removed to Wyoming (then a part of Dakota); was president of the council, Wyoming legislature, in 1873, and member of the council in 1884; was mayor of Cheyenne, and served as treasurer of Wyoming; was appointed governor of Wyoming by President Arthur and removed by President Cleveland; was again appointed governor of Wyoming by President Harrison and served till the territory was admitted as a state, when he was elected governor, Sept. 11, 1890; was elected to the United States Senate and took his seat Dec. 1, 1890; served until the expiration of his term, March 3, 1893. In 1895 he was again elected for six years.

WARREN, GOUVERNEUR KEMBLE, an American soldier; born at Cold Spring, New York, Jan. 8, 1830. He graduated at West Point in 1850. In 1850-59 he was connected with the corps of topographical engineers in the Western states and territories. From 1859 to 1861, he was assistant professor of mathematics at the Military Academy. During the Civil War he was colonel of the Fifth New York Volunteers (1861), commanded a brigade in the Fifth Corps (1862), was promoted brigadier-general for gallant conduct at Gaines's Mills, and distinguished himself at Malvern Hill, Manassas and Fredericksburg. In 1863 he was chief of topographical engineers under Hooker, and later chief engineer of the Army of the Potomac. For gallant conduct at Gettysburg he was brevetted colonel United States army; was promoted major-general of volunteers. In command of the consolidated First and Fifth Corps, he participated in all the battles from that of the Wilderness, through the siege of Petersburg, to that of Five Forks in 1865, when, for venturing to exercise discretion in the latter engagement, General Sheridan relieved him of command. He was afterward placed in command at Petersburg and later of the department of the Mississippi. He resigned his volunteer commission in May, 1865, and was brevetted major-general in the United States army. As major of engineers he remained in the regular army, in charge of surveys, harbor improvements, the construction of fortifications, etc. He was a member of the National Academy of Sciences and of other scientific associations. He died at Newport, Rhode Island, Aug. 8, 1882.

WARREN, HENRY WHITE, an American bishop; born in Williamsburg, Massachusetts, Jan. 4, 1831; graduated at the Wesleyan University, Middletown, Connecticut, in 1853; joined the New England Conference of the Methodist Episcopal Church in 1858, and filled posts at Boston, Worcester, Lynn, Westfield, Cambridgeport, Charlestown and Philadelphia. He was elected bishop, May 12, 1880. In 1888 he visited Japan to inspect the missions of his church. He published *Sights and Insights* (1874); *Studies of the Stars* (1878); *Recreations in Astronomy* (1878); *The One Book: Lectures on the English Bible* (1892); *The Bible in the World's Education* (1893).

WARREN, JOHN COLLINS, an American surgeon; born in Boston, Massachusetts, Aug. 1, 1778; grad-

uated at Harvard in 1797; in 1800 studied chemistry in Edinburgh; in 1801 attended the lectures of Vauquelin, Cuvier and Desfontaines in Paris; in 1802 began to practice in Boston; from 1806 to 1815 was adjunct professor of anatomy and surgery in Harvard Medical School; professor (1815-47), and emeritus professor (1847-56). He died in Boston, May 4, 1856. In 1803 he was joint editor of the *Monthly Anthology*; in 1811 assisted in founding the *New England Journal of Medicine and Surgery*, and in 1828 founded and edited the *Boston Medical and Surgical Journal*. He was one of the founders of the Massachusetts General Hospital in 1820, and of the McLean Asylum for the Insane. For many years he was president of the Boston Society of Natural History. He was the first to operate for hernia and aneurism, and in 1846 successfully used anaesthetics in surgical operations. He contributed to scientific journals and published numerous and valuable monographs relating to surgery, palæontology, and the use of chloroform and ether.

WARREN, JOSEPH, an American physician; born at Roxbury, Massachusetts, June 11, 1741; graduated at Harvard (1759); studied medicine, and began to practice in Boston (1762). He was one of the Committee of Safety appointed after the "Boston Massacre" of March 5, 1770, and in 1772 and again in 1775 delivered the oration in commemoration of that event. In 1774 he drew up the "Suffolk Resolves," which were subsequently approved by the Continental Congress, and which virtually placed Massachusetts in rebellion against Great Britain, and was chairman of the Committee of Safety for organizing the militia and collecting military stores. He was chosen president of the Provincial Congress, May 31, 1775, and was thus chief executive officer of the provisional government. In the battle of Bunker Hill, June 17, 1775, while endeavoring to rally the militia, he was struck by a bullet and instantly killed.

WARREN, MERCY (OTIS), an American poetess and historian; born at Barnstable, Massachusetts, Sept. 25, 1728; married James Warren about 1754. A zealous patriot, she corresponded with Samuel and John Adams, Thomas Jefferson, and other leaders of the Revolution, concerning public affairs, and had the friendship of the most notable men of her time in America. Her first work was *The Group*, a satiric production directed against the Tories; *The Squabble of the Sea-Nymphs* was an account of the "Boston Tea-Party." She wrote two tragedies, *The Sack of Rome* and *The Ladies of Castile*. Her *History of the American Revolution* (3 vols.) was published in 1805, and her correspondence with John Adams, in 1878, by the Massachusetts Historical Society. She died at Plymouth, Massachusetts, Oct. 19, 1814.

WARREN, SAMUEL PROWSE, a Canadian organist; born in Montreal, Feb. 18, 1841; educated in Montreal till 1861, when he went to Berlin and studied for four years, giving special attention to the organ. Returning in 1864, he settled in New York City, and from 1868 to 1894 was organist of Grace Church. His series of organ-recitals covered the whole field of organ-music, giving interpretation to all its schools. His compositions include

church music, organ-arrangements, and songs for solo and concerted voices.

WARREN, WILLIAM, an American actor; born in Philadelphia, Pennsylvania, Nov. 17, 1812; educated at the Franklin Institute in Philadelphia. He appeared first at the Arch Street Theater, as Young Norval, in 1832, and afterward in New York, Boston and other cities. In 1845 he appeared at the Strand Theatre in London, and in 1846, as Sir Lucius O'Trigger in *The Rivals*, at the Howard Athenæum, Boston, where he won an immediate success. In 1847 he became a member of the Boston Museum Company, with which organization he was connected for 35 years, playing with popularity and success, and representing a greater variety of characters than any other contemporary actor. He was particularly successful in the rôles of fine old English gentlemen. He died in Boston, Massachusetts, Sept. 21, 1888.

WARREN, WILLIAM FAIRFIELD, an American educator; born in Williamsburg, Massachusetts, March 13, 1833; graduated at Wesleyan University, Middletown, Connecticut, in 1853; became a minister in the Methodist Conference in 1855; and afterward studied theology at Andover, Berlin and Halle. After traveling in the East, he was appointed, in 1861, professor of systematic theology in the Methodist Mission Theological Institute in Bremen, Germany, in 1866 in the Boston Theological Seminary, and in 1873 president of the Boston University. He was appointed a member of the American committee for the revision of the New Testament, but did not serve. He was the author of two works, in German, on logic and theology. Among his other writings are *True Key to Ancient Cosmology and Mythological Geography* (1882); *Paradise Found: The Cradle of the Human Race at the North Pole; A Study of the Prehistoric World* (1885); *In the Footsteps of Arminius* (1888); *The Story of Gottlieb* (1891); *Constitutional Law Questions in the Methodist Episcopal Church* (1894). His *Quest of the Perfect Religion* (1887) was translated into many languages, and largely contributed to the success of the Parliament of Religions at Chicago in 1893.

WARRENSBURG, a city and the capital of Johnson County, western Missouri, is situated on Black River, 29 miles W. of Sedalia, 64 miles S.E. of Kansas City and 218 miles W. of St. Louis, on the Missouri Pacific railroad. It is the center of an extensive and highly productive agricultural country; ships large quantities of blue sandstone, which is found in the vicinity; is noted as a health-resort, owing to the presence of mineral springs; has water-works and electric lights, flour and woolen mills, grain-elevator, foundry and machine-shops, carriage and wagon factories, and is the seat of the State Normal School for Southern Missouri. Population 1890, 4,706; 1900, 4,724.

WARRENTON, a town and capital of Warren County, northeastern central Georgia, 50 miles W.S.W. of Augusta, on the Georgia railroad. It is in a district devoted to agriculture, and in a limited degree to stock-raising. Population 1900, 1,113.

WARRENTON, a town and capital of Warren County, eastern Missouri, 58 miles N.W. of St.

Louis, on the Wabash railroad. It is principally engaged in the production of tobacco and grain. Here is located Central Wesleyan College (Methodist Episcopal), founded in 1864, and now having an average attendance of 250 students under 12 instructors. Population 1890, 664; 1900, 770.

WARRENTON, a town and capital of Warren County, northern North Carolina, 35 miles W. of Weldon, on the Raleigh and Gaston railroad. Located in an extensive agricultural district, it has flour-mills and tobacco factories, besides large tobacco-warehouses. There is a United States signal station at Warrenton. Population 1900, 836.

WARRENTON, a town and capital of Fauquier County, northeastern Virginia, 55 miles W.S.W. of Washington, District of Columbia, on the Richmond and Danville railroad. It is a popular summer resort, in a region devoted to agriculture, and has seven churches, a good school system, water-works, etc. Population 1900, 1,627.

WARRINGTON, a town of Escambia County, extreme northwestern Florida, seven miles S.W. of Pensacola, on the Gulf of Mexico, and on the Pensacola Terminal railroad. It is situated near Fort Pickens, on a government reservation, and is principally engaged in the lumber trade. Population 1890, 1,301.

WARSAW, a city of Hancock County, central western Illinois, on the Mississippi River, three miles S. of Keokuk, Iowa, on the Toledo, Peoria and Western railway. A shipping-point for agricultural products, it is also engaged in cooperage, flour-milling, pickling, and the manufacture of farm machinery. Forts Edwards and Johnson were built here early in the nineteenth century. Population 1890, 2,721; 1900, 2,335.

WARSAW, a city and capital of Kosciusko County, central northern Indiana, on the Tippecanoe River, 40 miles W. of Fort Wayne, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. Situated in a lumbering and agricultural region, it is chiefly interested in saw and flour milling, and has, also, manufactories of milling-machinery. It has nine churches, good schools, and a courthouse valued at \$250,000. Population 1890, 3,574; 1900, 3,987.

WARSAW, a town and capital of Gallatin County, northern Kentucky, on the Ohio River, 35 miles S.W. of Cincinnati, the nearest railway station being Sparta, on the Louisville and Nashville railroad. It is principally interested in farming and tobacco-raising. Population 1890, 676; 1900, 785.

WARSAW, a town and capital of Benton County, western central Missouri, on the Osage River, 36 miles S.W. of Sedalia, on the Missouri Pacific railroad. It is in a grazing and fruit-raising district, and has medicinal sulphur-springs. There are several saw-mills in the town, and iron and lead ores are found in the vicinity. Population 1890, 700; 1900, 743.

WARSAW, a town and capital of Wyoming County, western New York, 48 miles E. of Buffalo, on the Buffalo, Rochester and Pittsburg and Erie railroads. There being extensive salt-deposits in this section, which is mainly agricultural, the town has several salt-works, besides an iron-foundry,

wagon factory and other industries. There is also a sanatorium here. Population 1900, 3,048.

WARSAW, a town and capital of Richmond County, eastern Virginia, on the Rappahannock River, about 50 miles E.N.E. of Richmond. It is in an agricultural region, and has an estimated population of 200.

WARTA, a river. See POLAND, Vol. XIX, p. 307.

WARTBURG, a town and capital of Morgan County, northeastern central Tennessee, on the Emory River, 4 miles from Lansing, the nearest railway station, on the Queen and Crescent railroad. It is in a hilly country, devoted to agriculture and the raising of live-stock. Population 1890, 206.

WARTBURG, a castle. See EISENACH, Vol. VII, p. 790.

WARTEGG, MINNIE, COUNTESS OF, American singer, better known by her maiden name of Minnie Hauck; born in New York city, Nov. 16, 1852. Her father was a German and her mother an American. The family removed to New Orleans when she was in her third year, and there, in 1865, she made her first appearance in a concert. She then received instruction in New York from Errani, and sang there in 1868, in opera, as Amina. She was at that time the soprano in the choir of Christ Church. After a successful career in the United States, she appeared at Covent Garden, London, in the autumn of 1868, as Amina and Margherita. The next year she went to Vienna, and sang there for four years in grand opera, varying her work by tours in the principal capitals of Europe. Her especial triumph came in 1878, when she made Bizet's *Carmen* a great success, both in Brussels and London, though the opera was not gratifying to the musical people of Paris. She became recognized at once as adding a fine dramatic faculty to a brilliant vocal technique. Her voice was mezzo-soprano, of much force and richness. In 1881 she married Count Ernst von Hesse-Wartegg, after which time she appeared but infrequently on the stage, although in 1885 she sang with great acceptance in London Philharmonic concerts, and several times visited her native land. Her repertoire was notably large in range and variety. Wagner particularly applauded her rendering of Elsa in *Lohengrin*.

WART-HOG. See SWINE, Vol. XXII, p. 774.

WARWICK, a town of Orange County, southern New York, on Wawayanda Creek, 29 miles S.W. of Newburg, and on the Lehigh and Hudson River railroad. Situated in a hilly country, near a number of beautiful lakes, it is chiefly famous as a summer-resort. There are some granite quarries and iron-mines in the vicinity, though the town is more especially interested in dairying. There are several churches and excellent educational facilities. Population 1900, 1,735.

WARWICK, a township of Kent County, central Rhode Island, 5 miles S.W. of Providence, on Narragansett Bay, the Pawtuxet River, and Greenwich Bay, and on the New York, New Haven and Hartford railroad; contains the villages of Natick, Phoenix, Centreville, Arctic, Crompton and Apponaug. It has 18 cotton-mills, 1 woolen-mill, 3 bleacheries, 2

print-works and 15 churches. The majority of the villages are connected by electric railway, and possess public libraries and graded schools. It is famed for Drum Rock, a balanced rock that can be moved by a strong man, and when moving, makes a sound which can be heard a mile distant. Population 1890, 17,761; 1900, 21,316.

WARWICK, GUY OF. See GUY OF WARWICK, Vol. XI, p. 341.

WARWICK, ROBERT RICH. See POST-OFFICE, Vol. XIX, pp. 563, 564.

WASATCH or WAHSATCH MOUNTAINS. See UTAH, Vol. XXIV, pp. 19-21.

WASECA, a city and the capital of Waseca County, central southern Minnesota, on Lake Clear, 15 miles W. of Owatonna, on the Chicago and North-Western and the Minnesota and St. Louis railroads. It is in a dairying and agricultural region, has excellent educational advantages, and is the gathering-place of the Minnesota Chautauqua. Population 1890, 2,482; 1900, 3,103.

WASHBURN, a town of Aroostook County, northeastern Maine, on the Big Machias River, 52 miles N.W. from Houlton and 10 miles from the nearest railway station, Caribou, on the Bangor and Aroostook. It contains the villages of Washburn and East Washburn; has several churches, an excellent school system and a public library. The population in 1890 was 1,097; in 1900, 1,225.

WASHBURN, a town and capital of McLean County, western central North Dakota, on the Missouri River, and having steamboat connection with Bismarck, the nearest railway station on the Northern Pacific railroad. It is the center of a wheat-growing district, and has a population estimated at 300.

WASHBURN, a city and capital of Bayfield County, northern Wisconsin, on Ashland Bay, 60 miles E. of Duluth, on the Chicago, St. Paul, Minnesota and Omaha railway. Situated in a densely wooded region and having a good harbor, it is largely engaged in lumbering and shipping. There are also some brownstone quarries near here. Washburn has 11 churches and an excellent school system. Population 1890, 3,699; 1900, 6,814.

WASHBURN, EDWARD ABIEL, an American clergyman; born in Boston, Massachusetts, April 16, 1819; graduated at Harvard (1838); studied theology in Andover and New Haven; licensed as a Congregational minister (1842), but entered the Episcopal Church, and was ordained deacon in 1844 and priest in 1845; rector of St. Paul's, Newburyport, Massachusetts (1844-51). He traveled in Egypt, Syria, India and China in 1851-53, and on his return was rector of St. John's, Hartford, Connecticut (1853-62); rector of St. Mark's, Philadelphia, Pennsylvania (1862-65), and of Calvary, New York (1866-81). He was a member of the New Testament company of revisers, a lover of scholarship, and an eloquent preacher. Among his published works are *Relation of the Episcopal Church to the Other Christian Bodies* (1874); *The Social Law of God* (1874); *Epochs of Church History* (1883); *Voices from a Busy Life* (1883). He died in New York, Feb. 2, 1881.

WASHBURNE, ELIHU BENJAMIN, an American statesman; born in Livermore, Maine, Sept. 23, 1816 (wrote his family name with a final "e"); entered the office of the *Christian Intelligencer* in Gardiner in 1833, and of the *Kennebec Journal*, at Augusta, in 1835; decided to study law, and for that purpose entered Kent's Hill Seminary in 1836, and the Harvard Law School in 1839; admitted to the bar in 1840, and began to practice in Ga-



ELIHU B. WASHBURNE.

lena, Illinois. In 1852 he was elected to Congress, serving thereafter till March, 1869. On account of his continuous service therein he was called the "Father of the House," and because of his close scrutiny of all demands upon the treasury he acquired the name of the "Watch-dog of the Treasury." He opposed all land-grants and railroad subsidies, and resisted the passage of the bill subordinating the first mortgage of the government on the Union Pacific railroad to the mortgage of the railroad companies. In 1869 President Grant appointed him Secretary of State, which office he soon resigned to become minister plenipotentiary to France. During the Franco-Prussian war he acted as the representative of other foreign governments, and gave protection to Germans and persons of other nationalities who were unable to leave Paris; in recognition of his services the Emperor of Germany conferred upon him the order of the Red Eagle (which he declined on constitutional grounds) and sent him his portrait; he was similarly honored by Bismarck, Thiers and Gambetta. On his return to the United States he settled in Chicago, where he resided till his death, Oct. 22, 1887. His *Recollections of a Minister to France* was published in two volumes, in 1887.—His brother, CADWALLADER COLDEN, a soldier, was born in Livermore, Maine, April 22, 1818. In 1839 he went to Davenport, Iowa; studied law; was admitted to the bar in 1842, and began to practice at Mineral Point, Wisconsin, where, in 1852, he became connected with a bank. From 1854 to 1861 he served in Congress. At the beginning of the Civil War he was commissioned colonel of the Second Wisconsin Cavalry, and served in Arkansas under General Curtis; was commissioned brigadier in July, 1862, and major-general of volunteers in November following; was at the siege of Vicksburg, and on its surrender was sent to the Department of the Gulf in command of the Thirteenth Corps; captured Fort Esperanza in 1863; succeeded Gen. S. A. Hurlburt, in command at Memphis, of the district of West Tennessee; and resigned May 25, 1865. In 1867 and again in 1869 he was elected to Congress, and in 1871 governor of Wisconsin. On retiring from office he operated extensively in lumber at La Crosse, Wisconsin, and in flour at Minneapolis, Minnesota. He resided at Madison, Wisconsin, and founded the Washburn Observatory of the University of Wisconsin, at that place. He died in Eureka Springs, Arkansas,

May 14, 1882.—Another brother, CHARLES AMES, an editor and author, was born in Livermore, Maine, March 16, 1822; graduated at Bowdoin College in 1848, and soon afterward practiced law in Mineral Point, Wisconsin. He went to California in 1850, and in 1853 founded the *Alta California*, the first Republican newspaper in San Francisco. From 1858 to 1861 he was editor of the San Francisco *Daily Times*. In 1861 President Lincoln appointed him commissioner to Paraguay, where he was afterward minister-resident from 1863 to 1868. During his residence there he was accused of conspiring against President Lopez, and escaped with his family only by the timely arrival of the United States warship *Wasp*. Upon his return to the United States he became a resident of Morristown, New Jersey, and devoted his attention to mechanical invention and literature. He published *Philip Thaxter* (1861); *Gomery and Montgomery* (1865); *The History of Paraguay* (2 vols., 1870); *Political Evolution* (1887); *From Poverty to Competence* (1887). He died in New York, Jan. 26, 1889.—Another brother, WILLIAM DREW, a United States Senator, was born in Livermore, Maine, Jan. 14, 1831; graduated at Bowdoin College in 1854; admitted to the bar in 1857, and began to practice in Minneapolis, Minnesota. In 1858 and again in 1871 he was elected to the legislature, and in 1861 was appointed by President Lincoln surveyor-general of Minnesota. He represented Minnesota in Congress from 1879 to 1885, and in the United States Senate from 1889 to 1895. He engaged in various manufacturing industries in Minneapolis; was a director of the Minneapolis Water Power Company; was president of the Minneapolis and St. Louis railroad, as well as of the "Soo" line.

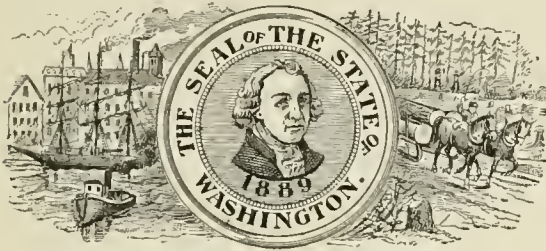
WASHBURN, EMORY, an American jurist; born in Leicester, Massachusetts, Feb. 14, 1800; graduated at Williams College (1817); studied law at Harvard, and was admitted to the bar (1821); practiced at Leicester till 1828, when he settled in Worcester. He was a member of the lower house of the legislature (1826-27) and of the state senate (1841-42). From 1844 to 1848 he was judge of the court of common pleas; elected governor in 1852, and re-elected for another term. In 1856 he was appointed professor of law in the Harvard Law School; resigning in 1876, he opened a law office in Cambridge, served in the state legislature, and held other positions of public and private trust. His legal works are standard authorities in the law schools and courts of the United States; among them are *Treatise on the American Law of Real Property* (1860); *Treatise on the American Law of Easements and Servitudes* (1863); *Testimony of Experts* (1866); *Lectures on the Study and Practice of the Law* (1871); *Manual of Criminal Law* (1878). He died at Cambridge, Massachusetts, March 17, 1877.

WASHBURN, WILLIAM BARRETT, an American public man; born in Winchendon, Massachusetts, Jan. 31, 1820; graduated at Yale College (1844); engaged in manufacturing and banking at Greenfield, Massachusetts. In 1850 he was elected to the state senate, and in 1854 to the lower house of the legislature. From 1862 to 1872 he was

a representative in Congress; governor of Massachusetts (1872-74); United States Senator (1874-75), to fill the vacancy caused by the death of Charles Sumner. He was one of the trustees of Yale College, of the Massachusetts Agricultural College, and of Smith College, Northampton, Massachusetts. He died at Springfield, Massachusetts, Oct. 5, 1887.

WASHING OF FEET. See MAUNDY THURSDAY, Vol. XV, p. 635.

WASHINGTON, the twenty-ninth state admitted to the Union, has an area of 69,180 square miles.



STATE SEAL OF WASHINGTON.

Of this, about 2,300 square miles are water surface, leaving 66,880 square miles of land surface.

(For a description of the physical features of the state and for historical matter in connection therewith, see WASHINGTON, Vol. XXIV, pp. 385-387.)

In 1900 the population was 518,103, that of 1890 was 349,390, making an increase of 168,713. The density of population was 5.22 to the square mile, a gain from 1.12 in 1880; 98,765 citizens lived in the three cities of over 8,000 inhabitants, thus giving an urban population of 28.27 per cent. The male inhabitants numbered 217,562, the female 131,828; the native-born citizens numbered 259,385, constituting 74.24 per cent of the whole; the negroes numbered 1,602, a gain since 1880 of 1,277.

GOVERNMENT. Under an enabling act of the same year a convention met July 4, 1889, at Olympia, and in seven weeks framed a constitution. Its principal features are as follows: The legislative branch is to consist of a house of representatives of not less than 63 nor more than 99 members and a senate of not more than one half nor less than one third as many members as the house. Senators are to be elected for four years, one half retiring every two years, and representatives for two years. Legislative sessions, after the first, are to be held biennially, and not to continue longer than sixty days. The executive department comprises a governor, lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, superintendent of public instruction, and a commissioner of public lands, all of whom are to hold office for four years. The governor is empowered to veto separate sections in appropriation bills; his salary is not to exceed \$6,000 per annum. The judges of the supreme court hold office for six years. The legislature may not authorize any lottery or grant any divorce; it is to provide a general and uniform system of public schools; to prescribe such a method of voting as shall secure to every elector absolute secrecy in preparing and depositing his ballot; to fix maximum

charges for the transportation of passengers and freight.

The convention provided that the question of woman suffrage should be submitted to a vote of the people, as should a provision prohibiting the manufacture or sale of liquor within the state, except for mechanical, sacramental or scientific purposes. Both provisions were submitted, and were defeated. Further provision was made against alien ownership of lands save in certain excepted cases; the state debt was limited to \$400,000; the seat of government was fixed at Olympia until a permanent place should be chosen; and it was provided that amendments to the constitution should be passed by a two-thirds vote of the legislature, and be ratified by a majority vote of the electors at the next election.

On Nov. 11, 1889, President Harrison issued a proclamation admitting the state of Washington to the Union.

Reports published in 1896 show the value of the real property of the state for the purposes of taxation during the preceding year to have been \$165,132,116; of the personal property, \$26,139,710; the total value of the railroad tracks of the state, \$12,918,220; making a grand total of \$204,190,377, as equalized by the state board. The total valuation in 1890 was \$217,612,987; in 1892 it reached the sum of \$285,846,824; in 1894 it fell to \$226,245,182, and in 1895 more than \$81,000,000 less was on the tax duplicates than in 1892, a loss due to the stringency of the times. On Jan. 1, 1899, it was \$226,996,294. The net state debt on Jan. 1, 1898, was \$1,700,000. The total receipts for the two years ending Oct. 31, 1898, were \$3,984,049; the disbursements for the same period, \$3,443,424.

BENEVOLENT, EDUCATIONAL AND PENAL STATE INSTITUTIONS, NOV. 1, 1895.

INSTITUTION.	LOCATION.	COST.	MAINTENANCE.
Penitentiary	Walla Walla	\$504,243	\$180,000
Western Hospital for Insane	Ft. Steilacoom	293,154	168,960
Eastern Hospital for Insane	Medical Lake	237,386	105,000
State University	Seattle	751,000	-----
Agricultural College	Pullman	132,050	-----
School for Defective Youth	Vancouver	134,000	80,000
Reform School	Chehalis	67,000	52,000
Soldiers' Home	Orting	53,155	30,000
Normal School	Ellensburg	71,000	25,000
Normal School	Cheney	14,000	15,682
State Fair	N. Yakima	47,000	-----
State Capital	Olympia	150,000	-----

At the beginning of 1895 there were 173 convicts confined in the penitentiary; 127 boys and 26 girls in the Reform School; the School for Defective Youth contained 53 boys and 38 girls; the Eastern Hospital for the Insane had 207, and the Western Hospital for the Insane 447 patients; inmates of the Soldiers' Home numbered 123.

NATIONAL GUARD. The authorized strength of the National Guard is 2,327. At the opening of 1895 the actual strength was 1,530, divided into three regiments of infantry and a squadron of cavalry.

Brigade headquarters are located at Spokane, and it is estimated that the entire force could be concentrated at a given point in the state within fifty hours.

AGRICULTURAL STATISTICS FOR 1880 AND 1890.

	1880.	1890.
Number of farms-----	6,529	18,056
Total acres in farms-----	1,409,421	4,179,190
Average size of farms-----	216	231
Value of farms, fences, buildings, implements, machinery and live-stock-----	\$19,655,044	\$100,724,970
Number of horses-----	45,848	153,770
Number of mules and asses---	626	1,345
Number of cattle-----	134,554	255,134
Number of milch cows-----	27,622	70,721
Number of swine-----	46,828	90,274
Number of sheep-----	292,883	265,267

STATE REPORTS OF 1895, MAKING THE FOLLOWING SHOWING OF LIVE-STOCK.

	NUMBER.	VALUE.
Horses, mules and asses-----	161,627	\$2,693,113
Cattle-----	195,179	2,414,728
Sheep-----	361,286	328,768
Swine-----	101,218	207,495

The hop acreage of the state in 1890 was 5,113, an increase of 4,579 from 1880. The 8,313,280 pounds produced gave an average of 1,626 pounds per acre, almost three times the average yield per acre in New York. New York had over seven times as many acres devoted to hops as had Washington, and yet the yield of the former state was but little in excess of twice the yield of Washington. Out of 5,082 acres on the Pacific slope devoted to flax in 1890, 4,252 acres were in the single county of Whitman, Washington. The superiority of the fiber is such that shipments are made to Ireland for use in the flax-mills there.

ACREAGE AND PRODUCTION OF CEREALS BY CENSUS OF 1890.

	ACREAGE.	PRODUCTION.
All cereals-----	500,671	13,475,090
Corn-----	9,583	156,413
Wheat-----	372,658	6,345,426
Oats-----	65,089	2,273,182
Barley-----	51,551	1,269,140
Rye-----	1,703	19,188

FARM DISTRIBUTION BY CENSUS OF 1890.

Under 10 acres-----	117
10 and under 20 acres-----	200
20 and under 50 acres-----	919
50 and under 100 acres-----	1,715
100 and under 500 acres-----	13,907
500 and under 1,000 acres-----	890
1,000 acres and over-----	308

Of these, there were cultivated by the owners, 16,529; rented for money, 541; rented on shares, 986.

FRUIT. At the close of 1895 the area devoted to the culture of fruit was 55,000 acres, of which not over 20,000 acres were in bearing. This area is about evenly divided between the eastern and the western divisions of the state. Of prunes and plums raised in 1895, 16,000,000 pounds were sold green

and 3,000,000 pounds evaporated. Over 15,000 crates of red raspberries and blackberries were shipped from Puget Sound points; 100 carloads of dried prunes were sold in the eastern markets, and so well have these been received that such importations from Germany and France have been almost entirely suspended. Pears and cherries in the fresh state are now shipped to Chicago and the Atlantic coast cities, the five transcontinental lines of railroad which enter the state affording excellent facilities therefor. Clarke county is the leading prune section of the state. In the valleys of the Snake, Walla Walla, Columbia, and Yakima rivers are found the leading peach, apricot and grape sections of the state. From the Walla Walla valley 205 carloads of fruit and 245 cars of vegetables were shipped in 1895. Along Snake River are bearing orchards for 90 miles, comprising about 3,000 acres. Douglas County had over 6,000 acres in fruit orchards in 1895, and Yakima County had about 5,000. In the western part of the state and adjacent to Puget Sound more than 5,000 acres are devoted to market-gardening. The value of the fruit and vegetable crop of 1895 is estimated at \$2,750,000.

MANUFACTURES. The number of specified manufactures in Washington, in 1890, was 1,543, in which capital to the amount of \$34,369,735 was invested, and 20,366 persons employed, whose wages amounted to \$12,658,614. The cost of the material used was \$19,917,057, and the value of the finished products aggregated \$41,768,022. The leading manufacture was that of lumber in various forms, which amounted to \$19,480,580. Flouring and grist mill products yielded a return of \$2,460,809, followed by foundry and machine-shop products valued at \$1,347,700. Other industries of importance were brick and tile, carpentering and malt-liquors.

MINERALS. The known coal-fields of Washington cover about 1,650 square miles. Thirty-two mines are in operation, furnishing employment to about 5,000 men. The kinds and quality of the coal of different localities vary greatly. In some places all varieties are found in close proximity, as in Lewis County, where there are 72 square miles of anthracite, 216 square miles of bituminous and 180 square miles of lignite. The largest and best developed coal-field in the state is in King County, where there are about 120 square miles of a high class of lignite and about 300 square miles of bituminous. On the Skagit River is found a class of coal that makes excellent coke. Veins of as great thickness as 42 feet have been discovered, and in Lewis County the Geological Survey shows that under a specified section there lie 14 different veins of coal of a combined thickness of 112 feet. The output for 1894 is given as 1,208,250 tons by the mine-inspector. Gold has long been mined, the Old Dominion mine, in Stevens County, having produced since 1885 over \$1,000,000, at slight expense. In Spokane and Snohomish the incorporated companies engaged in the development of the gold and lead mines have a combined capital of over \$10,000,000. Silver has been found in several localities, and is mined with profit. Limestone and sandstone to the value of nearly \$250,000 were produced in 1895,

and crude petroleum has been found in Thurston County.

FORESTS. Washington possesses magnificent forests of fir, cedar, spruce and hemlock, extending from the Cascade Mountains to the Pacific Ocean, and from the Columbia River to the British line. Their extent has given to Washington the name of the "Evergreen State." Fir, yellow-pine and tamarack abound on the eastern slope of the Cascade Mountains. The central portion of the state is devoid of timber, but in the northeast is found yellow-pine, cedar and tamarack and an excellent quality of white-pine. In western Washington the Douglas fir constitutes about eighty five per cent of the total amount of timber. This is a valuable timber for car-sills and bridge-stringers, and its tall growth and large girth admit of great possibilities in the way of long and large dimension timber. The standing merchantable timber of Washington was estimated to be as follows in 1895: Fir, 127,500,000,000; cedar, 9,000,000,000; spruce, 4,500,000,000; hemlock, 9,000,000,000 feet. The lumber interests of the state are in their infancy. In 1889 the first shipments by rail were made to the Eastern states, and in 1895 an average of a train-load was shipped every day of the year. South Africa became a customer for lumber in 1894, and the business became a large one. The total lumber shipments for 1895 were as follows: Cargo shipments (foreign), 152,294,372 feet; (domestic), 259,299,600 feet; rail shipments, 90,984,000 feet. The shipments of shingles amounted to 13,776 carloads, or 2,181,240,000 shingles.

FISHERIES. The fish industry of Washington is of large importance. The chinook or sockeye, the blueback, the steelhead and the silverside salmon are among the varieties most extensively used in the canneries. Sturgeon, smelt, shad, halibut and cod are taken in great quantities, as are herring, catfish, tomcod, salmon-trout and brook-trout. The shellfish found include the oyster, crab, lobster, clam and mussel. The total value of the industry in all of its branches for 1895 was close to \$5,000,000.

COMMUNICATIONS. The railroads of Washington have a total mileage of 2,823, valued for the purposes of taxation at \$14,078,245. The value of side-track mileage, added to the valuation of rolling-stock and all railroad personal property, makes a total valuation of \$17,268,246. The railways of the state employed 4,446 men in 1895, to whom was paid \$3,099,388 as wages for the year. The total value of the cable, horse and electric railways of the state approximated \$1,000,000 in 1896, and the telegraph and telephone had almost an equal value. The shipping interests of Washington are large, and constantly increasing. In 1894 the steamboats and sailing-vessels had a total valuation of \$1,015,721. The general government has expended large amounts in improving the different harbors of the state, Congress at the session of 1894-95 making appropriations for Olympia, Everett, Swinomish Slough, Willapa river and harbor, Grey's Harbor and Chehalis River, Cowlitz River, Seattle and the Lake Washington Canal.

EDUCATION. In 1898 there were 1,975 school districts in the state. The number of school-houses

was about 1,900; the number of graded schools was 152; the number of children between the ages of 5 and 21 years, 115,160; number of pupils enrolled, 97,916. The number of teachers was 3,321, to whom were paid average monthly wages of \$42.13 to male teachers, and \$34.53 to female. The total amount expended during the year for school purposes was \$1,815,662, an increase from the expenditure of 1894 of \$230,269. The receipts for the school year of 1898 were \$2,490,180, leaving a balance of \$674,518. At the head of institutions for higher education stands the University of Washington (q. v., in these Supplements). The Agricultural College and School of Science is located at Pullman, Whitman County. It has an endowment of 190,000 acres of land from the United States government. In addition, it has from the United States a graduated annual allowance, starting at \$15,000 and going to \$25,000, at which amount it is to remain.

Of the denominational institutions of Washington, the Baptists control Colfax College, at Colfax; the Seventh-Day Adventists, Walla Walla College, at College Place; the Presbyterians, Whitworth College, at Sumner; the Methodist Episcopal, Puget Sound University, at Tacoma; and the Congregationalists, Whitman College, at Walla Walla. Both Vashon College, at Burton, and the University of Washington, at Seattle, are non-sectarian institutions.

The report of the state auditor showed the condition of the sixty state banks to be as follows on the 31st of May, 1894:

Capital stock paid in-----	\$3,477,575
Surplus fund-----	268,258
Undivided profits-----	306,598
Individual deposits-----	2,669,526

MISCELLANEOUS. In 1890 Washington had 892 church organizations, 532 edifices, 58,796 members, constituting 16.83 per cent of the population, and church property of the value of \$2,408,625. All Baptist bodies numbered 95; Congregationalists, 104; Disciples of Christ, 86; all Methodist bodies, 239; all Presbyterians, 99; United Brethren, 47.

On Jan. 1, 1899, 202 newspapers were published in Washington, of which 14 were daily, 2 triweekly, 1 semiweekly, 168 weekly, 1 fortnightly, 15 monthly, and 1 quarterly. Papers were published in all of the 34 counties of the state, and in 95 of the cities, towns, and villages, of which 33 were county seats.

The following are the principal cities and towns of Washington, with the populations of 1900: Seattle, 80,671; Tacoma, 37,714; Spokane, 36,848; Walla Walla, 10,049; Olympia, 4,082; Port Townsend, 3,443; Fair Haven, 4,228; Whatcom, 6,834; Vancouver, 4,006; Ellensburg, 1,737; Aberdeen, 3,747; and Ballard, 4,568.

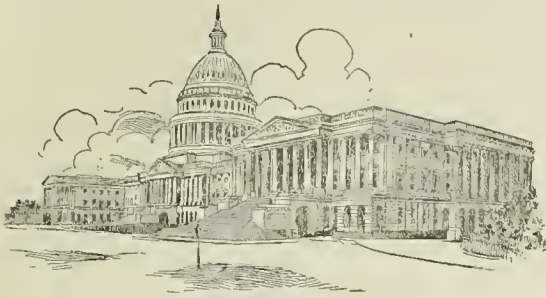
The merchandise imported into the United States through the Puget Sound customs district in 1895 was valued at \$5,365,723. The principal receipts were from China, Japan, British India and British Columbia. The value of the exports passing through the same district during the same period was \$5,575,000.

List of the territorial and state governors: Isaac I. Stevens, 1853-57; Fayette McMullin, 1857-59;

Richard D. Gholson, 1859-61; William H. Wallace, 1861; William Pickering, 1861-66; George E. Cole, 1866-67; Marshall F. Moore, 1867-69; Alvin Flanders, 1869-70; Edward S. Salomon, 1870-72; Elisha P. Perry, 1872-80; William A. Newell, 1880-84; Watson C. Squire, 1884-87; Eugene Semple, 1887-89; Miles C. Moore, 1889; Elisha P. Ferry, 1889-93; John McGraw, 1893-97; John R. Rogers, 1897.

WASHINGTON, an incorporated town of Litchfield County, northwestern Connecticut, on the Shepaug River, and the Shepaug, Litchfield and Northern railroad, 40 miles N. of Bridgeport. It is picturesquely situated; has quarries of white marble, and is engaged in agricultural pursuits. Population 1880, 1,590; 1890, 1,633; 1900, 1,820.

WASHINGTON, the capital city and seat of government of the United States, is situated in the



THE CAPITOL, WASHINGTON.

District of Columbia on the left or east bank of the Potomac River, at the junction of the Anacostia or eastern branch, the head of navigation and tide, 106 1/2 miles from Chesapeake Bay and 185 miles from the Atlantic Ocean. (For general descriptive and historical article prior to 1885, see WASHINGTON, Vol. XXIV, pp. 382-84.) The city has excellent transportation facilities upon three railroads, and is reached by steamers plying between northern and southern ports; with its beautiful parks, magnificent drives and splendid buildings is an unsurpassed residence city, but commercially is of little relative importance, being overshadowed by the neighboring cities of Baltimore and Philadelphia. Travel within the city and between Washington and its numerous suburbs on both sides of the Potomac is made easy by coach-lines and street-railway lines operated by cable and the conduit system of underground trolleys. To add to the beauty of the city are its numerous monuments and statues, erected both in government buildings and in the public squares; and of those recently unveiled the ones most deserving of mention are those of James A. Garfield and Winfield S. Hancock. Museums, parks, cemeteries, charitable institutions of various kinds are all numerous, and points of interest, clubs and societies, literary and scientific, abound and are well known; and within recent years the city has been the scene of many notable gatherings and conventions.

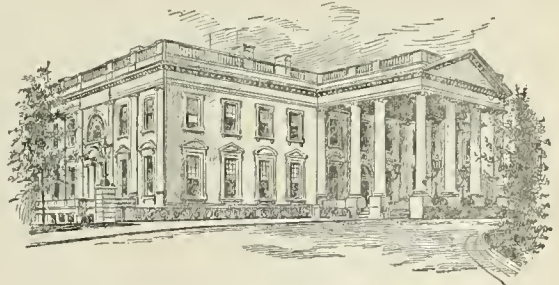
To the already large list of splendid government buildings may be added the new Congressional Library building, done in a modified Italian renaissance style, making one of the finest edifices, externally and internally, of all the capital buildings.

Its ground plan, 470 by 340 feet, covering 3 3/4 acres, is an oblong square inclosing four courts and a rotunda. The material of the building is New Hampshire granite exteriorly, and enameled brick within the courts. A unique feature is, that upon the keystone of each of the 33 arched windows is carved a human head typical of some distinct race of man. A feature of the west or main front is a series of busts of great literati—Demosthenes, Dante, Scott, Irving, Hawthorne, Emerson, Franklin, Macaulay and Goethe. Over the arches of the three entrance doors are carved three spandrels, in relief, each representing two female figures, by Bella Pratt, each emblematic of Art, Science and Literature. The roof is of copper, having a heavily-gilded dome, which terminates 195 feet above the ground in a gilded torch of Science. The ultimate capacity of this building, which was six years in course of construction, and cost \$6,250,000, is 4,500,000 volumes.

The churches of the city number over two hundred, divided among all of the leading denominations; and the public schools, which are under district control, are numerous.

In and about the city are several private and denominational institutions, the best known of them being Georgetown College, the Catholic University of America, the American Catholic University, and the Columbian University; all of which see in these Supplements.

As the capital of the United States, Washington has a distinction to which no other city in the land can lay claim, giving it a cosmopolitan and ever-



WHITE HOUSE OR EXECUTIVE MANSION.

shifting population, coming and going with every change in administration.

As has been said, Washington is not a great commercial center, yet the industries of the city are not without importance, for the census returns of 1890 showed 2,295 establishments reporting, with a capital of nearly \$29,000,000, paying to 23,000 persons wages to the amount of \$14,600,000, and for materials over \$17,000,000, from which products were turned out to the value of \$39,000,000.

The principal industries are printing and publishing and various lines of building. The assessment value of property in 1891 was nearly 142 millions. Pop. 1890, 230,392; 1900, 278,718.

WASHINGTON, a village and the capital of Wilkes County, northeastern Georgia, on the Georgia Southern railroad, 76 miles N.W. of Augusta. It is in an agricultural region, growing grain and cotton; manufactures carriages and furniture; has min-

eral springs, seminaries, a bank and two weekly newspapers. Population 1890, 2,631; 1900, 3,300.

WASHINGTON, a city of Tazewell County, north central Illinois, on the Atchison, Topeka and Santa Fé, the Chicago and Alton and the Toledo, Peoria and Western railroads, 12 miles E. of Peoria. It is in a farming and stock-raising region; has grain elevators; manufactures flour and woolen goods; has carriage, wagon and furniture factories; ships hogs; has a public library, two banks and a weekly newspaper. Population 1890, 1,301; 1900, 1,459.

WASHINGTON, a city and the capital of Daviess County, southwestern Indiana, on the Baltimore and Ohio Southwestern and the Evansville and Indianapolis railroads, 20 miles E. of Vincennes. It produces large quantities of bituminous and canal coal, and is an important shipping-point for coal, flour, grain, cattle and hogs; has saw-mills, two banks, two daily, four weekly and other newspapers. Population 1890, 6,064; 1900, 8,551.

WASHINGTON, a city and the capital of Washington County, southeastern Iowa, on the Chicago, Rock Island and Pacific and the Burlington and Northwestern railroads, 52 miles N.W. of Burlington. It contains many mills, foundries, factories, machine-shops and elevators, brick and tile and carriage factories; manufactures pipe-organs and corn-cob pipes; is an important horse-market; ships grain, dairy produce, poultry, etc.; has a thriving local trade, and is noted for its educational advantages; it has four banks and three weekly newspapers. Population 1890, 3,235; 1900, 4,255.

WASHINGTON, a city and the capital of Washington County, north central Kansas, on the Burlington and Missouri River and the Missouri Pacific railroads, 22 miles N.W. of Marysville. It is in a farming and stock-raising region, has a Friends' academy, four banks, and three weekly newspapers. Population 1890, 1,613; 1900, 1,575.

WASHINGTON, a town of St. Landry Parish, south central Louisiana, on Courtableau Bayou, at the head of navigation, on the Southern Pacific railroad, 6 miles N. of Opelousas. It has saw-mills, brick-works, cotton-mills, cotton, twine and yarn and tile factories, one bank and one weekly newspaper. Population 1890, 1,064; 1900, 1,197.

WASHINGTON, a town of Knox County, southern Maine, 24 miles E. by S. of Augusta. It manufactures carriages, undertakers' supplies, barrels and casks, staves and headings, and cabinet-work. Population 1890, 1,230; 1900, 1,019.

WASHINGTON, a city of Franklin County, eastern Missouri, on the Missouri River, and on the Missouri Pacific railroad. It is an important shipping-point for pork and grain; contains many industries, including manufactories of lumber, leather, shoes, musical instruments, cob-pipes, and has excellent educational facilities. In the vicinity are large deposits of fire and potters' clay. Population 1890, 2,725; 1900, 3,015.

WASHINGTON, a borough of Warren County, northwestern New Jersey, 13 miles N.E. of Easton, Pennsylvania, and 60 miles W. of Newark, on the Morris Canal, and on the Delaware, Lackawanna and Western railroad. It is on the south side of an ele-

vation known as Scott Mountain, in a fertile agricultural region; has electric lights and water-works, large piano and organ works, and a silk-mill. Population 1890, 2,834; 1900, 3,580.

WASHINGTON, a town and the capital of Beaufort County, eastern North Carolina, 128 miles E.S.E. of Raleigh, at the head of navigation on the Pamlico River, and on the Atlantic Coast Line and the Wilmington and Weldon railroads. It carries on a considerable trade with the West Indies, has large fishing and trucking interests, and contains a rice-mill, barrel, sash, harness and ice factories, a grain elevator and grist and planing mills. It has a large river trade. Population 1900, 4,842.

WASHINGTON, a city, and the capital of Fayette County, southwestern central Ohio, 77 miles N.E. of Cincinnati and 35 miles S.E. of Springfield, on Point Creek, and on the Baltimore and Ohio, the Cincinnati, Hamilton and Dayton, the Cincinnati and Muskingum Valley and the Ohio Southern railroads. It is in an agricultural and stock-raising district, and has large boot-and-shoe factories, wheel, soap and ice factories, flour-mill, foundries and vapor-stove works. Population Washington Court House (1900), 5,751.

WASHINGTON, a borough and the capital of Washington County, southwestern Pennsylvania, on Chartiers Creek, and on the Baltimore and Ohio, the Pennsylvania, the Pittsburgh, Cincinnati, Chicago and St. Louis and the Waynesburg and Washington railroads, 32 miles N.E. of Wheeling, West Virginia, and 31 miles S.W. of Pittsburg. It is in a region rich in bituminous coal and natural gas; has many manufactories, including flour and woolen mills, machine-shops, carriage factories, glass and oil-well tool-works, and contains a number of educational institutions, including Washington and Jefferson College (q.v., in these Supplements), Washington Female Seminary and Trinity Hall School; the LeMoyné crematory is also located here. Population 1900, 7,670.

WASHINGTON, MOUNT, a summit of the White Mountains, New Hampshire, the highest elevation in New England, 6,288 feet above the sea; is ascended by railroad and by carriage-road. There is a United States Signal Station at its summit. See also NEW HAMPSHIRE, Vol. XVII, p. 390; and MOUNTAIN RAILWAYS, in these Supplements.

WASHINGTON, UNIVERSITY OF, an institution of learning at Seattle, Washington. It was granted



WASHINGTON UNIVERSITY.

by Congress, in 1854, two townships of land in the territory of Washington, and opened to students in

1862, being then located in the "wilderness." In 1892 its tuition was rendered free, with beneficial results, the number of students enrolled the next year being 468. In 1893 the state appropriated to the university for an endowment, 100,000 acres of land. In 1895 its site was removed to a tract of 320 acres of land lying between Lakes Union and Washington, about 2½ miles from the former site. The buildings erected there are designed to accommodate 800 students. The departments are philosophy, Greek, Latin, mathematics and astronomy, natural science, physical science, modern languages, English and history, pedagogy, and pharmacy. Schools of medicine and law are contemplated. There is a conservatory of music. In 1898 there were 23 instructors and 239 students; the library had 8,000 volumes; and the total income was \$45,000.

WASHINGTON, BOOKER TALIAFERRO, an American educator; born a slave at Hale's Ford, Virginia, April 18, 1858; after emancipation, his mother removed him to Malden, West Virginia, where the young negro worked in the salt and coal mines, attending school in the winter months; spent several years in service in New England. In 1871 he went to General S. C. Armstrong's School for colored boys at Hampton, Virginia, where, after much hardship by the way, he arrived with fifty cents in his pocket. He was graduated there with the highest honors of his class in 1875; went thence to Wayland Seminary, Washington, District of Columbia; in 1879 began to teach at Hampton; in 1881 was placed in charge of the Tuskegee Institute, which then consisted of "a small church and a shanty," with thirty students, to which the state of Alabama made an annual appropriation of \$2,000. Here in the heart of the "black belt" he gradually modeled the institute after the plans of the Hampton school, and in 1897 the institute comprised 867 students from 19 states, 79 instructors, 2,460 acres of land and 37 buildings, all valued at \$300,000. Twenty-five industries are carried on by the students, at an annual cost of \$80,000. Two fifths of the annual income goes into the permanent plant; 650 acres are cultivated by the students; all but three of the buildings were built by the students, even to the brick-making and wood-sawing. The institution is free from debt. The chief aim is to send the students out into the world masters of a trade by which they can maintain themselves. While all mechanical arts are taught, special emphasis is laid upon the various branches of farm-life. Female students are also trained in arts suitable to them. At the Atlanta Exhibition for the Cotton States, Sept. 18, 1895, Mr. Washington made a memorable speech on the solution of the race-question in the South that attracted the admiration of all the country and won for him the respect and gratitude of whites as well as blacks. His position is that race-friction can be brought to an end as negroes become valuable workmen and thus acquire financial independence. See "*The Awakening of the Negro*," *Atlantic Monthly*, September, 1896.

WASHINGTON, BUSHROD, an American jurist, nephew of George Washington; born in Westmoreland County, Virginia, June 5, 1762; graduated at

William and Mary College in 1778; studied law in Philadelphia, and practiced in his native county; and served in the Revolutionary army as a private. In 1787 he was a member of the Virginia house of delegates, and in 1788 of the session to ratify the Constitution of the United States. In 1798 he was appointed associate justice of the United States Supreme Court, and held the office until his death. He was the first president of the Colonization Society. At the death of Mrs. Washington the mansion and four hundred acres of the Mount Vernon property were left to him. He died in Philadelphia, Nov. 26, 1829.

WASHINGTON AND JEFFERSON COLLEGE, an institution of learning at Washington, Pennsylvania, formed by the union of Jefferson College, Cannonsburg, chartered in 1802, and of Washington College, chartered in 1806. The union was accomplished by the offer of \$50,000 by the Rev. Dr. Charles C. Beatty if both colleges would unite. The offer was accepted, and an enabling act passed the state legislature in 1865. The preparatory department, the scientific department and the freshman class of the classical department were placed at Washington, while the sophomore, junior and senior classes were located at Cannonsburg. This arrangement proving unsatisfactory, permission was secured from the legislature in 1869 to locate the whole at Washington. Additional buildings were erected in 1875, costing \$80,000, and a gymnasium was erected in 1892, costing \$40,000. In 1898 the productive funds were \$275,374, and the total income was \$28,718. In 1898 there were 15 instructors and 340 students, and the library had 15,000 volumes. The total number of graduates up to 1898 was 3,801. Sons of ministers and missionaries and young men studying for the ministry are furnished free scholarships. The institution is non-sectarian, but Presbyterian in sympathy. The president is the Rev. James D. Moffat, D. D., who was elected in 1881. Endowments were made by Dr. Francis J. LeMoyné, for the purpose of establishing chairs of agriculture and applied mathematics; and by Dr. C. C. Beatty, \$60,000, for chairs of Greek and Latin.

WASHINGTON AND LEE UNIVERSITY, an institution of learning at Lexington, Virginia, the corporate title of which originated by act of the general assembly of Virginia in 1871. The history of the institution is an interesting one of development from modest beginnings. In 1749, Robert Alexander, one of three brothers who emigrated to America from Ireland in 1736, established a school called the Augusta Academy, which existed from 1749 to 1776. The location of this academy was first at Greenville, then for a while at or near Old Providence Church, whence it was moved to Mount Pleasant, near Fairfield, the latter place bringing the academy within the bounds of Rockbridge County. The name was changed, while the academy was still located at Mount Pleasant, to Liberty Hall Academy, which name it retained from 1776 until 1798. The academy was removed from Mount Pleasant to a point near Timber Ridge Church, where it remained until 1780, when it was again removed to a place near Lexington, becoming a chartered institution in 1782. The ruins of a building, erected in 1793 and

accidentally burned in 1802, are still to be seen in the northwest portion of Lexington. In 1803 the academy was located within the corporate limits of Lexington, its name being changed once more in 1798, upon the occasion of the donation to it by General Washington, of some funds, which had been voted to him by the general assembly of Virginia, but which he preferred to be devoted to some such object instead of appropriating them to himself. The institution continued to bear the name of Washington Academy until 1813, when it became Washington College, continuing under this name until after the death of its president, Gen. R. E. Lee, when the name



WASHINGTON AND LEE UNIVERSITY.

of that benefactor, who had "rescued the institution from the obliteration that threatened it after the war," was added in recognition of his devotion to the institution. The endowments by numerous additions have been increased to about \$643,904, and in 1898 the total income was \$45,000. The courses of study include classics, literature, applied sciences, engineering, and law. The degrees conferred are in arts, philosophy, science, and law. The university is well endowed with scholarships and fellowships. In 1898 there were 25 instructors and 140 students, and the library had 40,000 volumes. General Lee was succeeded in the presidency by his son, General G. W. C. Lee, in 1870. General Robert E. Lee was buried in the chapel, a recumbent statue in marble marking his resting-place.

WASHINGTON UNIVERSITY, an institution of learning located at St. Louis, Missouri, incorporated in 1853, non-sectarian, and for both sexes. It has six higher departments: The undergraduate department, which includes the college (1859); the O'Fallon Polytechnic School (1870); the Henry Shaw School of Botany (1886); the St. Louis Law school (1867); the School of Fine Arts; the St. Louis Medical College (1891); and the Missouri Dental College (1892). The college curriculum is identical with that in similar institutions. The polytechnic school has courses in civil engineering, mechanical engineering, chemistry, mining and metallurgy, building and architecture; each course includes four years' instruction. To the university are attached three secondary schools: The Smith Academy, for boys (1854); the Mary Institute, for girls (1859); and the manual-training school (1879). There were, in 1898, in all departments, 170 professors and instructors, and 1,669 students. The total number of volumes in the special libraries was 5,000. The

university real estate amounted to \$625,000, the productive funds in 1898 were \$675,000, and the total income was \$146,000.

WASHITA OR OUACHITA RIVER, a stream of southern United States; rises in western Arkansas, and after a southeasterly course through Arkansas and Louisiana, empties into the Red River, in latitude 31° 18' N., at the southeastern corner of Catahoula County, Louisiana. Its length is about five hundred miles, for two thirds of which it is navigable. Its chief tributaries are the Saline, Texas and Little Missouri.

*WATCH-MANUFACTURING, ON THE AMERICAN SYSTEM. For generations Switzerland has been the special home of the watch-making industry. Fathers instructed their children in the art of making the special portion of the watch, which it had been their own life-work to make. It seemed to be the generally accepted destiny of successive generations to continue in the line of work which their fathers had followed.

As one result of such a condition, the Swiss became very skillful workmen in the narrow lines of their employment, and their watches of the better grades deservedly rank high. But, on the other hand, their methods rendered uniformity of product an impossibility. As a result, there is required a certain amount of fitting of the parts to each other, which renders impossible their use in any other combinations, so that when a watch comes to require repairs, there is demanded the careful fitting of a new part, if, indeed, it does not have to be made entire.

The higher price of labor in America, as compared with the wages of Swiss workmen, made the repair of foreign watches in the United States a matter of annoyance and expense. Moreover, it is a fact that among foreign watches many are of inferior quality, both as to appearance and durability.

These facts suggested to Mr. Aaron L. Dennison, a young watch-repairer of Boston, Massachusetts, a plan of manufacturing watch-movements by machinery, so that economy and uniformity of product might be attained at the same time. He secured the co-operation of Mr. Edward Howard and Mr. D. P. Davis, who were engaged in the manufacture of clocks and standard scales and measures in the city of Roxbury, now Boston Highlands. A Mr. Samuel Curtis was induced to advance the sum of twenty thousand dollars as a working capital, which was afterward followed by a still larger amount. A small factory was built in 1850, a model watch was designed, and also some machinery and tools. But the way to success lay through unknown regions. Mistakes were made, involving expense and loss of time. The original capital was soon swallowed up, and after about three years it was decided to abandon the location as unsuitable, and a new spot was found in the town of Waltham, ten miles west of Boston. Additional capital was secured, and a larger factory was built, in which operations were begun in October, 1854. About fifty men were employed, and a few watches were produced, but at a cost far exceeding a practicable selling-price. It is quite probable that in appearance they may not

have been as attractive as those of European make. Nor was it admitted by the public that it was possible to make watches in America. Sales were therefore slow; the company was forced to assign. In May, 1857, the property was sold at auction, which completed the second stage of the enterprise. Four years of general anxiety and struggle followed; business of all kinds was prostrated and the new business fared hard. But the Civil War created an unexpected demand for watches for army use, and American watches were eagerly purchased.

Mr. Royal E. Robbins had purchased the entire property of what was, at that time, the Boston Watch Company, paying therefor \$56,000. The capital at his disposal was gradually increased, until in 1875 the company had \$1,500,000. In 1885 it was increased to \$2,000,000, and in 1889 still another million was added. At the annual stockholders' meeting of that year Mr. Robbins, the treasurer, in his thirtieth annual report, stated that, up to Feb. 1, 1879, the factory had made 1,112,133 movements. At the close of 1888 the number had reached 3,800,496, showing that the product of the last ten years had been more than double that of the preceding twenty years. The total product, up to November, 1896, amounted to nearly 7,500,000 movements full. For the thirty years ending Feb. 1, 1889, the sales aggregated \$48,000,000.

It was natural that, after the struggles and calamities of the enterprise had been succeeded by a season of prosperity, there should come an impression that watch-making was sure to return immense profits to those who should engage in it. Therefore, it was not to be expected that the original American Watch Company would be allowed to gather all the prospective profits. On the sale of the bankrupt Waltham Company in 1857, Mr. Edward Howard returned to the original Roxbury factory, and began the manufacture of watches on a small scale, and the business has been continued with intervals of more or less extent, but has been carried on together with the more profitable one of making high-grade clocks. The watch product was confined almost entirely to high-priced movements, and for years took high rank in the American markets. But their restricted capital, or policy, has prevented improvement in tools and methods of manufacture, and continued the early and somewhat crude combination of machine-work and hand-labor, so that their manufacturing ceased, and it is uncertain whether it will ever be resumed.

The next attempt to establish an American watch factory was made in 1859, when a few of the men who had held some of the prominent positions in the Waltham factory, organized, in Nashua, New Hampshire, a company with a capital of \$100,000. By the end of three years their money had been entirely expended, and they were forced to suspend. In 1862 their entire stock of machinery, tools and unfinished product was purchased, and removed to the Waltham factory.

Up to the year 1861, Mr. Dennison, the originator of what has come to be known as the "American system of watch-making," had continued with the Waltham Company in the capacity

of superintendent, but in that year he retired, and after a time engaged in a similar enterprise, which in 1864 established, in Melrose, Massachusetts, the Tremont Watch Company. But with this change of interests, Mr. Dennison seems in some measure to have abandoned the system which he first labored to establish, for the Tremont Company undertook to produce watches upon the plan of having the watch train and other portions of the movement made in Switzerland and brought to the factory at Melrose and assembled. Mr. Dennison therefore took up his residence in Zurich, Switzerland, to superintend the manufacture of the material, which, on completion, was forwarded to America. As might have been expected, this enterprise had but a brief existence, and came to an end in 1868.

In 1864 some of the men who had been connected with the unfortunate Nashua factory, associated with some others of the leading men in the Waltham factory, visited Chicago and succeeded in interesting some capitalists in the scheme of establishing a watch factory in the growing West. The town of Elgin, Illinois, was selected as a suitable location. This enterprise was fortunate in being controlled by men of large capital, and with a business pride that prompted them to replenish the frequently exhausted treasury of the new and struggling industry. For ten years the Elgin factory made no return to its stockholders in the way of dividends, but from that time forward it has been profitable. It now has a capital of \$4,000,000, and a productive capacity about equal to the original Waltham factory.

There has been but one other *direct* offshoot from the parent factory, and that is of comparatively recent origin. In 1883 Mr. Charles van der Woerd, who had for a time been the superintendent of the Waltham factory, retired, and carried on the business of watch-tool making, but later (about 1886), he induced a friend, Mr. E. C. Hammer, to invest capital in watch-making. Land was donated and a small factory was built, but was operated at a loss.

From the Elgin Company there was an offshoot, and a factory was built at Springfield, Illinois, which, like all its predecessors, has had severe struggles, but is still living.

The list of unsuccessful American watch factories is by no means a short one, while those which have been made profitable are very few. Excessive competition and the necessity of promptly marketing their products have compelled small factories to continually reduce prices, till there was no margin for profit, and expenses could be met only by additional capital; and when that resource was exhausted, bankruptcy followed. Some companies have continued their existence during the last year or two by diverting their energies to the making of bicycles and cyclometers.

It is doubtless true that there is no manufacturing industry now carried on anywhere in the world which is so complex, and which demands so much of brain-work and careful management, as does the manufacture of watches by modern methods. As at first designed, the machines were very light and delicate, to accord with the nature of the work to be

produced. But years of experience proved that the required accuracy could be obtained only by the employment of machinery which should possess the stability, requiring a proper amount of strength and weight, to be obtained by a careful distribution of metal.

Mr. Charles S. Mosely was one of the men who were prominent in the development of the Nashua factory, and designed several types of machines that have been substantially copied in almost every American watch factory, and even in Europe. He was also one of the prominent men in starting the Elgin factory.

Until about 1870 few radical departures were made from the early types of machines, but since, machines have been made much heavier; and as the production of the factories has increased it has become practicable to introduce automatic features, which, though perhaps possible at an earlier period, would not have been practicable.

Mr. Van der Woerd was one of the first to design semi-automatic machines. One of his most successful machines was for making small screws, and it could produce them at the rate of eight to ten per minute. The writer then designed a screw-making machine different in principle and having double the capacity of the Woerd machine. The most radical improvements in machinery, however, are the work of Mr. D. H. Church, who has carried the automatic features of machinery to an extent never before attempted. Perhaps the most interesting example of his talent in machine invention is the machine for turning complete balance-staffs from a rod of wire, finishing both pivots before the completed staff is severed from the wire rod.

The model of watch, which was originally adopted by the Waltham Company, was patterned from the English style, and is commonly known as the "full-plate" model. This style has been substantially followed by nearly all American factories. It has also been imitated with great exactness by European makers, whose product has often been sold as of American make.

The advantages of the full-plate model are convenience in manufacture and repair, and also strength and durability. Of necessity, a watch of this model must be somewhat thicker than the "bridge" model, which is almost exclusively adopted by the Swiss makers. All of the smaller American watches, as well as those of the highest grade, are made on what is called the three-quarter-plate model. In watches of this style the balance is located within the thickness of the frame-plates, whereas in the full plate the balance is placed on the top. For the first twenty years all American watches were made "key-winding," but about 1870 "stem-winding" watches were introduced, in which the main-spring is wound by turning the "crown" of the case-pendant. By opening the cover of the case access is had to a small lever, which can be moved so as to shift the connection of the crown from the winding-wheels to those for setting the hands. This form of hand-setting only is used by all American companies, except the Waltham and Elgin.

In 1882 Mr. D. H. Church engaged in the me-

chanical production of watches. One of his early accomplishments was the designing of a new form of stem-winding mechanism, in which the setting-lever is dispensed with, and the connection with hands made by an outward pull on the case-crown. This form of construction (known as pendant-setting) has become popular in America, and is adopted in nearly all open-face movements. Its great advantage consists in its avoidance of opening the case for the purpose of setting the hands, at the same time allowing interchangeability of cases, which the Swiss form of construction will not permit. The original Waltham model was made in what was known as "18 size." When the Nashua Watch Company passed into new hands they acquired a lot of unfinished movements of "20 size." These were completed and put on the market, but their manufacture was not continued. The first watches for the use of ladies were made in 10 size, and were manufactured for about fifteen years, but were gradually displaced by an "8 size," which was introduced in 1873. This, in turn, was displaced by a "6 size," which was followed by an "0 size," both of which sizes are demanded by the market. The original model 18 size being too large for fine high-grade gentlemen's watches, a 16 size three-quarter-plate model was constructed, and is largely sold. But the tendency toward the use of smaller watches, by men as well as women, has led to the issue of a 12-size movement of a specially thin model. It may be further said that in America the manufacture of watch-cases is an industry entirely distinct from the manufacture of movements, but, inasmuch as all American watch factories adopt uniform measurements for the various sizes, it is possible for purchasers to select movements and cases of any of the various makes, with the assurance that they will properly fit each other, thus giving the largest opportunity for the selection of style and cost desired.

E. A. MARSH.

WATER, CHEMICAL EFFECTS OF. See CHEMISTRY, in these Supplements.

WATER, HEATING BY. See FURNACES, in these Supplements.

WATER-BEAR, the common name for the group of microscopic animalcules composing the order *Tardigrada*. They have some fancied resemblance to the animal whose name they have. Owing to their slow movements, they are also called sloth-animalcules. They are less than a millimeter in length, and have four pairs of legs. They occur in damp moss in swamps, and sometimes in gutters of house-roofs, but they are by no means abundant. Their affinities are yet unsettled, but they are believed to be closely related to the *Arachnida*. See ARACHNIDA, Vol. II, p. 276.

WATER-BEETLE. See COLEOPTERA, Vol. VI, p. 130.

WATER-BOATMAN. A popular name for hemipterous insects of the family *Notonectida*. They are boat-shaped insects, which are often seen swimming, back downward, on the surface of water. The large electric-light bugs (*Belostoma*) are closely related, but are more properly designated

water-scorpions. See **BOATFLY**, in these Supplements.

WATERBORO, a town of York County, southern Maine, on the Portland and Rochester railroad, 28 miles S.W. of Portland. The villages Ossipee Mills, Waterboro Center, East Waterboro, South Waterboro, North Waterboro and Waterboro are contained within the town. Population 1900, 1,169.

WATERBURY, a city of Connecticut, on the New England and the New York, New Haven and Hartford railroads. It is particularly famous for its manufacture of cheap watches. It has 8 churches, 4 national banks, 1 private and 3 savings banks, 3 daily and 5 weekly newspapers. According to the census of 1890, there were in Waterbury 219 manufacturing establishments, which gave employment to 10,354 persons, and the output of which was valued at \$17,712,829. There are 23 churches, 16 graded schools and several private academies. Population 1890, 28,646; 1900, 45,859. See also **WATERBURY**, Vol. XXIV, p. 400.

WATERBURY, a town of Washington County, north central Vermont, an important manufacturing center, on the Winooski River and on the Central Vermont railroad, 12 miles from Montpelier. Leather, brick, carriages, boots and shoes and lumber are manufactured. In addition to graded schools, Green Mountain Seminary is located here. The villages Waterbury and Waterbury Center are included in the town. Population of the town 1890, 955; 1900, 1,597.

WATER-CLOCK. See **CLOCKS**, Vol. VI, p. 25.

WATER-CLOSET. See **SEWERAGE**, Vol. XXI, pp. 716-718; and **PLUMBING**, in these Supplements.

WATER-COLOR PAINTING. See **PAINTING**, Vol. XVIII, p. 139.

WATERCOURSES. See **WATER-SUPPLY**, Vol. XXIV, pp. 403, 404.

WATERCRESS, a name given to species of the genus *Nasturtium*, plants belonging to the mustard family (*Cruciferae*), but especially to *N. officinale*, which is a native of Europe, but has run wild everywhere in streamlets. It is a smooth plant, with pinnate leaves of roundish leaflets, small white flowers and linear pods. It is extensively used as a garnish and salad-plant.

WATER CURE. See **HYDROPATHY**, Vol. XII, pp. 542-545.

WATER-DOG. See **DOG**, Vol. VII, p. 328.

WATER-DROPPER, a device for measuring the electric potential of the atmosphere. It is the invention of Sir William Thomson. An insulated tank of water is provided with a nozzle so arranged that it emits water drop by drop. Each drop is made to carry off an electrostatic discharge until the potential at the nozzle is found to be the same as that of the surrounding air, when the potential can be determined by an electrometer.

WATER-DUTY, LAW OF. See **IRRIGATION**, in these Supplements.

WATERFALL. See **HYDRO-MECHANICS**, Vol. XII, p. 519.

WATER-FEATHER. See **FEATHERFOIL**, in these Supplements.

WATER-FLEA, a popular name given to several

small entomostracan crustaceans. The name properly belongs to the *Daphnida*, a family of phyllopod crustacea. *Daphnia pulex* is a well-known form. The water-fleas proper are widely distributed, and are numerous in most fresh waters.

WATERFORD, a town of Saratoga County, southeastern New York, on the Hudson River, on the Delaware and Hudson railroad, and on the Champlain canal, 10 miles N. of Albany. It contains manufactories of soap, paper and flour, knitting-mills, machine and boiler works, and foundries. Population 1900, 3,146.

WATER-GAS is made by the action of steam on glowing coke, and consists chiefly of carbon monoxide and hydrogen ($H^2O + C = CO + H^2$). Air and steam are admitted alternately to a generator filled with coke. The generator-gas formed while the air is turned on contains much nitrogen, along with combustible gases, and is used for heating purposes in the works themselves. The water-gas is produced during the injection of the steam, contains very little nitrogen, and is a very efficient fuel. It can be used, also, for illuminating purposes, either by burning it in some form of incandescent burner, or by enriching it with a gas containing hydro-carbons, especially ethylene. This enriching-gas is made by throwing waste oil from oil-refining into red-hot retorts, and using the gases which result from its destructive distillation.

WATER-GLASS. See **SILICA**, Vol. XXII, pp. 53, 54.

WATER-HEN, a name sometimes applied to any species of the rails (*Rallidae*). The names marsh-hen and moor-hen are also given to some rails. See also **MOOR-HEN**, Vol. XVI, p. 808; and **MARSH-HEN**, in these Supplements.

WATER-HOG. See **CAPYBARA**, Vol. V, p. 80; and in these Supplements.

WATERHOUSE, ALFRED, a British architect; born in Liverpool, July 19, 1830; studied his profession at Manchester, where he commenced practice on his own account; traveled in Italy, and made his first great mark when, in a hardly contested competition, his designs were selected for the Manchester Assize Courts. Some of his chief public works include: In Manchester, the Town Hall, Owens College, etc.; in Liverpool, the Turner Memorial Home, the New Royal Infirmary, and University College; in London, the Natural History Museum, the New University Club, the National Liberal Club; in Leeds, the Yorkshire College. He received a *grand prix* for architecture at the Paris Exhibition of 1867, and a *rappel* at that of 1878. He was elected to full membership in the Royal Academy in 1885; received the royal gold medal of the Royal Institute of British Architects in 1878; and was president of that body in 1888, 1889 and 1890.

WATERING STOCK. See **RAILROADS**, in these Supplements.

WATERLAND, DANIEL, an Anglican clergyman; born in Wasely rectory, Lincolnshire, England, Feb. 14, 1683; entered Magdalene College, Cambridge, becoming a fellow in 1704, and master in 1713; was ordained in the Church of England; became rector of Ellingham in 1713; chaplain to George I

in 1717; was chosen to deliver the Lady Moyer lectures at St. Paul's, London; and in the same year rector of the parishes of St. Austin and St. Faith, London; chancellor of York in 1723; canon of Windsor in 1727; and archdeacon of Middlesex and vicar of Twickenham in 1730. He engaged in fervid controversies with Dr. Daniel Whitby, Dr. Conyers Middleton and Dr. Matthew Tindal, in defense of the Trinity and the Eucharist. His best-known works are his two *Vindications of Christ's Divinity* (1719-23); *Further Defense* (1725); *A Critical History of the Athanasian Creed* (1724); *A Review of the Doctrine of the Eucharist* (1737); and *Scripture Vindicated* (1730). In his day he was an able polemic and stout upholder of the divinity of Christ. He died in London, Dec. 23, 1740. A complete edition of his works, with a memoir of his life, by Bishop W. Van Mildert, was published at Oxford in 1823, in ten volumes, and in 1828 volume 11, and a third edition in 1856.

WATERLOO, a city and the capital of Monroe County, southwestern Illinois, on the Mobile and Ohio railroad, about 20 miles S. of St. Louis, Missouri. Building-stone is quarried in the vicinity, and the tributary farming region is given up to wheat and corn raising. The town has flouring-mills, breweries and an ice factory. It has graded schools, St. Joseph's Academy (Roman Catholic), two newspapers and modern municipal features. Population 1890, 1,860; 1900, 2,114.

WATERLOO, a town of Dekalb County, north-eastern Indiana; 30 miles N. of Fort Wayne, on the Lake Shore and Michigan Southern railroad. It is the market of a surrounding agricultural region. Population 1890, 1,473; 1900, 1,244.

WATERLOO, a city and the capital of Blackhawk County, northeastern Iowa, on both sides of the Cedar River, about 100 miles S.W. of Dubuque, 105 N.E. of Des Moines and 156 W. of Burlington, on the Burlington, Cedar Rapids and Northern, Illinois Central and Chicago Great-Western railroads. The river furnishes water-power for the manufactures conducted in the vicinity, which are extensive and growing. It is also the center of a fertile agricultural country, and the shipping-point for very large consignments of grain and produce. The city contains 3 banks, 4 weekly papers, a comprehensive graded school system, 10 churches, 2 opera-houses, a masonic hall, and an extensive line of commercial enterprises. Besides the division repair-shops of the Illinois Central railroad, the city contains manufactures of windmills, lumber and lumber products, furniture, wagons, plows, hollow-ware, brooms, well-drilling machinery, cigars, etc., and operates electric-light works for illuminating purposes. Population 1890, 6,679; 1900, 12,580.

WATERLOO, a village and the capital of Seneca County, central western New York, on the New York Central and Hudson River railroad, 58 miles E. of Rochester, on the Cayuga and Seneca canal and the Seneca River. Wagons and pianos are manufactured, and there are also saw, flour and woolen mills. Population 1900, 4,256.

WATERLOO, a town of Waterloo County, southwestern Ontario, Canada, on the Grand Trunk rail-

road, about 40 miles E. of Stratford and 2 miles N. of Berlin. The town is divided into North and South Waterloo. There are manufactures of agricultural implements, woodenware, woolen-goods, and there are breweries and distilleries. Population of North town in 1891, 2,841; and of the South town, 3,901.

WATERLOO, a town and the capital of Shefford County, southern Quebec, Canada, on the Central Vermont and Canadian Pacific railroads, 60 miles E. of Montreal. It is surrounded by a rich agricultural region, and manufactures carriages, leather and woolen goods. Population 1891, 1,733.

WATERLOO, BATTLE OF. See NAPOLEON, Vol. XVII, pp. 224, 225.

WATERLOW, SIR SYDNEY HEDLEY, a British public man; was apprenticed at the age of 14 to Thomas Harrison, the British government printer; at the age of 18 was placed in charge of the Cabinet Printing Press at Downing Street; at 20 went to Paris and was engaged by the Galignanis; in 1844 joined his father and brothers, and for the next twenty years devoted himself to extending the business of the printing firm known as Waterlow and Sons, Ltd. He was elected to the common council in 1855, and devised the scheme of overhead telegraph-wires for police use; was elected alderman in 1863, sheriff of London and Middlesex (1866-67), and knighted; contested Dumfriesshire, Scotland, which had not been contested for eighty years, and was returned, as a Liberal, at the head of the poll; elected Lord Mayor of London in 1872, and created a baronet the same year. He sat for Gravesend in Parliament from 1880 to 1885, and made a tour of the world in 1883. He presented, in 1889, a public pleasure-ground, known as Waterlow Park, to London.

WATERMELON, the well-known gourd-fruit of *Citrullus vulgaris*, cultivated from Asia. The plant is prostrate, with deeply lobed leaves, pale-yellow gamopetalous flowers, and a huge fruit containing an edible pulp, which are enlarged placentæ, in which are imbedded the seeds. Citron of the gardens is a variety with firm or hard flesh, used for preserving.

WATER-METER. The disk type of water-meter is now in quite common use. The Thomson form has an annular chamber, in which a flat disk is centrally mounted on a ball-and-socket bearing so that one edge of the disk is depressed, giving the surface an inclination of about twenty-five degrees. The chamber is so formed that when water is admitted to the under side of the disk the latter gyrates about its center, transferring the water to the other side of the chamber and allowing it to flow out. As the disk fits tightly in the chamber, it must, under a slight pressure of water, deliver at each revolution the amount of water which the chamber contains. A recording-device of dials, being directly geared to the disk, will show the number of revolutions made, and consequently the amount of water that has passed through the meter. The piston form of water-meter is also absolute in its action, the pressure from the mains being used to displace two reciprocating-pistons in such manner that their stroke measures the water. Meters which register the

pressure and afford data for a calculation as to the flow of water have never secured much of the public's confidence, though some of them are simple and accurate. The Venturi meter is formed by a contraction of the main pipe and the placing of pressure-gauges just before and at the point of contraction. A recording-mechanism being added, and a formula prepared, the amount of water flowing through is easily calculated.

WATER-MOCCASIN. See SNAKE, Vol. XXII, p. 199.

WATER-MOLDS, the common name of the *Saprolegniæ*, a family of aquatic fungous plants which are either parasites or saprophytes. They abound in fresh waters containing algæ, living upon dead plants and animals, or attacking living ones. *S. ferox* is a species which has proved very destructive to the salmon in certain rivers of England and Scotland.

WATER-MOLE, a name which the Australian colonists often apply to the duck-bills (*Ornithorhynchidæ*). The name refers to their aquatic and mole-like burrowing habits. See ICHTHYOSAURUS, Vol. XII, pp. 695, 696.

WATER-OUZEL. See OUZEL, Vol. XVIII, p. 75.

WATER-PLANTAIN, the common name of *Alisma Plantago*, a monocotyledonous plant of the family *Alismaceæ*. It grows in shallow water, and has long-petioled heart-shaped to lanceolate leaves, an ample panicle of numerous small white flowers and seed-like fruits.

WATER-PORE, a peculiar form of stoma found in some plants, and usually called a water-stoma. They are situated upon the apex or margins of leaves, at the terminations of the veinlets, and through them drops of water are excreted. They differ from true stomata not only in their situation, but also in the fact that their guard-cells are rigid, not being able to alter their form so as to vary the size of the aperture.

WATER-POWER. See HYDRO-MECHANICS, Vol. XII, pp. 459-533.

WATERPROOF CLOTH. See INDIA RUBBER, Vol. XII, p. 842.

WATER-RAT. See VOLE, Vol. XXIV, p. 278.

WATER RIGHTS. See IRRIGATION, in these Supplements.

WATERSPOUT. See METEOROLOGY, Vol. XVI, pp. 130, 131.

WATER-TIGER, larva of the *Dytiscus*. See COLEOPTERA, Vol. VI, p. 130.

WATERTOWN, a town of Middlesex County, eastern Massachusetts, on the Charles River, and on the Watertown branch of the Fitchburg railroad. It is eight miles W. of Boston, of which city it is an attractive suburb, and with which it is connected by an electric railway; but its chief importance is due to the number and variety of manufactures carried on there. These embrace starch, soap, paint, paper-bag and paper works, cloth, knit-goods and wire factories, stove foundries, cardigan-jacket and knit-cloth mills, sewing-machine needles, etc., besides the usual run of enterprises in the various lines of production not included in the above. The town

has one weekly paper, two banks, schools, churches, hotels, stores, warehouses, etc., and has a government arsenal. The township includes Bemis, Mount Auburn and Watertown villages, and Mount Auburn Cemetery is within its limits. Population of township in 1890, 7,073; 1900, 9,706.

WATERTOWN, a city and the capital of Jefferson County, New York, on the Rome, Watertown and Ogdensburg and the Utica and Black River railroads, and is connected with neighboring towns by trolley lines. It contains five banks, one daily and two weekly papers, a courthouse, ten churches, a high school, academy and intermediate schools, manufactures printing-presses, locks, brass goods, tinware and agricultural implements; has flour-mills, foundries, canneries, planing-mills, air-brakes, etc., and has a large tributary agricultural region. Population 1890, 14,725; 1900, 21,696. See also WATERTOWN, Vol. XXIV, pp. 410, 411.

WATERTOWN, a city of Codington County, South Dakota, on the Minneapolis and St. Louis, Chicago and North-Western and the Burlington, Cedar Rapids and Northern railroads, 70 miles N.E. of Huron, near Lake Kampeska. There are one daily and three weekly papers, three national and two state banks, three hotels, churches and schools. The tributary region is devoted to wheat-raising. Population 1890, 2,672; 1900, 3,352.

WATERTOWN, a city in Jefferson and Dodge counties, southeastern Wisconsin, on the Chicago and North-Western and Chicago, Milwaukee and St. Paul railroads, between Milwaukee and Madison. There are two banks established in the city, three weekly papers, thirteen churches, a high school and graded schools. In the way of manufactures there are foundries and machine-shops, breweries, woolen, flour, lumber and planing mills, cheese, cigar and shoe factories. The surrounding region is very fertile, and adapted to all kinds of agricultural products. Population 1900, 8,437. See also WATERTOWN, Vol. XXIV, p. 411.

WATER VALLEY, a town and the capital of Yalobusha County, northwestern Mississippi, on the Illinois Central railroad, 17 miles S. of Oxford. It has machine-shops and car-works, and manufactures sashes, blinds, doors and plows, and cotton is raised in the adjacent districts. Population 1900, 3,813.

WATERVILLE, a city of Kennebec County, southern Maine, on the right bank of the Kennebec River, at Ticonic Falls, 82 miles N.E. of Portland and 18 miles N.E. of Augusta, on the Maine Central railroad. Around the falls are clustered saw-mills, plow, ax, hoe and scythe factories, machine-shops, tanneries, etc. Waterville has Colby (Baptist) University (q.v., in these Supplements). Population 1890, 7,107; 1900, 9,477.

WATERVILLE, a village of Oneida County, central New York, about 20 miles S.W. of Utica, in the midst of a rich hop-growing district, on the Delaware, Lackawanna and Western railroad. It is the site of an academy, and contains manufactures of boots and shoes and of hop-presses. Population 1890, 2,024; 1900, 1,571.

WATER-VIOLET. See FEATHERFOIL, in these Supplements.

WATERVLIET ARSENAL, established by the United States government in 1807, on a reservation of 109 acres within the limits of the village of West Troy, New York. The arsenal constructs field, coast-defense and siege ordnance, having for the manufacture of such one of the largest plants in the United States. It also manufactures shot and shell, gun-carriages, equipments for field and siege service, as well as small ammunition. There are two stone magazines for powder and ammunition. Recently the various foundries and construction-works have been engaged in completing the great guns for the army and coast-defense. The arsenal has a wharfage of one thousand feet on the Hudson, and the Erie canal passes through the reservation. There are officers' quarters, barracks and a hospital. Its railroad station is East Troy, distant one mile. It is in command of a colonel of the Ordnance Department.

WATERWAYS, INTERNATIONAL COMMISSION FOR DEEP. The large growth and increase of inland commerce, as noted in the article on SHIPPING ON THE GREAT LAKES, in these Supplements, has awakened shippers to the need of deeper channels to accommodate the large steamers. As noted in the article mentioned, all general channels, such as the St. Clair and St. Mary's rivers, have been deepened so that vessels drawing twenty feet of water can with safety navigate the lakes from Duluth to Buffalo; but when lake ship-builders began to launch vessels prepared to sail not only the Great Lakes but also the Atlantic Ocean, the need of deep-water canals connecting the inland waters with the sea became apparent. If ocean vessels could sail from one end of the Great Lakes to the other when a connecting channel was made, and that connecting channel could be found by the deepening of the Welland and the St. Lawrence canals on the north, or the Erie canal or some equivalent route on the south, little doubt existed that a few years would see the development of one or both passages. At the same time, Western engineers called attention to the possibility of ocean-connection with the Great Lakes by means of the Chicago drainage-canal (q.v., under CANALS, in these Supplements), and its connection with the Mississippi River by the Illinois, and by a more northern route for barges, by the Fox River from Green Bay to the Wisconsin River, and thence by the Mississippi to the Gulf of Mexico. In the East, in addition to the Erie or some equivalent route, the promoters of deep-water navigation called attention to the desirability of deepening the Delaware and Raritan canals, and thus extending to Philadelphia inland water-connection. Added to the commercial feature, the citizens of the United States realized the need of deep-water connecting-passages for national defense, through the development of an intercoast line by various short links between Boston and Norfolk, and even farther south, and in permitting the passage of war-vessels into the Great Lakes. The Canadian government early acted upon these two reasons for deepening their canals, and had expended large sums when the United States was but beginning to make concerted

action. The Erie and Delaware and Ohio canals were built with local capital and through local agitation. The St. Mary's Canal was built by the United States government, and may be said to have been the first instance of general action and legislation along lake-connection lines. Deep-water agitation—that is, agitation in favor of connecting channels of such depth as to permit the passage of ocean-draft vessels—began in 1849. From that time until 1895, conventions were held at irregular intervals in all the principal lake and river cities, from Duluth to New Orleans, and from St. Paul to Saratoga Springs. The majority of these were but sectional. In 1894 there was held, in Toronto, Ontario, a convention that had more than ordinary significance, and to which went delegates, not only from the various Canadian provinces, but also from a number of portions of the United States. The object of this convention was, primarily, to consider the deepening of some one channel from the Great Lakes to the Atlantic Ocean. It was found impossible for the Canadian and United States representatives to agree upon a definite route, inasmuch as no one route could satisfy the commercial need, the St. Lawrence being used for Canada's purposes, while the chief movement of commerce was to the American seaboard between Portland and Norfolk, and further, such an agreement would imply an unwarranted concession on the part of one or the other country. However, a recommendation was passed, requesting both governments to appoint commissioners, with full powers of representation, who might unite in a common convention and agree upon some international plan of action. The first step was taken by the United States, and consisted in the introduction, by Senator W. F. Vilas of Wisconsin, of a bill which, known as the Vilas Act, passed both houses, and became a law March 2, 1895. This act was as follows:

"That the President of the United States is authorized to appoint, immediately after the passage of this joint resolution, three persons, who shall have power to meet and confer with any similar committee which may be appointed by the government of Great Britain, or the Dominion of Canada, and who shall make inquiry and report whether it is feasible to build such canals as shall enable vessels engaged in ocean commerce to pass to and fro between the Great Lakes and the Atlantic Ocean with an adequate and controllable supply of water for continual use; where such canals can be most conveniently located, and the probable cost of the same with estimates in detail; and if any part of the same, shall be built in the territory of Canada, what regulations or treaty arrangements will be necessary between the United States and Great Britain to preserve the free use of such canals to the people of this country at all times; and all necessary facts and considerations relating to the construction and future use of deep-water channels between the Great Lakes and the Atlantic Ocean."

An appropriation was made for the expenses of the commission, but no salaries were to be paid. In accordance with the act, President Cleveland appointed, Nov. 4, 1895, James B. Angell of Michi-

gan, Lyman E. Cooley of Illinois, and John E. Russell of Massachusetts. The Canadian government enacted a similar law, and appointed, as commissioners, Oliver A. Howland, Thomas C. Keefer, and Thomas Monro. In September, 1895, a convention was held in Cleveland, Ohio, under the auspices of the International Deep Waterways Association, a permanent organization formed to promote the union of the lakes and seaboard. This meeting was attended by some of the members of the International Commission and others interested. A platform was adopted, in which it was advocated that all channels should have a depth of at least 21 feet, and all permanent canals provided with a navigable depth of at least 26 feet, the purpose being a progressive development to the limit of utility in provision for the largest ocean-draft.

This convention reiterated the declaration of the preceding convention at Toronto, in favor of a permanent international court to settle, by rules of law, all differences that might arise between Great Britain and its dependencies and the United States, and the principle thus enunciated has found secure lodgment in the policies of the two governments in the settlement of the Venezuela boundary dispute.

The two commissions have been engaged, since their appointment, in gathering the material facts which would determine the question of route, and the character of a waterway in respect to the requirements of ocean-navigation, and how far these requirements can be met through the improvement of the intermediate channels of the Great Lakes, and the construction of canals to overcome rapids and falls and to cross from one body of water to another.

They have held several joint meetings to arrange their respective fields of work and for the exchange of data, as well, also, as to determine on a proper policy in regard to routes wholly or in part of an international character. Early in 1897 a preliminary report was submitted to Congress by the American Commission, and one contemplated to Parliament by the Canadian Commission, looking to final surveys, with project and estimates of cost for a deep-sea route or routes from the Atlantic seaboard into and through the Great Lakes, and to define the policy of the two governments respecting the same. In this connection it is interesting to note that the treaty of Washington has prepared the way by providing that the St. Lawrence River, and all canals constructed along the same and between the several lakes, shall be available to the people of the United States, on the same terms as to those of Canada, and further, that Canadians are to enjoy the same privileges in regard to any American route or routes that may be opened between the lake system and the Atlantic seaboard through the territory of the United States; so that it may be said that any route will be international in its practical character, and will be of equal service to both sides of the boundary line, subject only to the usual restrictions respecting the coasting trade and domestic commerce.

It is expected that the two governments will enact such further laws as will be necessary to complete the final surveys and determine the full scope of a

project; but until the possibilities have been developed it will be impracticable to define the full scope of the international questions involved.

WATER-WHEELS. A striking departure in water-wheels has been inaugurated by the introduction of the Pelton wheel, which has come into considerable use on the Pacific Coast. It is the simplest of all water-wheels, and is specially adapted for use with high heads, no other wheel approaching it in economy where the source of water is extremely high. It consists of a wheel of comparatively small diameter, bearing simple iron buckets on its rim, against which the water is directed at a tangent from a nozzle. The buckets have a central ridge, that divides the stream of water, which is turned on paraboloid surfaces, and falls dead from the buckets, with all its force expended. Its efficiency under favorable conditions has been shown by tests to be from 82 to 87 per cent, indicating that it delivers almost the whole of the theoretical power received. An efficiency of 82.6 per cent has been shown with a 15-inch wheel under a 50-foot head. By varying the size of the buckets and of the wheel, desired differences of speed in rotation can be obtained. To reduce the number of revolutions while delivering the same power, it is only necessary to use smaller buckets on a wheel of larger diameter. Pelton wheels are used under circumstances which would call for two thousand revolutions by a turbine, yet they require but a few hundred from this direct-acting mechanism. Of course this is a material saving in belting or gearing to reduce speed. The speed is also conveniently adapted for direct connection with a dynamo, so that electric power is cheaply developed. Where it is desired to increase the power of a wheel by the use of more water, it is only necessary to add more nozzles, as three or four may be used on the same wheel without interference. The small size of Pelton wheel required to deliver large power is a matter of surprise to those who have not investigated its principles. A wheel of 12 inches diameter placed under a 100-foot fall will develop $1\frac{1}{2}$ horse-power; under 200-foot head, 4 horse-power; under 500-foot head, 16 horse-power. A fall of 80 feet will deliver 50 horse-power, through the medium of a Pelton wheel of 6 feet diameter; under a 250-foot head, 267 horse-power; at 500 feet 755 horse-power and at 1,000 feet 2,136 horse-power is developed. These figures are for one-nozzle wheels. With plenty of water and more nozzles, the power from such wheels can be increased materially. Other variations in speed and effectiveness can be accomplished by changing the size of the nozzle-tip, which may be reduced without damage to the system, when less power is required. The figures given above are for full size of nozzle-tip for those sizes of wheel. A Pelton wheel is in use in the Comstock mines, in Virginia, Nevada, and probably delivers more power than any other mechanism of its size in the world. Its diameter is three feet, and it is working at the bottom of a mine, under 2,100 feet head of water. With a half-inch stream of water it develops 100 horse-power, and more in proportion. When loaded, its peripheral speed is 120 miles an hour. If allowed to run free, it will double this

speed. See HYDRO-MECHANICS, Vol. XII, pp. 522 et seq.

WATER-WITCH, a name applied to the grebes, birds of the family *Colymbidae*. They are expert divers, and spend most of the time in the water. See also GREBES, Vol. XI, p. 79.

WATER-WORKS. See WATER-SUPPLY, Vol. XXIV, pp. 405-410.

WATKIN, SIR EDWARD WILLIAM, an English railroad magnate; born in Manchester in 1819, where he was educated, and entered the counting-house of his father, who was a merchant there. In 1845 he was appointed secretary to the Trent Valley railroad. This led, in time, to his becoming identified with many of the leading railroads, becoming chairman of the boards of directors of the Southeastern, Metropolitan and other lines, and for some time president of the Grand Trunk railway of Canada. He became widely known in connection with his advocacy of a tunnel under the Channel, to reduce the time in going between London and Paris. He also has investigated the feasibility of a submarine tunnel to connect the north coast of Ireland with the south coast of Scotland. He was first elected to Parliament in 1857, but was unseated. In 1864 he was returned unopposed for Stockport, and sat, with several intermissions, for constituencies until the general election of 1895. He organized, in connection with the Manchester Athenæum, the great literary soirées of that institution, which were presided over by the most prominent men of the time. He was one of the originators of the Manchester *Examiner*. In 1861 he went to Canada at the instance of the Duke of Newcastle, then Secretary for the Colonies, for the purpose of effecting a union between the five provinces and establishing a transcontinental railroad, which he accomplished. He became high sheriff of Cheshire in 1874; a deputy lieutenant of the Tower Hamlets; a knight commander of the orders of the Redeemer of Greece and of Leopold of Belgium; and was created a baronet in 1880.

WATKINS, a village and glen of Schuyler County, western New York. The village lies 22 miles N. of Elmira, on Seneca Lake, and on the Northern Central railroad, and is the capital of the county. The refining of salt is the principal industry, in addition to which there are flour and saw mills, iron foundries and carriage-works, three weekly newspapers, two public libraries and Glen Springs Sanitarium. Watkins Glen is in the near vicinity, on Seneca Lake, and is noted for its natural beauty and picturesqueness; is filled with small cataracts and deep chasms. It is a popular resort, and one of great interest. Population of village (12th census, 1900), 2,943.

WATKINSVILLE, a town and the capital of Oconee County, Georgia, seven miles S. of Athens, on the Macon and Northern railroad. It is in an agricultural region, and has a weekly newspaper. Population 1890, 314 1900, 351.

WATLING'S ISLAND. See WEST INDIES, Vol. XXIV, p. 509.

WATSEKA, a city and the capital of Iroquois County, eastern Illinois, on the Chicago and East-

ern Illinois, and the Toledo, Peoria and Western railroads, 77 miles S. of Chicago; has foundries, carriage-works, flour, brick and tile manufactories, and 3 weekly papers. Its most noteworthy feature is the large number of artesian wells which are within the city limits, estimated at 200. Population 1890, 2,017; 1900, 2,505.

WATSON, HENRY WILLIAM, an English physicist; born Feb. 25, 1827; educated at King's College, London, where he obtained a mathematical scholarship; entered Trinity College, Cambridge, in 1846; elected scholar of the same in 1848; graduated in 1850, as second wrangler and Smith's Prize-man; elected fellow of his college and assistant tutor in 1851; mathematical lecturer at King's College, London (1856); and was presented to the rectory of Berkswell (1856). He published a *Treatise on Geometry* (1871); a *Treatise on the Kinetic Theory of Gases* (1876); and conjointly with Samuel Hawksley Burbury, a *Treatise on Generalized Co-ordinates Applied to Kinetics of a Particle*; and *Electricity and Magnetism*. He contributed the article MOLECULE to this ENCYCLOPÆDIA. He was elected a fellow of the Royal Society in 1881.

WATSON, JAMES CRAIG, an American astronomer; born in Fingal, Ontario, Canada, Jan. 28, 1838, while his parents were visiting there. He graduated at the University of Michigan (1857). While in the university he paid attention to astronomy entirely and for a time was the only student in that department. As a young man he learned to grind lenses for the university, and before his graduation discovered a comet, and became professor of astronomy and director of the observatory there (1863). In 1879 he relinquished these positions and accepted similar ones in the University of Wisconsin. He discovered 23 asteroids, among them, those named Minerva, Aurora, Io, and Eurynome, several of the smaller comets, and calculated the orbit of Donati's comet, which computation is accepted as authoritative. In 1869 he went to Iowa, and in 1870 to Sicily, to observe the eclipses of the sun. In 1870 he was awarded the Lalande gold medal. In 1874 he had charge of the American party that observed the transit of Venus from Peking, China. In 1876 he was one of the judges of award at the Centennial Exposition in Philadelphia, and wrote a *Report of Horological Instruments*. In 1878 he had charge of the government expedition to Wyoming to observe the total solar eclipse. Watson published a *Popular Treatise on Comets* (1860); *Theoretical Astronomy* (1868); and *Tables for Calculation of Simple and Compound Interest and Discount* (1879). He died in Madison, Wisconsin, Nov. 23, 1880.

WATSON, JOHN, a British philosophical critic; born in Glasgow, Scotland, Feb. 25, 1847; educated at the University of Glasgow, and appointed professor of moral philosophy in Queen's University, Kingston, Canada (1872). He published *Kant and His English Critics: A Comparison of Critical and Empirical Philosophy* (1881); *Schelling's Transcendental Idealism* (1882); *The Philosophy of Kant as Contained in Extracts from His Own Writings* (1888); *Comte, Mill and Spencer* (1895); and *Hedonistic Theories from Aristippus to Spencer* (1895).

WATSON, JOHN, an English author and clergyman, widely known by his pen-name, "Ian Mac-laren"; was born Nov. 3, 1850, at Manningtree, in Essex, of Scotch parents. In 1854 the family moved to Perth, Scotland. The lad was graduated at the University of Edinburgh in 1870, having had as fellow-students there R. L. Stevenson and Henry Drummond. He gained his theological education by spending the winter terms at New College, the Edinburgh Seminary of the Free Church, and the summer terms at Tübingen. In 1875-77 he was pastor of the Free Church congregation in Logiealmond, Perthshire, where he found the features of the Drumtochty of his stories. In 1877 he became associate pastor in St. Matthew's church, Glasgow; and in 1880 took charge of Sefton Park Presbyterian church, Liverpool, where he became noted for the strength, sympathy, and ability of his pulpit-work. He began publishing tales of humble Scottish life at the instance of W. Robertson Nicholl, for the *British Weekly*, the first being *A Lad o' Pairts*. In 1894 these were collected into the *Bonnie Brier Bush*. A similar work was *The Days of Auld Lang Syne* (1895). He also published *Kate Carnegie* (1896); *The Mind of the Master* (1896), wherein he pleads for a truer likeness to Christ, and emancipation from the jargon and aridity of creeds; *The Cure of Souls* (Yale Lectures, 1896); *The Potter's Wheel* (1897); *Companions of the Sorrowful Way* (1898); and *Rabbi Saunderson* (1898). In 1896 and 1899 he visited the United States on lecturing tours.

WATSON, JOHN CRITTENDEN, American naval officer; born in Frankfort, Ky., Aug. 24, 1842. On Sept. 29, 1856, he was appointed from Kentucky to the Naval Academy, and graduated in 1860. In 1861 he was made master, and attached to the steam-sloop *Sabine*, and afterward to Farragut's flagship *Hartford* of the West Gulf squadron; and in July, 1862, he was commissioned lieutenant. On board the *Hartford* he took part in the passage past Forts Jackson and St. Philip (April 24, 1862) and the capture of New Orleans (April 28); in the passage past the Vicksburg batteries up the river (June 28, 1862) and down (July 15, 1862); in the attempt to pass the batteries at Port Hudson, La. (March 8, 1863); in the passage past the batteries at Grand Gulf, Miss. (April 1, 1863); in the siege of Port Hudson (May-July, 1863); and in the battle of Mobile Bay, Ala. (Aug. 5, 1864). He was wounded by a fragment of shell from a Confederate battery at Warrington. In 1866 he was made lieutenant-commander, and assigned to the steam-frigate *Franklin*, Farragut's flagship on the European station. Later he served on special duty at Philadelphia till 1870, when he was assigned to the Asiatic squadron. In January, 1874, he was made commander, and attached to the Navy Yard at Mare Island, Cal. On March 6, 1887, he was promoted captain and transferred to San Francisco on special service. Later he was made president of the Naval Home, Philadelphia. In 1897 he was made commodore. During the war with Spain (April-August, 1898) he was in command of the blockading squadron off the north coast of Cuba, and later took part in the blockade of Santiago de Cuba. On June 27 arrangements were completed for send-

ing him, in command of the "Eastern squadron," to harass the coasts of Spain, an operation, however, which the return from Suez of the Spanish squadron under Camara rendered unnecessary. Commodore Watson took no part in the destruction of Cervera's squadron on July 3, as his flagship, the *Newark*, was at Guantanamo, coaling. He is now (1899) in command of the Navy Yard at Mare Island, Cal.

WATSON, SERENO, an American botanist; born in East Windsor Hill, Conn., Dec. 1, 1826; graduated at Yale (1847), and in medicine at the University of New York; was appointed botanist of the United States geological exploration of the fortieth parallel (1869); assistant curator in the Harvard herbarium (1871); and curator (1888-92). With Asa Gray and William H. Brewer he published *Botany of California* (1876-80). He also compiled a *Bibliographical Index to North American Botany, Part I, Polypetalæ* (1878); edited Lesquereux and James's *Mosses of North America*; and, with Prof. J. M. Coulter of the University of Chicago, revised *Gray's Manual of Botany*. He died in Cambridge, Mass., March 9, 1892.

WATSON, THOMAS (1557-1592), an English pastoral poet, who wrote *Hecatombathia*; *Amyntas*, etc.

WATSON, THOMAS E., an American politician and journalist; born in Columbia Co., Ga., Sept. 5, 1856; received a common-school education, was then sent to Mercer University, Macon, Ga., but on account of lack of funds left the university at the end of his sophomore year; taught school; read law for a short time; was admitted to the bar and began to practice in Thomson, Ga., in 1876; elected to the state legislature (1882); Democratic state elector-at-large (1888); and to the 52d Congress from Georgia (1890). During his term he published a sensational book, *If Christ Came to Congress*, in which he made many charges against fellow-Congressmen. In 1896 he was the nominee of the People's Party for Vice-President.

WATSON, WILLIAM, an English poet; born in Wharfedale, Yorkshire, Aug. 2, 1858. Up to his twelfth year he was in delicate health; removed with his parents to Southport, where his condition improved, and he went to school for a short time. In his early youth gave evidence of fine poetic powers, but it was not until 1890 that his poem *Wordsworth's Grave* made him famous. His *Lachrymæ Musarum* (1892) contained a memorial poem on Tennyson, the finest tribute paid to the dead laureate. He had previously published *The Prince's Quest* (1880); *Epigrams of Art, Life, and Nature* (1884); and *Lyric Love* (1892). In 1893 *The Eloping Angels*, a poetical caprice, and an admirable volume of essays, *Excursions in Criticism*, were published; *Odes and Other Poems* appeared in 1894; *The Father of the Forest* in 1895; *The Purple East* and *The Year of Shame* in 1896; *The Hope of the World* in 1897; and *Collected Poems* in 1898.

WATSONTOWN, a borough of Northumberland Co., Pa., on the Susquehanna river, 9 miles N. of Lewisburg; has flour and planing mills, nail-works, a tannery, car-shops, and table factories, and a newspaper. Population 1900, 1,898.

WATSONVILLE, a city of Santa Cruz Co., Cal., 20 miles S.E. of Santa Cruz, in a fertile agricultural region, where large quantities of fruit are raised; has lum-

bering interests and a beet-sugar factory, one daily and three weekly newspapers. Population 1890, 2,149; 1900, 3,528.

WATTERSON, HENRY, an American journalist; born in Washington, District of Columbia, Feb. 16, 1840; educated by private tutors; began his career as an editorial writer on *The Democratic Review* and *The States*; in 1861 went to Nashville, Tennessee, and edited the *Republican Banner*; served in the Confederate army; was on staff-duty from 1861 to 1863, and chief of scouts in General Johnston's army. After the war he again edited the *Banner*; but soon



HENRY WATTERSON.

went to Louisville, where, in 1867, he founded and continued to edit the *Journal*, which was later consolidated with the *Courier*, the paper becoming known as the *Courier-Journal*, and which he made one of the foremost American newspapers. As one of the leading Democrats of the country, he successfully opposed the reactionary movement of the Southern extremists against the reconstructive amendments to the constitution, supported Horace Greeley for the Presidency, was chief among the supporters of Samuel J. Tilden, and presided over the national Democratic convention which nominated him for President in 1876. He represented Kentucky in each succeeding convention, acting in those of 1880 and 1888 as chairman of the committee on resolutions and exercising a decisive influence in shaping the party policy. For years an energetic and consistent free-trader, in 1892 having declined the chairmanship of the committee on resolutions, which subsequently made a report unsatisfactory to the tariff reformers, and he led a fight in the convention, resulting in the adoption, by a two-thirds vote, of a minority report made by a single member of the committee. He steadily refused office, but in 1876-77 accepted a seat in Congress, serving with distinction and declining a re-election. He is an active public speaker and lecturer, and a voluminous writer on economic subjects. He delivered the dedicatory oration at the opening of the World's Columbian Exposition at Chicago in 1893. He declined the offer of a nomination for President on the National (Gold) Democratic ticket in 1896. He wrote *Oddities of Southern Life and Character* (1892); and *History of the Spanish-American War* (1898).

WATTLE-BIRD, a name applied to many birds of the family of honey-eaters (*Meliphagidae*), in reference to the naked wattles near the angles of the mouth. They all are inhabitants of the Australian region. The name is especially applied to the wattled honey-eater (*Anthochaera carunculata*).

WATTLE-TURKEY, the brush-turkey (*Talegallus lathami*) of Australia, and other species found in the Eastern islands. These birds belong to the family *Megapodidae*, which have the peculiar habit of building mounds, which serve as artificial incubators.

WATT-METER, a form of galvanometer for measuring, in watts, the rate of doing electrical work. It usually consists of two coils of insulated wire, one being coarse, the other fine, and so placed at right angles that the currents act on each other and measure both difference of potential and quantity of current. The watt-meter registers the watt-hours,—that is, the amount of power rather than amount of current in a circuit,—being equivalent to the horse-power measure of a steam-engine. The Thomson recording watt-meter is very largely used, and has been materially improved since its introduction in 1889. It is now practically a little electric motor, the retardation of which actuates the registering-apparatus. This retardation is produced by the drag of a small copper disk placed on the principal shaft, the disk rotating in a strong magnetic field that is proportional to the power in the circuit. With such an arrangement the dials must record the actual power, except for the item of friction, which is exceedingly trifling, and for which compensating-mechanism is introduced. The Thomson recording three-wire watt-meter requires to be read only at stated intervals, like a gas-meter, and as now made consumes but five watts in the largest size, suited for a 600-light circuit. For arc-stations the Thomson meter is provided with a high-resistance rheostat, inclosed in a brass case and mounted upon slate. Special forms of this meter are made for use in power-stations, for arc circuits, for the incandescent system, for primary circuits, for power-service, etc.

WATTS, GEORGE FREDERICK, a British painter; born in London in 1820; studied in the schools of the Royal Academy, and exhibited his first picture at its exhibition of 1837. In 1843 he received a prize of \$1,500 for his cartoon *Caractacus*, sent to Westminster Hall in that year, and from the commissioners for the decoration of the Houses of Parliament he also received a further prize of \$2,500 for his *Alfred Inciting the Saxons to Maritime Enterprise*. He painted also, for Parliament, his *St. George and the Dragon*, and for other public halls in England he has done much excellent work in elaborate frescoes. He was eminent as a portrait-painter, many of his sitters being prominent in all walks of life. Among his better-known subjects are his portraits of Tennyson (1862 and 1890); Gladstone (1865); The Duke of Argyll (1860); The Dean of Westminster (1867); J. E. Mills and Lord Leighton (1871); James Martineau and John Stuart Mill (1874). His most notable productions have been ideal or mythological subjects, such as *Sir Galahad* (1862); *Love and Death* (1877); the *Meeting of Jacob and Esau* (1868); *The Return of the Dove* (1869); *Daphne* (1886); *Orpheus and Eurydice* (1886). These are characterized by delicacy of touch and tender coloring, as well as by



GEORGE F. WATTS.

refinement and grace. His historical subjects are, however, stronger than his life-size allegories. In portrait-work he is one of the best modern exponents of the art. Mr. Watts is understood to have twice declined the offer of a baronetcy. He has also done something in sculpture, and it is said that a collection of his works are to be given on his death to the nation. He became a Royal Academician in 1867, but resigned in 1896, after the death of Millais.

WATTS, HENRY, an English chemist; born in London, Jan. 20, 1815; was educated to scientific pursuits; became demonstrator of chemistry at University College, London; librarian to the Chemical Society (1850); editor of its *Journal* (1861). He translated Gmelin's *Handbuch der Chemie* (18 vols., 1848-55); but is better known by his *Dictionary of Chemistry*, based on that of Dr. Ure (5 vols., 1863-68), supplements to which were issued (1872, 1875, 1881), and a new edition by Morley and Muir (4 vols., 1889-94). He died in London, June 30, 1884.

WATTS-DUNTON, THEODORE, English poet and literary critic; born at St. Ives, Huntingdonshire, in 1836; received his education privately at Cambridge. For a time he pursued a legal career, but turned from it, when he settled in London, to pursue literature as a calling. By his talents and other favoring circumstances he became the center of a remarkable literary and artistic circle in the metropolis, his friends being among the literary notables of the day, including Rossetti, Browning, Tennyson and Swinburne, the latter residing with him for many years, and to whom he acted as mentor and critic. Mr. Watts contributed many valuable articles to the London *Examiner* and *Athenaeum*, and since 1876 to the *Nineteenth Century*, the *Fortnightly Review*, and to other prominent reviews. He also contributed articles to this *ENCYCLOPEDIA* (see *INDEX*), of which the best examples are *POETRY* (see Vol. XIX, pp. 256-273), *ROSSETTI* (see Vol. XX, pp. 857-860), and *WYCHERLEY* (see Vol. XXIV, pp. 705-708). His prose papers are on varied subjects, though chiefly on art and literature, and are marked by originality and insight, as well as by culture and thought. His verse, chiefly sonnets, is ephemeral and elusive, though it possesses much charm, as the work of a highly cultured exponent of the romantic movement in literature. He contributed to Humphry Ward's *English Poets*, and wrote a great mass of suggestive and forceful literary criticism. He also wrote *The Coming of Love* (1897); and *Aylwin* (a novel, 1898).

WAT TYLER. See *RICHARD II*, Vol. XX, p. 541.

WAUGH, EDWIN, a British poet; known in England as "the Lancashire poet"; was born at Rochdale, Jan. 29, 1817; educated at the local academy; apprenticed to a printer and bookseller; was a journeyman printer for ten years; filled the office of secretary of the Lancashire Public School Association for five years; became an active member of the Manchester Literary Club, and was at one time its president. His first literary contributions were to the Manchester *Examiner*, and were full of the rich, local color and the quaint touches of the Lancashire character.

He became a very popular and successful author among his works being *Sketches of Lancashire Life and Character* (1855); *Poems and Lancashire Songs* (1859); *Rambles in the Lake Country and Its Borders* (1862); *Lancashire Songs* (1863); *Tufts of Heather from Lancashire Moors* (1864); *The Dead Man's Dinner* (1864); *The Goblin Grave* (1865); *Besom Ben and His Jackass* (1865); *Poies from a Country Garden*, selections from his former works (1865); *Ben an' th' Bantam* (1866); *Home Life of the Lancashire Factory Folk* (1866); *Yeth-Bobs an' Scalplins* (1869); *Dules-Gate* (1868), *Johnny o' Wobblers an' th' Two-Wheeled Dragon* (1869); *Lancashire Sketches* (1871); *Rambles and Reveries* (1872); *The Old Coal Man* (1873); *Jar-nock* (1873); *Old Cronies* (1875); *A Green Nook of Old England* (1875); *The Hermit Cobbler* (1878); *Around the Yule Log* (1879); *Complete Works* (10 vols., 1881-83). He received a pension of \$450 from the Civil List. He died in New Brighton, Cheshire, April 30, 1890.

WAUKEGAN, a city and the capital of Lake County, northeastern Illinois; occupies a prominent bluff on the west shore of Lake Michigan, 36 miles N. of Chicago and 49 miles from Milwaukee, on the main line of the Chicago and North-Western railroad, and is also entered by a branch of the Elgin, Joliet and Eastern railroad. From its elevated site Waukegan can be seen for miles, and its proximity to both Chicago and Milwaukee have made the beautiful city a favorite place of resort or summer residence for citizens of both municipalities. Gas and electric lights, good water-works and electric railways have been introduced, and the growth of the city since 1890 has been very rapid. During the summer months excursion steamers run regularly from Chicago to Waukegan, and a considerable shipping in iron, lumber, salt and coal is carried on through the harbor. Some of the more important industries include a sugar-refinery, wire-mills, large brass-works, and manufactures of brick and tile. At the village of North Chicago, a short distance south of Waukegan, and connected with it by an electric railway, are large zinc-works. Population 1890, 4,915; 1900, 9,426.

WAUKESHA, a village and the capital of Waukesha County, southeastern Wisconsin, on the Chicago, Milwaukee and St. Paul, the Chicago and North-Western, the Wisconsin Central and the Waukesha Beach railroads, 16 miles W. of Milwaukee. It is a noted health-resort on account of its springs, the waters of which are shipped to all parts of the United States, contains large stone-quarries and railroad repair-shops; has three weekly newspapers, and is the seat of Carroll College and of the State Industrial School for Boys. Population 1890, 6,321; 1900, 7,419.

WAUKON, a town and the capital of Allamakee County, northeastern Iowa, on the Chicago, Milwaukee and St. Paul railroad, 18 miles N.E. of Decorah. It is in the midst of a region producing grain and live-stock; has stone-quarries, machine-shops and wagon-works, and two weekly newspapers. Population 1890, 1,610; 1900, 2,153.

WAUPACA, a city and the capital of Waupaca County, central Wisconsin, on the Wisconsin Central railroad, 40 miles N. W. of Oshkosh; possesses mineral springs, whose waters are sought by invalids; has also manufactures of flour and woolen goods, a brewery, foundry and a planing-mill, and three weekly newspapers. Much grain is raised in the vicinity, for which Waupaca is the shipping-point. The State Soldiers' Home is located here. Population 1890, 2,127; 1900, 2,912

WAUPUN, a city of Dodge and Fond du Lac counties, southeastern Wisconsin, on the Chicago, Milwaukee and St. Paul railroad, 19 miles S. W. of Fond du Lac. It is the trade center of a fine farming region; has a brewery, pump and wind-mill factories, four nurseries, and contains the Wisconsin State Prison. Two weekly newspapers are published. Population 1900, 3,185.

WAUSAU, a city and the capital of Marathon County, central Wisconsin, situated on the Wisconsin River, and near its junction with Rib River, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. The city is the center of a large area covered with pine timber, and is engaged in the manufacture of rough and dressed lumber, sashes, doors, blinds, flooring and other lumber products. From a dozen to fifteen planing-mills are in operation, also saw-mill machinery works, foundries and machine-shops, furniture and cigar factories, etc., a large part of the motive power being obtained from the Wisconsin River. The city contains five weekly papers, two banks, seven churches and graded schools. Some mining and granite-quarrying are carried on in the vicinity. Population 1890, 9,253; 1900, 12,354

WAUSEON, a village and the capital of Fulton County, northwestern Ohio, 30 miles W. of Toledo, on the Lake Shore and Michigan Southern railroad. It is the center of an agricultural region, and contains two flour-mills, a public library, electric lights and graded schools. Population 1890, 2,060; 1900, 2,148.

WAUTERS, ÉMILE CHARLES, a Belgian painter; born in Brussels, Nov. 29, 1846; studied under Portaels in Brussels, and under Gérôme in Paris; second class medals at Salon (1875-76); medals of honor, Paris Exposition (1878-89); chevalier of the Legion of Honor; knight of the Order of Leopold of Belgium, and of Francis Joseph of Austria. Among his works are *Mary of Burgundy Sworn to Respect the Privileges of the Commons, 1477*; *The Madness of Hugh Van der Goes*; *Mary of Burgundy before the Sheriffs of Ghent*; *Citizens of Brussels Demanding the Constitution of Duke John IV*; etc.

WAUTOMA, a town and the capital of Wau-shara County, central Wisconsin. Its nearest station is Plainfield, on the Wisconsin Central railroad, 40 miles N. of Portage and 30 miles S. E. of Grand Rapids. It is in the midst of a farming region, and has a flour-mill. Population 1890, 704, 1900, 1,060.

WAVE-LENGTHS, in the spectrum. See SPECTROSCOPY, Vol. XXII, p. 379.

WAVELLITE. See MINERALOGY, Vol. XVI, p. 405.

WAVE-MOTORS. Numerous forms of wave-motors have been invented, and most of them will perform more or less work without any other cost than keeping them in repair; yet for some reason none of them are in extensive operation, and in fact it is a matter of doubt whether any of them were ever used for anything more than experimental work. Probably their unreliability as a source of steady power is the cause of their general rejection. They may be classified as follows: 1. Those that depend upon the vertical rise and fall of the particles near the surface of the water; the simplest of these is a float with connecting levers, that delivers up-and-down motion. 2. Those which utilize the variation of slope of the waves' surface, as in oscillating a float, so that arms at either end may operate pawls that will drive a wheel. 3. Those constructed to use the horizontal to-and-fro motion of the particles of water, as where a horizontal board is hung edge-up near the surface, so that it may swing to and fro and drive a crank. 4. Those using the impetus of waves rolling up a beach, as the Whitesides surf-motor, which has a horizontal shaft set above the water, and arranged to be turned by a number of swinging-boards which drive against pawls as they are swept in by the surf. 5. Those which make use of the tendency of the waves to throw a paddle or disk out of the vertical. Of this latter class is Stahl's, which has a vertical board with cross-pieces to which suspending levers are hinged. The levers receive an oscillatory motion that drives a horizontal wheel through pawls and ratchets. If no way is discovered for rendering this class of motors more regular in their action, it would seem as if they might at least be made serviceable in charging electric accumulators, which are coming into increased use.

WAVERLY, a city of Morgan County, western central Illinois, on the Jacksonville, Louisville and St. Louis and the St. Louis, Chicago and St. Paul railroads, 18 miles S. E. of Jacksonville. It is in the midst of a farming region; has creameries, flour-mills and tile factories; has a weekly newspaper and graded schools. Population 1890, 1,337; 1900, 1,573.

WAVERLY, a city and the capital of Bremer County, northeastern Iowa, on the Burlington, Cedar Rapids and Northern, the Chicago Great Western and the Illinois Central railroads, 12 miles N. of Cedar Falls. The tributary region is devoted principally to stock-raising and horse-breeding. The city possesses creameries and cheese factories, and has four weekly newspapers. Wartburg College (Lutheran) is located here. Population 1890, 2,346; 1900, 3,177

WAVERLY, a village of Tioga County, southwestern New York, on the Delaware, Lackawanna and Western and the New York, Lake Erie and Western railroads, four miles N. of Athens; contains cigar factories, planing-mills, tanneries, flour and paper mills and car-wheel works. It is

the center of a region producing grain and is interested in dairying. It is connected with neighboring cities by electric railways, has electric lights and three weekly papers. Population 1890, 4,123; 1900, 4,465.

WAVERLY, a village and the capital of Pike County, southern Ohio, on the Norfolk and Western and the Ohio Southern railroads, 16 miles S. of Chillicothe, on the Ohio canal; has planing and saw mills, a tannery and a furniture factory. Tobacco and grain are raised, and attention is given to fine stock. Population 1900, 1,854.

WAVERLY, a town and the capital of Humphreys County, southwestern Tennessee, on the Middle Tennessee and Alabama railroad, 60 miles W. of Nashville. It is the commercial center of an extended agricultural region and ships a variety of products, and has a weekly newspaper. Population 1900, 786.

WAVES, ELECTRIC. See ELECTRICITY, § 93, in these Supplements.

WAVES, SEA. See GEOLOGY, Vol. X, p. 285-287; and WAVE, Vol. XXIV, pp. 419, 420.

WAXAHACHIE, a town and the capital of Ellis County, northwestern Texas, on the Houston and Texas Central and the Missouri, Kansas and Texas railroads, 180 miles N.E. of Austin. Cotton, wheat and corn are grown in the vicinity, and the town contains an ice factory, machine-shop, cottonseed-oil and flour mill and one daily and four weekly papers. It has street-railways, electric lights and graded schools. Population 1890, 3,076; 1900, 4,215.

WAX-MYRTLE, a name given to *Myrica cerifera*, a shrub of the sweet-gale family (*Myricaceæ*); also called bayberry. It grows along the Atlantic coast, and has fragrant lanceolate glossy leaves, and bony nuts thickly coated with greenish or white wax, giving them a berry-like appearance.

WAX-PALM. See FOREST, Vol. IX, p. 406.

WAX-PLANT, a well-known house-plant from India (*Hoya carnosa*), belonging to the milkweed family (*Asclepiadaceæ*). It has rooting-stems, very thick and fleshy oval leaves and umbels of numerous flesh-colored or whitish wax-like flowers.

WAXWORK. See WAX FIGURES, Vol. XXIV, p. 460.

WAXY DEGENERATION OR AMYLOID DEGENERATION. See PATHOLOGY, Vol. XVIII, p. 390.

WAY, in its popular sense, is a term signifying a road, street, or other passage, which may be either for public or private use. In its legal and technical sense, the term refers to the right to use such road or other passage, rather than to the road or passage itself, and in this abstract sense it is an incorporeal hereditament, and entirely different from a common highway. A way, or as it is more commonly called, a right of way, may arise by prescription, as when the right has been exercised without interruption for twenty years; by necessity, as when one buys land which is accessible only by passing over other land of the vendor, in which case such purchaser is entitled to a right of way over the vendor's land during such time as

the right is necessary; by reservation, which is by express grant of the owner of the land; by custom, as in the case of navigable streams those who desire to tow vessels have a right of way to drive their horses along the banks of such streams; and by act of legislature, whereby public ways may be established. A right of way may be a personal right, incapable of being passed from one to another, or a right annexed to an estate, and therefore transferable with the estate. A way can be used only for the purpose for which it was acquired. The obstruction of a public way is a nuisance, and may be abated, while the obstruction of a private way, unless such obstruction is sufficient to close up the way, is merely a disturbance of the right, for which there may or may not be a remedy, according to the nature of the right.

WAYCROSS, a town and the capital of Ware County, southeastern Georgia; on the Brunswick and Western, the Savannah, Florida and Western and the Waycross Air Line railroads, 60 miles W. of Brunswick, in a region which is thickly timbered; has two weekly newspapers, one daily and a monthly. Population 1900, 5,919.

WAYLAND, a town of Middlesex County, eastern Massachusetts, on the Boston and Maine railroad, and on the Sudbury River, 15 miles W. of Boston; has a shoe factory, a public library (founded in 1850), and graded schools. The town contains Cochituate and Wayland villages. Population 1890, 2,060; 1900, 2,303.

WAYLAND, FRANCIS, an American educator; born in New York City, March 26, 1796; studied medicine and theology at Union College, Schenectady, New York, and entered the Baptist ministry (1816); tutor of Union College (1817-21); occupied the pulpit of the First Baptist Church, Boston, Massachusetts (1821-26). In 1827 he became president of Brown University, Providence. He filled this office for 28 years with distinguished honor to himself and the highest advantage to the university, which speedily enjoyed a greatly enlarged prosperity. He was the author of *The Duties of an American Citizen* (1825); *Elements of Moral Science* (1835); *Elements of Political Economy* (1837); *Limitations of Human Reason* (1840); *Thoughts on the Present Collegiate System of the United States* (1842); *Elements of Intellectual Philosophy* (1854); *Memoir etc. of Dr. Chalmers* (1864). His *Life* was written by his sons, Francis and Heman Lincoln (1867), and by Prof. J. O. Murray (1890). He died in Providence, Rhode Island, Sept. 30, 1865.—FRANCIS, an American jurist, was born in Boston, Aug. 23, 1826; graduated at Brown University; admitted to the bar and began practice in 1850; judge of a court in Connecticut (1864); lieutenant-governor of Connecticut (1869); professor in Yale Law School (1872); dean of the same (1873).—HEMAN LINCOLN, an American clergyman; was born at Providence, Rhode Island, April 23, 1830; graduated at Brown University (1849), and at Newton Theological Institution; tutor in Rochester University (1852-54); minister of a Baptist church at Worcester (1854-61); chaplain Seventh Connecticut

Regiment (1861-64); professor of rhetoric and logic at Kalamazoo College, Michigan (1865-70); president Franklin College, Indiana (1870-72). He was editor of the *National Baptist* (1872-94) and *The Examiner* (1894), and published *Faith and Works of Charles H. Spurgeon* (1892).

WAYNE, a village of Wayne County, southeastern Michigan, on the Flint and Pere Marquette and the Michigan Central railroads, and on the Rouge River, 18 miles W. of Detroit and 26 miles N. of Monroe. Carriages, cigars and brick are manufactured; there are graded schools and two weekly newspapers. Population 1890, 1,226; 1900, 1,361.

WAYNE, a town and the capital of Wayne County, northeastern Nebraska, on the Chicago, St. Paul, Minneapolis and Omaha railroad, 46 miles W. of Sioux City, in an agricultural region, and is a shipping-point for grain and cattle; has four weekly and one monthly publications. Population 1890, 1,178; 1900, 2,119.

WAYNE, a village of Delaware County, southeastern Pennsylvania, on the Pennsylvania railroad, 14 miles N.W. of Philadelphia. It is a popular suburb of Philadelphia. Population 1890, 997.

WAYNE, ANTHONY, an American general; born in East Town, Pennsylvania, Jan. 1, 1745; educated in Philadelphia, and became a land-surveyor. He was a member of the Pennsylvania convention of 1774 and 1775; member of the colonial legislature (1774), and of its committee of safety (1775); commissioned colonel of a Pennsylvania regiment (Jan. 3, 1776); served under General Thomas; was wounded at the battle of Three Rivers, in Canada (1776); commanded at Ticonderoga (1776); commissioned brigadier-general in 1777, and joined Washington's army in New Jersey; defended Chadd's Ford at the battle of Brandywine, Sept. 11, 1777; was surprised in a night attack by the British, under Major-General Grey, Sept. 20; commanded the right wing at Germantown, October, 1777; directed an efficient foraging raid within the British lines for the army at Valley Forge during the winter of 1777-78, returning with many horses, cattle and miscellaneous supplies; hung on the rear of General Clinton, on the evacuation by the latter of Philadelphia, in June, 1778; served at Monmouth, June 28, 1778. He led the attack at Stony Point, on the Hudson, July 16, 1779, and with twelve hundred men reached the fort without being observed, and by a bayonet charge forced the garrison to surrender. This was his most famous achievement, and for it Congress voted a gold medal to "Mad Anthony Wayne," as he came to be called, on account of his impetuous valor. He suppressed a mutiny among the troops of the Pennsylvania line in January, 1781; was in command at Green Spring in 1781; took a prominent part in the capture of Yorktown, Oct. 19, 1781; defeated the British and Indians in the south in 1782; and took possession of Charleston, South Carolina, after its evacuation, Dec. 14, 1782. He received the brevet rank of major-general in 1783;

was a member of the Pennsylvania legislature (1784); a member of the state ratifying convention, Dec. 12, 1787; settled on a land-grant in Georgia, and represented the latter in Congress (1791-92). He was appointed major-general, commanding the United States Army, in 1792; commanded a force in the northwestern territories in 1793, defeating the Indians at Fallen Timbers, or Maumee Rapids, Aug. 20, 1794; built Fort Wayne (now in Indiana) in this year; and concluded a treaty with the Indians at Greenville in 1795. He died on his way home, at Presque Isle, now Erie, Pennsylvania, Dec. 15, 1796.

WAYNE, JAMES MOORE, an American jurist; born in Savannah, Georgia, in 1790; graduated at Princeton in 1808; admitted to the bar, and practiced in Savannah; elected to the legislature, and chosen to preside over two constitutional conventions; elected mayor of Savannah in 1823; judge of the superior court of Georgia (1824-29); member of Congress (1829-35); appointed by President Jackson associate-justice of the supreme court of the United States (1835). He died in Washington, District of Columbia, July 5, 1867.

WAYNESBORO, a village and the capital of Burke County, eastern Georgia, on the Central of Georgia railroad, 32 miles S. of Augusta, in the midst of a cotton-raising region, and has a cottonseed-oil mill. Population 1900, 2,030.

WAYNESBORO, a borough of Franklin County, southern Pennsylvania, on the Western Maryland and the Mont Alto railroads, 15 miles S. of Chambersburg. Largely a manufacturing center, exporting boilers, engines, sawmills and agricultural machinery. It contains also a pottery, foundries and general machine-shops. In the vicinity are found iron and copper. Population 1890, 3,811; 1900, 5,396.

WAYNESBORO, a village and the capital of Wayne County, southern Tennessee, 40 miles S.E. of Lexington and 80 miles S.W. of Nashville, on no railroad, in an agricultural region. Population 1890, 239.

WAYNESBURG, a borough and the capital of Greene County, southwestern Pennsylvania, on the Waynesburg and Washington railroad, 50 miles S. of Pittsburg. It is in the midst of a rich farming and stock-raising region. Attention is given to fine sheep, and from it many are shipped. It has iron-foundries, woolen-mills and flour-mills, and four weekly newspapers. Population 1890, 2,101; 1900, 2,544.

WAYNESVILLE, a town and the capital of Haywood County, southwestern North Carolina, on the Atlantic and Danville railroad, 30 miles E. of Bryson City, in a mountainous region. Population 1900, 1,307.

WAZAN. See MOROCCO, Vol. XVI, p. 834.

WEAKFISH, another name for the squeteague, q. v., in these Supplements.

WEALDEN BEDS. See GEOLOGY, Vol. X, p. 359.

WEATHER. See METEOROLOGY, Vol. XVI, pp. 157-159.

WEATHER BUREAU. See METEOROLOGY and SIGNAL SERVICE, in these Supplements.

WEATHERFORD, a town and the capital of Parker County, northern Texas, on the Texas and Pacific and the Gulf, California and Santa Fé railroads, 65 miles W. of Dallas and 40 miles N.W. of Cleburne. Texas Female Seminary (Cumberland Presbyterian), and Weatherford College (Methodist Episcopal) are located here. The tributary region is devoted to farming and stock-raising. Population 1900, 4,786.

WEATHERLY, a borough in Carbon County, eastern Pennsylvania, on the Lehigh Valley railroad, 14 miles N.W. of Mauch Chunk. It is in a coal-mining region; has a silk-mill and the division repair-shops of the Lehigh Valley railroad. Population 1890, 2,961; 1900, 1,089.

WEATHERSFIELD, a town of Windsor County, southern Vermont, on the Connecticut River, 63 miles S. of Montpelier; has manufactories of lime, cider, shingles, butter-tubs and apple jelly; includes the villages of Weathersfield, Perkinsville, Felchfield and Amsden. Population 1890, 1,174; 1900, 2,471.

WEATHER-SIGNALS. See SIGNAL SERVICE, in these Supplements.

WEAVER, JAMES B., an American public man; born in Dayton, Ohio, June 12, 1833; graduated at the law school of the Cincinnati College in 1854. He served in the Union army during the Civil War, attaining the rank of brigadier-general, and at the conclusion of hostilities practiced law in Iowa. He was elected district-attorney of the second judicial district of that state, and filled the position of internal revenue assessor, besides that of editor of the *Iowa Tribune*, issued at Des Moines. He was elected to Congress in 1878, and in 1880 became the Greenback candidate for the Presidency. He was again returned to Congress in 1884, and re-elected in 1886. In 1892 he became the Presidential candidate of the People's party, receiving 22 electoral votes.

WEAVERVILLE, a town and the capital of Trinity County, northwestern California, 43 miles N.W. of Redding, which is the nearest railroad station, on the Southern Pacific railroad. It is of importance principally as a supply-center for mining towns in the vicinity. Population 1890, 768; 1900, 968.

WEBB, ALEXANDER STEWART, an American soldier; born in New York City, Feb. 15, 1835; son of James Watson Webb; graduated at West Point, 1855; commissioned in the artillery; served in Florida; then on frontier duty for two years, when he was appointed assistant professor of mathematics at West Point, 1857, which position he held until 1861; in this year was promoted successively until he became major of the First Rhode Island Artillery. He was at the first battle of Bull Run; was on duty in the defenses of Washington; served with the army of the Potomac through the Peninsula campaign, 1862; chief of staff Fifth Corps in the Maryland and Rappahannock campaigns; commissioned brigadier-general of volunteers, being assigned to the Second Corps; commanded a brigade at Gettysburg, during which he was wounded, and received

a bronze medal for personal gallantry; commanded a division in the Rapidan campaign; brevetted lieutenant-colonel at Bristow Station, Oct. 14, 1863; led a brigade at the battles of the Wilderness and Spottsylvania, at the latter being severely wounded, May 12, 1864; chief of staff to General Meade until the close of the war. Subsequently he acted as inspector-general of the Military District of the Atlantic (1865-66); brevetted major-general of the United States Army (1865); was then a professor at West Point until 1868; lieutenant-colonel Forty-fourth United States Infantry (1866); commanded the Fifth Military District (1869); president of the College of the City of New York (1869); resigned from the army in December, 1870. He contributed articles on the war to the *Century Magazine*, and was the author of *The Peninsula: McClellan's Campaign of 1862* (1882).

WEBB, GEORGE JAMES, an American musician; born June 24, 1803, at Salisbury, Wiltshire, England; found his way to the United States in 1830; settled in Boston as an organist and teacher of music; appointed a director of Boston Academy of Music on its organization; removed to Orange, New Jersey, where he developed his method of voice-culture. He published with T. B. Hayward *The Musical Cabinet* (1832); with William Mason (who married his daughter) *The Melodist*; and, with Chester G. Allen, *Voice Culture*; and was the author of *The American Glee Book; Common-School Songster; Little Songster for Schools; Vocal Class-Book for Schools; Massachusetts Collection of Psalmody; Cantica Ecclesiastica*, etc. He died in Orange, New Jersey, Oct. 7, 1887.

WEBB, JAMES WATSON, an American journalist and diplomatist; born in Claverack, New York, Feb. 8, 1802; was a son of Samuel Blatchley Watson, an American Revolutionary general, descended from Richard Watson, an Englishman, who in 1635 helped to found Hartford. James Watson Webb was educated at Cooperstown, New York, commissioned second-lieutenant in the United States army (1819); first-lieutenant (1823); adjutant Third Infantry (1826); resigned, in 1827, on becoming editor of the New York *Morning Courier*, which was consolidated, in 1829, with the *Enquirer*, the consolidated journal being under the editorship of Webb until 1861, when it was absorbed in *The World*. In June, 1842, he was wounded in a duel with Thomas F. Marshall, of Kentucky, for which, after indictment, he was imprisoned, but was released at the expiration of the second week. In 1849 he was appointed Minister to Austria, but the Senate refused to indorse the appointment. Having solicited a major-general's commission at the outbreak of the Civil War, he refused the offer of that of brigadier-general. He was Minister to Brazil (1861-70), and was instrumental in settling outstanding claims of United States citizens against that country. While in Paris in 1865 he negotiated a treaty with the Emperor for the removal of French troops from Mexico. He wrote *Alton: or, Incidents of Life and Adventure in the Rocky*

Mountains (1846); *Slavery and its Tendencies* (1856); *National Currency*, a pamphlet (1875). He died in New York City, June 7, 1884.

WEBB, SIDNEY, an English writer on socialism; born in London, July 13, 1859; educated in Switzerland and Germany; became a distinguished scholar in law, moral and political philosophy, etc., at Cambridge and Gray's Inn, called to the bar in 1885; entered the civil service in 1878, retiring in 1891. He published *Socialism in England* (1889) and *The London Programme* (1892), and, with Harold Cox, *The Eight-Hours Day* (1891). His wife, Beatrice Potter, published *The Co-operative Movement in Great Britain*.

WEBB CITY, a city of Jasper County, southwestern Missouri, on the Kansas City, Fort Scott and Memphis, the Missouri Pacific and the St. Louis and San Francisco railroads, nine miles S.W. of Carthage. It is in the midst of a zinc and lead mining region, in which extensive operations are carried on. Pop. 1890, 5,043; 1900, 9,201.

WEBBER, CHARLES WILKINS, an American journalist and frontiersman; born at Russellville, Kentucky, May 29, 1819; went to Texas in 1838, where he became one of the famous Texas rangers; returned to Kentucky and studied medicine; entered Princeton Theological Seminary in 1843, but abandoned his intention of entering the ministry; went to New York City and engaged in literature, becoming a contributor to the *New World*, *Democratic Review*, *Sunday Despatch*, and subsequently to the *Whig Review*, of which he was joint proprietor and editor for two years. He headed an expedition to the Colorado and Gila Rivers in 1849. On account of the difficulty he experienced in crossing the desert he formed a camel company, obtaining a charter from the New York legislature in 1854. In 1855 he joined the Walker expedition to Nicaragua, took part in the battle of Rivas, and fell in a chance encounter in that engagement, April 11, 1856. He was the author of *Old Hicks, the Guide: or, Adventures in the Comanche Country in Search of a Gold Mine* (1848); *The Gold Mine of the Gila* (1849); *The Hunter Naturalist* (1851); *Texas Virago: or, the Tailor of Gotham* (1852); *Tales of the Southern Border* (1853); *Spiritual Vampirism* (1853); *Shot in the Eye* (1853); *Adventures with Texas Rifle Rangers* (1853); *Wild Scenes and Song-Birds* (1854); and *History of Mystery* (1855).

WEBER, WILHELM EDUARD, a German physicist; born in Wittenberg, Oct. 24, 1804; was appointed professor of physics at Göttingen in 1831, retiring in 1837; became professor at Leipzig; returned to Göttingen in 1849, where he remained until his death. With his elder brother, Ernst Heinrich (1795-78), he produced *Die Wellenlehre* (1825); with his younger brother, Eduard Friedrich (1801-71), *Mechanik der Menschlichen Gehwerkzeuge* (1836); and with Karl Friedrich Gauss (1777-1855), *Resultate aus den Beobachtungen des Magnetischen Vereins*; and an *Atlas des Erdmagnetismus* (1840). He died in Göttingen, June 23, 1891.

WEBER RIVER, a stream of northeastern

Utah, which rises in Summit County, flows north and northwesterly through Morgan and Weber counties, and empties into the Great Salt Lake. It has a length of 175 miles, and in that part of its course which is through the Wasatch Mountains it flows through Weber's cañon, which furnishes the pathway of the Union Pacific railroad to Ogden. Numerous valleys are connected and watered by this stream.

WEB PERFECTING PRESS. See PRINTING-PRESSES, in these Supplements.

WEBSTER, a town of Worcester County, central Massachusetts, 15 miles S. of Worcester, on the Boston and Albany and the New York and New England railroads. It manufactures woolen, cotton and linen goods, and contains several brass and iron foundries, and has two weekly newspapers. Pop. 1890, 7,031; 1900, 8,804.

WEBSTER, a town and the capital of Jackson County, southwestern North Carolina, on the Southern railroad, 150 miles N. of Charlotte. It is the commercial center of a farming district. Population township (1900), 1,012.

WEBSTER, a village and the capital of Day County, northeastern South Dakota, on the Chicago, Milwaukee and St. Paul railroad, 45 miles E. of Aberdeen, in the center of a wheat-raising region, from which much grain is shipped. Population 1900, 1,506.

WEBSTER, SIR RICHARD (now Lord Alverstone), Lord Chief Justice of England, born Dec. 22, 1842; educated at Trinity College, Cambridge; was called to the bar at Lincoln's Inn in 1868, and rapidly achieved a reputation for his conduct of engineering, patent, shipping and railway cases; became a Q.C. at the unusually early age of 35. He was member of Parliament for Launceston (1885), and for the Isle of Wight (1885-95), when he was re-elected; was Attorney-General in Lord Salisbury's government of 1885, and again in that of 1886; appeared on behalf of *The Times* before the Parnell commission, and his acceptance of this brief led to much acrimonious discussion in the House of Commons. He delivered a vigorous speech to the Strafford Club on the Parnell Commission report in 1890; was one of the British representatives in the Bering Sea arbitration in 1893; was reappointed Attorney-General in the Salisbury ministry of 1895; and in 1899 was British counsel before the Venezuela arbitration tribunal at Paris. Before his elevation to the chief justiceship of England, he was Master of the Rolls. He was made a K. B. in 1885 and a G. C. M. G. in 1893.

WEBSTER CITY, a city and the capital of Hamilton County, central Iowa, on the Illinois Central, the Chicago and North-Western and the Webster City and South-Western railroads, 20 miles E. of Fort Dodge. Considerable coal is mined in the vicinity, although the principal occupation is farming; it has mineral springs and is a health-resort. Population 1900, 4,613.

WEBSTER GROVES, a village of St. Louis County, eastern Missouri, on the Missouri Pacific railroad, 10 miles W. of St. Louis, of which it is a suburb. Population 1890, 1,783; 1900, 1,895.

WEDDERBURN, JOHN. See HYMNS, Vol. XII, p. 591.

WEDGEWOOD WARE. See POTTERY AND PORCELAIN, Vol. XIX, p. 632.

WEDMORE, FREDERICK, an English author; born at Richmond Hill, Clifton, July 9, 1844, of an old Quaker family; educated at Paris and Lausanne; after being for a while engaged on a Bristol newspaper he went to London in 1868, becoming a contributor to the *Spectator*. He produced *The Two Lives of Wilfred Harris* (1868); and two novels, *A Snapt Ring* (1871) and *Two Girls* (1874), which were well received by the critics, but which the author never sought to republish. In 1877 he produced *Pastorals of France*, a volume of short stories, which was followed by *Renunciations*. These volumes gave him rank as an imaginative writer. He became better known as an art writer and critic, producing in this department *Studies in English Art*, two series (1878-80); *The Masters of Genre Painting* (1880); and *The Four Masters of Etching*. He became art critic for the *London Standard* in 1878. He also published *Balsac* in Great Writers series (1889); *The Fitting Obsequies* and *The Vicar of Pimlico*, short stories. He visited the United States in 1885, and lectured at Harvard and Johns Hopkins Universities. He edited an edition of M. Michel's *Rembrandt* (1893).

WEDNESDAY. The fourth day of the week. The name is a reminiscence of Odin worship, Woden (the "furious") being the Anglo-Saxon and Old High German form of the great Norse god Odin, who has been identified with Mercury; hence Odin's day corresponded to the Roman *dies Mercurii*. Ash Wednesday is the first day in Lent, and was so called from the custom established by Gregory the Great, of sprinkling ashes on the heads of penitents on that day. Ash Wednesday is also called Pulver Wednesday (Latin, *pulvis*, dust). Spy Wednesday is the Wednesday next preceding Easter, and was so named in allusion to the treachery of Judas Iscariot, who prepared on that day to betray our Lord.

WEDOWEE, a precinct and village, the capital of Randolph County, eastern Alabama; the nearest railroad station is Roanoke, about 15 miles S., on the Central Railroad of Georgia, about 100 miles N.E. of Montgomery. Population of village and precinct, 1900, 2,997.

WEED, THURLOW, an American journalist and public man; born at Cairo, New York, Nov. 15, 1797; when ten years of age he was a cabin-boy on a Hudson River vessel; at 12 was engaged in a printing-office in Catskill, New York; was employed in successive printing-offices, and was enrolled as a volunteer in 1812, serving on the northern frontier of New York; in 1815 went to New York City, working at the case; in 1819 established *The Agriculturist* at Norwich, Chenango County, New York; two years later removed to Manlius, and founded the *Onondaga County Republican*; in 1824 became editor and owner of the *Rochester Telegraph*. He retired from the

publication of the latter in 1826, starting in that year the *Anti-Mason Enquirer* at Rochester, and was elected to the legislature. After his retirement at the end of his second term he established the *Evening Journal* in Albany, which he controlled for 35 years, and by means of which he wielded a tremendous power in politics. He opposed the administration of President Jackson, the "Albany Regency," which managed the Democratic affairs of the state, and the nullification policy promoted by Calhoun. He took an active part in the nomination of William Henry Harrison in 1836, and in the nomination and election of the latter in 1840; in the nomination of Henry Clay in 1844, of General Winfield Scott in 1852, and of John C. Frémont in 1856. He supported the nomination of William H. Seward for the Presidency (1860), but in the campaign worked for the election of Abraham Lincoln; and subsequently took an active part in the election of General Grant. In 1861 he was sent to Europe on a semi-official mission at the instance of President Lincoln, and did a great deal to remove the misapprehensions as to the Civil War, and to induce foreign governments to refrain from interference. In 1867 he became editor of the *New York Commercial Advertiser*, but resigned the editorial chair the following year on account of failing health. He continued to give the benefits of his ripe experience to his party until his death, and was the author of *Letters from Europe and the West Indies* (1866); and published some *Reminiscences* in the *Atlantic Monthly* (1876). His *Autobiography* appeared in 1882, edited by his daughter, the account of his life being completed in another volume, in 1884, by his grandson, Thurlow Weed Barnes. He died in New York City, Nov. 22, 1882.

WEEDEN, WILLIAM BABCOCK, an American soldier, manufacturer and author; born in Bristol, Rhode Island, Sept. 1, 1834; educated at Brown University; engaged in manufacturing woollens at Providence; commissioned second-lieutenant in the first battery (1861); enlisted in the Union army, becoming chief of artillery of the division under Brigadier-General Morrell; was present at the siege of Yorktown, and at the engagements at Hanover Court House, Mechanicsville, Gaines Mill and Malvern Hill; after his resignation in 1862, re-engaged in business. He published *Morality of Prohibitory Liquor Laws* (1875); *Social Law of Labor* (1882); *Economic and Social History of New England, 1620-1789* (1890).

WEEDSPORT, a village of Cayuga County, central New York; on the New York Central and Hudson River, the Lehigh Valley and the West Shore railroads; 10 miles N. of Auburn, on the Erie Canal; has manufactories of corsets, farming implements, etc. Coal is mined in the vicinity, and it is surrounded by an agricultural district. Population 1900, 1,525.

WEEHAWKEN, a township of Hudson County, northern New Jersey, on the West Shore and the New York, Ontario and Western railroads, and on the Hudson River, near New York City, and has

many industries identified with the latter. Large coal and freight docks are here, and the Hackensack Water Company's reservoirs. The Hamilton-Burr duel occurred here. Population township (1900). 5,325.

WEEK. See SABBATH, Vol. XXI, pp. 125, 126.

WEEKES, HENRY, an English sculptor; born at Canterbury, in 1807; studied under Chantrey and Behnes, and at the Royal Academy, which he entered in 1823; became assistant to Chantrey, occupying Chantrey's studio after the latter's death in 1841; elected an associate of the Royal Academy in 1850; received, in 1852, the gold medal of the Society of Arts for the best treatise on the fine-art section of the exhibition of 1851; academicien in 1863, and professor of sculpture to the Academy in 1869. He made the first portrait-bust of Queen Victoria (1837); and among his other well-known works are the colossal statues of Cranmer, Latimer and Ridley, forming part of the Martyrs' Monument at Oxford; statues of Bacon (Trinity College, Oxford); Marquis of Wellesley (India House); Lord Auckland (Cuttack); and one of the groups of the Albert Memorial. He died May 29, 1877.

WEEKS, FEAST OF. See PENTECOST, Vol. XVIII, p. 514.

WEEKS, EDWIN LORD, an American painter, born in Boston in 1849; studied at l'École des Beaux-Arts, and under Gérôme and Bonnat, in Paris, and found his sphere in illustrating life in the far Orient; received an honorable mention, Paris Salon, 1884; third-class medal, 1889; first-class medal, Paris Exposition, 1889. Among his works are *A Cup of Coffee in the Desert*; *Pilgrimage to the Jordan*; *Scene in Tangiers*; *A Moorish Camel-Driver*; *Alhambra Windows*; *An Arab Story-Teller*; *The Last Voyage—Souvenir of the Ganges*; *They Toil Not, Neither Do They Spin*; *A Rajah of Jodhpore*; *Departure for the Hunt, India*; etc.

WEEMS, MASON LOCKE, an American biographical writer and historian, was born in Dumfries, Virginia, about 1760; studied theology in London; ordained a pastor of the Protestant Episcopal Church, and was for some time rector of the church of that denomination at Mount Vernon attended by George Washington and his family. He resigned that charge in 1790, and became a book agent for Mathew Carey. He afterward devoted his attention to preparing sketches of prominent patriots of the Revolution. He was the originator of the "little hatchet" fiction about Washington. His *Life of Washington* (11th edition, 1811) had a phenomenal sale and popularity. He also published *The Philanthropist* (1799); *Life of General Francis Marion* (1816); *Drunkard's Looking Glass* (1816); *Life of Benjamin Franklin* (1817); *Life of William Penn* (1829). He died at Beaufort, South Carolina, May 23, 1825.

WEENIX, JAN, commonly called The Younger, a Dutch artist, son of Jan Baptist Weenix (1621-1660); born at Amsterdam, in 1640; studied under his father, whom he surpassed in the characteristics peculiar to him, especially as a colorist. His works include portraits, historical pictures,

animals, marine views, fruits, hunting-scenes, and game. He was patronized by the Elector of the Palatinate. Many of his works are to be seen in the chief capitals of Europe. He died at Amsterdam, Sept. 20, 1719.

WEEPING WATER, a city of Cass County, eastern Nebraska, on the Missouri Pacific railroad, 24 miles S.W. of Plattsmouth. It has large deposits of building-sand; has stone-quarries, lime-kilns and a flour-mill; is in the midst of a farming region, and exports considerable quantities of grain, stock, sand and other products. Population 1890, 1,350; 1900, 1,156.

WEEVILS. THE AMERICAN BEAN and PEA (*Bruchus fabæ* and *Bruchus pisi*). The first has spread from Rhode Island since 1861. It is similar to the latter, but a little smaller. As many as 14 larvæ have been counted in a single bean. The little spots where the larvæ entered a pea can always be detected, even in a dry pea; but in the beans these points of entrance become obliterated. The larvæ grow in the beans and peas, while they eat the seeds, and in the end there is nothing but an excrementitious powder left in the pods. The body of these weevils is oval, slightly convex; their feelers are small and bent sideways; their wing-cases do not cover the end of the abdomen. These beetles frequent the leguminous plants. They wound the skin of the tender pods, and lay their eggs singly in the wounds. Each of the maggot-like grubs hatched therefrom enters a seed and feeds upon its pulp until fully grown. Persons indulging in early green peas swallow these larvæ very frequently. The pea-weevil is a native of the United States. It has spread from Pennsylvania over the Eastern states. A simple method of checking the ravages of these bugs is to put seed-beans and seed-peas in hot water just before they are planted, so as to kill the weevils. See also WEEVIL, Vol. XXIV, p. 477.

WEHRLITE. See MINERALOGY, Vol. XVI, p. 381.

WEIDNER, REVERE FRANKLIN, an American theologian; born at Centre Valley, Pennsylvania, Nov. 22, 1851; graduated at Muhlenberg College, Allentown, Pennsylvania (1869); at the Lutheran Seminary, Philadelphia (1873); occupied pulpits in Phillipsburg, New Jersey, and in Philadelphia, Pennsylvania (1873-1878); after which he was professor of dogmatics and exegesis in the Augusta Theological Swedish-English Seminary, Rock Island, Illinois, and in 1891 was appointed chairman of the faculty of the Lutheran theological seminary, Chicago, Illinois. He published *Commentary on the Gospel of Mark* (1881); *Exegetical Theology* (1886); *Biblical Theology of the Old Testament* (1886); *Historical Theology* (1888); *A System of Dogmatic Theology* (1888); *Grammar of the New Testament Greek* (1888); *The Greek Text of St. John* (1888); *Method for the Study of New Testament Greek* (1888); *Commentary on the Hebrew Text of Obadiah* (1888); *The Theological Encyclopedia, Vol. II: Historical and Systematic* (1889); *Studies in the Book* (1890).

WEIGELA, an old name of *Diervilla Japonica*, or *D. florida*, a cultivated bush honeysuckle from China and Japan. It is a shrub with ovate, tapering, pointed leaves, a great abundance of showy rose-colored, broadly funnel-shaped flowers and linear pods.

WEIGHING-MACHINES. The most noteworthy improvement in weighing-machinery during recent years was made by Percival Everitt, of England, who patented the nickel-in-the-slot weighing-machine in 1886. It is so arranged that the weight of a person is conveyed by means of levers from the platform to a counterpoise, turning a pivoted spindle and a weighted arm, which through segment gearing controls the pointer of a circular index in front of and outside of the case of the machine. Normally, the outer index is out of gear and the weight of a person on the platform has no effect on the index, but when a coin of the required size is introduced into the slot it throws the index into gear and the weight of a person on the platform is shown. When the person steps off the platform the index is moved back by means of the gearing and the weighted arm, while the coin is dumped into a receptacle. Everitt also patented a drawer and printing-device for delivering to the person weighed a ticket bearing printed figures showing the weight. This last feature did not prove very popular, and the machines as now made are usually without the ticket-printing apparatus. When first introduced, these machines were set to be operated by five-cent pieces, or "nickels." Later the price was reduced to one cent. It was possible to cheat the earlier machines by allowing several persons to get on the platform one after another without wholly relieving the platform of weight. This was later rendered impossible by slight changes in the mechanism. The machines have been generally introduced throughout the civilized world, and are said to be very profitable; though the income is somewhat impaired by people who use brass slugs, round bits of glass, etc., instead of cent-pieces. See MECHANICS, Vol. XV, p. 771; and BALANCE, Vol. III, pp. 261-267. C. H. COCHRANE.

WEI-HAI-WEI, a naval port and garrison leased in 1898 by Great Britain for so long a period as Russia shall remain in possession of Port Arthur. Wei-Hai-Wei is situated in the Chinese province of Shantung, and was the object of Japanese attack and temporary occupation in the war of 1894-95. The place is under the administration of the British admiralty, while forts command the harbor.

WEINSBERG, a town. See KERNER, Vol. XIV, p. 50.

WEIR, a city of Cherokee County, southeastern Kansas, on the Kansas City, Fort Scott and Memphis and the St. Louis and San Francisco railroads, four miles S.E. of Cherokee. It is in a zinc and coal mining region, large quantities of coal being shipped to all parts of the state. Population 1890, 2,138; 1900, 2,977.

WEIR, HARRISON WILLIAM, an English artist

and author; born at Lewes, May 5, 1824; early showed an aptitude for drawing, and was unfortunately articted in 1837 to a designer on wood, color-printing and wood engraving; was unable to obtain release, and seven years were thus wasted. He was entirely self-taught in his chosen profession; was elected a member of the new society of painters in water-colors in 1849, and shortly afterward exhibited his *Dead Shot* at the British Institution, and began to exhibit at the Royal Academy in 1845. Among his best known works are *Startled*; *The Forester*; *A Servant of All Work*; and *The Christmas Carol*. He is even more widely known by his drawings and wood-engravings in *The Illustrated London News*; *British Workman*; *Band of Hope Review*; *Chatterbox*; *Pictorial Times*; *The Field*; *The Graphic* and *Black and White*; etc. He has illustrated various books on natural history, including *Routledge's Natural History*; *Poultry Book*; *Funny Dogs with Funny Tails*; *The Adventures of a Bear*; etc. He also wrote, as well as illustrated, several works, including *Everyday in the Country*; *Animal Stories, Old and New*; *Bird Stories, Old and New*; and *Our Cats, and All about Them*. The latter work the author regards as his chief labor; in it he gives the standard of excellence for all varieties, arranged by himself; rules for breeding, particularly as to the tortoise-shell "Tom." He was also noted as a judge at shows, as a horticulturist, and was a successful breeder and exhibitor of pigeons and poultry. He was the founder of the famous cat-show at the Crystal Palace, held annually, and which has been of so much use in improving the condition of the domestic cat. He never enjoyed robust health, but the amount of work he disposed of was remarkable.

WEIR, ROBERT WALTER, an American painter; born in New Rochelle, New York, June 18, 1803. After studying painting in New York, he went to Italy in 1824, where he remained for several years. In 1829 he was elected a member of the National Academy of Design. Three years later he became professor of drawing in the West Point Military Academy. He held this position for 42 years. Subsequently he resided in New York City. His works include portraits, genre pictures and historical compositions. Among his best-known paintings are *The Belle of the Carnival*; *Landing of Henry Hudson*; *Embarkation of the Pilgrims*, in the rotunda of the capitol at Washington, District of Columbia. He is noted especially for the faithful rendering of still-life. He died in New York City, May 1, 1889.—His son, JOHN FERGUSON WEIR, born at West Point, New York, Aug. 28, 1841; studied painting under his father, and opened, in 1861, a studio in New York City. He became a National Academician in 1866. After spending a year in Europe, he was in 1869 appointed director of the Yale School of Fine Arts. He was also judge of the fine arts at the Philadelphia Exhibition of 1876. His two best-known pictures are *The Gun Foundry*, exhibited at the National Academy in 1867 and in Philadelphia in 1876, and *Forging the Shaft* (1868). The latter

was burnt, but a replica was exhibited in Paris in 1878. Among his other works are *Sunset at West Point*; *The Christmas Bell*; *The Culprit Fay*; *Tap-ping the Furnace*; *The Confessional*, shown at Philadelphia in 1876; *Venice* (1887); and various portraits.—Another son, JULIAN ALDEN WEIR, born at West Point, Aug. 30, 1852, also studied under his father, and later under Gérôme at Paris. After 1886 he was also a National Academician. His works include *Breton Interior*; *Brittany Peasant Girl*; *The Good Samaritan*; and portraits of R. W. Weir, Peter Cooper (1884) and John Gilbert (1888). His *Idle Hours* was awarded the prize at the exhibition of the American Art Association in 1888.

WEISER, a town and the capital of Washington County, western Idaho, on the Union Pacific railroad, 82 miles N.W. of Boise City. Mining is the principal industry, in addition to which there are lumbering, stock-raising and flour-milling. Population 1900, 1,364.

WEISHAUP, ADAM. See ILLUMINATI, Vol. XII, p. 706.

WEISMANN, AUGUST, a German biologist; born at Frankfort-on-the-Main, Jan. 17, 1834; his father being professor of languages in the lyceum there. He attended the gymnasium of his native place until his eighteenth year, and then studied medicine at Göttingen, Vienna and Paris, giving special attention to the natural sciences. In 1861 he became physician to the Archduke Stephen of Austria. This appointment enabled him to devote time to his favorite studies, resulting in the publication of *Die Entwicklung der Diptern* (Development of the Diptera) (1864). He went to the University of Giessen in 1863 to study zoölogy under Leukart; became in 1866 extraordinary, and 1873 ordinary, professor at Friburg, in Briesgau. He followed up his researches on insects, etc., with *Beiträge zur Kenntniss der Daphnoiden* (1879-80) and *Die Entstehung der Sexualzellen bei den Hydromedusen* (2 vols., 1883). As a result of the impairment of his eyesight, he had to abandon original research and devoted himself to philosophical studies in regard to the theory of descent and natural selection. His works in this field have become familiar to all biologists, having been translated into the English language, and include *Studies in the Theory of Descent* (1880); *Essays on Heredity and Kindred Subjects* (1882-92); *The Germ-Plasm* (1893); and *Germinal Selection* (1896). In these various publications he laboriously grappled with the problem of modern biology: "How is it that a single cell of the body can contain within itself all the hereditary tendencies of the whole organism?"

Weismann's views will be found fully dealt with in the articles HEREDITY and NEO-LAMARCKISM, in these Supplements. His "germinal theory" is intensive and extensive. It is not a new theory, although expressed in new terms by Weismann. W. Kitchen Parker, F.R.S., in his Hunterian lectures on *Mammalian Descent* (1885) spoke of the "germinant tenement of the soul, in its first inception; in other words, the tiny germ,—that

is, the Man *in potentia*." It is the "germinant tenement" that Weismann has sought to explore as containing the very solution to the great modern riddle of heredity as furnishing the chief factor of evolution. It is still the same problem that confronted the Vedic philosopher who spoke of "the primal germ productive, the first subtle bond, connecting Entity and Nullity." It may be true that Weismann's opponents are in "possession of the field"; the same was the case with the opponents of Darwin when the latter made public his theory. The value of the new theory is already acknowledged. As to the crucial test of the heredity of acquired characters, Edward Clodd says the *onus probandi* is thrown upon Weismann's opponents.

WEITZEL, GODFREY, an American soldier; born in Cincinnati, Nov. 1, 1835; graduated at West Point in 1855; attached to the engineers; from 1855 to 1859 aided in the construction of fortifications at New Orleans; chief engineer of General Butler's expedition to New Orleans, and planned the capture of the city; appointed acting military commander and mayor of the city; commissioned brigadier-general of volunteers in 1862; overcame the Confederates in the Lafourche campaign, and commanded a division at Port Hudson. He was chief of the Army of the James from May until September, 1864; and constructed the defenses of Bermuda Hundred, James River and Deep Bottom; promoted major-general at the end of the year; assisted Butler in the unsuccessful attack upon Fort Fisher, Dec. 23-25; was assigned to the troops north of the Appomattox, 1865, and took possession of Richmond, April 3; commanded a military district in Texas from April, 1865, to March, 1866. He received the brevet rank of major-general in the regular army. On his return to his corps in 1866 he was made major, and engaged in important engineering works; was promoted lieutenant of engineers in 1882. He died in Philadelphia, March 19, 1884.

WELCH, WILLIAM HENRY, an American pathologist; born at Norfolk, Connecticut, April 8, 1850; graduated at Yale (1870), and at the College of Physicians and Surgeons, New York (1875); studied pathology at leading European universities; demonstrator of anatomy and professor of pathology in Johns Hopkins University, and pathologist in the university hospital. His writings are mostly contributions to standard works, including the sections on pathology and pathological anatomy in the recent editions of Flint's *Theory and Practice of Medicine*; and the chapters on *Organic Diseases of the Stomach* in Pepper's *System of Medicine*; on *General Considerations Concerning the Biology of Bacteria, Infection and Immunity* in Pepper's *Text-Book of the Theory and Practice of Medicine*. He is the author of the Cartwright lectures (1888), on the *General Pathology of Fever*.

WELBECK ABBEY. See DUKERIES, THE, in these Supplements.

WELD, THEODORE DWIGHT, an American abolitionist; born at Hampton, Connecticut, Nov.

23, 1803; studied at Hamilton, and at Phillips Academy, Andover; became agent for a society for promoting manual labor instruction in 1830; went to Lane Theological Seminary, but left with six other students upon the suppression of a students' anti-slavery society by the trustees in 1883; he then went to Oberlin and went on a lecturing tour until 1836, when, on losing control of his voice, he was placed in editorial charge of the publications of the American Anti-Slavery Society. In 1854 he organized a school at Perth Amboy, N. J., in which he received pupils without distinction as to color. In 1864 he removed to Hyde Park, Mass., engaging in teaching, and again in lecturing. He published many pamphlets, and wrote *The Bible Against Slavery and American Slavery as It Is*. Died in Hyde Park, Mass., Feb. 3, 1895. His wife, ANGELINA EMILY GRIMKÉ, abolitionist, was born Feb. 20, 1805, at Charleston, South Carolina, being the daughter of Judge John Faucheraud Grimké. She removed to Philadelphia, and became a member of the Society of Friends in 1828, and emancipated the slaves she inherited in 1836, and began to lecture with her sister against slavery in New York. Two years later she married. She published *Sacred Palmlands: or, The Journal of a Spring Tour in Egypt and the Holy Land* (1881).—Her sister, SARAH MOORE GRIMKÉ, was her companion until she married Mr. Weld, and was afterward a teacher in the schools he established. She published *An Epistle to the Clergy of the Southern States* (1827); *Letters on the Condition of Women and the Equality of the Sexes* (1838); etc.

WELD, WOLD OR DYER'S WEED. See DYER'S BROOM, in these Supplements.

WELDING, ELECTRIC. Professor Elihu Thomson announced in 1886 the results of experiments in welding metals in the heat developed by resistance to the passage of an electric current. In April, 1890, a paper was read by Sir Frederick Bramwell (*Proceedings Institute of Civil Engineers*, Vol. 102), which exhibited in detail the already large commercial application of the process. Hermann Lemp, Jr., read a paper in May, 1890 (*Transactions American Institute Electrical Engineers* Vol. 7 p. 288), describing the machinery used; and Professor Thomson himself, in 1890 presented a paper on the subject at the New York meeting of the Iron and Steel Institute (*Journal Iron and Steel Institute*, 1890, No. 2, p. 231, and *Transactions American Institute Mining Engineers*, Vol. 19, p. 877). The process requires a current of large quantity and low intensity. A direct current of this character would require large conductors, and consume extra power through the heating of the conductors, these objections being proportional to the area of the surface to be welded (i.e., the total heat required) and the distance of the welding-machine from the dynamo. Obviously, under special conditions, the direct current may be economical, nevertheless. Professor Thomson says the practical results are not very different, whether continuous or alternating currents are

employed. But for economical reasons, the general practice is to use alternating currents, distributed at high pressure over small conductors, and transformed to low pressure at the welding-machine. It was at first supposed by some that the welding-heat obtained at the surfaces of the two pieces of metal to be joined was due to their imperfect contact, causing an extra resistance at that point. Professor Thomson has shown that while this limitation of contact-surface undoubtedly hastens the heating at the joint, the welding-temperature is not thus created; since a solid bar, joining the clamps of the machine (and thus having no break of continuity) will be heated between these clamps to the welding-temperature, and may be upset by their mutual approach. This is indeed done to upset collars on shafts, and for other similar purposes. The real cause of the concentration of the heating at the joint, or in the metal between the clamps, is the greater conductivity of the rest of the welding-circuit, which is usually of massive copper, cooled, when necessary, with water.

The applications of electric welding are already innumerable. Few improvements in the arts have been so instantaneously recognized and widely adopted. It is employed for welding wire, tires, axles, rails, hubs and spokes, hand-saws, pipes, chains, the points and bodies of projectiles, and even heavy forgings; and it has not only taken the place in such operations of the ordinary method of welding previously employed, but has proved practicable in many cases where welding could not be practiced before, and has thus given rise to new methods and products of manufacture.

ARC-WELDING. Thomson's system of electric welding has been called the incandescent system, from the fact that the ordinary incandescent electric lamp is the most familiar illustration of its principle of heating by resistance. Professor Thomson objects to the name, however, because lead, tin, zinc and other metals, fusing far below incandescence, are thus welded. It may serve, nevertheless, to distinguish his process from those of Bernardos and Coffin, in which the heat of the electric arc is utilized. In the Bernardos process, the material to be heated is connected with one terminal of the generator, and the tool (generally a carbon electrode) with the other. Contact is made between the tool and the material to establish the circuit, and an arc is sprung between them by separating them slightly after the current has been turned on. The carbon electrode is slowly traversed along the part to be heated, and the intense heat of the arc fuses the metal at the joint. This simple method, in which the length of the arc is maintained by hand, is evidently liable to irregularities; and in the welding of iron or steel the metal is likely to become overheated, oxidized, and also to be chilled at the weld. In welding some other metals, these objections are less important. In the Coffin apparatus, the surfaces to be welded are heated by the application of the electric arc formed between two converging car-

bon pencils, and blown downward, like a blow-pipe flame, by the influence of an electromagnet. All the elements of the operation are subject to the most delicate mechanical adjustment: the length of the electrical "blowpipe flame" being regulated by raising and lowering the core of the electromagnet, or by a switch. The whole apparatus is so compact that one form of it, intended for such small work in shops, is a portable welder, which may be carried from point to point, being attached to any continuous circuit, or operated from any dynamo used for arc or incandescent lighting. The energy consumed is about the same as that of an ordinary arc-lamp. In other forms of the apparatus, the material to be welded is part of an electric circuit, and it is to some extent heated by resistance, but the essential principle appears to be the application of the arc. Inch bars of iron and steel have been successfully welded by the process, with a one-horsepower machine. Its application to large masses is a problem, involving many new conditions. There is no doubt, however, that the arc-machine is theoretically more effective in heat-economy. In incandescent welding, as Professor Langley (*Transactions American Institute of Mining Engineers*, Vol. 20, p. 252) has shown, the resistance is very large, and the heat generated is proportionately great, but as the metal is squeezed together, and the number of contacts increases, the local resistance falls off, until, when the complete contact of the parts has been affected, the local development of heat on that plane almost vanishes, and there is left only the heat stored up during the earlier stages of the process, together with that which may be continuously generated by the resistance of the whole mass of metal between the clamps. If the latter is, as Professor Thomson seems to claim, alone sufficient for a welding-temperature, then much more metal must be thus heated than is necessary for the weld. In the arc system, on the other hand, the resistance of the arc remains constant, and the heat thus generated can be applied to all parts of the weld. The rapidity with which this heat is locally communicated, without proportionate lateral diffusion through the mass receiving it, was shown by an experiment of Professor Langley's, in which the electric arc between a carbon rod and a lump of steel about as large as a hen's egg bored a hole by fusion through the steel in a few seconds, without raising the outside parts to incandescence. This intense and rapid local heating may have its drawbacks in some operations; but there can be no doubt of its theoretical economy, and of its practical usefulness in a wide field. A curious instance of it was an "electric forge" exhibited at the Chicago Exposition of 1893, in which a bar of iron was heated for the manufacture of a horseshoe by simply plunging it into water, and the horseshoe made was cooled by dropping it into the same water (of course, no longer a part of an electric circuit). In this case, the effect of the current passing through the iron and the water was first to decompose the latter, and then to set

up an arc, through the gas produced by this decomposition.

R. W. RAYMOND.

WELDON, a town of Halifax County, north-eastern North Carolina, on the Seaboard Air Line and the Atlantic Coast Line railroads, and on the Roanoke River, 96 miles N. E. of Raleigh. It is the center of a farming district, and has manufactures of agricultural implements and flour. The river is navigable to this point. Population 1890, 1,286; 1900, 1,433.

WELHAVEN, JOHANN SEBASTIAN C. See NORWAY, Vol. XVII, p. 591.

WELLAND, the name of a river, town and canal, all in Ontario, Canada. The river rises in Wentworth County, southern Ontario, and after an easterly course through Monck and Welland Counties, empties into Niagara River just above Niagara Falls. The last few miles of its course form a part of the Welland canal. (See ST. LAWRENCE, Vol. XXI, p. 179.) The town is the capital of Welland County, southern Ontario, on the Grand Trunk and Michigan Central railroads, the Welland canal and river, 12 miles S. of St. Catharines. It has manufactures of boilers and other machinery, a canning factory, flour-mills and lumber interests. Population 1891, 2,035.

WELL-DRILLING. See PETROLEUM, Vol. XVIII, pp. 716-718.

WELLE-MAKUA. See AFRICA, in these Supplements.

WELLES, GIDEON, an American statesman; born in Glastonbury, Connecticut, in 1802. He studied law, and in 1826 became editor and proprietor of the *Hartford Times*, in which he advocated the election of General Jackson as president. In 1846-49 he was in Washington as chief of a bureau in the navy department. When the Republican party was formed he was one of its earliest adherents, although he had been an ardent Democrat before. President Lincoln called him to be his Secretary of the Navy, which office he conducted with unflagging zeal, industry and efficiency. He maintained along two thousand miles of coast a blockade as effective as the circumstances would permit, organized on the Mississippi River a fleet of iron-clads and transports, and sent out well-equipped expeditions to various points, thus contributing to the numerous victories of the American navy. After his retirement from public service he published his *Memoirs of the War*. He died in Hartford, Connecticut, Feb. 11, 1878.

WELLESLEY, a town of Norfolk County, eastern Massachusetts, 15 miles W. of Boston, on the Boston and Albany railroad. It is the seat of Wellesley College (q.v., below). Population 1890, 3,600; 1900, 5,072.

WELLESLEY COLLEGE, an institution for the higher education of women, at Wellesley, Massachusetts, near Boston. It was founded in 1875, by Henry F. Durant, of Boston. The well-kept grounds extend to 300 acres, and are situated on an elevation fronting Lake Waban. The main building is a stately edifice, with a frontage

of 475 feet and five stories in height. The additional buildings are for the School of Music (1881), the Farnsworth School of Art (1889), the Chemistry Building (1894), besides Stone Hall and cottage dormitories. In 1898 there were 654 students, 78



WELLESLEY COLLEGE.

instructors, and 48,600 volumes in the library; and the total income was \$215,172. Up to 1899, 1,596 had graduated. The instruction is entirely collegiate, ranking with that of the foremost colleges for men.

WELLFLEET, a town of Barnstable Co., Mass., on Cape Cod, on the New York, New Haven and Hartford railroad; includes the villages of Wellfleet and South Wellfleet; has graded schools and a public library; fishing is the chief industry. Pop. 1900, 988.

WELLHAUSEN, JULIUS, a German theologian; born in Hameln-on-the-Weser, May 17, 1844; studied under Ewald, at Göttingen, and in 1870 was appointed docent in theology there. In 1872 he went to Greifswald, in 1882 to Halle, to Marburg, and returned to Göttingen in 1892 as professor of philosophy. He changed from theology to philosophy because of his altered views in regard to Protestantism. He believed that the Old Testament had no supernatural origin, and that its historical data were to be questioned. He wrote *The Text of the Book of Samuel* (1871); *History of Israel* (1878); and *Israelite and Jewish History* (1894); also the articles on ISRAEL, MOHAMMED, MOSES, and kindred subjects, in this ENCYCLOPÆDIA.

WELLING, JAMES CLARK, an American educator and editor; born in Trenton, N. J., July 14, 1825; graduated at Princeton in 1844; studied law, and in 1848 was appointed associate-principal of the New York Collegiate School; contributed to the *Washington National Intelligencer*, and in 1856-65 was its editor. He became clerk of the United States court of claims in 1862; president of St. John's College, Annapolis, Md., in 1867; professor of belles-lettres at Princeton in 1870; and in 1871-94 was president of Columbian University, Washington. Died in Hartford, Conn., Sept. 4, 1894.

WELLINGTON, a city, the capital of Sumner Co., Kans., on Slate Creek, and on the Atchison, Topeka and Santa Fé and the Chicago, Rock Island and Pacific railroads, 30 miles from Wichita; a market-center for an extensive wheat-raising district; has several grist and lumber mills, salt-works, galvanized-iron and electric-light works, foundries and machine-shops, carriage, sash, door, blind, and broom factories. Population 1900, 4,245.

WELLINGTON, a village of Lorain Co., Ohio, on the Cleveland, Cincinnati, Chicago and St. Louis and the Wheeling and Lake Erie railroads, 36 miles

S. W. of Cleveland; is a center of cheese-production, 3,000 tons being shipped annually; has a foundry, bending-works, a national bank, a newspaper, and 3 churches. Pop. 1890, 2,069; 1900, 2,094.

WELLINGTON, ARTHUR MELLE, an American civil engineer; born in Waltham, Mass., Dec. 20, 1847. From 1868 to 1874 he was engaged in engineering work with the South Carolina Blue Ridge railroad; assistant engineer of the Duchess and Carolina railroad; a division engineer on the Buffalo, New York and Philadelphia railroad; locating engineer of the Michigan Midland railroad; and chief engineer of the Toledo, Canada Southern and Detroit railroad. The next four years were devoted to scientific writing. In 1878 he returned to active engineering, and after several years with the New York, Pennsylvania and Ohio railroad, undertook the location of the Mexican Central railroad. On his return from Mexico, in 1886, he became editor of the *Railroad Gazette*, and later of the *Engineering News*. He was consulting engineer of the Nicaragua canal and the railways of Jamaica. He wrote *The Computation of Earthwork from Diagrams* (1874); *Location of Railways* (1875; 2d ed., 1887); *Car-Builders' Dictionary* (1887); also the article on RAILWAY—United States, in Vol. XX, pp. 253-55, of this ENCYCLOPÆDIA. Died in New York, May 16, 1895.

WELLMAN, WALTER, Arctic explorer; born in Ohio about 1860. For a time he was engaged in journalism in Chicago and in Washington. In 1894 he organized an Arctic expedition, consisting of three Americans besides himself, and of ten Norwegian sailors, to proceed northward from Spitzbergen, using aluminum boats. They left Tromsö, Norway, May 1, and eleven days later reached the Seven Islands, north of Spitzbergen, but their vessel, the *Ragnvald Jarl*, was crushed in the ice, and after an unsuccessful attempt to push north, the expedition returned to Tromsö in August, the aluminum boats, though subjected to the severest usage, being uninjured. Nothing daunted, he organized another expedition, some members of which, including himself, left New York, May 10, 1898; and on June 26 the expedition sailed from Tromsö on the *Fridtjof*. After wintering at Cape Tegethoff, the S. point of Hall's Island, Franz Josef Land, in 80° N. lat., he in Feb., 1899, started north with three Norwegians, and discovered new land, but in March, while leading the party, he fell into a crevasse and injured one of his legs so severely as to compel his return, and he reached Tromsö Aug. 17, 1899.

WELLS. See ARTESIAN WELLS, Vol. II, pp. 644-46; and in these Supplements.

WELLS, a town and summer resort of York Co., Maine, on the Boston and Maine railroad, 28 miles S. W. of Portland; has 7 churches, 2 libraries, lumber, shingle, and grist mills. Pop. 1890, 2,029; 1900, 2,007.

WELLS, a town of Faribault Co., Minn., on the Chicago, Milwaukee and St. Paul railroad, 20 miles W. by N. of Albert Lea, in a farming region; has 8 grain-elevators, a creamery, flour-mill, repair-shops, 3 banks, 2 newspapers. Pop. 1890, 1,208; 1900, 2,017.

WELLINGTON ISLAND. See PATAGONIA, Vol. XVIII, p. 352.

WELLS, CLARKE HENRY, an American naval offi-

cer; born in Reading, Pennsylvania, Sept. 22, 1822; entered the navy in 1840, and graduated at Annapolis in July, 1846. He participated in the siege of Vera Cruz, being also present at the capture of other Mexican ports, and was attached to the expedition sent out in 1857 to superintend the laying of the Atlantic cable. During the Civil War he served with the South Atlantic squadron and as commander at the navy-yard, Philadelphia, and participated in many engagements, notably the battle in Mobile harbor, culminating in the surrender of the city. After the war he was attached to the squadron serving off Brazil, and later, off the coast of Italy. He received the cross of the Legion of Honor from the French government for assistance given a French iron-clad in distress near Spezzia, and was promoted through the regular official grades of the navy until his retirement as rear-admiral, Sept. 22, 1884. He died in Washington, District of Columbia, Jan. 28, 1888.

WELLS, DAVID AMES, an American economist; born in Springfield, Massachusetts, June 17, 1828; was graduated at Williams College in 1847, and at Lawrence Scientific School in 1851. He was associated with George Bliss in the publication of *The Annual of Scientific Discovery* from 1849 to 1866; in 1866 was appointed special commissioner of the revenue, and in 1867 visited Europe, by government commission, to investigate industries there competing with those of



DAVID A. WELLS.

the United States. In 1870 he was appointed chairman of a commission to examine the New York state local-taxation laws. He became lecturer on political science at Yale in 1872; receiver for the Alabama and Chattanooga railroad in 1876, and rescued the road from bankruptcy; one of the reorganizers of the Erie railway; and in 1879 a member of the board of arbitration of the associated railroads of the United States. Berkshire Medical College gave him the degree of M. D. in 1863, Williams that of LL. D. in 1871, Oxford that of D. C. L. in 1874; he delivered the annual address before the Cobden Club in London in 1873; was chosen an associate of the French Academy in 1874; and in 1877 a foreign associate of the Accademia dei Lincei of Italy. He wrote *Familiar Science* (1856); *The Science of Common Things* (1857); *Elements of Natural Philosophy* (1858); and *First Principles of Geology* (1861). His books on economic subjects are more important, and include *Production and Distribution of Wealth* (1875); *Robinson Crusoe's Money* (1876); *Our Merchant Marine* (1882); *Practical Economics* (1886); *The Relation of the Tariff to Wages* (1888); *Recent Economic Changes* (1889); *The Principles of Taxation* (1898). Died in Norwich, Conn., Nov. 5, 1898.

WELLS, HENRY TANWORTH, a British artist; born in London, in December, 1828. He began his artistic work in miniature-painting; exhibited *Master*

Arthur Prinsep, a portrait, in 1845, and from that date until 1866 exhibited in every exhibition. His pictures included portraits of Princess Mary of Cambridge, the Duchess of Sutherland and the Countess of Waldegrave. Until 1866 his work was all in miniatures. That year he began to exhibit work in oil. He was elected a member of the Academy in 1870. Among his ideal works are *Preparing a Tableau Vivant* (1865); *Volunteers at a Firing Point* (1866); *The Old Stoudbreaker* (1879); and *The Quarrymen of Purbeck* (1885).

WELLS, HORACE, an American dentist, one of the discoverers of anæsthesia; born at Hartford, Windsor County, Vermont, in 1815. He was a dentist at Hartford, Connecticut, in 1836. Moved by the suffering attending some dental operations, and noticing, at a lecture on nitrous oxide gas, that a person, to whom this gas was administered, was unconscious of a hurt he accidentally received, he put this discovery to a personal proof by having a molar drawn while he was under the influence of the gas. This was in December, 1844. From that time on he used "laughing-gas" in his dental practice. He went to Boston in 1845 and communicated his experiments to Dr. William T. G. Morton, a former pupil, who afterward laid claim to the discovery, and with Dr. Charles T. Jackson took out a patent for it in 1846, and submitted their claims as discoverers of anæsthesia to the Medical Institute of France. This wrong, and the controversy accompanying it, embittered Wells so deeply that he became insane, and committed suicide in New York City, Jan. 14, 1848. He was author of a pamphlet, *History of the Application of Nitrous Oxide Gas, Ether, and Other Vapors to Surgical Operations* (1847).

WELLSBORO, a town and the capital of Tioga County, central northern Pennsylvania, 81 miles N. of Williamsport, on the Fall Brook railway. It is the trade center of a fine farming and dairy district, and contains many mills, shops and tanneries. Population 1900, 2,954.

WELLSBURG, a city and the capital of Brooke County, northern West Virginia, on the Ohio River, 16 miles N. of Wheeling, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad. While there are extensive coal-mines in the vicinity, the factories are supplied with natural gas, and produce glass, paper, cigars, etc. The surrounding country is devoted to agriculture and wool-growing. Population 1890, 2,235.

WELLSTON, a city of Jackson County, southeastern Ohio, 10 miles N. of Jackson, on the Hamilton and Dayton, the Ohio Southern and the Cincinnati, Hamilton and Dayton railroads. Situated in a coal-mining region, it has iron foundries, machine-shops and mills. There are 12 churches, 5 school buildings, and a bank with a capital of \$50,000. Population 1890, 4,377; 1900, 8,045.

WELLSVILLE, a city of Montgomery County, central eastern Missouri, 90 miles W. of St. Louis, on the Wabash railroad. Situated in an agricultural district, it has woolen and flour mills, canning and tobacco factories and grain-elevators. Population 1890, 1,138; 1900, 1,160.

WELLSVILLE, a village of Alleghany County, southwestern New York, on the Genesee River, 26 miles S.W. of Hornellsville, on the Erie railroad and the Wellsville, Coudersport and Pine Creek branch of the Buffalo and Susquehanna railroad. It has a good school system and a public library, and is chiefly interested in iron-working. There are many oil-wells in the vicinity. Population 1900, 3,556.

WELLSVILLE, a city of Columbiana County, eastern Ohio, on the Ohio River, 20 miles above Steubenville and 48 miles below Pittsburg, and on the Cleveland and Pittsburg railroad, 102 miles from Cleveland, and has direct communication with Cincinnati and Southern cities by way of the river. Five foundries, besides iron and steel works, terra-cotta works, electric-light works, grist, lumber and planing mills, manufactories of leather belting and mechanical supplies, Rockingham ware, fire-brick, hardware, woodenware, paper, brooms, etc., are in successful operation. There are nine churches, a good school system and two banks. Population 1890, 5,247; 1900, 6,146.

WELSH, JOHN, an American merchant and philanthropist; born in Philadelphia, Pennsylvania, Nov. 9, 1805. He received a collegiate education, engaged in mercantile pursuits, and was, at the time of his death (April 10, 1886), senior member of a West India trading firm which had been established since 1834. During much of his life he gave largely of his time and means to public concerns, having been one of the founders of and heaviest contributor to the Episcopal Hospital. During the Civil War he was president of the executive committee of the Sanitary Fair, which disbursed over one million dollars for army needs; was president of the board of finance of the Centennial Exhibition of 1876, the success of which is said to have been largely due to his efforts, in recognition whereof the city presented him with fifty thousand dollars and a gold medal. With the money thus received he endowed the Welsh chair of English literature in the University of Pennsylvania. He was appointed minister to England in 1878, but resigned within two years.—His son, HERBERT, born in Philadelphia, Dec. 4, 1851; graduated at the University of Pennsylvania in 1871; spent two years in Europe, devoting part of his time to the study of art in Paris. Upon his return to America he turned his attention to the championing of the rights of the Indians, and strove for a higher and more humane policy in their behalf. He founded the Indian Rights Association, which has exposed and defeated several fraudulent schemes; advocated the holding of land in severalty, which was finally introduced by the passage of the Dawes Bill, and favored the education of Indian children and the extending of law to the reservations. He wrote *Four Weeks among Sioux Tribes of Dakota and Nebraska in 1882*, and *Report of a Visit to the Navajo, Pueblo and Hualapai Indians of New Mexico and Arizona in 1884*.

WELSH CALVINISTIC METHODIST CHURCH, while Methodistic in its historical connection, is purely Calvinistic in doctrine, with a church polity about the same as that in the Presbyterian Church. The first church of this denomination

in the United States was organized at Remsen, New York, in 1826. By 1830 a sufficient number of congregations were established to form a presbytery, and in 1869 a General Assembly was organized. In 1890 they reported 6 synods, 19 presbyteries and 12,722 communicants. The Welsh language is used in the services. The church in Wales claimed, in 1895, a total of 306,669 adherents and 145,094 actual communicants in 1,308 churches. The "Forward Evangelical Movement," organized in 1892, is a plan for evangelistic preaching to people outside the churches, and had gathered in its first three years' work, new congregations with a total membership of 6,000. See also METHODISM, Vol. XVI, p. 193.

WELSH LANGUAGE. See CELTIC LITERATURE, Vol. V, p. 298.

WELSH LITERATURE. See CELTIC LITERATURE, Vol. V, pp. 302, 314-323.

WELWITSCHIA, an exceedingly curious genus of gymnosperms, native of the deserts of southwestern Africa, and represented by a single species, *W. mirabilis*. It resembles a giant radish, the stem becoming as much as twelve or fifteen feet in circumference and but two or three feet high. It bears two long and persistent leathery leaves, which are six to eight feet long, and, trailing out over the sandy surface, become torn into segments. In the axils of the leaves the clusters of scarlet cones arise, and the spike-like clusters of stamens.

WEMYSS AND MARCH (FRANCIS WEMYSS CHARTERIS), EARL OF, eighth earl of Wemyss; born in Edinburgh, Scotland, Aug. 4, 1818; educated at Oxford; conservative member of House of Commons from 1841 to 1846, when he resigned his seat upon becoming converted to the free-trade measures of Sir Robert Peel. He was returned as a Liberal Conservative in 1847; was a Lord of the Treasury under the Aberdeen ministry (1852-55), retiring with the Peelite party in that year. As Lord Elcho he took a conspicuous part in the volunteer movement; chairman of the council of the National Rifle Association, and an authority on questions connected with national defense and armaments. He succeeded to the earldom of Wemyss on the death of his father, Jan. 1, 1883. He wrote *Letters on Military Organization* (1871).

WENS, cysts containing fatty matter, found on the scalp, face, or other portions of the body. Caused by obstruction of the mouths of the sebaceous glands, they enlarge by the accumulation of the fatty secretions, but seldom reach a large size. They are harmless, non-malignant tumors, only their unsightliness and annoying presence making their removal desirable—an operation accomplished by the use of caustics when small and by the surgeon's knife when large.

WENDS AND WENDISH. See SLAVS, Vol. XXII, pp. 153, 154.

WENER OR VENER LAKE. See SWEDEN, Vol. XXII, p. 736.

WENONA, a city of Marshall County, north-central Illinois, 20 miles S. of LaSalle, on the Chicago and Alton and Illinois Central railroads. It is in an agricultural district, and has bituminous coal-mines. Population 1890, 1,053; 1900, 1,486.

WENTLETRAP, a common name for any gastropod mollusk of the family *Scalaridae*. The name, meaning spiral stairway, was suggested by the shape of the shell. Formerly, shells of some species of *Scalaria* were sold to collectors for exorbitant sums. *S. pretiosa*, the precious wentletrap, was so named because of its rarity and consequent high value.

WENTWORTH, a town and the capital of Rockingham County, central northern North Carolina, near the Dan River, about 75 miles N.W. of Raleigh and 6 miles from the nearest railway station, Reidsville, on the Southern railway. It is in a hilly country, with fertile soil, adapted to agriculture and stock-raising, which are the principal industries. Population township (1900), 2,795.

WENTWORTH, BENNING, a royalist governor of New Hampshire; born at Portsmouth, July 24, 1696; graduated at Harvard in 1715. He entered upon a mercantile life, made visits to England and Spain, sat in the assembly, and in 1734 was appointed a provincial councilor. When New Hampshire was made a separate province in 1741, he was commissioned governor. Notwithstanding the intercolonial dissensions which arose during his rule, and which were not quieted until Vermont entered the Union as a state in 1790, he was said to have been of "benevolent and charitable disposition, inoffensive in life and conversation." The Vermont region was claimed by both New Hampshire and New York. The collision between the two governors in 1763-64 finally resulted in the separate statehood of Vermont. He resigned in favor of his nephew, Sir John Wentworth (1766). He bestowed five hundred acres upon Dartmouth College. He died at Portsmouth, Oct. 14, 1770.

WENTWORTH, SIR JOHN, the last royalist governor of New Hampshire; born at Portsmouth, Aug. 9, 1737; graduated at Harvard (1755), and entered upon a business life with his father. Before 1765 the province sent him to England as their agent to procure a repeal of the Stamp Act. This mission is thought to have been commemorated in Theodore Winthrop's novel, *Edwin Brothertoft*. While in England, Oxford made him a doctor of laws, and on Aug. 11, 1766, he was commissioned governor of New Hampshire and surveyor of the king's woods throughout North America. He reached home in June, 1767, and began a wise administration, wherein he attained great popularity, promoting agriculture and building roads. He gave Dartmouth College its charter in 1769, together with forty-four thousand acres of land. As troubles grew with England he maintained firm allegiance to the crown, although sympathizing keenly with the colonists in their grievances. After vain labors in the interest of conciliation, and after his house and belongings had been destroyed and pillaged, he left the country in 1776. The high quality of his mind and character is shown by the fact that, notwithstanding he had been proscribed as a royalist and his property confiscated, he rejoiced over the final establishment of the Federal constitution, and wished for the prosperity of the United States. In 1792 he was made lieutenant-governor of Nova Scotia, and in 1795 a baronet. He died in Halifax April 8, 1820.

WERDER, AUGUST, COUNT VON, a Prussian soldier; born at Schlossberg, East Prussia, Sept. 12, 1808. Entering the Prussian army in 1825, he participated in the campaigns of 1842-43 in the Caucasus, and became a member of staff in 1846. He attained the rank of lieutenant-general in 1866; and in the campaign against Austria was in charge of the Third Division at Königgrätz and Gitschin. In the war with France in 1870, he was given the command of the Baden-Württemberg Army Corps, which he led at the battle of Wörth, Aug. 6, 1870. After his siege and capture of the fortress of Strasburg, he was made a general of infantry. He repulsed the attack of Bourbaki at Belfort (Jan. 15-17, 1871), which victory gained him great popularity in southern Germany. He was decorated with the order of the Black Eagle in 1875; retired from the army and was made Count von Werder in 1879. A statue has been raised to him at Freiburg. He died at Schloss Grüssow, Pomerania, Sept. 12, 1887.

WEREGILD OR WERGELD. See DAMAGES, Vol. VII, p. 787.

WERGELAND, HENRIK ARNOLD. See NORWAY, Vol. XVII, pp. 590, 591.

WESLEYANS. See METHODISM, Vol. XVI, pp. 185-191; and METHODIST CHURCHES, in these Supplements.

WESLEYAN UNIVERSITY, located at Middletown, Connecticut, the oldest of the Methodist Episcopal Church colleges; was located in 1829, through an offer made by the city of Middletown to a joint committee of the New York and New England conferences. The offer consisted of two large stone buildings, together with a subscription of \$18,000 toward an endowment fund of \$40,000. The first



LIBRARY AND CHAPEL, WESLEYAN UNIVERSITY.

class, six in number, was graduated in 1833. In 1898 there were 34 instructors, 330 students, and the library had 53,000 volumes. There are an observatory, with a 12-inch refracting-telescope, laboratories, apparatus, and cabinets for the study of physical sciences, and half-a-dozen fine buildings. The institution offers three courses of study of four years each, and its doors are open to women. In 1898 the productive funds were \$1,240,000, and the total income was \$99,486. The cost of tuition is \$75, and living expenses are from \$150 to \$300.

WESSEL, JOHAN HERMAN. See DENMARK, Vol. VII, p. 91.

WESSEX. See ENGLAND, Vol. VIII, pp. 270 et seq.

WESSINGTON, a town of Beadle County, southeastern central South Dakota, 25 miles N.W. of

Huron, on the Chicago and North-Western railroad. It is the center of an agricultural district, and had, in 1900 a population of 320.

WESSON, a town of Copiah County, southwestern Mississippi, 46 miles S. of Jackson, on the Illinois Central railroad. Situated in a section largely devoted to agriculture. It is a favorite summer resort for New Orleans people. It has a cotton and woolen factory employing 1,400 operatives. Population 1890, 3,168; 1900, 3,279.

WEST BAY CITY, a city and the capital of Bay County, eastern central Michigan, on the Saginaw River, about five miles S. of Saginaw Bay, on the Michigan Central railroad. In 1888 an act was adopted by the Michigan legislature, providing for the consolidation of West Bay City and Bay City, but it has never been carried into effect, the former electing to retain its corporate privileges. It is the center of a large trade, and among the most important cities in the state, making a specialty of the manufacture of lumber and salt. The city is lighted by electricity, supports well-regulated municipal departments, has several fine hotels, and is reached from Bay City by means of a thoroughly equipped street-railroad. Population 1890, 12,981; 1900, 13,119.

WEST BEND, a city and the capital of Washington County, southeastern Wisconsin, on the Milwaukee River, 34 miles N. of Milwaukee, on the Chicago and North-Western railroad. It is in a farming section, and has grain-elevators, a brewery, wagon-making and iron-working establishments and other industries. Population 1890, 1,296; 1900, 2,119.

WESTBORO, a town of Worcester County, central Massachusetts, 32 miles S.W. of Boston, on the Boston and Albany railroad. Besides an excellent school system and a good public library, it has the Willow Park Seminary and the Lyman Reform School (for boys), and is also the seat of a state hospital for the insane. It has a number of manufacturing industries, including boot, shoe and hat shops. Population 1900, 5,400.

WEST BOYLSTON, a town of Worcester County, central Massachusetts, 40 miles W. of Boston, on the Boston and Maine railway. It is mainly a farming community. It has manufactories of boots, shoes and cotton goods. It includes the villages of West Boylston, Oakdale, Valley, Central, West Boylston Station, Lower Factory and Harrisville. Population 1900, 2,314.

WEST BRANCH, a village of Ogemaw County, northeastern Michigan, 60 miles N. of Saginaw, on the Michigan Central railroad. Situated in a lumbering district. It has several mills. Population 1900, 1,412.

WEST BRIDGEWATER, a town of Plymouth County, southeastern Massachusetts, 25 miles S. of Boston, on the New York, New Haven and Hartford railroad. It has machine-shops, and manufactures boots and shoes. Howard Seminary (for young ladies) is located here and has an attendance of 42 under four instructors. The town includes the villages of West Bridgewater, Cochesett, Matfield, Westdale and Jerusalem. Population 1900, 1,711.

WESTBROOK, a city of Cumberland County,

southwestern Maine, on the Presumpscot and Stroud-water rivers, six miles N.W. of Portland, on the Boston and Maine and Maine Central railroads. It is engaged in the manufacture of paper, silk and cloth goods, most of the power being furnished by the water of the adjacent streams. There is an electric railway between Westbrook and Portland. Population 1890, 6,632; 1900, 7,283.

WEST CHESTER, a city and the capital of Chester County, southeastern Pennsylvania, 27 miles W. of Philadelphia, on the Philadelphia, Wilmington and Baltimore and Pennsylvania railroads. A state normal school and the Chester County Hospital are located here, the former occupying a building valued at four hundred thousand dollars. Besides ten churches, an excellent school system and two libraries, there are several manufacturing industries. Population 1890, 8,028; 1900, 9,524. See, also, WEST CHESTER, Vol. XXIV, p. 506; and PENNSYLVANIA, Vol. XVIII, p. 499.

WESTCOTT, BROOKE FOSS, an English bishop and author; born near Birmingham, England, Jan. 12, 1825; educated at Trinity College, Cambridge; ordained deacon and priest (1851); became preacher to the University of Cambridge (1859); canon of Peterborough Cathedral (1869). In March, 1890, he was nominated to the bishopric of Durham and consecrated May 1st. He was one of the English clerical revisers of the authorized version of the New Testament. In 1881 was published the result of 28 years' joint labors with Dr. Hort, under the title of *The New Testament in Greek*. He wrote *The Bible in the Church* (1864); *Reason and History* (1866); *History of the English Bible* (1868); and numerous other works.

WESTCOTT, EDWARD NOYES, banker-author, was born in Syracuse, N. Y., Sept. 27, 1847, and died there Mar. 31, 1898. In 1895, owing to ill health, he withdrew from business and wrote the novel *David Harum*. The work was published in 1898 and at once reached an extraordinary sale.

WEST DULUTH, a village of St. Louis County, northeastern Minnesota, on St. Louis Bay, 4 miles S.W. of Duluth, on the St. Paul and Duluth railroad. It is extensively engaged in manufacturing, having brass-works, lumber-mills, car and machine shops, brick-kilns, etc., and has docks for the shipment of stone quarried in the vicinity. Population 1890, 3,368. It is now (1897) united with Duluth.

WESTERLY, a town of Washington County, southern Rhode Island, five miles N. of Long Island Sound, on the New York, New Haven and Hartford railroad, and on the Pawcatuck River; originally known as Misquanicut, incorporated in 1669. It has manufactures of woolen and cotton goods and large granite-quarries. It includes Avondale, Potter Hill, White Rock, Niantic and Westerly villages. Population 1890, 6,813; 1900, 7,541.

WESTERN ASSOCIATED PRESS. See NEWSPAPERS, in these Supplements.

WESTERN AUSTRALIA. (For general article on WESTERN AUSTRALIA, see Vol. XXIV, pp. 507-509.) The colony has an area of 975,920 square miles; population 1897, 161,924. Perth, the capital, had a population of 37,929 in 1897, and Fremantle

about 17,000. Western Australia was the last of the British colonies on the Australian continent to obtain responsible government. By an act of 1890 the government, which had previously been vested in the governor, assisted by a legislative council composed partly of nominated and partly of elected members, was vested in the governor and a legislative council and assembly, the council to consist of 15 members, nominated, in the first place, by the governor, and the assembly to consist of 30 elected members. It was provided that the council should be elective when the population reached 60,000, which mark was passed July 18, 1893, and the colonial parliament soon amended the constitution, making the council consist of 24 members, elected for six years, and the legislative assembly of 44 members, elected for four years. The qualification for electors to the council is the possession of a freehold estate of the clear value of £100; of a leasehold estate of the value of £25 per annum; of a license from the crown of £10 annually, or the occupation of a dwelling-house of £25 per annum. Qualifications of electors to the assembly are 50 per cent lower. The duration of the assembly is fixed at four years. The entire management and control of the waste lands of the crown in Western Australia are vested in the legislature of the colony.

INSTRUCTION. Education is compulsory. The government schools in 1897 numbered 167, with 12,257 scholars, and an average attendance of 8,970. The "assisted" schools numbered 58, with 4,546 scholars, and an average attendance of 3,612.

INDUSTRY AND PRODUCTIONS. The agricultural prosperity of the colony has greatly increased in recent years; still there were only 133,182 acres of land under cultivation at the end of 1897, out of a total of 624,588,800 acres. The live-stock consisted in 1897 of 62,222 horses, 244,971 cattle, and 2,210,742 sheep. At the census of 1891, 8,746 persons were returned as directly engaged in agricultural pursuits, exclusive of their families, and 6,380 persons as engaged in industrial pursuits.

In 1897, of the cultivated area, 38,705 acres were under wheat, 1,694 under barley, 1,678 under oats, and 80,938 under hay. The total area alienated in the colony up to the end of 1897 was 8,847,044 acres, of which 31,450 acres were alienated during 1897. The average produce per acre was: Wheat 10.56 bushels, barley 13.83 bushels, oats 17.44 bushels, maize (only 243 acres) 19.84 bushels, and hay 0.93 ton to the acre.

REVENUE, EXPENDITURE, AND COMMERCE. In 1897 the revenue aggregated £2,843,775; expenditure, £3,236,044; total value of imports, £6,418,565; value of exports, £3,940,098.

The principal exports were: Gold, £2,564,977; wool, £295,646; timber, £192,451; pearls and pearl-shell, £60,253; sandalwood, £49,480; and skins, £28,021.

Gold-mining is rapidly becoming one of the most important industries. In 1890 the gold export was £86,000, and in 1897 it had increased to over £2,564,977, with the prospect of a continued and large increase. The most prominent and important

of the gold-fields are in the district known as Coolgardie, in the southwestern portion.

In 1898 there were 1,456 miles of railway open and 360 under construction; of telegraph, there were 5,958 miles open and 965 under construction. Efforts are being made to open up the interior country by the construction of railroads on a large scale, through the system of land grants. In 1897, 12,898,552 letters and postal-cards passed through the post office, 6,744,536 newspapers, and 3,952,025 parcels.

WESTERN COLLEGE was founded by the United Brethren in Christ in 1856. It was located in Western, Linn County, Iowa, and was removed in 1881, to Toledo, Tama County, Iowa. In 1898 there were 12 instructors and 230 students, and the library had 3,000 volumes. There are six courses of study, with special or subordinate departments. Both sexes are admitted on equal terms. The institution is supported by coöperating conferences in Iowa, Wisconsin, Minnesota, Illinois, and Colorado. In 1898 the total income, including benefactions, receipts from tuition, and incidentals, was \$11,000.

WESTERN RESERVE UNIVERSITY, an institution founded in 1884 in Cleveland, Ohio. In effect, this organization was a consolidation of quite a number of institutions, either prospective or already in existence, under one single control. The university now consists of the following departments: 1. Adelbert College, the parent institution, organized in 1826 under the title of Western Reserve College (see **ADELBERT COLLEGE**, in these Supplements). 2. The Women's College, having a course of study on an equal plane with that of Adelbert, with 13 instructors, an endowment fund of \$172,000, and grounds and buildings worth \$120,000. 3. The College of Medicine, formerly Cleveland Medical College, having 24 instructors, a four-year graded course, permanent fund of \$150,000, and building worth \$250,000. 4. College of Dentistry, with 9 instructors. 5. College of Law, with 10 instructors, and having the support of the Cleveland bar. 6. The graduate department, under the direction of the faculties of Adelbert College and the Women's College. 7. The Western Reserve Academy, at Hudson, Ohio, a classical and preparatory school of Adelbert College. The whole number of instructors in 1898 was 142; there were 750 students, and the library contained 55,000 volumes. In 1898 the productive funds amounted to \$717,000, the receipts from benefactions to \$110,000, and the total income, including tuition receipts and incidentals, to \$125,000.

WESTERN TRAFFIC ASSOCIATION. See **RAILROADS**, in these Supplements.

WESTERVILLE, a village of Franklin County, central Ohio, on Alum Creek, 12 miles N. of Columbus, on the Cleveland, Akron and Columbus railway. Situated in a region devoted to agriculture. It has several flour-mills, and also clay-works, wagon-shops, and lumber-mills. Here is located Otterbein University (q. v., in these Supplements). Population 1890, 1,329; 1900, 1,462.

WEST FARNHAM, a town of Missisquoi Co., southern Quebec, at the junction of two branches of the Yamaska river, on the Central Vermont and Canadian Pacific railroads. Besides several Protestant

churches and schools, there is a Roman Catholic Church, convent and college. It is in an agricultural district, and manufactures beet sugar. Railroad repair-shops are located there. Population 1891, 2,822.

WESTFIELD, a town of Clark County, eastern Illinois, 18 miles N.W. of Marshall, on the Peoria, Decatur and Evansville railroad. It is in a nearly level agricultural region, containing some woodland and light beds of coal. Population 1900, 820.

WESTFIELD, a town of Hampden County, southern Massachusetts, on the Westfield River, 9 miles W. of Springfield, on the New York, New Haven and Hartford and Boston and Albany railroads. It has an excellent school system, maintained at an annual expense of over \$40,000, and is the seat of a state normal school. There is a good water-supply from Montgomery Mountain, seven miles distant, and the town is fully equipped with electric lights and railways. It manufactures whips, cigars, paper, baskets and machinery. Population 1890, 9,805; 1900, 12,310.

WESTFIELD, a village of Union County, northeastern New Jersey, seven miles W. of Elizabeth, on the Central Railroad of New Jersey. Mainly a suburban residence-place for New York business men, it has beautifully shaded macadamized roads lighted by electricity. There are a number of churches of many denominations, a good school system, and a building and loan association. Population township (1900), 4,328.

WESTFIELD, a village of Chautauqua County, western New York, on Chautauqua Creek, 59 miles W. of Buffalo, on the Lake Shore and Michigan Southern and the New York, Chicago and St. Louis railroads. It is in a grape-growing section, and in addition to that industry has railway repair-shops. There are excellent educational facilities, a fine public library, and the town is fully equipped with electric-lighting and water systems. Population 1890, 1,983; 1900, 2,430.

WESTFIELD, a borough of Tioga County, northern Pennsylvania, on the Cowanesque River, 26 miles N. of Wellsboro, on the Addison and Pennsylvania and Fall Brook railroads. The leading industries are dairying and agriculture. Population 1900, 1,180.

WESTFIELD RIVER, a stream of Massachusetts rising in the Green Mountains, and in Berkshire and Hampshire counties, Massachusetts, by three branches, the north, middle and western, uniting at Huntington, and flowing thence in an easterly direction until it empties into the Connecticut, near Springfield. Throughout its course it furnishes power to numerous mills and factories.

WESTFORD, a town of Middlesex County, northeastern Massachusetts, six miles S.W. of Lowell, on the Concord and Montreal and Boston and Maine railroads. It has excellent educational facilities, is in an agricultural section, and has granite-quarries, machine-shops and woolen-mills. In the township are included the villages of Central Village, Brookside, Forge, Graniteville, Parkersville, Westford and Westford Corner. Population 1900, 2,624.

WEST GROVE, a village of Chester County, southeastern Pennsylvania, 40 miles S.W. of Philadelphia, on the Philadelphia, Wilmington and Baltimore railroad. A very extensive rose-growing establishment is located here; and there is also a casket-factory and knitting-shop. Population 1900, 929.

WEST HARTFORD, a town of Hartford County, northwestern central Connecticut, containing the villages of West Hartford and Elmwood, the former five miles W. of Hartford, and connected with that city by the Hartford and Farmington electric street-railway, and the latter six miles S.W. of Hartford, on the New York, New Haven and Hartford and the New York and New England railroads. It is chiefly engaged in agriculture, but has also brick and pottery kilns. Population 1890, 1,930; 1900, 3,186.

WEST HOBOKEN, a town of Hudson County, northeastern New Jersey, two miles W. of New York. It is extensively engaged in the manufacture of silk goods, and has a convent of the Sisters of St. Dominic and a monastery of the Passionist Fathers. Population 1890, 11,665; 1900, 23,094.

WEST INDIA COMPANY, DUTCH. See **NEW YORK**, Vol. XVII, p. 454.

WESTINGHOUSE BRAKE. See **RAILWAY**, Vol. XX, pp. 248, 249.

WEST LIBERTY, a city of Muscatine County, southeastern Iowa, 38 miles N.W. of Davenport, on the Chicago, Rock Island and Pacific and the Burlington, Cedar Rapids and Northern railroads. It is chiefly engaged in agriculture and stock-raising, but has also a creamery, a wagon-shop and clay-works. Population 1900, 1,690.

WEST LIBERTY, a precinct and capital of Morgan County, northeastern Kentucky, on the Licking River, about 80 miles E. of Lexington, the nearest railway station being Morehead, on the Chesapeake and Ohio Southwestern railroad. It is in a region abounding in coal and iron, and has interests in agriculture. Population 1900, 1,849.

WEST LIBERTY, a village of Liberty township, Logan County, western central Ohio, on the Mad River, 10 miles N. of Urbana, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It is located in an agricultural region, and has flour-mills and several machine-shops. Population 1900, 1,236.

WESTMINSTER, a city and the capital of Carroll County, northern Maryland, 34 miles N.W. of Baltimore, on the Western Maryland railroad. It has several churches and a good school system, and is also the seat of Western Maryland College (Methodist Protestant), an institution having an average attendance of 250 students under 16 instructors. The city is lighted by gas and electricity, and has several flour-mills, phosphate-works and other industries. Population 1890, 2,903; 1900, 3,199.

WESTMINSTER, now comprising three boroughs of London. See **LONDON**, Vol. XIV, pp. 821, et seq.; and in these Supplements.

WESTMINSTER (HUGH LUPUS GROSVENOR), **DUKE OF** (the first duke and third marquis); born in London, England, Oct. 13, 1825; sat in Parliament for Chester (1847-69); succeeded to the marquise on

the death of his father, Oct. 31, 1869; created duke (1874). He is said to be the wealthiest nobleman in Europe.

WESTMINSTER ABBEY. See LONDON, Vol. XIV, pp. 837, 838.

WESTMINSTER ASSEMBLY. See PRESBYTERIANISM, Vol. XIX, pp. 687, 688.

WESTMINSTER CONFESSION. See CREED, Vol. VI, p. 565.

WESTMINSTER HALL. See ARCHITECTURE, Vol. II, plate XX, opp. p. 428; LONDON, Vol. XIV, p. 839; and in these Supplements.

WESTMINSTER PALACE. See LONDON, Vol. XIV, p. 839.

WESTMINSTER SCHOOL OR THE ROYAL SCHOOL OF ST. PETER'S, Westminster, one of the seven great public schools of England. It was founded in 1560, and was reorganized in 1868. The school has a number of class scholarships, and has some celebrity for its annual Christmas *Westminster Play*, being a representation of some one of Terence's Latin comedies, written for the occasions, suited to the times, and performed by the boy students. Westminster School boasts many distinguished names among its masters and pupils. Among them are Ben Jonson, Herbert, Cowper, Dryden, Warren Hastings, Halifax, Lord Raglan, Christopher Wren, Gibbon, any many others.

WEST NEWBURY, a town of Essex County, northeastern Massachusetts, on the Merrimac River, 32 miles N. of Boston and 4 miles N.W. of Byfield, the nearest station on the Boston and Maine railroad. It is in a region devoted to agriculture, and has shoe and comb factories, and excellent educational facilities. Population 1900, 1,558.

WEST NEWTON, a borough of Westmoreland County, southwestern Pennsylvania, on the Youghiogheny River, and 33 miles S.E. of Pittsburg, on the Pittsburg and Lake Erie and the Baltimore and Ohio railroads. It is principally engaged in agriculture, has flour, paper and planing mills, and coal is abundant in the vicinity. Population 1900, 2,467.

WESTON, a town of Middlesex County, eastern Massachusetts, on the Charles River, 13 miles W. of Boston, on the Fitchburg and Boston and Maine railroads. It is in a farming community, and has an excellent system of schools and a public library. Population 1900, 1,834.

WESTON, a town of Platte County, northwestern Missouri, on the Missouri River, 32 miles N.W. of Kansas City, on the Kansas City, St. Joseph and Council Bluffs railroad. It produces a variety of manufactures, principally flour and leather, and has a distillery and brewery. Population 1900, 1,019.

WESTON, a village of York County, central southern Ontario, on the Humber River, and nine miles N.W. of Toronto, on the Grand Trunk and Canadian Pacific railways. It is situated in a farming district, has flour, grist and woolen mills, a foundry, carriage factory and other manufacturing industries. Population 1891, 1,191.

WESTON, a town and capital of Lewis County, northern central West Virginia, on the west fork of the Monongahela River, 80 miles S.E. of Wheeling, on the West Virginia and Pittsburg railroad. It is

situated in a section devoted to stock-raising and agriculture, has several flour and lumber mills, is the seat of the state insane asylum, and has a large local trade. Population 1890, 2,143.

WESTPHAL, RUDOLF, a German classical scholar; born at Oberkirchen, Schaumburg, Germany, July 3, 1826. His university training was in chemistry, mathematics and Oriental languages. Notwithstanding years of experience as an instructor in these branches, his fame rests almost entirely upon what he has done for Greek music and versification. He was a man of versatile talents, as the titles of the following works will indicate: *Methodische Grammatik der griechischen Sprache* (2 vols., Jena, 1872); *Theorie der musischen Künste bei den Hellenen* (3 vols., 1885-87); *Prolegomena zu Aeschylus's Tragödien* (1869); *Vergleichende Grammatik der indogermanischen Sprachen* (1873). He died at Staathagen, Germany, July 10, 1892.

WESTPHALIA, TREATY OF. See GERMANY, Vol. X, p. 498.

WEST PLAINS, a city and capital of Howell County, central southern Missouri, 130 miles S. of Jefferson City, on the Kansas City, Fort Scott and Memphis railroad. It is engaged in lumbering, stock-raising and agriculture, and is especially noted for its extensive apple-orchards and vineyards. Population 1890, 2,091; 1900, 2,902.

WEST POINT, a city of Troup County, western Georgia, on the Chattahoochee River, and 87 miles S.W. of Atlanta, on the Western Railway of Alabama and Atlanta and West Point railroad. It is situated in a cotton-raising country, has several cotton factories, ginning and oil mills, and an iron foundry. Population 1890, 1,254; 1900, 1,797.

WEST POINT, a town and capital of Clay County, eastern Mississippi, 150 miles S.E. of Memphis, Tennessee, on the Mobile and Ohio, the Illinois Central and the Southern railroad. It is located in the midst of the rich prairie section of the state, is extensively interested in cotton-growing and general agriculture, has foundries and machine-shops, lumber-mills and clay-works, cotton milling and ginning establishments and other industries. Population 1890, 2,762; 1900, 3,193.

WEST POINT, a town and capital of Cuming County, northeastern Nebraska, on the Elkhorn River, 74 miles N.W. of Omaha, on the Fremont, Elkhorn and Wisconsin Valley railroad. It is in an agricultural and stock-raising section, has grain-elevators, stock-yards and grist-mills, a brewery and other industries. Population 1900, 1,890.

WEST POINT, a village of Cornwall township, Orange County, New York, situated on the right or western bank of the Hudson River, 52 miles N. of the city of New York, and 24 miles S. by W. of Poughkeepsie. The buildings of the United States Military Academy occupy a plateau 188 feet above the level of the Hudson, whence may be viewed the finest known pass in any river of the world. West Point is reached by steamer and has a railroad station on the West Shore railroad. Population 1895, about 1,500. (For an account of the Military Academy of the United States, see that title in these Supplements, and also ARMY, Vol. II, p. 619, and WEST

POINT, Vol. XXIV, p. 81.) The locality itself has a history worthy of attention. The whole neighborhood of the Military Academy was once part of an early grant to a captain in the English Royal Artillery, one John Evans. His patent was vacated in 1669, and the lands passed to several proprietors. Rocky and uninviting, as was the soil, it attracted only the camping hunter and an occasional wood-cutter. Such was West Point when the Lexington and Concord minute-men defeated the redcoats of King George. The military importance of the place overbalanced its disadvantages, and as early as the autumn of 1775 a scheme of fortifications for Constitution Island, was begun but to be abandoned. Dominated as was the site of Fort Constitution by the elevated ground of West Point, it was condemned by a Congressional committee before it was destroyed by the enemy in 1777. Then the British success nerved the patriot leaders to more elaborate defensive works. From Gee's or Stony Point a huge chain, forged at the Stirling Iron Works in Orange County, was stretched to the rocky shore of Constitution Island. It was defended by a battery of guns at each end, and further rendered secure by a system of fortification on West Point, designed by a French officer, Lieutenant-Colonel Radière, and on his supersession improved and completed by Thaddeus Kosciusko. Forts Arnold, Putnam, Webb, Wyllis and Battery Knox were constructed, with the hardships of a severe winter to hamper the working parties of Parsons's brigade, and one thousand troops garrisoned the works during the winter of 1778-79, with the remainder of the northern army in winter quarters near by. Washington himself resided here from July 25 to November 28, 1779. The works were made impregnable to direct assault, and the knowledge of it led the British to intrigue with Benedict Arnold, then in command of the post. (See ANDRÉ, JOHN, Vol. II, p. 19.) As he fled headlong to the *Vulture*, and the hapless André paced his prison, thinking of his fate, Washington sent a letter to the sturdy patriot in charge of the works, Colonel Nathaniel Wade of Massachusetts, commanding extreme vigilance for fear of immediate attack. But West Point was never threatened with assault. Its forts were increased and strengthened, the traitor's name was taken from one fort and replaced by that of Clinton, the garrisons were reinforced, and war stores of all kinds placed within the works. With peace, the place became a repository for war material, the redoubts were dismantled in 1787, and allowed to fall into ruin. In 1805 Fort Putnam was temporarily restored, and Fort Clinton was more enduringly repaired in 1857. It was the presence of these forts which determined the placing here of the corps of engineers and the Military Academy.

The West Point of the present day is the objective point of many a tourist, and amply repays a visit. Situated in the heart of the romantic Highlands of the Hudson, every rocky promontory and tree-clad slope is potent in memories of the Revolutionary period. No more agreeable method of spending a summer day can be found than a journey to West Point by one of the Albany day line of steamers.

Among the points of interest may be mentioned the fine collection of military portraits in Grant Hall; the chapel, with its trophies of British colors surrendered by Cornwallis at Yorktown, and its memorial tablets of the Revolutionary generals; the site of Fort Clinton, Kosciusko's Garden, and Flirtation Walk, where gray-coated Alexanders in embryo have won the hearts of scores of American maidens; Dade's Monument, recalling the Seminoles in the swamps of Florida, and the statue to the heroic Pole, Kosciusko, enshrined by a poet in an oft-quoted verse. Here, towering over the fair gateway of the Hudson, hovers MacMonnies's winged figure of Victory, surmounting the Battle Monument erected in recent years to commemorate the "boys in blue" of the regular army who fell in the Civil War. Trophy Point, with its Mexican cannon and mortars and a section of the chain boom of Revolutionary days, and the statue of Sedgwick, erected by the Sixth Corps of the Army of the Potomac, are worthy of notice, and a visit to the distant cadet cemetery is a fitting conclusion to the day. Here rest the heroes of many a hard-fought field,—the trusty Anderson, of Sumter fame; Generals Winfield Scott, Q. A. Gillmore, Buford the brave; Cushing, who fell with the high tide at Gettysburg; Sykes of a hundred battles; and the gallant Custer, slain in the Little Big Horn by the bloodthirsty Sioux. In the loveliest spot of the land they loved and fought for, as undying exemplars for the American soldier of the future, the flower of America's soldiery fitly here amid the hills await the sound of the great reveille. Last of all, the first of all local traditions is enshrined here—the tutelar saint of West Point, Benny Havens. Benny and his contraband liquor-house have gone to the Great Beyond, like scores of those who toasted Generals Brady, Worth and Scott within his walls, but for many a long year, among army men his name will be a name to waste-jure with, and the rocks of many of America's waste places, sites of bivouacs, resound with the refrain:

"To our regiments, now, fellows, we all must shortly go,
And look as sage as parsons when they tell of what 's below!
We must cultivate the graces, do everything 'just so,'
And never talk to ears polite of Benny Havens, O!"

WEST POINT, a town of King William County, eastern Virginia, at the junction of the Mataponi and Pamunkey rivers, 38 miles E. of Richmond, on the Southern railway. Its principal industries are lumbering and oyster-packing, shipping by rail and boat, being connected by regular steamboat lines with Philadelphia, New York and Boston. Population 1890, 2,018.

WESTPORT, a town of Fairfield County, southern Connecticut, at the mouth of the Saugatuck River, 25 miles S.W. of New Haven, on the New York, New Haven and Hartford railroad. It is principally engaged in agriculture, but has several manufactories of twine, buttons, etc. Along the shore are a number of small, but pleasant, summer resorts. Westport contains the villages of Green's Farms, Saugatuck and Westport. Population 1890, 3,715; 1900, 4,017.

WESTPORT, a town of Bristol County, southeastern Massachusetts, bordered on the south by the

Atlantic Ocean, on the New York, New Haven and Hartford railroad. It is interested in a riculture, is engaged to a large extent in fishing, and has some manufactories. It includes the villages of Central Village, South Westport, Westport Factory, Head of Westport, Westport Harbor, Westport Point, North Westport, and Westport. Population 1900, 2,890.

WEST RUTLAND, a town in Rutland township, Rutland County, southwest central Vermont, four miles W. of the city of Rutland, and on the Rensselaer and Saratoga railroad. It was detached from Rutland and organized as a town in 1887. It has ten large quarries of white marble and mills for sawing the stone, also a mantel manufactory. There are four Protestant and two Roman Catholic churches. Population 1890, 3,680; 1900, 2,914.

WEST STOCKBRIDGE, a town in West Stockbridge township, Berkshire County, western Massachusetts, 14 miles S.S.W. of Pittsfield and 10 miles N. of Great Barrington. The town contains the villages of State Line, Williamsville, West Stockbridge, Rockdale Mills and West Stockbridge Center, and has manufactories of flour, pig-iron, lime, and has also quarries of marble. The Boston and Albany railroad passes through the village of State Line. Population of town in 1890, 1,492; 1900, 1,158.

WEST SPRINGFIELD, a town of Hampden County, southwestern Massachusetts, on the Connecticut River, opposite Springfield, and on the Boston and Albany railroad. It embraces the villages of West Springfield, Merrick and Mittineague, and has manufactures of paper and cotton cloth. It has 5 churches, a high school, public library, 30 schoolhouses and 3 hotels. Population 1890, 5,077; 1900, 7,105.

WEST TROY, a village of Albany County, eastern New York, on the Hudson River, opposite Troy, and on the Delaware and Hudson railroad. Its manufacturing interests are large, comprising street-cars, stoves, iron castings, bells and carriages. There are also woolen-mills, wood-working and other establishments. The Watervliet United States arsenal is here. There are 10 churches, 1 parochial and 4 public schools, a national bank and a weekly newspaper. Pop. Watervliet city (1900), 14,321.

WEST UNION, a city and the capital of Fayette County, northeastern Iowa, 84 miles N.W. of Dubuque, and on the Burlington, Cedar Rapids and Northern and the Chicago, Milwaukee and St. Paul railroads. It is in a fertile agricultural section; has two large creameries, 3 weekly newspapers, 3 banks, a water-works system and 11 churches. Population 1890, 1,676; 1900, 1,935.

WEST UNION, a village and the capital of Adams County, southern Ohio, 33 miles W. by N. of Portsmouth. Its nearest railroad station is Winchester, on the Cincinnati, Portsmouth and Virginia railroad. It has flour, furniture and planing mills. Wheat, corn and tobacco are the leading products of the district. There are four weekly newspapers. Population 1890, 825; 1900, 1,033.

WEST UNION, a town and the capital of Doddridge County, in northwestern West Virginia, 54 miles E. of Parkersburg, and on the Baltimore and Ohio railroad. It is in a coal-mining, farming,

lumbering and stock-raising region. Population 1890, 312; 1900,

WEST VIRGINIA had a population in 1900 of 958,900, that of 1890 having been 762,794,—an increase of 196,106. During the preceding decade the gain had been 39.92 per cent. The gain in density of population was from 25.09 to the square mile in 1880 to 30.95 in 1890. In 1890 the number of cities having 8,000 or more population was three, and the total was 53,038, constituting 6.95 per cent of the people of the state. By the census of that year the division of the sexes was,



STATE SEAL OF WEST VIRGINIA.

males 390,285, females 372,509; the native-born population amounted to 97.52 per cent; the negroes increased from 25,886 in 1880 to 32,690 in 1890—a gain in numbers of 6,794; there were 15 Chinese, 3 Japanese and 9 Indians.

The last surveys of West Virginia, prior to 1897, gave the gross area of the state at 24,780 square miles, of which 135 square miles were water surface, leaving the land surface 24,645 square miles.

Agriculture. The census reports of 1890 give the following facts relative to the products of 1889:

Number of acres devoted to the cereals.....	1,151,578
Number of bushels produced.....	20,554,325
Acreege under cereals—	
Corn.....	51.47%
Wheat.....	30.31%
Oats.....	15.70%
Barley.....	0.03%
Rye.....	1.30%
Buckwheat.....	1.19%
Acres under corn.....	592,763
Bushels of corn produced.....	13,730,506
Acres under wheat.....	349,016
Bushels of wheat produced.....	3,634,197
Acres under oats.....	180,815
Bushels of oats produced.....	2,946,653
Acres under barley.....	326
Bushels of barley produced.....	5,387
Acres under rye.....	14,962
Bushels of rye produced.....	117,113
Acres under buckwheat.....	13,696
Bushels of buckwheat produced.....	120,469

Comparative view of products in 1880 and 1890:

	1880	1890
Total number of farms.....	62,674	72,773
Average size of farms, acres..	163	142
Total acreage of farms.....	10,193,779	10,321,326
Percentage of improved land..	38	45
Total value of land, fences, buildings, farm implements, machinery and animals.....	\$153,588,725	\$178,961,330
Number of horses.....	126,143	154,722
Number of mules and asses....	6,226	7,390
Whole number of cattle.....	458,444	566,066
Number of milch cows, included in above.....	156,956	188,366
Number of swine.....	510,613	411,018
Number of sheep.....	674,769	785,063

Size of farms in 1889:

Under 10 acres.....	2,712
10 acres and under 20 acres.....	3,830
20 acres and under 50 acres.....	12,219
50 acres and under 100 acres.....	19,857
100 acres and under 500 acres.....	31,735
500 acres and under 1,000 acres.....	1,727
1,000 acres and over.....	693

Farm tenures in 1890 were, 59,858 cultivated by the owners, 4,275 rented for money, and 8,640 rented on shares.

In 1895 there were 42 counties of the state in which agriculture and stock were of chief importance; five reported lumber and three mining as their chief occupation. The production of wheat for the year reached 4,577,644, and 14,089,051 bushels of corn were raised. The assessed value of the live-stock was \$2,483,938. From 1890 to 1895 the productions of the soil, the forests, the mines and the factories of West Virginia continuously increased. In 1896 the following live-stock report was made:

KIND.	NUMBER.	VALUE.
Horses.....	163,312	\$7,586,792
Milch cows.....	182,265	3,490,375
Sheep.....	765,705	1,619,772
Mules.....	7,601	421,036
Swine.....	407,340	1,975,000
All other cattle.....	354,376	5,387,721

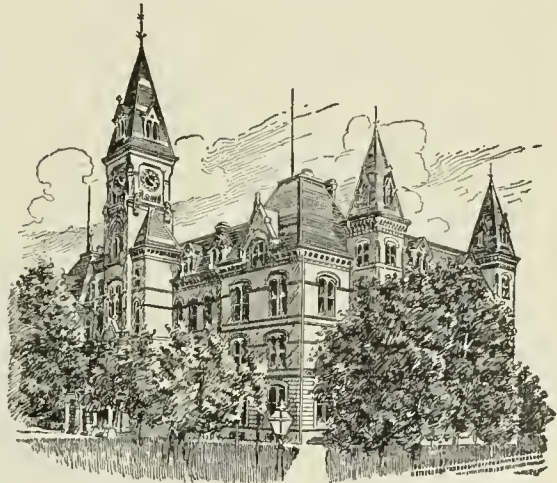
Minerals. West Virginia has rich and varied deposits of minerals. The census reports for 1890 give the total value of the output for the preceding year at \$6,969,804. Since that time great advances have been made in the production of coal, petroleum, coke and natural gas. The output for the years mentioned in the following table is in tons of coke and coal and in barrels of petroleum:

	COAL.	COKE.	PETROLEUM.
1891.....	9,220,000	1,238,418	1,358,269
1892.....	8,710,888	1,313,449	3,700,000
1893.....	10,708,578	1,062,076	8,400,000
1894.....	9,428,065	9,428,065	9,855,000
1895.....	11,629,757	-----	10,700,000

In 1890, 9,952 persons were employed in and about the coal-mines of the state. In 1895 this number had increased to slightly more than twenty thousand. The area of the coal-fields of West Virginia embraces 16,000 square miles. Coal is found in all but three counties of the state, and two counties, Fayette and Kanawha, produced in 1895 one twenty-seventh of the entire amount mined in the United States. Underlying more than ten million acres of the land of West Virginia there is an average of more than ten feet of coal. An aggregate thickness of from 25 to 50 feet of coal under the same property is not infrequent, and in one mountain in the state there are 11 veins of coal, one above the other, ranging in thickness from 2 feet 7 inches to 20 feet. The coking variety yields a superior product. Estimates made of the amount of coal in the West Virginia field show that, if all mined, it would, at the present rate of consumption, furnish the supply for the United States for 1,000 years.

The territory in which petroleum is found extends across the state from north to south in a belt 200 miles wide. A beginning had scarcely been made in developing this field up to 1896, and the possibilities of its production are immeasurable. Limestone and sandstone are both found in large deposits, and easily quarried. The returns for 1889 gave the value of these two items at \$234,543. In 12 counties of West Virginia iron ore of good quality is found in abundance. As with natural gas, which has been found in several points in the state, iron-ore deposits had not, up to 1896, been worked to any extent representing their importance. Salt is cheaply manufactured in West Virginia, the brine being reached by sinking wells, and the fuel to reduce it being had for the mining. In 1889 there were but five establishments engaged in the industry, but the number had been increased to nine in 1895 and the output more than doubled.

Forests. Large as is the total value of the mineral products of West Virginia, it is more than



STATE CAPITOL BUILDING, CHARLESTON.

equaled annually by the revenue drawn from the forests of the state. The hills and mountains are covered with a dense growth of the finest timber and the largest body of hard-wood timber in the United States. Fully three fourths of its surface, or over eighteen thousand square miles, is covered by forests. Careful estimates place the hard-wood timber at about four fifths of the entire amount, the kinds which embrace white oak, chestnut-oak, black oak, red oak, hickory, chestnut, locust, white maple, sugar-maple, birch, gum, black walnut, sycamore, wild-cherry and white walnut. The soft-wood timbers are principally tulip poplar, of which the state has fully one third of the supply of the United States, pine, white linden, yellow linden, cucumber, buckeye, ash and hemlock. The output of the mills of the state for 1895 was reported at 125,000,000 feet of poplar, 75,000,000 feet of hard wood, 50,800,000 feet of spruce and 20,000,000 feet of pine.

A drawback to the development of West Virginia has been the lack of transportation facilities. In 1890 the government began work on the Great Kanawha River, and up to 1895 had expended on

dams and locks almost \$4,000,000, thus rendering it navigable from its mouth to a distance of 90 miles. The work was completed in 1896, and so great were the benefits derived that the increase in the shipments of coal alone amounted, in 1894, when the work was unfinished, to more than 25,000,000 bushels.

Manufactures. The last complete report of the manufacturing industries of West Virginia prior to 1897 is to be found in the census of 1890. There were then 2,376 specified manufacturing industries, in which capital to the amount of \$28,118,030 was invested; 21,969 persons were employed, to whom \$8,330,997 in annual wages was paid; material to the amount of \$23,729,089 was used, the output from which was valued at \$38,702,125. The leading manufacture was of iron and steel, including nails, spikes and foundry and machine-shop work, these bringing a return of \$11,138,378. Lumber, products of mills, and timber not manufactured aggregated \$6,415,705; coke brought \$1,130,076; petroleum-refining, \$1,171,374; other industries of importance were clothing, glass and malt liquors.

Education and Churches. The enumeration of school youth in West Virginia in 1894 was as follows:

	WHITE.	COLORED.
School population	271,405	11,365
Enrollment	211,629	7,189
Male teachers	3,477	108
Female teachers.....	2,432	98
Wages, male teachers	\$505,932	\$21,837
Wages, female teachers.....	427,498	20,492
Schoolhouses	5,302	
Schoolhouses erected.....	206	
Volumes in libraries	7,521	
Value of schoolhouses.....	\$2,376,386	
Average daily attendance of pupils	135,381	

The value of the entire school property of the state was given at the beginning of 1895 as \$3,120,927. The average length of the school terms throughout the state was one hundred days.

Institutions of learning more advanced than the public schools include the West Virginia University (q.v., in these Supplements), Marshall College, State Normal School, Fairmount State Normal School, Concord State Normal School, West Liberty State Normal School, Glenville State Normal School, and West Virginia Colored Institute. In addition to the above, which are all under state supervision, there are 13 private colleges, academies and institutes of a high order.

West Virginia has three denominational educational institutions: Barbourville College, at Barbourville, under the auspices of the Methodist Episcopal Church South; Bethany College, at Bethany, controlled by the Christian Church; and West Virginia College, at Flemington, managed by the Baptists.

The churches of West Virginia numbered 2,989 in 1889; there were 2,160 edifices; the membership numbered 189,917, being 24.90 per cent of the entire population of the state; all church property was valued at the sum of \$3,701,483. All Baptist bodies

numbered 625; the Roman Catholics, 67; all Methodist bodies, 1,543; all Presbyterian bodies, 140; and the United Brethren, 259.

Taxation. For the purposes of taxation in 1895 the property of West Virginia was assessed at \$227,630,060, the realty being valued at \$153,360,503, and the personalty at \$22,767,554. The estimated receipts for the fiscal year ending Sept. 30, 1896, were \$656,600, which, with the balance in the state treasury, would make the total resources \$863,020. The estimated expenditures for the same period were \$530,600, leaving an estimated balance of \$332,420. On Jan. 1, 1898, the state was free from debt.

Miscellaneous. The following table shows the state institutions, their location, the number of inmates and the cost of maintenance for 1895:

INSTITUTION.	LOCATION.	IN-MATES.	MAINTENANCE.
Hospital for the Insane	Weston -----	951	\$125,662
Second Hospital for the Insane.....	Spencer -----	123	30,250
Colored Institute.....	Farms -----	75	23,815*
School for the Deaf and Blind.....	Romney -----	160†	30,440
Penitentiary	Moundsville ..	463	55,063
Reform School.....	Pruntytown ..	102	18,715

At the beginning of 1896 there were 26 national banks, 50 state banks, 4 private banks and 1 incorporated bank in West Virginia, the combined resources of all amounting to \$25,545,000. The capital stock of the national banks aggregated \$3,000,000; that of the state institutions, \$2,750,000.

In 1896 West Virginia had a total railroad mileage of 2,100,—an increase of 250 miles over the preceding year. The assessed valuation of all roads of the state, for the purposes of taxation, amounted to the sum of \$22,432,000.

The National Guard of the state was composed, in 1896, of one brigade, composed of two regiments of infantry. The organized force was 891 officers and enlisted men; the authorized strength was 1,438. The appropriation for the year was \$15,000 by the state, to which the Federal government added \$5,000, as it does annually.

On Jan. 1, 1899, there were 190 newspapers published in West Virginia, of which 19 were daily, 8 semiweekly, 153 weekly, 1 fortnightly, 1 semi-monthly, and 8 monthly. Papers were published in all of the 55 counties, and in 85 of the cities, towns, and villages of the state, of which 54 are county seats.

The following is a list of the principal cities and towns of West Virginia, with the populations of 1900: Wheeling, 38,878; Huntington, 10,108; Parkersburg, 8,408; Martinsburg, 7,226; Charleston, 6,742; Grafton, 3,159; Clarksburg, 3,008; Benwood, 2,934; Moundsville, 2,688; Hinton, 2,570; New Cumberland, 2,305; Charleston, 2,287; Wellsburg, 2,235; Keyser, 2,165; and Weston, 2,143.

List of the Governors of West Virginia. Arthur I. Boreman, 1863-69; William E. Stevenson, 1869-71; John J. Jacob, 1871-77; Henry M. Mathews,

* The United States government contributes \$9,557 annually.
† One hundred and thirteen deaf and 47 blind.

1877-81; Jacob B. Jackson, 1881-85; E. Willis Wilson, 1885-90; A. B. Fleming, 1890-93; William A. McCorkle, 1893-97; George W. Atkinson, 1897. See also WEST VIRGINIA, Vol. XXIV, pp. 517-20.

WEST VIRGINIA UNIVERSITY, an institution established at Morgantown, W. Va., in 1867, with the proceeds of the Congressional land grant of July 2, 1862. It has 13 academic and technical schools, besides special courses, is well equipped for instruction in engineering, and receives from the United States government \$15,000 annually for agricultural experiment-station work, besides \$20,000 from the Morrill fund. Tuition is free to West Virginia students. Besides an endowment of \$110,000, it has property worth about \$300,000. In 1898 there were 48 instructors, 845 students, and the library contained 20,000 volumes.

WETHERELL, ELIZABETH, the pen-name of SUSAN WARNER, q. v., in these Supplements.

WETHERILL MACHINE. See IRON AND STEEL, in these Supplements.

WETTE, W. M. L. DE, theologian. See DE WETTE, Vol. VII, p. 144.

WETTER, a Swedish lake, 80 miles long, 13 miles broad. See SWEDEN, Vol. XXII, pp. 736, 741.

WETUMPKA, a city and the capital of Elmore County, Ala., 15 miles N. N. E. of Montgomery, at the head of steamboat-navigation on the Coosa river, and on the Louisville and Nashville railroad. It is a cotton-shipping point. The state penitentiary is located here. Population 1900, 562.

WEYDEN, ROGER VAN DER (1400-64). See SCHOOLS OF PAINTING, Vol. XXI, p. 439.

WEYLER, DON VALERIANO Y NICOLAU, MARQUIS OF TENERIFFE, a Spanish general, born in Barcelona, Feb. 6, 1840, and said to be of German or Irish extraction. During the Carlist disturbances in Spain (1873), in the war against Morocco, and in the Ten Year's War in Cuba, (1868-78), he gained a reputation for excessive barbarity, which earned him the by-name of "Butcher." He has always claimed that this reputation was undeserved; but he likewise declared that conspirators against the government would be severely dealt with, as, being merely a soldier, he had nothing to do with reform, and would meet war with war. In 1879 he was made captain-general of the Canary Islands; and in 1889 of the Philippines, where he succeeded in establishing peace for a time. While captain-general of Catalonia, General Weyler was appointed to the like office in Cuba, and he arrived at Havana on the 10th of February, 1896, amid enthusiastic greetings from the Spanish populace. He immediately issued proclamations laying down strict rules for the government of the island, subordinating civil affairs and judicial administration to military control and courts-martial, and declaring punishable with death or life-imprisonment a long list of offenses against Spanish authority,—offenses not alone of commission, as by active warfare, but also of omission, as by failing to report facts detrimental to Spanish interests within the knowledge of the offending party. General Weyler pushed military movements against the insurgents with some vigor, but, owing probably to lack of proper knowledge of the enemy's tactics,

his endeavors accomplished little, the insurgents growing in numbers and audacity, and frequently defeating the Spanish troops or exhausting them by the elusiveness of their bush-fighting tactics. Ostensibly retaining the power of life and death in his own hands, and claiming to exercise a strict justice in his government, the slaughter of prisoners by his subordinates went on apparently unchecked and uncriticised save by the procrastinating promise of future investigation. Eager to make a show of reducing the island to subjection, Weyler announced that he had "pacified" the province of Pinar del Rio, a boast whose hollowness the Cuban leader Maceo promptly proceeded to show by running riot over the "pacified" territory. Weyler then constructed a new trocha from Mariel on the north coast to Majana on the south, and closely hugged this line while the insurgents exercised their will in the surrounding country. Finally, driven by the discontent of his former admirers, General Weyler took the field in person, occupied Pinar del Rio with 30,000 troops, and drove Maceo into the mountains, who, evading the trocha by boat, met his death near Punta Brava. General Weyler included in his plans for pacifying the island a scheme of reconcentration which was destined to become infamous. (See CUBA, *ante*, p. 960b.) On the 21st of October, 1896, he issued a decree forcing into the camps of concentration all the wretched *pacificos* who had been spared by his own troops and the more lawless of the insurgents. The horrors of this scheme are well known, and the direct and indirect effects of their publication in America are mentioned under CUBA, *ante* p. 960b, and UNITED STATES, *ante*, pp. 3000d-3000e. The brutalities practiced in the carrying out of this scheme turned even Spanish breasts against its author, and the revulsion of feeling against him in Havana and Spain, combined with the demand of the American government for his withdrawal, resulted in his recall (Oct. 7, 1897) and the appointment of Marshal Blanco in his place. General Weyler returned to Spain, it is said, with a vast amount of treasure nefariously obtained during his administration.

WEYMAN, STANLEY JOHN, an English novelist; born at Ludlow, Shropshire, Aug. 7, 1855. He was

educated at Shrewsbury and Christ Church, Oxford, and in 1878 was classical instructor in King's School, Chester. He was admitted to the bar in 1881, and practiced for eight years. His first writings appeared in the *Cornhill Magazine* in 1883, and his earliest romance, *The House of the Wolf*, based on an episode in French history, appeared in 1889. He traveled



STANLEY J. WEYMAN.

for some years, relinquishing his profession, though pursuing literature, for which he possessed a manifest taste. In 1890 appeared *The New Rector*, a novel in the manner of Anthony Trollope, and in the following year *The Story of Francis Cludde*. In 1893 he won distinction by his animated historical romance, *A Gentleman of France*, which was not

only reprinted in the United States, but was widely translated. This was followed by *The Man in Black*; *Under the Red Robe*, a story of the era of Richelieu; *My Lady Rotha*, founded on incidents in the Thirty Years' War (1894); *The Red Cockade and Memoirs of a Minister of France* (1895); *Shrewsbury* (1897); and *The Castle Inn* (1898). Mr. Weyman is a vivid and strikingly picturesque writer, whose work is instinct with the life and movement of a romantic time. The age and country with which he has chiefly dealt is mediæval France.

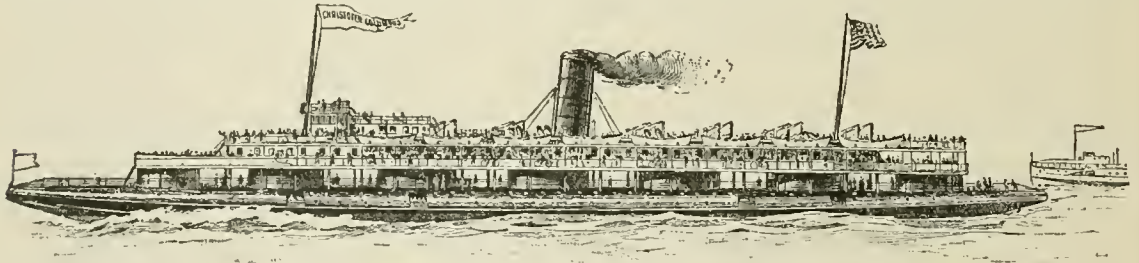
WEYMOUTH, a town of Norfolk County, Mass., 12 miles S. of Boston, on the Weymouth Fore river, and on the New York, New Haven and Hartford railroad. It contains the villages of North, South, and East Weymouth, and has large manufactories of boots, shoes, and nails, and an extensive coal and lumber trade. It has 4 banks, 3 savings banks, a weekly newspaper, 16 churches, 8 grammar and 2 high schools, and Tufts Library, containing 16,000 volumes. Population 1890, 10,866; 1900, 11,324.

WEYPRECHT, KARL (1838-81), Hessian explorer. See POLAR REGIONS, Vol. XIX, pp. 323-24.

WHALEBACK, a type of steamship whose construction partly resembles the back of a whale. Alexander McDougall, a lake captain, of Duluth, Minn., conceived the idea from Jules Verne's fictitious

WHARTON, the capital of Wharton County, Texas, 66 miles N.E. of Victoria, and on the Southern Pacific railroad. It is in an agricultural district. There is a weekly newspaper. Population 1890, 1,239.

WHARTON, FRANCIS, an American lawyer; born in Philadelphia, March 7, 1820; graduated at Yale in 1839; admitted to the bar in 1843; practiced in Philadelphia, and became assistant attorney-general in 1845. From 1856 to 1863 he was professor of logic and rhetoric in Kenyon College, Ohio, and then went abroad. Upon returning he was ordained in the Protestant Episcopal Church, and became rector of St. Paul's Church, Brookline, Mass., holding at the same time the professorship of ecclesiastical and international law in the Cambridge Divinity School. In 1885 he was appointed counsel to the State Department in Washington, in matters of international law; and in 1888, under resolution of Congress, was made editor of the Revolutionary diplomatic correspondence of the United States. He died in Washington, Feb. 21, 1889. He was a man of great versatility, and remarkable for the breadth of his knowledge. His best known work is a *Treatise on the Criminal Law of the United States* (1846), which is standard; besides which, his works on international law, evidence, contracts, and indict-



THE WHALEBACK, "CHRISTOPHER COLUMBUS."

Nautilus. The first craft was built about 1890, and in two years the American Steel Barge Company, founded by McDougall, had placed upon the Great Lakes whaleback steamers having an aggregate capacity of 70,000 tons. The first vessels were built at Duluth, Minn., the shipyards being subsequently removed to West Superior, Wis., where they employ from 1,500 to 2,000 hands. The whaleback was designed with a view to augmenting carrying capacity and safety, and lessening the cost of transportation; but while it has been commercially successful it has not superseded the older type of vessel. Its chief use is in carrying large bulk cargoes, as grain, iron ore, coal, and petroleum. The whaleback is built wholly of steel, with an oval section, and with the decks and bilges rounded so as to take the seas over them without resistance. Some of these vessels, built on Lake Superior, have crossed the Atlantic Ocean; and one 3,000-ton vessel, the *Christopher Columbus*, is in the passenger trade between Chicago and Milwaukee. This ship is 362 feet over all, 24 feet deep, 42 feet beam, and is driven by 2,600 horse-power triple-expansion engines at a speed of nineteen miles an hour.

WHALE FISHERIES. See WHALE, Vol. XXIV, pp. 526-28.

ments are regarded as authoritative. He also wrote a number of books on theological subjects.

WHARVES, landing-places for vessels and their cargoes. In the United States, where, owing to the ordinarily low tides, ships can discharge their cargoes at any stage of water, wharves are usually constructed of piling, braced and timbered, and sometimes filled with earth or stones. In many European ports, notably in Liverpool, the rise of tide is such (at times 26 to 30 feet) that vessels must lie in water of a constant level. This is secured by building wharves of masonry enclosing a large water space, the entrance to such docks being secured with water-tight gates which are only opened at high water. The charge for the use of a wharf is called *wharfage*.

WHAT CHEER, a city of Keokuk County, southeastern Iowa, 76 miles W. of Muscatine, on Coal Creek, and on the Burlington, Cedar Rapids and Northern and the Chicago and North-Western railroads. It has 6 coal-mining companies, a national and a state bank, 3 weekly newspapers, 6 churches, and 3 public-school buildings. Population 1000, 2,746.

WHATCOM, WHATCOM CITY, OR NEW WHATCOM, a city and the capital of Whatcom County, in northwestern Washington, on Belling-

ham Bay, 125 miles N. of Seattle, and on the Bellingham Bay and British Columbia, the Great Northern and the Northern Pacific railroads. It has an excellent harbor, capable of accommodating the largest vessels, and has steamboat connection with Puget Sound ports. There is a lumber-mill, and sash-and-door and furniture factories. Building-stone is quarried near at hand, and coal, lumber and hops are shipped. The city has water supplied by gravity from Lake Whatcom, four miles distant; electric lights, electric street-railways, improved sewerage, 3 banks, a daily and 4 weekly newspapers. In December, 1890, the town of Sehome and city of Whatcom were consolidated under the name of New Whatcom. Population 1900, 6,834.

WHEAT. This, although its aggregate production does not equal that of corn (maize) in quantity, is one of the most important and most valuable of the cereal products of the United States. Its geographical range is great, although it attains to the greatest perfection near the northern limit of its possible growth. Of its origin nothing positive is known. The earliest recorded history of man shows that its use as a breadstuff was known in remote antiquity: grains of wheat have been found in Egyptian mummy-cases, and there are several references to this grain in the Bible. Tradition says that it was introduced into Mexico by the Spanish invaders under Cortez, and there is no doubt that the earliest settlers in what is now the United States brought seed-wheat with them, and that it was among the first of the crops raised in New England. As the country was opened to civilization, the area of the wheat-belt was extended, until now it reaches from the Canadian border to the extreme South. However, the main wheat-growing section is in the states of Ohio, Indiana, Michigan, Illinois, Minnesota, North and South Dakota, Missouri, Kansas, and California.

The botanical appearance and structure of the wheat-plant will be fully described elsewhere in this work (see WHEAT, Vol. XXIV, pp. 531-536). Some of the species of the genus *Egilops* (now referred to *Triticum* by Bentham and Hooker and Haeckel) may possibly have been the sources of our cultivated forms, as they cross freely with wheat.

Most of the wheat grown in the United States is the *Triticum vulgare*, divided into subspecies, *T. hibernum*, or winter wheat, and *T. aestivum*, or spring wheat. The subspecies are further distinguished as hard and soft, white and red, bald and bearded; and these varieties differ again in many minor degrees, such as the coloration of the straw and chaff and the texture of the kernel. On heavy loams and clays winter wheat does best; on light prairie soil the spring varieties attain to perfection. In the United States spring wheats are harder than winter wheat.

Wheat is a moderately hardy plant, but likes a rich, strong soil. It does well on heavy loam or well-prepared clay, where sufficient attention is given to under-drainage and deep plowing is practiced, but many light and marly or calcareous soils will grow good wheat. Lime is an important aid to the growth of wheat, and soils naturally con-

taining lime are good for it. Where this does not exist it should be artificially supplied. A rich vegetable or alluvial soil, unless modified by the application of lime or ashes, or both, tends to a rapid and exuberant growth of straw and to the detriment of the grain. As a matter of course, wheat should be grown only in proper rotation with other crops. In the great wheat-growing country of the North—in Minnesota, Dakota, etc.—this system, although not having been adequately followed in the past, is now coming into quite general use. Depth of soil is as necessary to the successful growth of wheat as quality of soil. Wheat strikes its roots deep, and deep plowing, by furnishing it with ample food, tends greatly to its development, both in the size and quality of the berry.

The processes of wheat-growing, whether carried on in a small way, or, as in the great fields of the Northwest, by large gangs of men and modern machinery, are simple. The first essential to success, after the proper selection and preparation of the land, is to secure first-class seed. The heaviest and plumpest grains should be chosen, carefully sifted and freed from all foreign substances. There is a great difference, both in the theory and the practice of farmers, in regard to the quantity of seed to be sown to the acre. Experiments on a small scale have shown magnificent results from thin seeding, but the usual practice is to sow from five to eight pecks to the acre; the greater quantity on heavy clay and fertile soil. The tendency of wheat, like most of the cereal grasses, to "tiller," that is, to send out new shoots for future stalks, must not be overlooked in this connection. The wheat will occupy the ground as far as it can, and where the plants are far apart, will supply the deficiency by "tillering" to a greater extent. But when, owing to heavier seeding, the plants are close together, the operation of this natural law is suspended, to a greater or less degree. In early sowing the wheat "tillers" in the fall, in late sowing not entirely until the following spring. Early in September is the usual time for sowing winter wheat; spring wheat is sown from March to about the middle of April, varying in different latitudes.

All varieties may be easily modified by cross-fertilization and cultivation. The bearded may become beardless, and *vice versa*; the red may pass into the white varieties, and the winter is easily modified so as finally to become a spring wheat.

The old and wasteful system of sowing broadcast by hand has been almost entirely superseded in this country by drilling. The drill distributes the seed more evenly and economically, and leaves the field in better order for cultivation. After drilling the field should be thoroughly harrowed and rolled, or the wheat should be lightly plowed in.

An account may be found in the article on WHEAT (Vol. XXIV, pp. 531, et seq.), of the most destructive insects, the Hessian fly, the midge, the wireworm and the corn-weevil. Millepedes, although they are not insects, but one of the groups which compose the larger division *Tracheata*, must be included in an account of the pests which attack wheat. The species which is most destructive to

wheat, barley and oats is *Polydesmus complanatus*. For the crops and their commercial valuation, see AGRICULTURE, in these Supplements.

WHEAT, INSECTS INJURIOUS TO. See WHEAT, Vol. XXIV, pp. 534-536; and in these Supplements.

WHEAT IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

WHEATLEY, HENRY BENJAMIN, an English philologist and bibliographer; born at Chelsea, England, May 2, 1838. He was clerk to the Royal Society from 1861 to 1879; one of the founders of the Early English Text Society, and its honorary secretary until 1872; assistant secretary to the Society of Arts in 1879; secretary of the Topographical Society, and of the Index Society of London. He is author of the following articles in this ENCYCLOPÆDIA: INDEX, Vol. XII, p. 729; LONDON (History of), Vol. XIV, pp. 840-851; MIDDLESEX, Vol. XVI, pp. 279-281; besides having edited and written works upon a variety of subjects, including *Samuel Pepys and the World He Lived In* (1880); *Decorative Art* (1884); *How to Catalogue a Library* (1887).

WHEATLEY, PHILLIS. See AMERICAN LITERATURE, Vol. I, p. 722.

WHEATON, a city and the capital of Du Page County, northeastern Illinois, 25 miles W. of Chicago, and on the Chicago and North-Western railroad. The district is chiefly dairying and agricultural. The city has a good water-works plant, a public library, a bank, four weekly newspapers, eight churches, public schools, and is the seat of Wheaton College (Congregational), which in 1896 had 15 instructors, 200 students, and a library of 2,500 volumes; with total productive funds of \$50,000, and total income of \$18,000. The college was founded in 1853, under the name of Illinois Institute, and received its present title under a charter in 1860. Population of Wheaton 1890, 1,622; 1900, 2,345.

WHEATON, FRANK, an American soldier; born in Providence, Rhode Island, May 8, 1833; educated at Brown University as a civil engineer; engaged on the United States and Mexican boundary and other government surveys; became first-lieutenant in First United States Cavalry in 1855, and lieutenant-colonel of volunteers in July, 1861. He was promoted brigadier-general of volunteers, November, 1862; commanded a brigade at Marye Heights and Salem Heights, May 3-4, 1863; a division at Gettysburg; of a brigade of the Sixth Corps from the battles of the Wilderness to front of Petersburg, and of a division from Sept. 20, 1864, to the close of the war. He was brevetted from lieutenant-colonel to major-general for gallantry in battle; mustered out of volunteer service, April 30, 1866; appointed major Second Cavalry, Nov. 5, 1863, and through the regular grades of promotion became a brigadier-general, April 18, 1892.

WHEATSTONE BRIDGE. See ELECTRICITY, Vol. VIII, p. 44.

WHEDON, DANIEL DENISON, theologian; born at Onondaga, New York, in 1808. In 1833 he became professor of ancient languages in Wesleyan Uni-

versity, Middletown, Conn., and in 1845 professor of rhetoric in the University of Michigan. From 1846 to 1884 he was editor of the *Methodist Quarterly Review*. His chief works are *The Freedom of the Will as the Basis of Human Responsibility* (1864); *Commentary on the New Testament* (5 vols., 1860-75); and *Commentary on the Old Testament* (7 vols., 1880-85). He was the ablest exponent of Arminian theology in America. He died at Atlantic Highlands, N. J., June 8, 1885.

WHEEL AND AXLE. See MECHANICS, Vol. XV, p. 753.

WHEELER, BENJAMIN IDE, an American philologist; born at Randolph, Mass., July 15, 1854; graduated at Brown University (1875). He spent four years in Germany, after which he taught in Brown, Harvard, and Cornell universities. He held the chair of comparative philology in Cornell from 1886 to 1888, to which professorship that of Greek was added in 1888. He was director of the American School for Classical Studies in Athens, Greece (1895-96). He is the author of *The Greek Noun-accent* (Strasburg, 1885); *Analogy, and Its Influence in Language* (1887); *Life of Alexander the Great* (1899); and joint author of an *Introduction to the Study of the History of Language* (1890).

WHEELER, JOSEPH, American soldier and legislator, was born at Augusta, Ga., Sept. 10, 1836, and graduated at West Point in 1859. He served as second lieutenant of dragoons until April 22, 1861, when he entered the Confederate army as lieutenant of artillery, later receiving a staff appointment with the rank of colonel. On Sept. 4, 1861, he was made colonel of the 19th Alabama infantry, and at Shiloh commanded a brigade and captured Prentiss's division. During Bragg's campaign in the west, General Wheeler commanded the cavalry corps as brigadier and as major-general, ultimately rising to lieutenant-general. From Chickamauga, with Hood and J. E. Johnston, he opposed Sherman through Georgia and South Carolina, distinguishing himself greatly at Savannah, Macon, Augusta, and Waynesboro in Georgia, and at Aiken in South Carolina. For these services he received votes of thanks from the Confederate Congress and the South Carolina legislature. During the war he was three times wounded, and sixteen horses were shot under him. In 1866 he declined the proffered chair of philosophy in the Louisiana State Seminary, and in 1869 he settled at Wheeler, Ala., where he combined the profession of law with the business of planting. In 1880, his political disabilities being removed, he was elected as a Democrat from Alabama to the Forty-seventh Congress; was returned again in 1884 to the Forty-ninth, and in 1888 to the Fifty-first Congresses, since which time he has sat continuously, with the exception of the period of his constitutional disability consequent upon his accepting a military



GENERAL WHEELER.

commission during the war with Spain. His constituency promptly renominated him to succeed himself. In 1888 he was appointed a regent of the Smithsonian Institution. On May 4, 1898, General Wheeler was appointed major-general in the United States volunteers, and on the 16th he was assigned to the command of the cavalry division at Tampa, Fla. A large share of the land campaign in Cuba fell to General Wheeler's cavalry, which, however, fought as infantry. At Las Guasimas, El Caney, and San Juan, they displayed magnificent courage, although in the actions of July 1-2 General Wheeler was at first so ill as to be unable to take the field except in an ambulance. It was largely due to General Wheeler's persistence that the victories before Santiago were saved from being turned into a retreat. When the fever-stricken army was transported to Camp Wikoff at Montauk Point, Long Island, General Wheeler was indefatigable in his attention to the troops. While thus engaged he suffered a heavy loss in the death of his son by drowning.

WHEELER, WILLIAM ALMON, American statesman; born at Malone, N. Y., June 30, 1819. In 1858-59 he was a member of the New York senate, and as a Republican was elected to Congress in 1860 and 1869, serving continuously thereafter until 1877. He was the author of the famous "compromise" by which the political disturbances in Louisiana were adjusted in 1874. In 1876 he was elected to the Vice-Presidency, and took his seat as presiding officer of the Senate in March, 1877. On the expiration of his term, in 1881, he returned to Malone, and did not again enter public life. Mr. Wheeler was a man of most excellent character and of great liberality. He died in Malone, June 4, 1887.

WHEELING, a city of Ohio County, in northern West Virginia, on the Ohio River, about 90 miles below Pittsburg, and on the Baltimore and Ohio, the Pittsburg, Cincinnati and St. Louis, the Wheeling and Lake Erie, the Ohio River and the Cleveland, Lorain and Wheeling railroads. The interests of Wheeling are in the line of manufacture, and consist of blast-furnaces, iron foundries and forges, manufactories of nails, glass, paper, steam-engines, leather, woolen goods, wagons and carriages, stoves, pottery and other articles. There is an abundance of coal and natural gas in the vicinity, which give the city superior advantages in the matter of cheapness and facility of production. There are eight state and national banks, and four savings banks. By reason of its topography, the chief streets of Wheeling run parallel to the river for several miles, the intersecting streets extending back from the river to the high hills on the east side. One of the city's eight wards is on Zane's Island, lying in the river, which contains four hundred acres, and is nearly a mile in length. It is connected with the shores by suspension and steel bridges, giving electric-railway connection with neighboring Ohio towns. Steamboats transport freight up and down the river. Among the fine buildings of the city are the city hall and courthouse, United States custom-house and post-office (Wheeling being a port of entry), the Meth-

odist and the Episcopal churches, and the school buildings. There are no parks within the city limits, but there are two attractive ones outside.

Colonel Ebenezer Zane made the first settlement in Wheeling, in 1769, and in 1774 a stockade fort—Fort Henry—was erected for protection against the Indians. In 1777 and 1781 the fort successfully resisted severe attacks by large bodies of Indians, and in 1782 was besieged by British troops and several hundred Indians; but, after two days, were repelled by Colonel Zane and his garrison. The city was incorporated in 1836; and in 1863 the convention met here which formed the state of West Virginia. It was the state capital down to 1885. Pop. 1890, 34,522; 1900, 38,878.

WHEELOCK, ELEAZAR, an American educator; born at Windham, Connecticut, April 22, 1711; graduated at Yale College (1733); ordained pastor of the Second Congregational Church at Lebanon, Connecticut, March, 1735, where he continued for 35 years. He had as a pupil, during some of these years, a Mohican Indian boy, SAMSON OCCOM (q. v.), whose aptitude led him to the plan of an Indian school, and by 1762 he had upward of twenty Indian youths under his charge. Joshua Moor, a Mansfield farmer, gave them a house and two acres of land in Lebanon, and the institution took the name of Moor's Indian Charity School. Out of this school, through the efforts of Occom and Wheelock and others in obtaining subscriptions and concessions of land, Dartmouth College grew, and was named for the Earl of Dartmouth, the first trustee of the funds. Mr. Wheelock was named as founder and the first president of the college, although the college and the Indian school remained nominally separate until 1849.—His son, JOHN, educator; born at Lebanon, Connecticut, Jan. 28, 1754; entered Yale College (1767); went to Hanover, New Hampshire, with his father in 1770, and graduated with the first class from Dartmouth College in 1771; was tutor there until 1774; served in the army of the Revolution, and was a member of General Gates's staff. He succeeded his father as president of Dartmouth when 25 years of age, and was given the chair of civil and ecclesiastical history in 1782. In 1783 he was shipwrecked off Cape Cod while returning from England, where he had been endeavoring to raise money for the college, and all his money and personal effects were lost. Died at Hanover, New Hampshire, April 4, 1817.

WHEELOCK, JOSEPH A., an American journalist; born in Bridgstone, Nova Scotia, Feb. 8, 1831. He was educated at Sackville Academy, New Brunswick, and moved to the United States in 1850, becoming a resident of Minnesota. In 1856 he edited a weekly financial and advertising paper in St. Paul, and in 1858 joined the editorial staff of the St. Paul *Pioneer*. In 1861 he, with others, founded the St. Paul *Press*, becoming its editor the following year. He was postmaster at St. Paul from 1871 to 1875. For upward of twenty years Mr. Wheelock was editor-in-chief and part owner of the *Pioneer-Press*, a paper which

was formed by a consolidation of the two above-mentioned journals, and the most influential paper of Minnesota and North Dakota. The tone of Mr. Wheelock's editorial writings was always lofty and clean, and his policy broad and candid. On sociological questions he has been progressive and sound, and upon religious and philanthropic issues he maintained a dignified and tolerant position; while, as a teacher of sound finance, he stood abreast with journalists of the highest ability. As a man and a citizen, Mr. Wheelock's standing in the estimation of the people was equally high.

WHEEL-WORKS. See MECHANICS, Vol. XV, pp. 755-762.

WHEELWRIGHT, JOHN, an English clergyman; born in Lincolnshire, England, about 1592; graduated at Cambridge (1614); was a classmate there of Oliver Cromwell; was vicar of Bilsby, near Alford (1623-1631). He adopted Puritanism, was silenced by Archbishop Land, and went to Massachusetts in 1636. He preached at a church in Braintree, and created dissension through his sympathy with the religious opinions of his sister-in-law, Anne Hutchinson. He was banished from Massachusetts in 1638, owing to a sermon preached at Boston on Fast Day, 1637, and which the general court pronounced seditious; removed to Exeter, New Hampshire, and founded a church, and in 1643 removed with part of his church to Wells, Maine; was allowed to return to Massachusetts in 1646; settled as pastor at Salisbury, New Hampshire (1662), where he died, Nov. 15, 1679. Wheelwright's *Writings* were edited by Charles H. Bell (Boston, 1876).

WHELK, a name applied rather loosely to gasteropod mollusks of the family *Buccinidae*, and sometimes to *Muricinidae*. Properly, the name belongs to the genera *Buccinum* of Europe and *Sycotypus* and *Fulgur* of the Atlantic coast of North America. The whelks are used as food in Europe, but rarely in America.

WHEY. See MILK, Vol. XVI, p. 304.

WHICHCOTE, JOHN (1610-83), latitudinarian professor of Cambridge, England. See PLATO, Vol. XIX, p. 211.

WHIFF, a rare flat-fish (*Pleurodont*), found in English seas. It is known to science as *Lepidorhombus mcgasoma*.

WHIG PARTY, THE. From the publication of Washington's proclamation of neutrality (1793) to the end of the second war with England (1815), all political questions grew directly out of our complications with England and France. From 1815 to 1824 the issues were of a domestic kind. The introduction of the steamboat; the rise of manufactures; the rise of state banking; the rush of people from the seaboard to the Mississippi Valley; the disorders of the currency, made internal improvements, a national bank and a protective tariff the questions of the hour, and in 1824 split the Republican party into four factions, which led to the election of John Quincy Adams by the House of Representatives.

Out of this split grew two new parties, the one led by Adams and Clay and called the "Adams

men" or "Adams Republicans"; and the other led by Jackson and known as "Jackson men" or "Jackson Republicans." Though each claimed the name "Republican," they were, in reality, two distinct parties, a fact recognized after 1830, when the Adams-Clay wing formally took the name of *National Republicans*.

In 1831 (December 12th), the new party held a national nominating convention at Baltimore, and named Henry Clay and John Sergeant. No platform was framed, but a "Young Man's National Republican Convention," which met at Washington (May, 1832), defined the party principles in ten resolutions, which indorsed a protective tariff; a system of internal improvements; no removal from office for political reasons; and the decision of constitutional questions by the supreme court.

At this time it was really a party made up of all sorts of men—anti-Masons, Adams men, Clay men, tariff men, bank men, nullifiers, state-righters, with nothing in common but hatred of Jackson and his ways. It was this hatred of Jackson's ways that finally cemented the party and led James Watson Webb, in February, 1834, to give it the name of *Whig*, because (like the American Whigs of the Revolution) the new party was opposed to "executive usurpations."

It was in favor, therefore, of everything anti-Jackson; that is, a protective tariff, a national bank, internal improvements, limitation of the power of removal, distribution of the money derived from the sale of public lands, the abolition of the "spoils system," and the passage of bills over the veto by a majority vote. In 1836 the candidates were W. H. Harrison for President, and Francis Granger and John Tyler for Vice-President. In 1840 Harrison was again the candidate, with John Tyler, and swept the country. They received 234 electoral votes to 60 for Van Buren.

They now had the President, and a good majority in each house of Congress; and all seemed within their reach, when Harrison died, and Tyler made the administration Democratic. He vetoed two bank bills, two tariff bills, the distribution of the proceeds of land sales to the state, and was formally read out of the party.

In 1844 Clay and Theodore Frelinghuysen were the candidates on a platform calling for "a well-regulated currency, protective tariff, a single term for Presidents, and a distribution of the proceeds of sales of public lands." The bank issue was now dead.

For the third time (1824, 1832, 1844) Clay was beaten. On this occasion his defeat is to be ascribed to the anti-slavery men in New York, to Democratic frauds in several states, and to his own trimming on the Texas question. What this Texas question did for Clay in the South, the issues which grew out of it—the Mexican War, and the struggle over slavery in the territories—were soon to do for the Whigs in the North. When the national Whig convention met in 1848, the party was so divided that it did not face the slavery issue, and nominated Zachary Taylor and

Millard Fillmore without making any platform; nevertheless, the Whigs carried the election a second time, and, strangely enough, a second time their President died in office.

The action of the Whigs on the slavery issue so disgusted Henry Wilson (Grant's Vice-President) that he left the party, and, with a large following, joined the Free-Soilers. This schism was made larger yet by the Whig acceptance of the compromise of 1850, which split it into "Conscience Whigs," "Cotton Whigs" and "Silver-greys," and by the attempt in 1852 to force the party to indorse and abide by the fugitive slave law of 1850. This last effort was fatal, and in the election of 1852 Winfield Scott and Graham carried but four states (Massachusetts, Vermont, Kentucky and Tennessee), and elected but 71 Congressmen out of 234. In 1856 the remnant of the party then known as "The Silver-greys" met at Baltimore (September 13th) and indorsed Millard Fillmore for President. Fillmore had already been nominated by the "Native Americans" or "Know-nothings." Their platform deplored sectional strife and geographical parties, and called for the preservation of the Constitution and the Union. Nothing was said on the questions of the hour. Its work was now done. For the old issues which made its platform nobody cared. On the new issues it was afraid to take a stand; so it perished, and in the course of the next four years its fragments were absorbed in the North by the Republicans, in the South by the Democrats. The Constitutional Union party, which nominated Bell and Everett at Baltimore, May 9, 1860, may be regarded as the last fragment of the Whigs. For English party, see WHIG AND TORY, Vol. XXIV, p. 540. J. B. McMASTER.

WHIMBREL. See CURLEW, Vol. VI, p. 711.

WHIN. See FURZE, Vol. IX, pp. 851, 852.

WHINCHAT. See WHEATEAR, Vol. XXIV, p. 537.

WHIPPING-POST, a post or pillory to which a person is fastened to be whipped. The term is widely used as referring to the infliction of stripes in punishment of certain minor offenses. It has been in use from very early times, and in all nations, but as a public institution it has been greatly restricted, and in most cases abandoned. In England the Criminal Law Consolidation Acts of 1861 authorize the punishment by whipping of males under 16 years of age for crimes of larceny, malice, etc., and of male adults for certain infamous crimes such as highway robbery by violence; but the whipping is not done in public. In a few of the separate states whipping is now authorized by statute; and to some small extent it is inflicted for minor offenses.

WHIPPLE, EDWIN PERCY, an American author and critic; born at Gloucester, Massachusetts, in 1819. In 1837 he became a bank clerk in Boston. Thence he was transferred to the Merchants' Exchange and superintendent of the reading-room. This position enabled him to follow his literary inclinations. He began to write for reviews and

to lecture on literature and everyday life. In 1850 he was Boston's favorite orator. In 1860 he gave himself to purely literary pursuits. He wrote *Character and Characteristic Men* (1866); *Literature of the Age of Elizabeth* (1869); *Success and Its Conditions* (1871); and *American Literature and Other Papers*; and *Recollections of Eminent Men* (1887). The latter work appeared after his death. Whipple's style was happy, even, genial, and displayed a manly spirit, although he was not an original genius. He died in Boston, June 16, 1886.

WHIPPLE, HENRY BENJAMIN, an American Protestant Episcopal bishop; born at Adams, Jefferson County, New York, Feb. 15, 1822; prepared for college, but ill-health decided him to go into business, which he followed for several years. Later he decided to study for the ministry, and was ordained deacon in 1849, in Trinity Church, Geneva, New York; took charge of Zion Church, Rome, New York, Dec. 1, 1849; was ordained priest July 16, 1850, in Sackett's Harbor, New York, by Bishop DeLancey; became rector of the Church of the Holy Communion, Chicago, Easter, 1857; was chosen Bishop of Minnesota, June 30, 1859, and consecrated in St. James's Church, Richmond, Virginia, Oct. 13, 1859. In 1860 he with others organized the Seabury Mission, out of which have grown St. Mary's Hall, a girls' school, Shattuck Military School for Boys, and Seabury Divinity School, all located at Faribault, Minnesota. He gave much time and labor to work among the Indians, and, particularly among the Chippewas, is held in very high regard. His opinions upon Indian matters have frequently been sought and deferred to by the United States Government. He has written much for periodicals and the press.

WHIPPLE, WILLIAM, signer of the American Declaration of Independence; born at Kittery, Maine, Jan. 14, 1730; went to sea as a boy, became a ship-captain at twenty; engaged in the West India trade, and for a time in the slave trade, in which he acquired a fortune before he retired from the sea. In 1776-79 he was a member of the Continental Congress; signed the Declaration of Independence; with Stark he was active in the campaign against Burgoyne (1777), and assisted in the Rhode Island Expedition of 1778. He was a member of Congress (1778-79), and judge of the superior court of New Hampshire from 1782 until his death at Portsmouth, Nov. 28, 1785.

WHIP-POOR-WILL. See GOAT-SUCKER, Vol. X, p. 711.

WHIRLWIND. See METEOROLOGY, Vol. XVI, pp. 131, 132.

WHISKY REBELLION, a revolt or insurrection in western Pennsylvania, in 1794, against the execution of a Federal excise law. It was suppressed the same year. The inhabitants of the mountainous districts of Pennsylvania, Virginia and North Carolina derived their main support from whisky distillation, and in the absence of sufficient coin, whisky was used as a medium

of exchange. The excise law, imposing a tax of seven cents a gallon, was passed March 3, 1791. The average price of whisky being a shilling a gallon (the Virginia and Maryland shillings then in use were worth $16\frac{73}{100}$ cents), the mountaineers held the tax to be excessive, and during the following three years, violent protests, incendiary mass-meetings, and riots were almost constant under the leadership of David Bradford. Revenue officers, whose duties involved the inspection of private property, were tarred and feathered by Bradford and his followers, and, despite the efforts of Albert Gallatin and William Findley, who counseled a moderate policy, there was a general state of lawlessness. Blood was shed, the mails were robbed, and whole communities and towns deemed unfriendly to the whisky men were threatened.

In October, 1794, fifteen thousand militia from adjoining states were ordered out by President Washington, and, under General Henry Lee, marched into western Pennsylvania, whereupon the rebellion quickly subsided. Bradford fled the country, but a number of ringleaders were arrested and imprisoned. The affair was important, in that it first successfully established a Federal excise; that it was the first attempt to forcibly resist the Federal government, and that it decided the question of the entrance of militia of one state upon the soil of another.

WHISKY RING, the name given to a clique of revenue officers and distillers which formed an organization at St. Louis in 1872 to evade the payment to the government of the internal revenue tax on distilled liquors. By 1874 the conspiracy had assumed national proportions, and distillers who refused to enter the ring were threatened with ruin to their business. There were branches of the organization at Chicago, Milwaukee, Cincinnati, Peoria, and New Orleans, besides which the ring maintained an agent at Washington to corrupt the treasury officials. In 1875 the Secretary of the Treasury appointed Mr. Myron Colony of the St. Louis Cotton Exchange to make a secret investigation of the frauds, and he succeeded in bringing in indictments against 238 persons. The Government was shown to have been defrauded of \$1,650,000 in ten months. Among those concerned was General Babcock, President Grant's private secretary, and many other government officials.

WHIST. For general article on this, usually considered the greatest, game at cards, and for the laws of whist as played in England, see Vol. XXIV, pp. 543-548. The American game differs from the English game, in that honors are not counted and points alone are scored, each trick taken over six tricks, or a book, counting one point, and a game usually consisting of seven points. American innovations which have been adopted by English players are the elaborate systems of conveying information of the character of the cards remaining in a player's hand by those which he plays. Representatives of whist clubs all over the United States have formed an

American Whist Congress, which, at its third annual meeting, in Chicago, in 1893, formulated and adopted a code of rules for the American game, based on the English laws, but altered to fit the difference in scoring points, and the fact that the American game is played exclusively as a test of skill and not as a medium of betting.

In order to furnish a more perfect test of the skill of opposing players, the game of duplicate whist was recently invented, and rules for its play were adopted at the fourth American Whist Congress, held in Philadelphia, in 1894. In duplicate whist the hands are preserved, and, after a certain number of games have been played, each pair of partners plays the hands previously held by their adversaries, and the players scoring the highest number of points in the total play are the winners. Following are the special laws for duplicate whist:

THE GAME AND THE SCORE. (a) A game or match consists of any agreed number of deals, each of which is played once only by each player.

The contesting teams must be of the same number, but may each consist of any agreed number of pairs, one half of which (or as near thereto as possible) sit north and south, the other half east and west.

Every trick taken is scored, and the match is determined by a comparison of the aggregate scores won by the competing teams. In case the teams consist of an odd number of pairs, each team, in making up such aggregate, adds, as though won by it, the average score of all the pairs seated in the positions opposite to its odd pair.

Each side keeps its own score, and it is the duty of the north and south players at each table to compare the scores there made and see that they correspond. In case they fail to perform this duty, the east and west scores are taken as correct and the north and south scores made to correspond thereto.

In a match between two teams, the team which wins a majority of all the tricks scores the match as won by that number of tricks which it has taken in excess of one half the total.

In a match between more than two teams, each team wins or loses (as the case may be) by the number of tricks which its aggregate score exceeds or falls short of the average score of all the competing teams.

In taking averages, fractions are disregarded and the nearest whole number taken, one half counting as a whole, unless it is necessary to take the fraction into account to avoid a tie, in which case the match is scored as won by "the fraction of a trick."

FORMING THE TABLE. (b) Tables may be formed by cutting or by agreement.

In two-table duplicate, if the tables are formed by cutting, the four having the preference play at one table and the next four at the other. The highest two at one table are partners with the lowest two at the other. The highest two at each table sit north and south; the lowest two east and west.

DEALING AND MISDEALING. (c) The deal is never lost. In case of a misdeal or of the exposure of a card during the deal, the cards must be redealt by the same player.

THE TRUMP CARD. (d) The trump card must be recorded, before the play begins, on a slip provided for that purpose. When the deal has been played, the slip on which the trump card has been recorded must be placed by the dealer on the top of his cards, but the trump card must not be again turned until the hands are taken up for the purpose of overplaying them, at which time it must be turned and left face upward on the table until it is the dealer's turn to play to the first trick. The slip on which the trump card is recorded must be turned face downward as soon as the trump card is taken up by the dealer.

IRREGULARITIES IN THE HANDS. (e) If a player is found to have either more or less than his correct number of

cards, the course to be pursued is determined by the time at which the irregularity is discovered.

I. Where the irregularity is discovered before or during the original play of a hand: There must be a new deal.

II. Where the irregularity is discovered when the hand is taken up for overplay, and before such overplay is begun: The hand in which the irregularity is so discovered must be sent back to the table from which it was last received and the error be there rectified.

III. Where the irregularity is not discovered until after the overplay has begun: In two-table duplicate there must be a new deal; but, in a game in which the same hands are played at more than two tables, the hands must be rectified as above, and then passed to the next table without overplay at the table at which the error was discovered, in which case, if a player had a deficiency and his adversary the corresponding surplus, each team takes the average score for that deal. If, however, his partner had the corresponding surplus, his team is given the lowest score made at any table for that deal.

PLAYING THE CARDS. (*f*) Each player, when it is his turn to play, must place his card face upward before him, and toward the center of the table, and allow it to remain upon the table in this position until all have played to the trick, when he must turn it over and place it face downward and nearer to himself, placing each successive card, as he turns it, on top of the last card previously turned by him. After he has played his card, and also after he has turned it, he must quit it by removing his hand.

A trick is turned and quitted when all four players have turned and quitted their respective cards.

The cards must be left in the order in which they were played until the scores for the deal are recorded.

CLAIMING A REVOKE. (*g*) A revoke may be claimed at any time before the last trick of the deal in which it occurred has been turned and quitted and the scores of that deal recorded, but not thereafter.

WHISTLER, JAMES ABBOTT M'NEIL, artist, son of GEORGE WASHINGTON WHISTLER (1800–1849), an eminent American engineer, who made a large fortune in railroad construction in Russia; born at Lowell, Massachusetts, in 1834, and educated at the United States Military Academy, West Point. He studied art in France, in 1863 and settled in London, where he became president of the British Society of Artists in 1886. He made inter-

esting experiments in the harmonies and contrasts of colors, and produced some really striking effects. Among his more important works are *White Girl*; *Gold Girl*; *Blue Girl*; portrait of *My Mother*; of *Thomas Carlyle*; *Princesse des Pays de la Porcelaine*; and *Great Fire-Wheel*. Most of his later paintings he named according to the colors used, as, *Nocturne in Blue and Gold*; *Harmony in Gray and Green*; *Nocturne in Blue and Silver*; *Harmony in Brown and Black*; *Arrangement in Gray and Black*, etc. He is even more celebrated in etching than in oil-painting. In this branch of art he has executed plates on London, Venice and Brussels. He has published *Four Masters of Etching* (1883) and *Ten o'Clock* (1888). The latter, a brilliant bit of writing, together with his rejoinder to Ruskin, refuting some



J. M'NEIL WHISTLER.

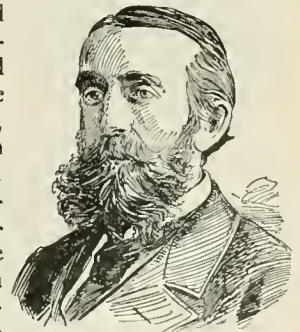
judgments on the author's work by the famous art critic, and a number of highly spiced letters on art and personal topics, Mr. Whistler collected in *The Gentle Art of Making Enemies* (1890; enlarged edition, 1892). Despite his erraticness, Mr. Whistler has genius, and has displayed gifts of a high order in the impressionist school, and attained eminence as an etcher and colorist.

WHITAKER, OZI WILLIAM, an American bishop; born in New Salem, Massachusetts, May 10, 1830; graduated at Middlebury College, Vermont, 1856; principal of the high-school at North Brookfield, Massachusetts, for several years, and graduated at the Protestant Episcopal General Theological Seminary in 1863. He was ordained priest in Boston, Aug. 7, 1863; was rector of St. Paul's Church, Englewood, New Jersey, (1865–67), when he went to Nevada and became rector of St. Paul's Church, Virginia City. In 1868 the General Convention in New York elected him missionary bishop of Nevada, and he was consecrated in St. George's Church, New York, Oct. 13, 1869. In 1886 he was elected assistant bishop of Pennsylvania, and upon the death of Bishop Stevens, June 11, 1887, became bishop of Pennsylvania. Some of his sermons have been published.

WHITE, ANDREW DICKSON, an American educator; born at Homer, New York, Nov. 7, 1832.

He graduated at Yale, and in 1857 was made professor of history and English literature in the University of Michigan, but resigned in 1862 on account of bad health. In 1867 he became president of Cornell University, which position he resigned in 1885. From his own means he contributed \$100,000 to the equipment of this school, and supplied the library of the new school of history and political science (which now bears his name) with 20,000 volumes of books. He visited Europe in 1867–68 in the interest of educational matters, at the request of the trustees of his college; was appointed one of the United States Commissioners to Santo Domingo (1871); president of the Republican State Convention of New York (1871); United States Minister to Germany (1879–81). He has published *Lectures on Mediæval and Modern History* (1861); *Lectures Relating to Cornell University*, including one on the *Co-education of the Sexes* (1871); and *The New Germany* (1882). His latest work, *History of the Warfare of Science with Theology* (1896), appeared first in the *Popular Science Monthly*, and is, perhaps, his most critical and thoughtful production. It argues for liberal methods in collegiate instruction. In 1892 he was appointed minister to Russia, serving a few months, and in 1897 minister to Germany.

WHITE, CHARLES ABIATHAR, an American geologist; born at North Dighton, Massachusetts,



ANDREW D. WHITE.

Jan. 26, 1826; removed to Iowa in 1839, and was graduated at Rush Medical College, Chicago, in 1863. In 1866 he became state geologist of Iowa, holding this appointment until 1870, having meanwhile, in 1867, accepted the chair of natural history in the Iowa State University. In 1873 he accepted an offer of the same chair in Bowdoin, but resigned, in 1874, to connect himself with Lieutenant George M. Wheeler in the United States Geological Survey. He was appointed geologist to the United States Survey in 1882, and palæontologist in 1883; became a recognized authority in his specialty (fossil life); a member of scientific societies; was president of the Biological Society of Washington (1883-84); a curator of the United States National Museum; and in 1888 was elected vice-president of the American Association for the Advancement of Science.

WHITE, EDWARD DOUGLAS, associate justice of the supreme court of the United States, was



JUDGE E. D. WHITE.

born in the parish of Lafourche, Louisiana, November, 1845, and educated at Mount St. Mary's College, Emmitsburg, Maryland, at the Jesuit College of New Orleans, and at Georgetown College, District of Columbia. He served in the Confederate army, practiced law, was elected state senator of Louisiana in 1874; was appointed associate justice of the supreme court of Louisiana in 1878, and was elected to the United States Senate as a Democrat to succeed James B. Eustis, taking his seat March 4, 1891. While serving as a Senator he was appointed, Feb. 19, 1894, an associate justice of the supreme court, and took his seat March 12th.

WHITE, EDWIN, an American artist; born in South Hadley, Massachusetts, May 21, 1817; began to paint when a boy; elected an associate of the National Academy in 1848, and the following year became a full academician. He was twice in Europe, in 1850 and 1869, studying in Rome, Paris and Florence. In 1875 he opened a studio in New York. Among the large number of his paintings, chiefly historical, are *Washington Resigning His Commission*—sold to Maryland for \$6,000; *The Requiem of De Soto*; *Old Age of Milton*; and *First Printing of the Bible*. His *Murillo Sketching the Beggar-Boy* is owned by the New York Historical Society and his *Age's Reverie* is at the United States Military Academy at West Point. He died in 1877.

WHITE, GENERAL SIR GEORGE STEWART, V. C., G. C. B., late commander of the British forces in Natal during the Boer war of 1899-1900, and in charge of the British garrison in Ladysmith besieged for 118 days by the Dutch burghers, was born of Irish parents July 6, 1835, educated at Sandhurst, and entered the army in 1853. He has had a distinguished career as a soldier, having

served in the Indian Mutiny, in the Afghan war (1878-80), in the Nile Expedition (1885), and in the Burmese Expedition (1885-87), when he attained the rank of Major-General. By conspicuous bravery at Charasiab in '79 and at Kandahar in '80, he won the Victoria Cross. In 1893 he succeeded Lord Roberts as commander-in-chief in India, and in 1898 was Quartermaster-General of the army. In Oct., 1899, when war with the Transvaal and the Orange Free State broke out, he was given command in Natal. Here he defeated the Boers at Elandslaagte (Oct. 21), repulsed them again three days later at Rietfontein; but, retiring upon Ladysmith (Nov. 2), was shut up by large Boer levies until the siege was raised, Feb. 28, 1900, by Lord Dundonald, acting under General Sir Redvers Buller.

WHITE, JOHN WILLIAMS, an American Greek scholar; born in Cincinnati, Ohio, March 5, 1849; graduated at Ohio Wesleyan University, Delaware, Ohio, in 1868; professor of Greek and Latin at Willoughby College and at Baldwin University in Ohio (1868-69); tutor and assistant professor of Greek in Harvard College (1874-84), when he was elected to fill the chair. He is one of the editors of Ginn's College Series of Greek Authors.

WHITE, PEREGRINE. See WINSLOW, EDWARD, in these Supplements.

WHITE, RICHARD GRANT, an American author; born in New York City, in 1821. He studied medicine and law, but practiced little of either. From 1845 till 1859 he was connected with the *Courier and Enquirer* of New York, the last five years as its editor. He was an authority on music and art topics. His first volume, *Handbook of Christian Art*, appeared in 1853. During the war he wrote *National Hymns* (1861); *The Gospel of Peace*, a satire on the



RICHARD GRANT WHITE.

Northern sympathizers with the South; and *Poetry of the Civil War* (1866). For thirty years he was a constant contributor to *Putnam's Magazine*, *The Galaxy*, and *The Atlantic Monthly*. The favorite subjects of his articles were the plays of Shakespeare. He published also *Words and Their Uses* (1870); *Every-Day English* (1879); *England Without and Within* (1881); and *The Fate of Mansfield Humphrey* (1884). From 1861 to 1878 he was chief clerk in the revenue bureau of the New York custom-house. He died in New York City, Aug. 8, 1885.

WHITE, WILLIAM, an American bishop; born in Philadelphia, Pennsylvania, April 4, 1748; graduated at the College of Philadelphia (1765), and finished his theological studies in 1770; was rector of Christ church and St. Peter's in Philadelphia (1779-1836). The degree of D.D. was given him by the University of Pennsylvania in 1782, it being the first honorary degree of that

college; presided at the first Episcopal convention held in America, September and October, 1785; wrote the constitution of the church, and was chosen bishop of the diocese of Pennsylvania (1786). Proceeding to England, he was consecrated by the Archbishop of Canterbury at Lambeth Palace chapel, Feb. 4, 1787, being the first American bishop in the line of succession from Canterbury. He was president of the first Bible society in the United States, and with Bishop Seabury of Connecticut revised the *Book of Common Prayer* for the use of the American Episcopal Church. He died in Philadelphia, July 17, 1836. He was the author of *Memoirs of the Protestant Episcopal Church in the United States*, and other works.

WHITE, WILLIAM HENRY, an English civil engineer and naval constructor; born at Devonport, England, Feb. 2, 1845; graduated from the Royal School of Naval Architecture in 1867. From 1883 to 1885 he was chief constructor of Elswick works, in charge of the ship-building department, since when he has been assistant controller of the navy and director of naval construction to the admiralty. He designed the cruisers *Blake* and *Blenheim*; is fellow of the Royal societies of London and Edinburgh; vice-president of the Institute of Naval Architects. He published a *Treatise on Ship-building*; a *Manual of Naval Architecture*; and many papers.

WHITE ANTS. See ANT, Vol. II, pp. 99, 100.

WHITE BEAR. See BEAR, Vol. III, p. 461.

WHITE BEAR LAKE, a village of Ramsey County, eastern Minnesota, 12 miles N. by E. of St. Paul, a summer-resort village on the beautiful lake of the same name, and on the St. Paul and Duluth railroad. The region is agricultural and stock-raising. It has a weekly newspaper. Population 1900, 1,288.

WHITE COPPER, same as PACKFONG. See GERMAN SILVER, Vol. X, p. 446.

WHITEFIELD, a town of Coos County, northern New Hampshire, 124 miles N. of Concord, and on the Maine Central and Concord and Montreal railroads. It has large lumber-mills, tub, box, shirt and bobbin factories; a weekly newspaper, five hotels, four churches, public library, and high-school. The town embraces the villages of Whitefield and Hazens. Whole population 1890, 2,041; 1900, 2,157.

WHITEFISH, a name locally applied to many species of the family *Salmonidæ*. The name properly belongs to fishes of the genus *Coregonus*. The best known is *C. albus (clupeii)* of the Great Lakes. This is one of the most important food-fishes; in fact, no American fresh-water fish equals it in importance. The Rocky Mountain whitefish is *C. Williamsoni*. There are several other species in North America which are called whitefish, usually with some prefix. See Vol. XXIV, p. 552.

WHITE FRIARS. See ABBEY, Vol. I, pp. 21, 22.

WHITEHALL, a town of Greene County, western Illinois, 45 miles N. of Alton, and at the junction of the Chicago and Alton and the Chicago,

Burlington and Quincy railroads. It is in an agricultural district, and bituminous coal and potters' clay are found in the vicinity. There are large manufactories of sewer-pipe, drain-tiles, brick, stoneware, pottery, flour, machinery and chairs; heavy shipments of live-stock are made from this point. It has a daily and two weekly papers, two banks, six churches and a high-school. Population 1890, 1,961; 1900, 2,030.

WHITEHALL, a village of Muskegon County, western Michigan, 16 miles N.N.W. of Muskegon, on White Lake, and on the Chicago and West Michigan railroad. The region is agricultural and lumbering, and is a popular resort in the summer. It has saw, shingle and lath mills, wagon, bicycle, furniture and box factories, tannery, creamery, and other industries. It has a weekly newspaper. Population 1900, 1,481.

WHITEHALL, a village of Washington County, eastern New York, at the head or southern extremity of Lake Champlain, 76 miles N.E. of Albany, on the Delaware and Hudson railroad, and the termination of the Troy and Champlain Canal. It has important steamboat connections, and water-power (from Poultney River) for saw and flouring mills, machine, woolen and carpet factories. It was settled by Major Philip Skene in 1761, and called Skenesborough; in the War of 1812 it was an important military depot. It has two weekly newspapers, two banks and electric-light and gas plants. Population 1900, 4,377.

WHITE HAVEN, a borough of Luzerne County, northeastern Pennsylvania, 30 miles S. of Wilkesbarre, on the Lehigh River, and on the Lehigh Valley and the Central of New Jersey railroads. It has stone-quarries, shoe and casket factories, foundry, a weekly newspaper and a state bank. The district, since the exhaustion of the timber, is chiefly agricultural and manufacturing. The town has seven churches, graded public-school system, and Roman Catholic parochial school. Population 1900, 1,517.

WHITE-HEADED EAGLE. See BALD EAGLE, in these Supplements.

WHITE HOUSE, the popular name of the residence in Washington of the President of the United States, officially known as the Executive Mansion. (See Vol. XXIV, p. 384.) It is built of freestone, and is painted white; hence the name. It is a plain edifice, 170 by 86 feet, having a colonnade of eight Ionic columns in front, and a semi-circular portico in the rear. Its architect was James Hoban, an Irishman. It occupies a reservation of about twenty acres. It was erected in 1818-29; the first executive mansion, begun in 1792, having been destroyed by the British in 1814.

WHITE LEAD. See LEAD, Vol. XIV, pp. 378, 379.

WHITE MOUNTAINS. See NEW HAMPSHIRE, Vol. XVII, p. 390.

WHITE OAK SWAMP, Virginia, a battle which occurred immediately after the battle of Savage's Station, June 30, 1862. Jackson, at the head of his own command, as well as the

brigades of A. P. Hill and Longstreet, was ordered to make a detour around the Chickahominy River and attack the retreating Federals as they emerged from the swamp. A bridge having been destroyed, he followed them through the swamp instead, and upon arriving at the White Oak Swamp bridge, which had also been destroyed, he was met by Richardson, Naglee, Smith, Ayres and Hazard of Franklin's Federal brigade, who offered battle. Hazard's force was cut to pieces, and he himself mortally wounded. The Federals retired during the night, leaving 305 sick and wounded.

WHITE PLAINS, a village and the capital of Westchester County, southeastern New York, 22 miles N. by E. of New York City, and on the New York Central and Hudson River railroad. It is the seat of Bloomingdale Insane Asylum (which cost two million dollars); contains Alexander Institute (Presbyterian), three large law libraries, two public and two private schools, three weekly papers and three banks. During the Revolution, a battle was fought here, Oct. 28, 1776, wherein the Americans were defeated by the British under General Howe, with a loss of 180 to the Americans. Population 1890, 4,042; 1900, 7,899.

WHITE RIBBON CLUB. See **WOMEN'S CHRISTIAN TEMPERANCE UNION**, in these Supplements.

WHITE RIVER, a river of Arkansas and Missouri. It rises in the Ozark Mountains, flows northeast into Missouri, then turning east and southeast into Arkansas, drains the northeastern portion of the state, and flowing southward, empties itself into the Mississippi near the mouth of the Arkansas. It is eight hundred miles long and navigable for 350 miles.

WHITE RIVER, of Indiana, is formed by the union of its east and west forks, which occurs at the southeast extremity of Knox County. It flows in a west-southwest direction for 50 miles, entering the Wabash 25 miles below Vincennes, and near Mount Carmel. The larger of the two is the west fork, which rises in Randolph County, in the extreme eastern part of the state, flowing westward to Hamilton County, thence southwestward to the northerly edge of Pike County, traversing about three hundred miles, almost the entire width of the state. On its banks are Indianapolis, Anderson and Muncie. The east fork rises in Henry County, in the eastern part of the state, and is about two hundred and seventy miles long. The east fork is navigable (in high water) to Rockford, Jackson County, nearly one hundred and fifty miles; the west fork to Martinsville, Morgan County, about the same distance. The main stream is about fifty miles in length.

WHITE RIVER JUNCTION, a village of Windsor County, southeastern Vermont, 64 miles S. by E. of Montpelier, at the junction of the White and Connecticut rivers, and on the Central Vermont, Boston and Maine and Woodstock railroads. It is a local trade center; has a weekly paper, a national and a savings bank, and

public high school. Population 1894 (estimated), 1,500.

WHITE SEA, also called the Gulf of Archangel, a large gulf of the Arctic Ocean, the entrance to which is formed by Cape Sviatoi, lat. 68° 10' N., long. 39° 47' E., and Cape Kanin, lat. 68° 39' N., long. 43° 32' E. It extends southward between Lapland and Archangel, into European Russia, for a distance of 380 miles, and has a breadth of from 30 to 150 miles. Its area is estimated at 45,000 square miles. It is, for the most part, surrounded by high mountains. The chief rivers which flow into it are the Onega, Mezen, Viq and Dwina. Its depth is sufficient for the largest vessels, except over the sand-bars at the mouth of the Dwina. It is one of the great sources of Russia's fish-supply, as it abounds in codfish and herring, and a large portion of the inhabitants of Archangel are engaged in fishing. It is usually frozen over for more than half the year, or from October till May.

WHITESBORO, a town of Grayson County, northern Texas, 17 miles W. of Sherman, and on the Missouri, Kansas and Texas and Texas and Pacific railroads. It is a point of shipment of stock, grain and cotton, and has a weekly paper. Population 1890, 1,170; 1900, 1,243.

WHITESTONE, a village of Queen's County, southeastern New York, on Long Island Sound, 11 miles E.N.E. of Brooklyn, and on the Long Island railroad. It has a good harbor, tinware factories and forge-works. It is a popular summer resort, and has a number of summer hotels and boarding-houses. There are two weekly newspapers. Incorporated in Greater New York.

WHITE SULPHUR SPRINGS, a town and the capital of Meagher County, central Montana, 60 miles E. of Helena, and connected by stage line with the Northern Pacific railroad at Townsend, 40 miles W. It is surrounded by a fine farming and grazing region, contains some gold, silver, copper and coal mines, and is a flourishing business town and a prominent resort for tourists, hunters and invalids. Its mineral springs and baths are very popular. It has two weekly newspapers, a national bank with a capital of two hundred thousand dollars, three churches and a graded school. Population 1890, 640; 1900, 446.

WHITE SULPHUR SPRINGS, a health-resort of Greenbrier County, southern West Virginia, 227 miles W. of Richmond, 140 miles E.S.E. of Charleston, and on the Chesapeake and Ohio railroad. It is situated in the mountains, at an altitude of 1,922 feet. The springs are saline chalybeate, of a temperature of 60° F., and have been popularly resorted to for their curative properties since 1778. The surrounding scenery is beautiful. The place contains several handsome hotels and has cottage accommodations, and swimming and mud baths.

WHITE SWELLING. See *Tubercle*, under **PATHOLOGY**, Vol. XVIII, p. 405.

WHITEVILLE, a town and the capital of Columbus County, southeastern North Carolina, 45 miles W. of Wilmington, and on the Wilmington,

Columbus and Augusta railroad. The surrounding district is level, with much swamp, and the chief industry is swine-raising. Corn, sweet potatoes, rice and cotton are produced. It has two weekly papers. Population 1900, 634.

WHITEWATER, a city of Walworth County, southeastern Wisconsin, 51 miles S.W. of Milwaukee, and on the Chicago, Milwaukee and St. Paul railroad. It has a large harvesting-machine factory, wagon, mowing-machine and other farm-implement factories, a paper-mill and other industries. The surrounding district is dairying and agricultural. It has a state normal school, a collegiate institute, two banks and two weekly newspapers. Population 1900, 3,405.

WHITEWATER RIVER, a stream of southeastern Indiana, formed by the junction of two forks, at Brookville, in Franklin County, flows southeasterly, and enters the Great Miami, in Hamilton County, Ohio, at a point six miles above its mouth. Its length, including the branches, is a little more than one hundred miles. The city of Richmond is on its east fork.

WHITEWATER RIVER, a stream which rises in the southeastern part of Missouri, flowing southward through the swampy and lake district of Cape Girardeau and Stoddard counties, in the region known as the "earthquake" or "sunken" country, which was formed by the earthquake of 1811. It discharges into St. Francis River, in northeastern Arkansas, after a course of about two hundred miles.

WHITE WHALE. See WHALE, Vol. XXIV, p. 525.

WHITEWOOD, one of the common names of *LIRIODENDRON TULIPIFERA*, or tulip-tree; q.v., in these Supplements.

WHITFIELD, ROBERT PARR, an American palæontologist and geologist; born near New Hartford, Oneida County, New York, May 27, 1828. His parents were English, and in 1835 he went with them to England, but returned to the United States in 1841. He had charge of a department in an electrical instrument establishment at Utica, New York, for several years; was assistant to James Hall, state geologist of New York, on the state natural history survey (1856-77); teacher and afterward professor of geology and palæontology in the Rensselaer Polytechnic Institute, Troy, New York (1872-77); curator of the geological department of the American Museum of Natural History, New York City, from 1877. The results of his palæontological work have appeared in numerous publications; among which are *Natural History of New York State*, *Reports on Palæontology* (since 1856); *The Black Hills of Dakota*, *Palæontology* (1880); *Cretaceous Fossils of New Jersey* (1885).

WHITING, a town of Lake County, northwestern Indiana, on Lake Michigan, 17 miles S. E. of Chicago, and on the Baltimore and Ohio and Lake Shore and Michigan Southern railroads. It has a good harbor. The chief industry is the refining and shipping of petroleum. It has two weekly newspapers, a bank, five churches, a public

and a Lutheran parochial school. Population 1890, 1,408; 1900, 3,983.

WHITING, WILLIAM, an American lawyer; born at Concord, Massachusetts, March 3, 1813. He studied at Harvard, and was admitted to the bar of Boston in 1838. In 1862 the United States War Department appointed him a solicitor. In the same year he published a treatise entitled *The War Powers of the President, and the Legislative Powers of Congress in Relation to Treason, Rebellion, and Slavery*. This treatise passed through 27 editions within a few years. To its original chapters were added, in later editions, others on *Military Arrests, Military Government, and Reconstruction*. Whiting was for five years president of the New England Historic Genealogical Society, and in the last year of his life was elected to Congress. He left five thousand dollars to Harvard for a scholarship. He died in Boston, June 29, 1873.

WHITING, WILLIAM HENRY CHASE, an American soldier; born in Mississippi in 1825; graduated at the United States Military Academy, at the head of his class, July 1, 1845, and was appointed second lieutenant in the corps of engineers. Until the outbreak of the Civil War he served in the work of harbors and of defenses at Pensacola, Florida, San Francisco, Cape Fear and other points on the South Atlantic and Gulf coast. In 1861 he resigned his commission of captain of engineers to join the Confederate service, rising to the rank of major-general and to the command of a division in 1863. He planned and constructed Fort Fisher, and commanded it in 1864, repelling the first attack under Gen. B. F. Butler, but was overcome by General Terry in January, 1865; was wounded and taken prisoner. He died at Governor's Island, New York, March 10, 1865.

WHITING POUT. See POUT, Vol. XIX, p. 650.

WHITLEY COURTHOUSE, the name of the post-office of the town of Williamsburg, Whitley County, Kentucky (q.v., in these Supplements).

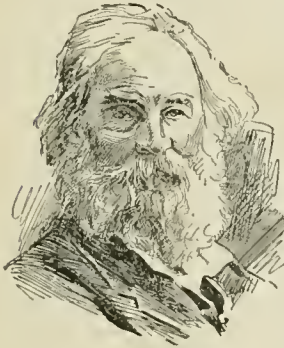
WHITMAN, a town of Plymouth County, southeastern Massachusetts, 21 miles S. of Boston, and on the New York, New Haven and Hartford railroad. It comprises the villages of Whitman, Auburnville and East Whitman (formerly South Abington); has a weekly newspaper, a savings bank, six churches, a public library and 19 district schools. It has extensive boot, shoe, tack and nail factories. Pop. 1890, 4,441; 1900, 6,155.

WHITMAN, CHARLES OTIS, an American naturalist; born at Woodstock, Oxford County, Maine, Dec. 14, 1842; graduated at Bowdoin College in 1868; studied at Leipsic, and in 1878 was appointed professor of zoölogy in the Imperial University of Tokyo. He returned to Europe for the purpose of study in 1880, and later returned again to the United States, serving as assistant under Professor Agassiz at Harvard University. In 1889 he was called to the head of the zoölogy department in the Clark University, and in 1892

to a similar position in the University of Chicago. Dr. Whitman was appointed director of the Marine Biological Laboratory at Woods Holl, Massachusetts, on its foundation in 1888. He wrote upon the structure and development of worms and of vertebrates, and published *Methods of Research in Microscopical Anatomy and Embryology* (Boston, 1885). He became associate editor of the *American Naturalist* in 1883, and established the *Journal of Morphology* in 1887.

WHITMAN, MARCUS, an American physician and missionary pioneer; born in Rushville, New York, Sept. 4, 1802; having studied medicine at the Berkshire (Massachusetts) Medical Institute, he practiced in Wheeler, New York, until, in 1834, he was persuaded by the Rev. Samuel Parker to go with him as a missionary of the American Board to Oregon (q.v., Vol. XVII, p. 825, for further matter relative to Whitman); and see, also, *Personal Recollections of Nelson A. Miles* (1896).

WHITMAN, WALT, an American poet; born in West Hills, Long Island, New York, in 1819.



WALT WHITMAN.

When young he worked as a printer in summer and as a school teacher in winter. In 1847-48 he made long pedestrian tours through the United States and Canada, generally following the courses of the great rivers. His chief work, *Leaves of Grass* (1855), is a series of poems dealing with moral, social and political problems, and more especially with the interests involved in nineteenth-century American life and progress. During the Civil War he administered to the sick and wounded of both armies in Virginia and Maryland, and in and around Washington City. In 1883 he published his prose book entitled *Specimen Days and Collect*. It contains biographical notes, personal memoranda during the war, and various essays, including *Democratic Vistas*. In 1888 he finished *November Boughs*, his last work, containing both poems and prose. Whitman's poetry is without rhythm and regular meter, and entirely unconventional. He died at Camden, New Jersey, March 26, 1892.

WHITNEY, MOUNT. See CALIFORNIA, Vol. IV, p. 697.

WHITNEY, ADELINE DUTTON TRAIN, an American authoress; born at Boston, Massachusetts, Sept. 15, 1824; a sister of George Francis Train. At the age of 19 she married Seth D. Whitney of Milton, Massachusetts, where her home has ever since remained. She contributed regularly to magazines for young people, and is author of a large number of books, among which are *Mother Goose for Grown Folks* (New York, 1860); *The Gayworthys* (1865); *Real Folks* (1872); *Homespun Yarns* (1887).

WHITNEY, ASA, an American manufacturer; born in Townsend, Massachusetts, Dec. 1, 1791. He obtained but scanty education, spending some years of his youth in his father's blacksmith-shop. He left home at the age of 21, and soon became an expert machinist, remaining until 1830 in Brownsville, New York, and conducting a machine and forge-works business, when he was appointed assistant superintendent of the Mohawk and Hudson railroad. He became superintendent the following year. In 1839 he was elected canal commissioner of New York state, and superintended the enlargement of the Erie canal. Removing to Philadelphia in 1842, he first engaged in the manufacture of locomotives with Matthew W. Baldwin, but soon withdrew and began the manufacture of car-wheels of his own invention. In 1848 he patented his process for annealing car-wheels. This discovery marked one of the most important eras in the history of railroads. The process is one of toughening, by placing the cast chilled wheel in a furnace, where it is heated and gradually cooled, the result rendering it practically unbreakable, and enabling railroads to increase both loads and speed. In 1860 Mr. Whitney became president of the Reading railroad, to whose success he largely contributed. He was a man of large benevolence, contributing, among other bequests, fifty thousand dollars to found a chair of dynamical engineering in the University of Pennsylvania. He died in Philadelphia, June 4, 1874.

WHITNEY, ELI, an American inventor; born at Westboro, Massachusetts, Dec. 8, 1765. He was educated at Yale College, where he paid his expenses partly by school-teaching, partly by mechanical labor. Having graduated in 1792, he went to Georgia as a teacher; but finding a generous patron in the widow of General Greene of the Revolutionary army, he resided on her estate and studied law. The cotton-culture at this period was limited



ELI WHITNEY.

by the slow and difficult work of separating the cotton from the seed by hand, but Mrs. Greene told her complaining neighbors that she was sure Whitney could help them out of their trouble. At their desire, he set to work under great disadvantages, for he had to make his own tools, and even draw his own wire; but the reports of his success prompted some lawless people to break into his workshop and steal his machine and get others made before he could secure a patent. He, however, formed a partnership with one Miller in 1793, and went to Connecticut to manufacture cotton-gins; but the lawsuits in defense of his rights took all his profits, as well as fifty thousand dollars voted him by the state of South Carolina. Finally, in 1798, he got a

government contract for the manufacture of fire-arms, and was the first to effect the division of labor, by which each part was made separately. He made a fortune by this manufacture, carried out with ingenious machinery at Whitneyville, Connecticut, while he had but barren honor from the gin, one of the most important of inventions connected with cotton-manufacture. He died at New Haven, Connecticut, Jan. 8, 1825.

WHITNEY, JOSIAH DWIGHT, an American geologist; born in Northampton, Mass., Nov. 23, 1819. After graduating at Yale he spent five years in scientific studies in Europe. He was engaged in the geological surveys of Ohio, Mississippi, Michigan, and California, besides the United States government surveys of the territories. In 1865 he became professor of geology in Harvard University. He published a translation of Berzelius's *Use of the Blowpipe* (1845); *Reports of the Lake Superior Region* (1849); *The Upper Mississippi Land Region* (1850); *The Metallic Wealth of the United States* (1854); *Geological Survey of Iowa* (1858-59); *Geological Survey of Wisconsin* (1862); *Geological Survey of California* (1864-70); *The Yosemite Guide Book* (1869); *Barometric Hypsometry* (1874); *California: Botany* (1877); and *Names and Places* (1888); also many articles on matters relating to physical geography. Died at Lake Sunapee, N.H., Aug. 18, 1896.

WHITNEY, WILLIAM DWIGHT, philologist, brother of preceding; born at Northampton, Mass., Feb. 9, 1827. While clerk in a banking-house he devoted his leisure to the study of languages, especially Sanskrit. In 1850-53 he studied them further at Berlin and Tübingen, Germany. In 1854 he was appointed to the chair of Sanskrit in Yale College. In 1870, he became, also,

professor of comparative philology in the same institution. He published a *German Grammar* (1869); *German Reader* (1873); *Life and Growth of Languages* (1875); a *Sanskrit Grammar* (1879); and was chief editor of the *Century Dictionary of the English Language* (completed in 1891). Professor Whitney had a European no less than a national fame, and ranked among the foremost expositors of the science of language. Died in New Haven, Conn., June 7, 1894.

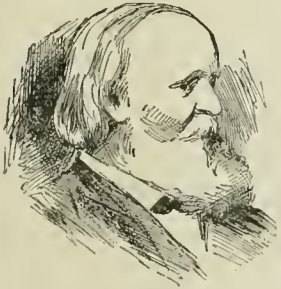
WHITNEY, WILLIAM COLLINS, an American lawyer and public man; born at Conway, Massachusetts, July 5, 1841, graduating at Yale College in 1863 and at the Harvard Law School in 1864; he began the practice of law in New York City in 1865. He was counselor for prominent insurance companies, and corporation counsel (1875-76 and 1880-82). In March, 1885, he was appointed Secretary of the Navy by President Cleveland, and it was under this administration that the several vessels were completed which were the beginning of the modern United States navy. Since his retirement from the Secretaryship at the close of the first Cleveland administration, March

4, 1889, he has resided in New York City, engaged in the practice of his profession.

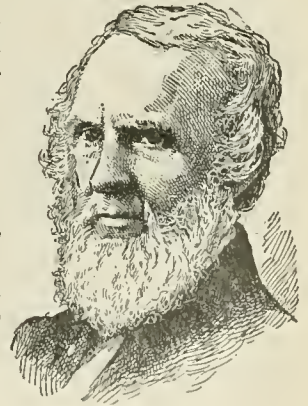
WHITTEMORE, THOMAS, an American editor and author; born in Boston, Massachusetts, Jan. 1, 1800; was apprenticed first to a morocco-dresser, then to brass-founder, and finally to a shoemaker. He became acquainted with the Rev. Hosea Ballou, who persuaded him to study theology, and in 1821 he became pastor of the Universalist Church at Milford, Massachusetts, and of that at Cambridgeport in 1822. He was a joint editor of the *Universalist Magazine*, and the founder of the *Trumpet*, a Boston Universalist paper, editing and managing it for thirty years. He was a member of the legislature from Cambridge repeatedly, and was president of the local bank, as well as of the Vermont and Massachusetts railway, for many years. He received the degree of D.D. from Tufts College in 1858. Among his most important works were *The Modern History of Universalism* (1830; new ed. 1860); *Notes and Illustrations of the Parables* (1832); *Songs of Zion* (1836); *Commentary on the Revelation of St. John* (1838); and a *Commentary on the Book of Daniel* (1840). He died at Cambridge, Massachusetts, March 21, 1861.

WHITTIER, JOHN GREENLEAF, an American Quaker poet, was born near Haverhill, Massachusetts, Dec. 17, 1807.

Until the age of 18 he toiled on a farm, with occasional opportunities for schooling, but his education was limited, save what he obtained from books. In 1830 he became editor, at Hartford, Connecticut, of the *New England Weekly Review*, but two years afterward returned to Haverhill to edit the *Haverhill Gazette*. In 1836 he removed to Philadelphia, where he edited for four years the *Pennsylvania Freeman*, a journal issued by the American Anti-slavery Society. By this time he was known as the laureate of the abolition party, the cause of which he early and ardently espoused. Many of the poems written by him at this period were inspired by his enthusiasm in the antislavery cause, and were afterward published in the collection entitled *Voices of Freedom* (1849). In 1840, after making his home at Amesbury, Massachusetts, he became corresponding editor of the *Washington National Era*, and devoted himself to literature. His range of subjects was comparatively limited as well as unexciting, but he had rare powers of felicitous and melodious expression. His *Snow-Bound*; *Prayer-Seeker*; *Maud Muller*; and *Barbara Frietchie*, are favorite poems wherever the English language is spoken. His lyrical qualities, the soundness of his sentiment and the fervor of his antislavery muse, endeared him to



WILLIAM D. WHITNEY.



JOHN G. WHITTIER.

the more serious type of readers. Not the least of his merits are his Quakerly purity of thought and devout feeling. His published volumes include *Legends of New England*, in prose and verse (1831); *Ballads* (1838); *Lays of My Home, and Other Poems* (1843); *Old Portraits and Modern Sketches* (1850); *Songs of Labor, and Other Poems* (1850); *The Chapel Hermits and A Sabbath Verse* (1853); *Literary Recreations and Miscellanies* (1854); *Home Ballads* (1860); *In War Time, and Other Poems* (1863); *Snow-Bound: A Winter Idyl* (1866); *The Tent on the Beach* (1867); *Among the Hills* (1868); *Ballads of New England* (1870); *Miriam, and Other Poems* (1870); *Child Life* (1870); *The Pennsylvania Pilgrims* (1872); *Hazel Blossoms* (1875); and a *Centennial Hymn* (1876). Not a few of these productions give expression to passionate objurgations with respect to slavery and the disunionist cause in the Civil War; but when the conflict was over his more genial, tranquil and beauty-loving spirit had scope, and his work asserted its transcendent charm. In 1869, and again in 1876, was published a uniform edition of his collected works, in seven volumes, embracing, beside the poems, his tales and sketches, historical and slavery subjects, together with *Leaves from Margaret Smith's Journal* (1849). His *Life and Letters*, edited by S. T. Pickard, appeared in two volumes in 1895. He died Sept. 7, 1892, at Hampton Falls, New Hampshire.

WHITTLESEY, CHARLES, an American geologist and soldier; born at Southington, Connecticut, Oct. 4, 1808. Graduating from the United States Military Academy in 1831, he joined the Fifth Infantry. After serving in the Black Hawk war he studied law and practiced in Cleveland, Ohio, where he was on the editorial staff of the *Cleveland Herald* in 1836-37. As assistant geologist of Ohio from 1837 to 1839, he made the topographical and mathematical survey of eastern Ohio, which disclosed the coal and iron deposits of that section. He was engaged from 1847 to 1851 in making the United States mineralogical and geological survey of the Lake Superior and upper Mississippi regions. During the war he served for three months as chief engineer of the Ohio troops in the western Virginia campaign. As colonel of the Twentieth Ohio Infantry in 1861, and chief engineer of the Department of Ohio he had charge of planning and constructing the defenses of Cincinnati. He was prominent at Fort Donelson and Shiloh, but failing health compelled him to leave the army, April 19, 1862. He then resumed his literary labors. Among his more important papers in the *Smithsonian Contributions* are *On Fluctuations of Level in the North American Lakes* (1860) and *Ancient Mining on the Shores of Lake Superior* (1863). He also wrote a *Life of John Fitch* for Sparks's *American Biography* (1845). He died at Cleveland, Ohio, Oct. 18, 1886.

WHITWORTH, SIR JOSEPH, an English mechanical engineer and inventor; born at Stockport, on the Mersey River, Dec. 21, 1803. Commencing the manufacture of engineers' tools at Manchester in 1833, he made his name famous throughout the world by his improvements in that line. He manufactured and introduced the standard gauges for

mechanical work, and the standard screw-threads which are in general use in Europe and are known throughout the world. He invented a method of employing hydraulic pressure in founding (q.v., Vol. IX, p. 481). He also produced in his shops extremely accurate measuring-machines (see MACHINE TOOLS, Vol. XV, p. 157). He read valuable papers on advanced mathematics before the Philosophical and Literary Society of Liverpool; received degrees from the universities of Oxford and Dublin; was elected a fellow of the Royal Society. In 1854 he commenced the manufacture of fire-arms, producing the Whitworth rifle, besides making other improvements in guns (see GUNMAKING, Vol. XI, pp. 282, 290). In 1868 Napoleon III decorated him with the cross of the Legion of Honor, and in the following year he was made a baronet. He founded, in 1868, thirty scholarships for the encouragement of the science of engineering. His most valuable writings include *Miscellaneous Papers on Mechanical Subjects* (1859); *Papers on Practical Subjects, Guns and Steel* (1873); and *Essays on Mechanical Subjects* (1882). He died at Monte Carlo, Italy, Jan. 22, 1887.

WHITWORTH GUNS. See GUNMAKING, Vol. XI, 282.

WHOOPIING-COUGH. See HOOP, Vol. XII, p. 154.

WHYDAH. See DAHOMEY, Vol. VI, pp. 765 et seq.

WHYMPER, EDWARD, an English artist, mountain-climber and traveler; born in London, April 27, 1840. Educated at Clarendon House School and under private tutors, he was trained to be a draftsman. Preferring, however, to travel, he commenced his career as a mountain-climber in 1861, when he ascended Mount Pelvoux (then supposed to be the highest mountain in France), and discovering the Pointe des Écrins five hundred feet higher, climbed that the following year. He continued mountain-climbing, ascending many peaks till then considered inaccessible, including the Matterhorn, July 14, 1865. (See MATTERHORN, in these Supplements.) He made two expeditions (1867 and 1872) to Greenland, on which he made many valuable discoveries of fossiliferous deposits, demonstrating the former existence of luxuriant vegetation in far northern latitudes. He published, in 1871, *Scrambles Amongst the Alps in the Years 1860-1869*, in recognition of which he received the decoration of the Order of SS. Maurice and Lazarus from the king of Italy. In 1879-80 he explored and measured the Andes on and near the equator, making the ascent of Chimborazo, Cotacachi and other peaks hitherto unexplored. As a result of this trip he published (1891-92) *Travels Amongst the Great Andes of the Equator; Supplementary Appendix to Travels Amongst the Great Andes of the Equator*; and *How to Use the Aneroid Barometer*. Upon the publication of these works the Royal Geographical Society awarded him the patron's medal. He published a number of other books of travel, and beautifully illustrated many of them.

WHYTE-MELVILLE, GEORGE JOHN. See MELVILLE, Vol. XV, p. 844.

WICHERN, JOHANN HEINRICH, a German philanthropist; born in Hamburg, Germany, April 21, 1808; attended the gymnasium in his native town and studied theology at Göttingen and Berlin. He took in hand the direction of a free Sunday school for poor children in Hamburg, and filled it with nearly five hundred of the poorest and most abandoned children of the city. In 1833 he opened, at Horn, near Hamburg, the Rauhes Haus, an institution which is a boarding-school for the moral and intellectual education of higher-class children, as well as a refuge for those morally neglected. Children received at the Haus were placed, in families of 12, in charge of young artisans, who taught them some trade. This idea was carried out in other parts of Germany, and was soon imitated in all the leading countries of Europe. As a member of the Central Home Mission Committee of the Protestant Ecclesiastical Assembly, Wichern traveled through all parts of Germany organizing institutions and societies for the education and care of the poor, sick and criminal. In 1851 he was commissioned by the Prussian government to inspect all the houses of correction and prisons, to the general supervision of which he was appointed in 1858. His most important book was his *Home Mission of the German Evangelical Church* (1849). In 1851 the University of Halle conferred on him the degree of doctor of divinity. He died at Hamburg, April 7, 1881.

WICHITA, a city and the capital of Sedgwick County, southern Kansas, on both sides of the Arkansas River, 160 miles S.W. of Topeka. It has grown in size and number very remarkably since 1880, and is prominent as a railroad, commercial, financial and manufacturing center, with equal progress made in the departments of education and internal improvement; located on the Atchison, Topeka and Santa Fé, the St. Louis and Francisco, the Wichita and Western, the Chicago, Rock Island and Pacific and the Missouri Pacific railway systems. Among the prominent edifices are the Sedgwick County Courthouse, completed during 1890, at a cost of \$200,000; the City Hall, erected at an expense of \$100,000; Wichita University, Lewis Academy, the Catholic colleges, the Medical College, the High School, the Real Estate Exchange and Board of Trade, and Young Men's Christian Association building. The city has numerous churches, good public schools, state and national banks, and several daily and weekly newspapers. The manufactures embrace many branches of industry and commerce. The packing and provision business and the purchase and shipment of live-stock are also important interests. The principal streets are paved and drained; the city is lighted by gas and electricity, and supplied with electric and horse railways. Population 1890, 23,853; 1900, 24,671.

WICHITA INDIANS, a confederacy of North American Indians, of the Caddoan family, and consisting of seven tribes, the chief of which are the Wichitas, Weekos, and Towakarehns. Their former habitat was the region of the Washita River, Arkansas; they now reside on the Wichita reservation, Oklahoma.

WICHITA FALLS, a town and the capital of Wichita County, northern Texas, 114 miles N.W. of Fort Worth and 51 miles N.E. of Seymour, on the Wichita River, and on the Fort Worth and Denver City, the Wichita Valley and the Missouri, Kansas and Texas railroads. It is the trade center of an agricultural and stock-raising district and the shipping-point for its products. Population 1900, 2,480.

WICKLIFFE, a town and the capital of Ballard County, southwestern Kentucky, five miles S. of Cairo, on the Mobile and Ohio and the Illinois Central railroads. It is the trade and shipping center of a region producing grain, tobacco and live-stock, and has a steam saw-mill. Population 1900, 995.

WICKLIFFE, JOHN. See WYCLIFFE, Vol. XXIV, pp. 708-712.

WIDOW. See WOMEN, Vol. XXIV, p. 641.

WIDOW-BIRD. See WEAVER-BIRD, Vol. XXIV, p. 463.

WIECK, FRIEDRICH, a German pianoforte teacher; born at Pretsch, near Torgau, in Saxony, Aug. 18, 1785. He studied theology at Wittenberg, preached and taught for a little time, and was connected with a piano factory at Leipsic. He taught the piano on a system of his own, which consisted of the most careful application of sense and intelligence to the teaching of technique and expression. His views on piano-playing and singing are expressed in the pamphlet *Clavier und Gesang* (1875). He also published a few studies and dances for the piano, besides some pamphlets, *Verfall der Gesangkunst* being the most noteworthy of the latter.—His daughter, CLARA JOSEPHINE, was born at Leipsic, Sept. 13, 1819. She began playing the piano at a very early age, making her first public appearance at the beginning of her tenth year. From that time she appeared repeatedly, both on the Continent and in England, until the death of her husband, Robert Schumann (q.v., Vol. XXI, p. 459), July 29, 1856. She had married this one of her father's most famous pupils, Sept. 12, 1840, and was most instrumental in bringing out his compositions. After her husband's death she appeared less frequently than before, until in 1878 she accepted the position of principal teacher of the pianoforte in Dr. Hoch's Conservatoire at Frankfurt.

WIELICZKA MINES. See SALT, Vol. XXI, p. 230.

WIERTZ, ANTONINE JOSEPH, a Flemish painter; born at Dinant, Belgium, Feb. 22, 1806; entered the Antwerp Art School in 1820, and after studying several years at Rome settled in Brussels in 1848. During that portion of his career prior to 1848, his ideal was the uniting of the excellencies of Rubens and Michael Angelo, as is shown in his paintings *The Flight of Greeks and Trojans Round the Dead Body of Patroclus* (1835); *The Disobedient Angels*; *The Flight Into Egypt*; and *The Triumph of Christ* (1848); the last being thirty by fifty feet, while all were very large canvases. He once held up to the ridicule of Europe the judges of a certain Paris exhibition, who had rejected a genuine Rubens he had sent them, marked with his own initials. In 1847 the Belgian government built him a studio which is still open to the public as the Musée Wiertz, and

where most of his paintings are to be seen. In 1848-50 he developed a new technical method of painting, *peinture mate*, a combination of the qualities of fresco and oil work. He now began the production of totally different subjects, such outcomes of a morbid imagination as *A Second After Death*; *Napoleon in Hell*; *Precipitate Inhumation*; and *Visions of a Head Cut Off*. He also painted some eccentric genre pictures, as *Quasimodo* and *The Young Witch*. He wrote a *Eulogy on Rubens* (1840) and a *Memoir on Flemish Painting* (1863). He supported himself by portrait-painting, bequeathing all his descriptive paintings to the state. He died in Brussels, June 18, 1865.

WIFE. See HUSBAND AND WIFE, Vol. XII, pp. 400-402.

WIFFEN, BENJAMIN BARRON, an English editor; born at Woburn, Bedfordshire, in 1794. He was a student of Spanish literature, and was one of the chief editors and translators of *Reformistas Antiguos Españoles*; or, *The Works of Spanish Reformers Reprinted and Edited* (29 vols., 1848-69), treating especially of the reforms of the sixteenth century. He was the author of a volume of *Poems* and of a *Life of Juan de Valdes*. (See VALDES, JUAN DE, Vol. XXIV, p. 32). His collections are now to be found at Oxford, in the Wadham College library. He died March 18, 1867.

WIGGLESWORTH, MICHAEL, an American author; born in England, Oct. 18, 1631. In 1638 he emigrated to Charlestown, Massachusetts, with his father, and settled in New Haven, Connecticut, the same year. Graduating at Harvard College in 1651, he became fellow and tutor in that institution, where he remained until 1656, when he was ordained minister of the church at Malden, Massachusetts. On account of ill health he was obliged to decline the presidency of Harvard College, offered him in 1684. He was the author of the poem containing the famous verse assigning "the easiest room in hell" to non-elect deceased infants. This poem, *The Day of Doom*; or, *A Poetical Description of the Great and Last Judgment, with a Short Discourse About Eternity*, ran through five editions (1662-1751) in America, and two (1673, 1711) in England, beside a reprint (1867), with the addition of other poems, and a *Memoir, Autobiography and Sketch of His Funeral Sermon by the Rev. Cotton Mather*. This and another poem, *Meat Out of the Eater*; or, *Meditations Concerning the Necessity, End and Usefulness of Afflictions Unto God's Children, All Tending to Prepare Them for and Comfort Them Under the Cross* (1st ed. 1669; 5th ed. 1717); with an *Election Sermon* (1696); and an *Artillery Election Sermon* (1696) are his most important works. He died at Malden, Jan. 10, 1705.

WIGHT, ORLANDO WILLIAMS, an American author; born at Centerville, New York, Feb. 19, 1824; educated at Westfield Academy and at the Rochester Collegiate Institute. After teaching Latin and Greek in Genoa Academy, and mathematics and languages in Aurora Academy, he removed to New York, where he studied theology, though he never connected himself with any denomination. He afterward studied medicine, and was appointed Wis-

consin state geologist and surgeon-general in 1874. He served as health-officer for the city of Milwaukee, Wisconsin (1877-82), and for the city of Detroit, Michigan (1882-88). He received the degree of LL.D. from Yale University. Besides contributing to *The North American Review*, *The New Englander* and other magazines, he published a large number of works, including *The Romance of Abélard and Héloïse* (1853; enlarged ed. 1861); *The Philosophy of Sir William Hamilton*; translations of Victor Cousin's *Course of the History of Modern Philosophy* (1852); and *Lectures on the True, the Beautiful and the Good* (1854); and *Standard French Classics* (1859), in 12 volumes. He also assisted Mary L. Booth in the translation of Henri Martin's *History of France* (1863). He died at Detroit, Michigan, Oct. 19, 1888.

WILBER, a village and the capital of Saline County, southeastern Nebraska, 31 miles S.W. of Lincoln, on the Big Blue River, and on the Burlington and Missouri River railroad in Nebraska. It is in a rich agricultural region, and has flour-mills, grain-elevators and cigar factories. Population 1890, 1,226; 1900, 1,054.

WILBERFORCE, a village of Greene County, southwestern Ohio, about three miles N.E. of Lima, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad. It is the seat of Wilberforce University (Methodist Episcopal), an institution founded in 1856 for the education of colored men and women. It had, in 1895, 18 instructors, 305 students and a library of 9,000 volumes.

WILBERFORCE, ALBERT BASIL ORME, an English clergyman; educated at Exeter College, Oxford, where he received the degree of bachelor of arts in 1865 and master of arts in 1867. He occupied the curacy of Cuddesdon (1866-67); was chaplain to the Bishop of Oxford (1866-70); occupied the curacy of St. Jude, Southsea (1861-71); chaplain to his father, the Bishop of Winchester (1870-73); and rector of St. Margaret's, Southampton (1871-94). In 1894 he was appointed a canon of Westminster and presented to the living of St. John's Church. He early became famous as a temperance advocate and later as an eloquent preacher.—His brother, ERNEST ROLAND, was born at Brightstone, on the Isle of Wight, Jan. 22, 1840; educated at Harrow and at Exeter College, Oxford, where he took the degree of bachelor of arts in 1864, master of arts in 1867, and doctor of divinity in 1882. As curate of Cuddesdon he was ordained a deacon in 1864, and was admitted to priest's orders in 1865. Receiving the appointment of rector of Middleton Stoney, Oxfordshire, in 1866, he held it until three years later, when he became domestic chaplain to his father, the Bishop of Winchester. As vicar of Seaforth, near Liverpool (1873-78), he was nominated in the latter year to a canonry in Winchester Cathedral. He was sub-almoner to the Queen (1871-82), when he was appointed first bishop of the see of Newcastle-on-Tyne.

WILBRAHAM, a town of Hampden County, western central Massachusetts, nine miles E. of Springfield, on the Chicopee River, and on the Boston and Albany railroad. The villages of Wilbraham and North Wilbraham are included in the township, which contains a public library and Wesleyan Acad-

emy. It has important agricultural interests, and carries on the manufacture of paper. Population 1890, 1,814; 1900, 1,595.

WILBRANDT, ADOLF, a German dramatist; born at Rostock, in Mecklenburg-Schwerin, Aug. 24, 1837; educated in Rostock, Berlin, and Munich, for some time editing a daily paper in the latter place. He traveled through Italy and France, and settled in Vienna in 1871, where he was director of the Hofburg Theater from 1881 until 1889, when he retired to Rostock to devote himself to literary pursuits. His dramas have been acted successfully in the principal German theaters. His leading tragedies are *Graf Hammerstein* (1870); *Gracchus* (1872); *Giordano Bruno* (1874); *Nero* (1876); *Kriemhild* (1877); and *The Master of Palmyra*, his masterpiece. His comedies are *Jugendliebe* (1872) and *Natalie* (1878). He treated modern social and literary questions in his novels *Adams Söhne* (1890); *Hermann Ifinger* (1892); and *Der Dornenweg* (1894).

WILBUR, JOHN. See FRIENDS, in these Supplements.

WILCOX, CADMUS MARCELLUS, an American soldier; born in Wayne County, North Carolina, May 29, 1826; educated at Cumberland College, Nashville, and at the United States Military Academy. He served in the Mexican War and earned the brevet of first lieutenant at the storming of Chapultepec. He served as assistant instructor of tactics at the Military Academy, was made a captain of infantry in 1860, and was on frontier duty in New Mexico at the opening of the Civil War. By turn colonel and brigadier-general in the Confederate army, in 1861 he commanded a brigade in Longstreet's corps in Virginia, was promoted to be major-general in August, 1863, and commanded a division from then till the surrender at Appomattox Courthouse. He received the appointment of chief of the railroad division of the general land-office in Washington, District of Columbia, in 1886. He is the author of *Rifles and Rifle Practice* (1859) and of a *History of the Mexican War*. He died in Washington, District of Columbia, Dec. 2, 1890.

WILCOX, ELLA (WHEELER), an American writer; born at Johnstown Center, Wisconsin, about 1845; received her education in the Windsor public schools and at the University of Wisconsin. She married Robert M. Wilcox in 1884, and after 1887 resided in New York city. She made many contributions to newspapers and magazines, besides publishing several books, including *Drops of Water* (1872); *Poems of Passion* (1883); *Poems of Pleasure* (1888); and the novels *Mal Moulde* (1885); *Was it Suicide?* (1893); and *A Double Life* (1894).

WILD, HEINRICH, a Swiss meteorologist and physicist; born at Uster, in the canton of Zurich, Dec. 17, 1833; educated at the gymnasium and university in Zurich until 1854, when he studied physics in Königsberg, receiving the degree of Ph.D. from the Zurich University in 1857. In the spring of 1858 he became privat-docent in physics at Zurich University and at the Federal Polytechnic, and later in that year went to Bern as professor of physics and director of the astronomical observatory at that place. In May, 1868, he was called to St.

Petersburg as a member of the Imperial Academy of Sciences and director of the Central Physical Observatory. At the instance of the Bundesrath he proposed a reform in the Swiss system of weights and measures, accomplishing the establishment of a "Federal Normal-Eichstätte" in 1867. He has accomplished much of value in science, especially in connection with optics, metrology, meteorology, electricity and terrestrial magnetism. In 1865 he began to edit the *Annalen des Physikalischen Central-Observatoriums für Russland*.

WILD ANIMALS. See GAME LAWS, Vol. X, pp. 61-63; and in these Supplements.

WILDCAT, a popular name for several species of *Felis* or *Lynx*. The European wildcat is *F. catus*. A number of species of both genera are found in North America, and were formerly abundant in many middle and Eastern states, where they are now rare. Most naturalists are now inclined to regard most of these species as local varieties. See also CAT, Vol. V, p. 205.

WILD CHERRY. See CHERRY, Vol. V, p. 586.

WILDE, OSCAR FINGALL O'FLAHERTIE WYLLYS, a British author; born in Dublin, Oct. 16, 1856; educated at Portora Royal School, Enniskillen, at Trinity College, Dublin, and at Magdalen College, Oxford. He went to London in 1879 and originated the æsthetic movement there in the following year. Gilbert and Sullivan pictured him as Bunthorne in *Patience*. In 1881 he lectured on art in America, and subsequently in England and France. He achieved some success as a poet, a novelist and a dramatist, his most important productions being a volume of *Poems* (1881); a novel, *The Picture of Dorian Gray* (1888), wherein he prophetically foretold his own subsequent career; a collection of "prose poems," *The House of Pomegranates*; the blank verse tragedy produced in New York in 1891, *The Duchess of Padua*; and the comedy, *Lady Windermere's Fan*, produced in London in 1892, and subsequently in New York. His one-act French tragedy was produced in Paris by Madame Sara Bernhardt. In 1895 he was convicted, in London, of gross and unmentionable offenses, was sentenced to two years' imprisonment with hard labor, and became socially extinct.—His mother, LADY JANE FRANCESCA SPERANZA (ELGEE), was born in County Wexford, in 1836. In early life she contributed poetry to the *Dublin Nation*, under the pseudonym "John Fanshawe Ellis," and later signed the name "Speranza." She was the author of *Driftwood from Scandinavia* (1884); *Ancient Legends, Mystic Charms, and Superstitions of Ireland* (1886); and *Social Studies* (1893). Died in London, Feb. 5, 1896.

WILDE, RICHARD HENRY (1789-1847). See AMERICAN LITERATURE, Vol. I, p. 723.

WILDEBEEST OR GNU. See ANTELOPE, Vol. II, p. 101.

WILDENBRUCH, ERNST ADAM VON, born in Beirut, Syria, Feb. 3, 1845; went to Germany in his thirteenth year and was educated at the gymnasia of Halle and Berlin and at the Potsdam Military Academy. As an officer in the Prussian army he fought in the campaigns of 1866 and 1870. He studied law in Berlin and entered the civil service,

holding the office of referee at the tribunal of Frankfurt-on-the-Oder, and becoming an assistant secretary in the German foreign office in 1877. His plays have been successfully performed in Germany. Those especially worthy of note are the tragedies *Die Karolinger* (4th ed. 1887); *Christoph Marlow* (1884); *Der Menonit* (3d ed. 1886); and *General-feldoberst* (1886); and the dramas *Harold* (4th ed. 1884; Eng. trans. 1891); *Der Neue Herr* (1891); and *Das Heilige Lachen* (1892). He produced several volumes of poems, including the satire, *Die Philologen am Parnassus* (1868) and the *Dichtungen und Balladen* (1884), the latter containing the popular *Hexenlied*. *Der Meister von Tanagra* (1880) is the best of his published stories.

WILDER, BURT GREEN, an American comparative anatomist; born in Boston, Massachusetts, Aug. 11, 1841; graduated at the Lawrence Scientific School in 1862 and at the Harvard Medical School in 1866, after serving as medical cadet in the United States army (1862-63) and surgeon in the Fifty-fifth Massachusetts Volunteers (1863-65). In 1867 he became professor of physiological, zoölogical and comparative anatomy in Cornell University. In addition to his Cornell professorship he was professor in the Medical School of Maine (1874-84), and in 1876-77 gave a course of lectures on zöology in the University of Michigan. He gave much attention to the simplification of anatomical nomenclature, and made a special study of the brain of vertebrates, on which subject he wrote many papers for American and foreign publications. A member of numerous scientific societies, he presided over the biological section of the American Association for the Advancement of Science in 1885, and was president of the American Neurological Association in the same year. He wrote *What Young People Should Know* (1875), and, with Simon H. Gage, *Anatomical Technology as Applied to the Domestic Cat* (3d ed. 1892).

WILDER, MARSHALL PINCKNEY, an American horticulturist; born at Rindge, New Hampshire, Sept. 22, 1798. Having received a common-school education he commenced business in Boston in 1825, as a West India merchant, and in 1837 became a partner in a commission house. He was a director of many financial and commercial companies. In 1839 he was a member of the Massachusetts legislature, a member of the governor's council in 1849, and president of the state senate in 1850. He took great interest in horticulture, was president of the Massachusetts Agricultural Society, of the Norfolk Agricultural Society, of the New England Historic Genealogical Society, and founder and president of the United States Agricultural Society and the American Pomological Society. He also had much to do with the founding of the Massachusetts Institute of Technology. He published a large number of addresses on historical, agricultural and pomological subjects. He died at Roxbury, Dec. 16, 1886.

WILDERNESS CAMPAIGN, THE. After the battle of Gettysburg (q.v., in these Supplements), in July, 1863, the two armies—that of northern Virginia and that of the Potomac—had confronted

each other, but no operations of importance took place until nearly a year later, at which time began that celebrated series of battles which, commencing with the battles of the Wilderness and Spottsylvania (q.v., in these Supplements), continued for a month, ending with the second Cold Harbor (q.v., in these Supplements), and passed into history as the Wilderness campaign. The bloody ferocity of these battles, and the singular obstinacy with which every foot of ground fought over was contested, go to make this campaign one of the most memorable in the annals of warfare. Here, for the first time, the two great captains of the North and South met in pitched battle, and here was decided finally the fate of the Confederacy, confirming and following up the work begun at Gettysburg. On March 29, 1864, General Grant had been made commander-in-chief of the Union armies, and having placed General Sherman in command in the farther South, he had in person taken the field with the Army of the Potomac, although General George G. Meade yet retained the nominal command of the latter organization. Grant's plan of campaign was different from any hitherto put into execution, inasmuch as it was proposed by him to move all of the Union armies as members of a common whole, thus securing unity of action in the direction of one ultimate goal. This goal was the Confederate capital, toward which the Army of the Potomac was to descend from the North while the army of the farther South, after destroying all possibility of attack in its rear, was to advance toward the same city from the south. On the morning of May 4, 1864, the Army of the Potomac began the initial movement of this programme, while Butler, at the same time, advanced up the south side of the James River, from Fort Monroe toward Richmond, and Sherman started on his march from Chattanooga to Atlanta. Grant began his movement by throwing his right wing across the Rapidan River, on the north bank of which his army had lain, while Lee's army was on the opposite side, in a strong position, at Mine Run. This movement on the part of Grant met with no opposition from Lee, and the former general drew the conclusion that he had surprised the latter by his movement; but this was not true. General Lee's intention was to draw the Federal army into the same difficult field in which Hooker had, a year before, met with so signal a defeat. Lee was perfectly familiar with this section of the country, and he hoped to so improve this knowledge as to be able to deal Grant as heavy a blow as he had given Hooker. Grant's forces amounted to 120,000 men, while those of Lee are estimated, by different authorities, at from 64,000 to 80,000 (the latter estimate being General Grant's figures). After the Federal right had crossed the river, that wing pushed forward into the heart of the Wilderness—a desolate region filled with tangled underbrush, and scrub oak and pine, whose impenetrable thickets made it almost impossible for an army to enter—while the left wing was hurried forward to Chancellorsville (the scene of Hooker's defeat), where it rested for the night. Grant then intended, if possible, to flank Lee, and by gaining Gordonsville, to get into

his rear. But Lee was fully aware of the advantages of the Wilderness for defensive operations, and resolved, if possible, to bring on a general engagement in the midst of this thicket. Two lines of advance running nearly due east and west, and parallel to each other, were open to Lee, and along these roads, on the morning of the 5th, he promptly advanced, Ewell's division taking the turnpike (or northerly) road, while Hill's division advanced along the plank-road (the southerly thoroughfare). Longstreet's division was, during the first day's battle, left at Gordonsville to cover Lee's rear, and did not come up in time to take part in the first of the fighting. Burnside's command in the Northern army was also too late in arriving to take part in the first day's fighting, he having been left on the Rappahannock to cover the rear of the Federal army. When the Union forces first struck the Confederates, they supposed it to be merely a rear-guard which they had encountered, and that the army of Lee was in retreat. But they were soon convinced that they had made a mistake, and in a few moments the fighting was sharp and results bloody. The attack was begun by the advance of Ayres's and Bartlett's brigades, which were sent to the right and left of the turnpike road to disperse whatever force might be found there. The Confederates were driven back; but the situation was soon changed by the quick advance of Stewart's brigade of Confederates, and shortly afterward by the arrival of Rhodes's division, and their attack on the Federal troops.

The effort to support Ayres and Bartlett proved abortive, as the thickets were so dense that before aid could arrive they had been driven back in confusion. On the whole, the fighting at this point was very disastrous for the Federals, McCandless's brigade alone losing two full regiments in its effort to escape from its entangled position on the right of the Federal advance column. So far the Union army had lost three thousand men, besides several guns, while the Confederates retained possession of the contested ground. A little after one o'clock the Sixth Corps, which had been sent to the aid of the Fifth, was struck by Ewell. The Confederates were at first repulsed, but a terrific charge by Rhodes's men drove the Federals back, the Confederates being afterward, in turn, forced back. When the fight for the day was over, the Union troops were in possession of the disputed ground. Meantime, General Grant had the conviction carried home to him that General Lee meant to fight him in this tangle of thickets, and he now began to make his preparations for such a contingency. He ordered Hancock to the assistance of Getty, who was holding the junction of the Brock road, which runs at right angles with the turnpike. Soon after Hancock arrived here he was ordered to attack and drive back Hill, but this he failed to do, the men fighting at close quarters, and at night each army drinking from the same "branch," or brooklet, so close were their positions to each other. This ended the first day's fighting in the Wilderness. Early the next day the fighting was resumed, Lee commencing the attack at about 4:30 a.m. In the mean time, Burn-

side and Longstreet had come up to their respective armies, and the lines of battle of both were now fully formed. Grant's line extended over a frontage of five and a half miles—from Todd's tavern to Germania Ford, Sedgwick occupying the right, to the left of Sedgwick, in regular succession, being Warren, Burnside and Hancock. Lee's army was disposed as it was on the preceding day, with the exception that it was now in three sections, Ewell being on the left, Hill in the center and Longstreet on the right. Lee began his assault by attacking Sedgwick, but the Confederates were easily repulsed, and Warren and Hancock made an attack on Hill. For a time the troops of Hill gave away, but at the critical moment Anderson's brigade of Hill's division was thrown forward, and Longstreet's troops suddenly coming to the support of Hill's shattered lines, the tide of battle was turned and Hancock was driven back. At the most critical juncture in the fight, General Longstreet was seriously wounded by his own men, and the loss of time occasioned by the change of officers necessary after this occurrence was fatal to the Confederate success. Before General Lee himself could reach the scene and restore order, the Federals had regained all they had lost by the attack which Longstreet had made. At four o'clock, Lee, in person, led Hill's and Longstreet's men to an assault against the enemy, and for a time the Union left was in extreme danger. But a prompt and desperate charge made by Colonel Hoffmann, according to Hancock, was the turning-point of the engagement, and saved the left wing from entire destruction. To add to the horror of the situation, the woods were afire from the burning powder of the guns, and many dead and wounded were consumed by the flames. Nightfall did not cause the fighting to cease, for just at sunset General Lee sent forward a heavy column, led by General Gordon, against the right wing of the Federal army, and threw it into the greatest confusion. Federal reinforcements were hurried up, however, and the total darkness of the night put an end to the fighting of the second day, in which, it was estimated, the Federals had lost at least fifteen thousand men, and the Confederates about ten thousand. The total losses for the two days were about twenty thousand and thirteen thousand, respectively.

On the morning of May 7th it was apparent that General Lee had determined to assume the defensive and let Grant attack him. This Grant at once began by attempting a flank movement, his objective point being Spotsylvania Courthouse, 13 miles away. The column of the Federal advance along the Brock road was led by Warren's division, and after considerable delay, occasioned by its own cavalry, which obstructed the road, the Federal advance reached a point two or three miles from the courthouse. No serious fighting had taken place, and the Federal commanders were elated with the idea that Lee had probably been unaware of the attempt made to turn his flank; but they were again to be undeceived in a terrible manner. No sooner had the head of the Federal column arrived at the point indicated above than they were met by a terrific fire

and forced back, each successive command, as it came up, sharing the same fate. The attempt to turn Lee's flank had failed, and Grant ordered his army to strengthen its position by intrenchments. All of this and the following day was spent in maneuvers, on both sides, for positions, Lee always barring any southward movement on the part of Grant by throwing his men across the line of march. At last, on the 10th, Grant attacked, and the battle of Spottsylvania Courthouse took place, after which Grant and Lee began their famous movement to reach Richmond, the one to obtain possession of the Confederate capital, the other to defend it. Lee was successful, and when Grant arrived at Hanover Junction on May 23d, he found Lee's army between him and Richmond, in a strong position, already intrenched. The position of Lee's army was impregnable. Grant knew it would be madness to attempt to turn his position, so after a little desultory skirmishing the same tactics as before were resorted to, Grant withdrawing his forces on the 26th and again attempting to flank Lee. Lee followed Grant's movements closely, at every turn interposing his army between the Federals and the Confederate capital. Several stands were made by both armies, but on no occasion was a pitched battle fought until the old battlefields of McClellan's campaign of two years before were reached. Here the Wilderness campaign proper ends, as the battle of Cold Harbor was placed by war historians in another category. Soon after this battle, the Federal army having described a semicircular path around the city of Richmond was transferred to the south bank of the James River, and the siege of Petersburg, the final act of the great drama, was begun.

No characteristics of the Wilderness stand out with greater prominence than do the heroism and determination exhibited by both armies. Never before had Lee's ability as a tactician and strategist had greater demands made upon it, and never before had those demands met with a fuller response. An impartial judge would find it hard to award the palm for superiority to either army. On the one hand, the Federal army was at a disadvantage on account of the intricate nature of the country, and on the other, the Confederate forces were largely outnumbered. But despite all advantages or disadvantages, no men in any circumstances could have done better than did both armies, and the claims of both Lee and Grant to greatness, even had they no other foundation, would find a solid basis in the conduct, by each, of this one campaign. On the battlefields several soldiers' cemeteries have been established, but thousands were unburied, and lay undisturbed amidst the thicket that once gave back the din of conflict and flamed red and bright with the fire of battle.

WILDMAN, ROUNSEVELLE, an American journalist; born at Batavia, New York, in 1862; educated at a Methodist school in Lima and at the Syracuse University, both in New York; engaged in journalism, and soon repaired to Boise City, where he bought and edited the *Idaho Statesman*; delegate to Congress in 1889, to facilitate the admission of Idaho into the Union; United States consul to

Singapore (1890), and Barmen, Prussia (1893); commissioner to the Columbian Fair, Chicago (1893), for the Straits Settlements and Borneo; editor of the *Overland Monthly*, San Francisco (1894), which he revived and brought to renewed prosperity.

WILEY, HARVEY WASHINGTON, an American chemist; born at Kent, Jefferson County, Indiana, Oct. 18, 1844; graduated at Hanover College in 1867; he studied at Indiana Medical College from 1868 to 1871, and was professor of Latin and Greek in Butler University during the same period, and was professor of chemistry in that institution after receiving the degree of B. S., from Harvard in 1873. He was professor at Purdue University from 1874 to 1883, receiving the degree of Ph. D. from Butler University in 1876, and studying chemistry at the University of Berlin in 1878. He was state chemist of Indiana from 1881 to 1883, and was appointed chemist in the Agricultural Department at Washington in 1883. A member of many scientific societies, he was president of the Association of Official Agricultural Chemists, and had charge of the chemistry section of the American Association for the Advancement of Science (1886). He was president of the American Chemical Society in 1886, 1893 and 1894. His researches in the field of food-products, especially in reference to the sugars, resulted in his publishing many valuable papers in scientific journals and reports, besides his *Principles and Practice of Agricultural Analysis*.

WILHELM, KARL, a German composer; born at Schmalkald, in Prussia, Sept. 5, 1815. He taught music in Crefeld and was director of the Liedertafel there (1840-65). In 1854 he composed the music to *Wacht am Rhein*, for which, in 1871, he received a pension of \$750. He died at Schmalkald, Aug. 26, 1875.

WILHELMINA, HÉLÈNE PAULINE MARIE, Queen of the Netherlands; born at The Hague, Aug. 31, 1880. On Nov. 23, 1890, at the death of her father, William III, she succeeded to the throne, her mother, the King's second wife, a daughter of Prince George Victor of Waldeck-Pyrmont, and a sister of the Duchess of Albany, having been appointed regent during the King's illness. She was well educated, under the supervision of her mother,



QUEEN WILHELMINA.

acquiring a speaking knowledge of English, French, and German. The simplicity of her mode of life made her a favorite with her people. Having become of age, she took the oath of office, Sept. 6, 1898, and was formally inaugurated as Queen amid imposing festivities throughout the kingdom. In Oct. 1900, the Queen's betrothal was announced to Duke Henry, youngest son of the late Grand Duke of Mecklenburg-Schwerin.

WILHELMSHÖHE. See CASSEL, Vol. V, p. 183.

WILKES, CHARLES, an American naval officer; born in New York city, April 3, 1798. He entered the navy in 1816, served in the Mediterranean,

(1819-20), and in the Pacific in 1821-23, where he was selected for a separate command. In 1826 he gained the rank of lieutenant, and in 1830 was appointed to the depot of charts and instruments at Washington, and was the first in the United States to set up fixed astronomical instruments and make observations. After being employed in surveying George's Bank, he was, in 1838, appointed to the command of an exploring expedition of five vessels and a storeship, in which he surveyed the Samoan group, in the Pacific, discovered many islands and the Antarctic continents, which he coasted through 70° of longitude, explored the Fiji group, and returned in 1842, when he was advanced to the grade of commander, and published a *Narrative of the United States Exploring Expedition*. Of the 11 supplementary quarto volumes, he was the author of the one on Meteorology; and in 1849, of a volume on California and Oregon, entitled *Western America*. In 1856 he published his *Theory of the Winds*. Having been promoted to the rank of captain in 1855, he, in 1861, took command of the United States steamer, *San Jacinto*, and forcibly removed from the British mail-steamer *Trent* Messrs. Mason and Slidell, commissioners of the Confederate States to England and France, and conveyed them to Boston, receiving the thanks of Congress, but at the demand of the British government his act was disavowed and the commissioners released. (See UNITED STATES, Vol. XXIII, p. 777; and ABRAHAM LINCOLN, Vol. XIV, p. 660.) In 1862 he was promoted to the rank of commodore, and to active service as rear-admiral; but at the close of the war was placed upon the retired list of commodores, on account of age. He died in Washington, District of Columbia, Feb. 8, 1877.

WILKESBARRE, a city and the capital of Luzerne County, eastern Pennsylvania, the population of which increased very greatly from 1880 to 1890. It has several miles of well-paved streets, lighted with gas and electricity, a steam-heating plant, water-works, paid fire department, a number of notable public buildings, including the city and county buildings, Grand Army Hall, Young Men's Christian Association building, Ousterhout Free Library and the Ninth Regiment Armory. There are a large number of churches, schools (both public and parochial), business colleges, an academy for boys and a seminary for girls, also a number of charitable institutions. The assessed valuation of property in 1894 was nearly six million dollars, and the capital of seven banks in 1895 aggregated \$1,675,000. As the center of a rich anthracite coal-mining district, the importance of Wilkesbarre as a shipping-point for mining products is enhanced by its location upon the Central Railroad of New Jersey, the Delaware, Lackawanna and Western, the Delaware and Hudson, the Lehigh Valley, the New York, Susquehanna and Western, and the Pennsylvania railroads. Besides its large interests in the coal-mines, the annual output of which reaches twelve million tons, and in which thirty-six thousand men and boys are employed, the city has foundries, axle factories, silk-mill, gun-works, large breweries, and manufactures of lace, cutlery, locomotives, leather goods, wire

rope and steel. Pop. 1890, 37,718; 1900, 51,721. See also WILKESBARRE, Vol. XXIV, p. 568.

WILKINS, MARY ELEANOR, an American writer of fiction was born about 1865, in Randolph, near Boston. Her father was from Salem, and through his mother, a Miss Lotbrop, she was related to the historian Motley. She was early left an orphan, and was educated at Brattleboro, Vermont, and at Mount Holyoke Seminary. One of her earliest works *A Humble Romance* (1887), discloses her field of work and method, a simple plot, and strong delineations of



MARY E. WILKINS.

New England character. The delineations are those of an impressionist in their clarity and force, and are realistic in their development. Beneath the self-repression and reserve of her personages she finds, with delicate insight, ardent human hearts working out their pathetic and often tragic stories. *A New England Nun, and Other Stories* (1891); *The Pot of Gold* (1892), a collection of whimsical stories for children; *Young Lucretia and Other Stories* (1892); *Jane Field*, novel (1895); *Giles Corey, Yeoman, a Salem witchcraft tragedy*, six acts (1893); and *Pembroke*, New England story, novel (1894). In 1895 she carried off a prize of \$2,000, offered by a publishing syndicate for a story of less than six thousand words, from three thousand competitors—it is called *The Long Arm*. She also published *Madelon* (1896); and *Some of Our Neighbors* (1898).

WILKINSBURG, a borough of Allegheny County, southwestern Pennsylvania, seven miles E. of Pittsburg, on the Pennsylvania railroad. It is in a rich coal-producing region and is chiefly engaged in the coal-mining industries. The business interests of the borough are, however, closely identified with those of Pittsburg. Population 1900, 11,886.

WILKINSON, JAMES, an American soldier; born at Benedict, Maryland, in 1757; completed the study of medicine and entered the Revolutionary army in 1778. Serving in Canada and at Saratoga under Gates, he attained the rank of brevet brigadier-general, and secretary of the Board of War. He was connected with the "Conway Cabal" (see WASHINGTON, Vol. XXIV, p. 389), and having told the plot to Lord Stirling, resigned his brevet commission upon the consequent demand of his brother officers. At the close of the war he emigrated to Lexington, Kentucky, where he engaged in trade in the Mississippi valley. While there he attempted to transfer the allegiance of Kentucky from the United States to Spain. In 1791 he was reinstated in the army under General Anthony Wayne, and did good service against the Indians of the Northwest, in recognition of which service he was made brigadier-general in 1792, and promoted to the supreme command of the army on the death of Wayne in 1796. Made governor of Louisiana in 1805, he disclosed Burr's southwestern empire scheme to the govern-

ment (see BURR, AARON, in these Supplements). He himself was implicated in this conspiracy, but was acquitted when court-martialed in 1811. Two years later he was made major-general in the northern department, where he was unsuccessful, on account of a disagreement with General Wade Hampton. He was acquitted by a court of inquiry, but discharged from the service, and removed to Mexico. He published a partial autobiography, *Memoirs of My Own Times* (1816). He died near the City of Mexico, Dec. 28, 1825.

WILKINSON, SIR JOHN GARDNER, an English Egyptologist; born at Haxendale, in Westmoreland, Oct. 5, 1797; educated at Harrow School and Exeter College, Oxford. In 1822 he settled at Cairo and learned to read and speak Arabic. During the next 12 years he made a complete survey of Egypt and sent over three hundred antiquarian objects to the British Museum. He made an especial study of Thebes, remaining there for a year and publishing a supplement (1830) to his *Materia Hieroglyphica* (1828), devoted entirely to that city, as well as a *Topographical Survey of Thebes* (1830) and the *Topography of Thebes* (1835). His most valuable work, *Manners and Customs of the Ancient Egyptians* (1837), was united with his *Religion and Agriculture of the Ancient Egyptians* (1841) by Dr. Samuel Birch, and published in 1879. He was made a knight in 1839. In 1843 he visited Egypt for the third time, and also traveled in Asia Minor and Tunis, returning to England in 1845 by the eastern coast of the Adriatic. He published *Dalmatia and Montenegro* (1848); *The Architecture of Ancient Egypt*; and *A Popular Account of the Ancient Egyptians* (1853). He made a fourth visit to Egypt in 1848 and a fifth in 1855. He presented to the Harrow School his collection of Egyptian, Greek and other antiquities, including about a thousand coins, for the purpose of founding a museum. He died at Llandoverly, Wales, Oct. 29, 1875.

WILL, SCHOPENHAUER'S VIEW OF. See PESSIMISM, Vol. XVIII, p. 687; SCHOPENHAUER, Vol. XXI, pp. 450, 457.

WILL, FREEDOM OF. See ETHICS, Vol. VIII, p. 608.

WILLAMETTE VALLEY. See OREGON, Vol. XVII, pp. 822, 823.

WILLAMUCCA LAKE. See WINNEMUCCA LAKE in these Supplements.

WILLARD, EDWARD S., an English actor; born at New Brighton, in Wales, in 1853. Obtaining an engagement at the Theatre Royal in Weymouth, he served for seven years as a "stock" actor, playing every part from Macbeth down. He made his first appearance in London in 1875; was then for a time in the country, returning to London in 1881, where he appeared first with Helen Barry, and later with Wilson Barrett. In 1888 he leased the Shaftesbury Theatre, where he achieved great success in *The Middleman*. He went to the United States in 1890, winning great popularity in that and succeeding years in *Judah*; *The Middleman*; *Wealth*; *The Professor's Love Story*; and other plays.

WILLARD, EMMA C., an American educator; born at Berlin, Connecticut, Feb. 23, 1787; educated in Berlin and in Hartford, Connecticut, she

began to teach when 16 years of age. She served as principal of various academies, taking charge of an institution in Middlebury, Vermont, where she married Dr. John Willard in 1809. She opened a boarding-school for girls at Middlebury in 1814, and subsequently a seminary for girls at Waterford, New York, which was moved to Troy in 1821, where it was known as the Troy Female Seminary. She resigned the management of this institution to her son, John Hart Willard, and settled in Hartford, Connecticut, in 1838. She published her *Journal and Letters from France and Great Britain* (1833), and contributed the profits, amounting to about one thousand dollars, to the support of a school for women in Athens, Greece, which had been founded through her efforts. Among her many publications were *A History of the United States* (1828); *Universal History* (1835); *Last Leaves of American History* (1849); and a volume of *Poems*, containing *Rocked in the Cradle of the Deep* (1830). She died at Troy, New York, April 15, 1870.

WILLARD, FRANCES ELIZABETH, a leading American reformer; born in Churchville, near Rochester, New York, Sept. 28, 1839; was graduated at the Northwestern Female College, 1858, and was professor of natural science in that institution in 1862. In 1866-67 she was preceptress in the Wesleyan Seminary, Lima, New York; professor of æsthetics in Northwestern University and president of the Women's College in 1871; corresponding secretary of the National Woman's Christian Temperance Union (1874); president of the Woman's Christian Temperance Union of Illinois (1878); president of the National Woman's Christian Temperance Union (1879-97). She was one of the founders of the Prohibition party in 1884; was the editor of the *Chicago Post* in 1879, and later, of *The Union Signal*, the official organ of the National Woman's Christian Temperance Union. She wrote *Woman and Temperance* (1883); *Glimpses of Fifty Years* (1889); *Nineteen Beautiful Years* (1868, 1877, 1889); *How to Win* (1888); *Woman in the Pulpit* (1889); *A Great Mother* (1893); and other purity and reform works. She originated the World's Woman's Christian Temperance Union, organized in 1883, and was made its president at the first convention, Boston, 1891; conceived the idea of the Polyglot Petition, against the manufacture and importation of alcohol and opium, to the governments of the world, to which 7,000,000 signatures have been secured. This was presented to Queen Victoria and the President of the United States. In 1889 she was president of the Woman's Council in the United States. Received degree of A.M. from Syracuse University and LL.D. from Ohio Wesleyan University in 1893. She wrote the article WOMAN'S CHRISTIAN TEMPERANCE UNION, *post*, pp. 3182-83. Died in New York, Feb. 18, 1898.



FRANCES E. WILLARD.

WILCOX, ORLANDO BOLIVAR, an American soldier; born in Detroit, Michigan, April 16, 1823; graduated at the United States Military Academy in 1847. He served in the latter part of the Mexican War, and against the Seminoles in 1856-57; left the army to study law, and was admitted to the Michigan bar in 1858. Becoming colonel of the First Michigan Regiment, May 1, 1861, he was present at the capture of Alexandria, in command of a brigade at Bull Run, and was there taken prisoner. He was exchanged, Aug. 17, 1862, and commissioned brigadier-general of volunteers. He was prominent in the Maryland and Rappahannock campaigns; was in command of the Ninth Army Corps and the district of central Kentucky, April to June, 1863; during the draft-riots in Indiana and Michigan, was in command there; was engaged in East Tennessee, September, 1863, to March, 1864; was placed in command of a division of the Ninth Corps of the Army of the Potomac, in the Richmond campaign; received the surrender of Petersburg, his division being the first to break through. He was mustered out of the service in 1866, after commanding a number of different military districts, but re-entered the army as colonel of the Twentieth Infantry, and was transferred to the Twelfth Infantry in 1869. He was brevetted brigadier-general and major-general in 1867 for gallantry. He became brigadier-general in 1886, and retired from the service in 1887. From 1889 to 1892 he was governor of the Soldiers' Home in Washington. Under the pseudonym, "Major March," he published *Shoepack Recollections* (1856), and other books.

WILLEMITE. See ZINC, Vol. XXIV, p. 785.

WILLEMSTAD. See CURAÇOA, Vol. VI, p. 709.

WILLET (*Symphemia semipalmata*), a popular name for the North American stone curlew, one of the so-called tattlers, of the snipe family. It is a well-known game-bird, ranging as far north as the sixtieth parallel, and migrating southward in winter. The name is one of the notes of its peculiar cry, pill-will-willet.

WILLETT'S POINT, a United States military reservation, at the western end of Long Island Sound, opposite Fort Schuyler; 20 miles N.E. of the Battery, New York City. The reservation, which comprises 136 acres, was purchased by the government in 1857, with the intention of building thereon a fort to coöperate with Fort Schuyler in defending the eastern entrance to New York. The scheme, however, was never carried out, and the place is now the site of a hospital, and has engineer stores and supplies, a school of practice and a torpedo experiment station.

WILLIAM II (FRIEDRICH WILHELM VICTOR ALBRECHT), king of Prussia and third German emperor; born in Berlin, Jan. 27, 1859, the eldest son of Emperor Frederick William and the Princess Royal, Victoria of England, and succeeded to the throne June 15, 1888. Early in life he manifested a predilection for military affairs, at the gymnasium of Cassel, and submitted to the ordinary discipline of that establishment until 1877, when he entered the University of Bonn. He then married Princess Augusta Victoria,

daughter of Frederick, duke of Schleswig-Holstein, Feb. 27, 1881, and in 1895 had six sons and one daughter. Prior to the death of his father he evinced a feeling of repugnance to the peaceful policy inaugurated by the latter, and it was feared his accession menaced the peace of Europe; but upon succeeding to the throne he issued two addresses, one to the army and the other to the navy, which in their pacific tone were a surprise to the outside world, and were received with a degree of caution as to their sincerity. These were supplemented by an address to the Prussian people, dated June 18, setting forth the determination of its



WILLIAM II.

author to adopt and enforce a policy that would preserve the peaceful condition existing, protect imperial interests and promote the national welfare. The young emperor spent several months following, visiting various courts of Europe for the ostensible purpose of cementing friendly relations, and has paid like visits annually since, going to England in 1893 and winning the Queen's cup at the Cowes yacht-race. He early evinced great energy, love of display, and determination to impress his will upon his subjects—qualities which strengthened with time. The first important result of this was the resignation of Prince Bismarck as chancellor of the Empire, March 17, 1890, forced by the emperor's insistence on being ruler in fact as well as in name. Besides being a firm ruler, he possesses an alert mind, as we see in his inaugurating an international labor congress in 1890, and in 1892 interesting himself in primary education. He is a liberal patron of science; a good violinist; composed a very popular song, *Sang an Ægir*; and published a collection of sermons delivered to the men of his yacht. Some of the important events of his reign are the acquisition of Heligoland, Kiao-chau, and the Caroline and Ladrone islands (except Guam), legislation in favor of workingmen, and the renewal of the Triple Alliance.

WILLIAM, the name of three kings of Holland; of the third it may be said that he succeeded to the crown upon the death of his father (see HOLLAND, Vol. XII, p. 83). In 1866, at the dissolution of the German Union, he succeeded in annexing Limburg and in obtaining the neutrality of Luxemburg. He carried out reforms inaugurated by his father, emancipating the West Indian slaves in 1862. The drainage of the Haarlem Lake, the extensive construction of railways and the improvement of the waterway to Rotterdam, as well as the development of parliamentary institutions, are also reforms incident to his reign. He died at the Castle of Loo, Nov. 23, 1890.

WILLIAM AND MARY, COLLEGE OF, an educa-

tional institution located near Williamsburg, Virginia. It was organized in 1693, and therefore is the second oldest college in the United States, Harvard having been founded a few years before. A charter was obtained in 1693 from Queen Mary, and King William aided in the original endowment; contributions from England were received, and the Virginia House of Burgesses levied a special tax. The first building was designed by Sir Christopher Wren, but was burned in 1705, and a new building was not completed until 1719; in 1732 a chapel was added as a south wing to the building. In this chapel were buried the magnates of the colony, including Lord Botetourt, whose statue, erected in 1797, still stands on the campus. The president's house, erected in 1732, was occupied by Cornwallis as his headquarters during the siege of Yorktown. The college building was again burned in 1859, but was rebuilt in 1860, only to be destroyed in 1861 by the Union troops. After the war, generous donations were received from citizens of the Northern states and from England, new buildings were erected, and the work of instruction was resumed. For many years William and Mary College held a foremost rank, and its classes were attended by many men afterward prominent in the life of the state and the nation. In 1898 the productive funds amounted to \$125,900; the annual income to \$20,315; there were 171 students in attendance, with 11 instructors, and a library of 14,000 volumes.

WILLIAM OF CHAMPEAUX. See CHAMPEAUX, Vol. V, p. 386.

WILLIAMS, EDWARD (1745-1826). See CELTIC LITERATURE, Vol. V, pp. 314, 315.

WILLIAMS, EDWARD LEADER, an English engineer; born April 6, 1828. Beginning his career under his father on the River Severn navigation, he was appointed, in 1856, engineer on the Great Northern railway, then in course of construction. After holding several other important engineering offices, he was given, in September, 1882, the office of chief engineer on the construction of the Manchester Ship Canal, according to plans proposed by himself. In recognition of this magnificent achievement he was knighted in July, 1894.

WILLIAMS, GEORGE, the founder of the Young Men's Christian Association; born at Dulverton, Somersetshire, Oct. 11, 1821; went to London in 1841, as junior assistant with Hitchcock and Rogers. Struck with the neglected condition of young men, he soon gathered together a company of those employed in this establishment, with the result that Mr. Hitchcock became converted, and gave them the greatest encouragement. Widening their sphere, 12 of them met on June 6, 1844, and founded the Young Men's Christian Association, which was designated as "a society for improving the spiritual condition of young men engaged in the drapery and other trades." He was the first treasurer of the Young Men's Christian Association, and was always energetically devoted to its welfare and growth. He was knighted in 1894.

WILLIAMS, GEORGE HENRY, an American jurist; born at New Lebanon, New York, March 23, 1823; educated at an academy in Onondaga County, he

studied law, and began practicing in Iowa in 1844. He served as judge of the first judicial district of Iowa (1847-52); was a Presidential elector (1852); was chief justice of Oregon territory (1853-57); a member of the convention that framed the Oregon constitution (1857); United States Senator from Oregon (1865-71); a member of the commission that framed the Treaty of Washington between the United States and Great Britain relative to the Alabama claims (1871); Attorney-General under President Grant (1872-75); and practiced law in Washington, District of Columbia, after resigning from the Cabinet.

WILLIAMS, GEORGE HUNTINGTON, an American geologist; born in Utica, New York, Jan. 28, 1856; graduated at Amherst College (1878), and studied in Germany, receiving the degree of Doctor of Philosophy at Heidelberg in 1882. Returning to the United States, he became an instructor at Johns Hopkins University, and was given the chair of inorganic geology in that institution in 1892. He is the inventor of an electric machine for cutting and grinding thin sections of rocks, and also of a petrographic microscope. A member of many scientific societies and vice-president of the Geological Society of America, he served on the international jury of awards at the Chicago Exposition of 1893. Beside many papers on petrography and geology, he was the author of *Elements of Crystallography* (1890). He died in Utica, New York, July 12, 1894.

WILLIAMS, HENRY SHALER, an American geologist; born in Ithaca, New York, March 6, 1847; graduated at the Sheffield Scientific School (1868). He was an instructor at Yale and at the Kentucky University, and then professor of geology and paleontology at Cornell University in 1879, resigning that position in 1892 to succeed James D. Dana in the chair of geology at Yale. He was secretary of the International Congress of Geologists at Washington in 1891, and had charge of the section of geology and geography in the American Association for the Advancement of Science in 1892. He was the author of a number of valuable papers, including *The Classification of the Upper Devonian* (1885); *The Cuboides Zone and Its Fauna* (1890); and *Correlation Papers, Devonian and Carboniferous* (1891).

WILLIAMS, JOHN, an American theologian; born at Deerfield, Massachusetts, Aug. 30, 1817; entered Harvard, and graduated at Trinity College in 1835, where he was subsequently, in turn, tutor, professor, trustee and chancellor. He studied divinity, was ordained a deacon in the Episcopal Church in 1838, and became a priest three years later. He was rector of St. George's, Schenectady, New York (1842-48); president of Trinity College (1848-53); and founder of the Berkeley Divinity School in 1854, acting as dean and occupying the chair of doctrinal theology in that institution. In 1851 he was assistant bishop for the diocese of Connecticut, and bishop in 1865. He became presiding bishop in the Protestant Episcopal Church at the death of Bishop Lee in 1887. He was the author of a number of books, including *A Translation of*

Ancient Hymns (1845); *Studies on the English Reformation* (1881); and *Studies on the Book of Acts* (1890). Died at Middletown, Conn., Feb. 7, 1899.

WILLIAMS, JONATHAN, an American soldier; born in Boston, Massachusetts, May 26, 1750; received a good education, and entered a Boston commercial house. He acted as private secretary to his uncle, Benjamin Franklin, during the latter's ambassadorship to France, and while there studied military science, making a specialty of fortification. He was for a time judge of the court of common pleas in Philadelphia; was appointed major of the Second Regiment of artillerists and engineers, February, 1801; was made inspector of fortifications in December of the same year, and was given command of the post at West Point, where he was also an instructor and first superintendent of the present Military Academy (1802-3). He planned and superintended the construction of most of the New York harbor forts, including Forts Columbus and Clinton (Castle Garden), and Castle Williams (Governor's Island), the latter being the first "casemated" battery in the United States, being planned after Montalembert, a fortification that Williams had studied while in France. In 1812 he resigned from the army, returned to Philadelphia, and was corresponding secretary of the American Philosophical Society. Besides a number of translations and many contributions to the *Transactions* of the American Philosophical Society, he published *The Use of the Thermometer in Navigation* (1799). He was elected to Congress in 1814, but did not live to take his seat, dying in Philadelphia, May 16, 1815.

WILLIAMS, ROLAND, an English divine; born at Halkyn, in Flintshire, Aug. 16, 1817; educated at Eton and King's College, Cambridge, becoming, in turn, fellow and tutor in the latter. In 1850 he was appointed vice-principal and professor of Hebrew at Lampeter College, and vicar of Broadchalke in 1859. He was early identified with the "Broad Church" movement under Frederick Dennison Maurice (q.v., Vol. XV, pp. 638, 639), and was condemned by the Court of Arches, December, 1862, for having contributed *Bunsen's Biblical Researches to Essays and Reviews*. He obtained from the Privy Council a reversal of this judgment in 1864, though he had resigned his professorship and retired to Broadchalke in 1862. He wrote a number of books, including *Rational Godliness* (1855); *Christianity and Hinduism* (1856); and *Psalms and Litanies* (1872). He died at Broadchalke, Jan. 18, 1870.

WILLIAMS, SAMUEL WELLS, an American sinologist; born at Utica, New York, Sept. 22, 1812; graduated at the Rensselaer Polytechnic Institute in 1832, and went to China in the following year as a printer in the service of the American Board of Foreign Missions. He was for several years assistant editor on the *Chinese Repository*; completed the printing of *Medhurst's Dictionary*; and translated the books of *Genesis* and *Matthew* into Japanese. He was interpreter to Commodore Perry on his expedition to Japan in 1853-54; became secretary and interpreter to the first United States legation to China (1862); and assisted in many other diplomatic services in China and Japan. Among the valuable

works that he published are *Easy Lessons in Chinese* (1842); *The Chinese Commercial Guide* (5th ed., 1863); *The Middle Kingdom* (1848, 1883); and a *Tonic Dictionary of the Chinese Language in the Canton Dialect* (1856). He resigned his commission in 1875 and returned to the United States, where he accepted a lectureship on the Chinese language and literature in Yale University. He was for some time president of the American Oriental Society, and in 1881 was elected president of the American Bible Society. He died in New Haven, Connecticut, Feb. 16, 1884.

WILLIAMS, SIR WILLIAM FENWICK (1800-83), a British general. See KARS, Vol. XIV, p. 6.

WILLIAMSBURG, a town and the capital of Whitley County, southeastern Kentucky, on the Cumberland River and on the Louisville and Nashville railroad, 100 miles S.S.E. of Lexington and 17 miles S. of Corbin. It is in a coal and lumber producing region, and has saw and planing mills. Population 1890, 1,376; 1900, 1,495.

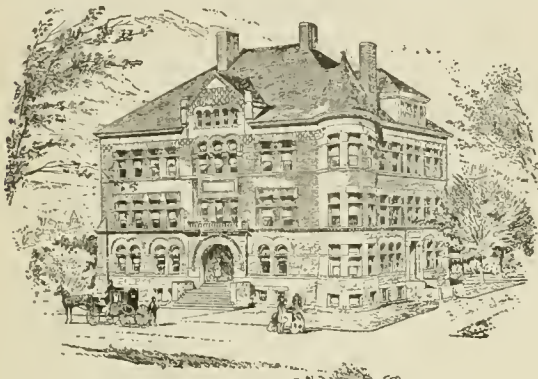
WILLIAMSBURG, a town of Hampshire County, western Massachusetts, 8 miles N.W. of Northampton, on the Mill River, and on the New York, New Haven and Hartford railroads. The town contains the villages of Williamsburg, Searsville and Haydenville, in the last of which there occurred, in 1874, a fatal disaster, caused by the bursting of a dam on Mill River. Agriculture and the manufacture of hardware and brass goods are the principal industries. Population 1890, 2,057; 1900, 1,926.

WILLIAMSBURG, a city and the capital of James City County, southeastern Virginia, lies near the James River, 48 miles by rail E.S.E. of Richmond, on the Chesapeake and Ohio railroad. Here are William and Mary College (q.v., in these Supplements) and the Eastern State Lunatic Asylum, opened in 1773, and said to be the oldest institution of its kind in the United States. Founded in 1632, Williamsburg was the colonial and state capital till 1779, and is the oldest incorporated city in the state. Population 1890, 1,831; 1900, 2,044.

WILLIAMSBURG, BATTLE OF, an engagement of the peninsular campaign, fought on May 6, 1862, at Williamsburg, Virginia, between the Union and Confederate forces. The fight, which lasted nine hours, was between the rear columns of Magruder's troops retreating from Yorktown, and Hooker's division of McClellan's army. The conflict was brought on by Hooker's having been sent in pursuit of the retreating Confederates, whom he overtook at Williamsburg. The Union advance was at first successful, but Longstreet, who had passed the town, returned to help Magruder, and before such odds, Hooker, after a desperate struggle, was compelled to retreat. The Union losses amounted to 2,283 men, killed, wounded and missing, while the corresponding losses on the Confederate side were 1,560.

WILLIAMS COLLEGE, an institution of learning in Williamstown, Massachusetts, founded by a bequest of Colonel Ephraim Williams (q.v., in these Supplements), and incorporated in 1793. A non-sectarian institution, it is especially noted for the

large proportion of ministers and missionaries among its graduates, more especially in Congregational and Presbyterian fields. In its early life it was the beneficiary of a number of state grants, and later, profited by gifts of alumni and philanthropists, having, in 1898, productive funds amounting to \$1,048,317, besides buildings and other property valued at nearly a million more. In 1806 the first foreign missionary society in the United States was formed by the students, Mills, Richards, Robbins, Loomis and Green, while taking refuge under a haystack during a thunder-storm. At Williams, in 1836, Professor Hopkins erected the



MARK HOPKINS MEMORIAL.

first astronomical and magnetic observatory, and also organized the first college scientific expedition, a scheme now very generally adopted. The college has a library of 40,750 volumes, excellently equipped physical, chemical, and biological laboratories, completed in 1894 at a cost of \$180,000; comfortable and commodious dormitories, including Morgan Hall, built in 1882 and costing \$82,400; sufficient rooms for lectures and recitations, especially in the Hopkins Memorial Hall (1890), \$87,800. Athletics are encouraged by the Laselle Gymnasium (perfectly equipped) and Weston Field. Williams was the first New England college to adopt (1894) the honor system in examinations, a system carried on there successfully since. In 1898 there were 30 instructors and 388 students, and the total income was \$95,400.

WILLIAMS FAMILY OF NEW ENGLAND.

JOHN, a clergyman; born at Roxbury, Massachusetts, Dec. 10, 1664; graduated at Harvard, 1683. He was ordained a minister in 1688, and settled at Deerfield, where he was living at the time of the noted Deerfield massacre, Feb. 28, 1704, when two of his children were killed and he himself, with the rest of his family, taken captive and forced to march to Canada. Released in 1706, he returned to his charge in Deerfield and remained there, publishing a number of sermons and a narrative of his captivity, *The Redeemed Captive* (1707). He died in Deerfield, Massachusetts, June 12, 1729.—His first cousin, William's son, ELISHA, a clergyman; born at Hatfield, Massachusetts, Aug. 24, 1694; graduated at Harvard in 1711; studied law and settled at Wethersfield, Connecticut; was for several years a member of the state general assembly and clerk of that body.

Ordained to the ministry in 1721, he preached at Wethersfield till 1726, when he became president of Yale College, serving in that capacity till 1839. He again represented Wethersfield in the legislature; was chosen a justice of the superior court; went to Cape Breton as chaplain of the Connecticut troops in 1745, and in 1746 was appointed colonel of the regiment of one thousand men, raised in Connecticut, for the expedition planned against Canada. He died at Wethersfield, July 24, 1755.—His great-grand-nephew, WILLIAM, a legislator; born at Lebanon, Connecticut, April 18, 1731; graduated at Harvard in 1747; studied theology with his father for a year, and went with his relative, Col. Ephraim Williams, on his Lake George expedition of 1757. Beginning in 1756, he was town clerk of Lebanon for 45 years, a member of the assembly for over fifty years, and for many years speaker. He was colonel of the Twelfth Regiment of militia from 1773 to 1776, in the latter year accepting a seat in Congress, where he was a signer of the Declaration of Independence. He was for forty years judge of the Windham County court and judge of probate for Windham district. In 1787 he was a member of the Connecticut convention held to ratify the Constitution of the United States. He died at Lebanon, Aug. 2, 1811.—John's great-great-grandson, ELEAZER, a missionary; born at Caughnawaga, New York, about 1787; educated at Longmeadow, Massachusetts, and by the Rev. Enoch Hale, at Westhampton, Massachusetts; served in the War of 1812, and became a Protestant Episcopal missionary to the Oneida Indians, removing with them to Green Bay, Wisconsin, in 1820. A claim was at one time made that he was the son of Louis XVI, and a story circulated, narrating a rescue from prison, a lapse of memory, and other romantic details. He was an authority on Indian manners, customs and history, and was the author of *A Spelling-Book in the Language of the Seven Iroquois Nations* (1813); and translated into Iroquois *The Book of Common Prayer* (1853). He died at Hoganstown, New York, Aug. 28, 1858.—Another member of the family, EPHRAIM, a soldier, born at Newton, Massachusetts, Feb. 24, 1715; early in life a sailor, he joined the army to serve in Canada against the French, in 1740. On the renewal of the French war in 1755, he led a regiment of Massachusetts troops to join Sir William Johnson, then on his way to invade Canada, and made his will while on the march, leaving all his property to found a "Free School" at Williams's Town (see WILLIAMS COLLEGE, in these Supplements), where land had been granted him by the Massachusetts government in 1750. He was killed in an ambuscade of French and Indians near the head of Lake George, Sept. 8, 1755. See WILLIAMS COLLEGE, in these Supplements.

WILLIAMSON, a town of Wayne County, northwestern New York, 15 miles E.N.E. of Rochester and 6 miles W. of Sodus. It includes the villages of Williamson, East Williamson and Poultneyville; is a shipping-place for an agricultural district; has a mineral spring, and contains a grain elevator, flour-mills and box factory. Population 1900. 2,670.

WILLIAMSON, BENJAMIN, an Irish mathematician; born in Cork, in 1827; educated at Kilkenny College, and at Trinity College, Dublin, graduating at the latter in 1848, and being elected fellow in 1852, appointed a college tutor in 1858, and professor of natural philosophy in 1884, in that institution. He was elected a fellow of the Royal Society in 1879, and received the honorary degree, D.C.L., from the University of Oxford in 1892. Besides publishing *A Treatise on the Differential Calculus* (8th ed., 1892); *A Treatise on the Integral Calculus* (6th ed., 1891); and an *Introduction to the Mathematical Theory of the Stress and Strain of Elastic Solids* (1894), he also contributed to this ENCYCLOPEDIA the articles on INFINITESIMAL CALCULUS, MACLAURIN, VARIABLE, and VARIATIONS.

WILLIAMSON, HUGH, an American statesman; born at West Nottingham, Pennsylvania, Dec. 5, 1735; graduated at the College of Philadelphia in 1757; studied theology, and was licensed to preach in 1759. He preached a short time; was professor of mathematics in the College of Philadelphia (1760-63); studied medicine in Edinburgh and Utrecht, and practiced in Philadelphia. In 1772 and 1773 he was instrumental in maintaining the academy at Newark, Delaware. He served in the militia of North Carolina (1780-82), having commenced the practice of medicine in that state late in the '70's. He was a member of the North Carolina house of commons in 1782; a member of the Continental Congress (1784-86); a delegate to the Constitutional Convention of 1787, and of the North Carolina Ratification Convention in 1789. He was elected to the first and second congresses, serving till 1793, when he removed to New York and devoted himself to literary pursuits. Besides a series of essays on *Paper Currency* (1786), he published a *Discourse on the Benefits of Civil History* (1810); *Observations on the Climate of America* (1811); *History of North Carolina* (1812). He died in New York City, May 22, 1819.

WILLIAMSON, ISAIAH VANSANT, an American philanthropist; born at Fallington, Bucks County, Pennsylvania, Feb. 3, 1803. He opened a small dry-goods store in Philadelphia in 1824; later, became a partner in a wholesale house, and in 1830 was worth \$200,000. He then began speculating in stocks and bonds, and in 1888 placed in the hands of a board of trustees, property and securities valued at \$2,500,000, for the founding of a free school of mechanical trades at Media, Delaware County, Pennsylvania. This industrial school is located on a farm of about 350 acres, and gives instruction to an average attendance of about 200 in drawing and all the mechanical trades. Mr. Williamson's will gave over \$9,000,000 to relatives and \$5,000,000 to Protestant charitable institutions in Philadelphia, to which he had long been a large benefactor. He died in Philadelphia, March 7, 1889.

WILLIAMSON, WILLIAM CRAWFORD, an English biologist; born at Scarborough, Yorkshire, Nov. 24, 1816; studied medicine under a physi-

cian in his native town, in the Manchester Medical School, and in University College, London, beginning to practice in Manchester in 1841. In the meantime, he had made extensive researches in geological and biological fields, his observations being published by the Zoölogical Society and the Geological Society of London and in the *Philosophical Magazine*. In recognition of his many invaluable biological researches, being the first to announce the existence of the Foraminiferous Ooze, he was elected a fellow of the Royal Society. Upon the founding of the Owens College at Manchester, in 1851, he became its first professor of biology and geology, but ultimately gave up all the work of this professorship save the department of botany. He made a study of carboniferous plants, resulting in the publication of 19 memoirs *On the Organization of the Fossil Plants of the Coal-Measures*. He studied diseases of the ear in Paris, in 1855, and founded the Manchester Institution for Diseases of the Ear. In 1884-85, he was president, and later, vice-president of the Literary and Philosophical Society of Manchester. He received the degree of doctor of laws from the University of Edinburgh; was elected an honorary member of the Göttingen Academy of Sciences, of the Royal Society of Sweden, of the Physical and Natural History Society of Geneva, and of the Royal Microscopic Society of London. Upon his retirement from academic labors, in 1892, he was elected emeritus professor of botany in Owens College. He contributed the article on AGASSIZ to this ENCYCLOPEDIA.

WILLIAMSPORT, a city and the capital of Warren County, western Indiana, 25 miles N.E. of Danville, Illinois, and 24 miles S.W. of Lafayette, on the Wabash River, and on the Wabash railroad. It is the center of a farming, stock-raising and stone-quarrying region; has mineral springs and large coal-mines near at hand, and contains electric-light plant, warehouses, and a grist-mill. Population 1890, 1,027; 1900, 1,245.

WILLIAMSPORT, a town of Washington County, northwestern Maryland, on the Potomac River and the Chesapeake and Ohio canal, and on the Cumberland Valley and the West Maryland railroads, 7 miles S.W. of Hagerstown. It is in a timber section, and is a trade-center. It has good water-power, flour-mills, sash-and-door factories; has a national bank and two weekly newspapers. Population 1890, 1,277; 1900, 1,472.

WILLIAMSPORT, a city and the capital of Lycoming County, northern Pennsylvania, on the west bank of the Susquehanna River (here crossed by a suspension bridge), the Beech Creek, the Williamsport and North Branch, the Fall Brook, the North Central, the Pennsylvania and the Philadelphia and Reading railroads, 93 miles N. of Harrisburg. It lies in the midst of attractive scenery, and is a popular summer-resort, but is chiefly notable as one of the great lumber-marts of the Union. The boom here cost one million dollars, and can hold three hundred million feet of lumber. The surrounding valley is rich in coal.

The city has numerous saw-mills, sash, door and blind factories, rubber, sewing-machine and boiler works. Williamsport also has five electric rail-ways, three parks, two race-tracks, eight banks, and four daily and eight weekly newspapers and monthly publications. Population 1880, 18,934; 1890, 27,132; 1900, 28,757.

WILLIAMSTON, a village of Ingham County, southern Michigan, on the Detroit, Lansing and Northern railroad, 14 miles E. of Lansing. It is in a farming and coal-mining region; has four churches, a state bank, and one weekly newspaper. Population 1890, 1,139; 1900, 1,113.

WILLIAMSTOWN, a town of Berkshire County, western Massachusetts, on the Hoosac River, and on the Fitchburg railroad, 20 miles N. of Pittsfield and 40 miles E. of Troy. It has bleacheries, and manufactures woolen goods, boots and shoes, carriages and hardware. It is the seat of Williams College (q.v., in these Supplements). Population 1890, 4,221; 1900, 5,013.

WILLIAMSTOWN, a borough of Dauphin County, central Pennsylvania, on the Northern Central and the Williams Valley railroads, 24 miles W. by S.W. of Pottsville. It is in a coal mining and shipping region; has hosiery-mills and coach-works, nine churches, and one weekly newspaper. Population 1900, 2,934.

WILLIMANTIC, a city of Windham county, northeastern Connecticut, at the junction of the Willimantic and Natchaug branches of the Shetucket, and on the Central Vermont, the New York and New England, and the New York, New Haven and Hartford railroads, 31 miles by rail E. by S. of Hartford. It has linen-thread, print-cloth, paper-box, cotton, silk, woolen, tin and carriage factories, etc., dependent on the power supplied by the Willimantic river, which here falls one hundred feet in one mile. There are a state normal school, public libraries, four banks and a daily and two weekly newspapers. Population 1880, 6,608; 1890, 8,648; 1900, 8,937.

WILLISTON, SAMUEL, an American philanthropist; born at Easthampton, Massachusetts, June 17, 1795; entered Phillips Academy, Andover, but left on account of sickness and commenced the manufacture of buttons. In 1840 he founded Williston Seminary, a preparatory school, at Easthampton, giving to it \$270,000 during his life and \$500,000 at his death. He also gave large amounts to Amherst and Mount Holyoke; built three times a church in Easthampton which was twice destroyed by fire, and did much to beautify his native place. The full amount of his benefactions was more than one million five hundred thousand dollars. He died at Easthampton, July 18, 1874.

WILLMAR, a village and the capital of Kandiyohi County, central North Dakota, on the Great Northern railroad, 32 miles N.E. of Granite Falls. It is in an agricultural region; has machine-shops and three weekly newspapers. Population 1880, 1,002; 1890, 1,825.

WILL-O'-THE-WISP. See PHOSPHORESCENCE, Vol. XVIII, p. 813, and FATA MORGANA, in these Supplements.

WILLOUGHBY, a village of Lake County, northeastern Ohio, on Chagrin River and the Lake Shore and Michigan Southern railroad, 2 miles S. of Lake Erie and 19 N.E. of Cleveland. It ships cheese, milk and fruit, and manufactures carriages and farming-implements. It has two weekly newspapers. Population 1880, 1,001; 1890, 1,219; 1900, 1,753.

WILLOUGHBY, SIR HUGH. See GEOGRAPHY, Vol. X, p. 183.

WILLOWS, a town and the capital of Glenn County, northwestern California, on the Southern Pacific Company's railroad, 150 miles N. of San Francisco. It is in an agricultural and fruit-growing region, has a foundry, bottling-works, wagon manufactures, and one evening and two weekly newspapers. Population 1890, 1,176; 1900, 893.

WILLOW-GALLS. See GALLS, Vol. X, p. 45.

WILLOW-GROUSE. See GROUSE, Vol. XI, p. 222.

WILLOW SPRINGS, a city of Howell County, southern Missouri, on the Kansas City, Fort Scott and Memphis railroad, 21 miles N. of West Plains. It is in a farming and fruit-growing region, and has a state bank and two weekly newspapers. Pop. 1890, 1,539; 1900, 1,078.

WILLOW WEED. See POCHARD, Vol. XIX, p. 252, note.

WILLS, IN THE UNITED STATES. See WILL, Vol. XXIV, p. 574.

WILLS, WILLIAM GORMAN, British dramatist, novelist, and painter; born in Kilkenny Co., Ireland, in 1828; graduated at Trinity College, Dublin, and studied art in that city. He produced, in 1866, his very successful *Man-o'-Airlie*, brought out in England by Herman Vezin and in America by Lawrence Barrett. His next success, *Charles I* (1872), was the play in which Irving won his first renown as a tragedian. His *Olivia* (1878) also added greatly to Irving's reputation, as well as his own. Besides a number of other moderately successful plays, including *Eugene Aram* (1873), *Jane Shore* (1876), and *A Royal Divorce*, he wrote several novels, the most popular being *Notice to Quit* and *Wife's Evidence*. Died in London, Dec. 14, 1891.

WILLS POINT, a town of Van Zandt County, northeastern Texas, on the Texas and Pacific railroad, 48 miles E. of Dallas. Ships cotton, cattle and hides; has cotton-gins and flouring-mills, two banks and a weekly newspaper. Population 1900, 1,347.

WILMERDING, a town of Allegheny County, southeastern Pennsylvania, near the Wilmerding (Monongahela) River, and on the Pennsylvania railroad, eight miles E. of Pittsburg. It is an industrial town, laid out by the Westinghouse Air-brake Company for works and residences for its men. Water is obtained from the river; each street is sewered, natural gas supplies fuel, and it has the Westinghouse incandescent electric light. In 1890, a year after the founding of the town, the population was 419; it is today (1900), 4,179.

WILMINGTON, a city of Delaware. The city has 83 churches, 26 public and many parochial

and private schools, banks, twenty loan and trust associations, gas and electric light and electric-railways. Among its buildings are the United States government and custom-house buildings; library building, auditorium, etc. The old Swedes' Church, erected in 1698, is still used by the Trinity Episcopal Society; the Delaware Historical Association Hall is over a century old. There are numerous iron-works, carriage, morocco and cotton factories; flour, tobacco, paper and powder mills; dental and surgical-instrument factories; also manufactures chemicals, fertilizers, boots and shoes, railroad-cars and car-wheels, iron ships, etc. It has five daily, six weekly, one semi-monthly and two monthly newspapers. Population 1890, 61,431; 1900, 76,508. See also WILMINGTON, Vol. XXIV, p. 589.

WILMINGTON, a city of Will County, north-eastern Illinois, on the Kankakee River, and on the Chicago and Alton railroad, 53 miles S. by W. of Chicago. It is in a farming and coal-mining region; has several churches, high-school, two banks, two weekly newspapers, and does some manufacturing. Population 1890, 1,576; 1900, 1,420.

WILMINGTON, a city of North Carolina. The city has a number of handsome buildings, among them the city hall, courthouse, United States government Building and marine hospital, the local light infantry armory and Christian Association and Union buildings; there is a chamber of commerce, electric street-railways, electric light, water-works, 39 churches, 5 cemeteries, library, many charities, 4 banks, 3 daily, 3 weekly and 1 monthly newspapers. The chief commerce is in cotton goods, guano, naval stores and machinery. Population 1900, 20,976. See also WILMINGTON, Vol. XXIV, p. 589.

WILMINGTON, a town and the capital of Clinton County, southwestern Ohio, on the Baltimore and Ohio and the Cincinnati and Muskingum Valley railroads, 56 miles N. E. of Cincinnati, and 60 miles S. W. of Columbus. It has planing and woolen mills, iron-bridge works, and pork-packing establishments. It has three banks and three weekly newspapers. It is the seat of Wilmington College, established 1870 as a Friends' institution, which has 10 professors, 130 students, and an income of \$5,000. Population 1880, 2,745; 1890, 3,079; 1900, 3,613.

WILMINGTON, a town of Windham County, southeastern Vermont, on the Deerfield River, and on the Hoosac Tunnel and Wilmington railroad, 20 miles W. of Brattleboro. It is in an agricultural and grazing region; has creameries, maple-sugar works, lumber-mills and one weekly and two monthly newspapers. Population 1880, 1,130; 1890, 1,106; 1900, 1,221.

WILMOT, DAVID, an American jurist; born in Pethany, Pennsylvania, Jan. 20, 1814; educated in academies at his native place and at Aurora, New York; studied law, and was admitted to the Pennsylvania bar in 1834, when he began practicing in Towanda. He was a member of Congress from Pennsylvania from 1845 to 1851, in 1846 proposing his famous proviso (q. v., below);

presiding judge of the 13th district of Pennsylvania (1853-61); United States Senator, March, 1861, to March, 1863; and was appointed judge of the United States court of claims in 1863. He died at Towanda, Pennsylvania, March 16, 1868.

WILMOT PROVISIO. See UNITED STATES, Vol. XXIII, p. 767.

WILNO. See VILNA, Vol. XXIV, p. 233.

WILSON, a town and the capital of Wilson County, eastern North Carolina, on the Wilmington and Weldon railroad, 108 miles N. of Wilmington. It is in a farming, tobacco and cotton growing region; manufactures cotton, plows, carriages and harness; has a machine-shop, planing-mills and sash, door and blind factories; water-works, electric light, an academy, a seminary for girls, two banks, two weekly and a semi-monthly newspaper. Population 1880, 1,475; 1890, 2,126; 1900, 3,525.

WILSON, ALLEN B. (1827-88). See SEWING MACHINES, Vol. XXI, p. 719.

WILSON, AUGUSTA JANE (EVANS), American authoress; born near Columbus, Georgia, May 8, 1835. For two years during the Mexican War she lived with her parents in the frontier town of San Antonio, Texas, but in 1849 the family settled in Mobile, Alabama. Miss Evans was a zealous sympathizer with the South during the Civil War, and labored to advance the cause of the Confederacy. She was married in 1868 to L. M. Wilson, of Mobile, who died in 1891. She was the author of the very popular novels, *Inez* (1856); *Beulah* (1859); *Macaria* (1863); *St. Elmo* (1866); *Vashti* (1867); *Infelice* (1876); and *At the Mercy of Tiberius* (1887).

WILSON, SIR CHARLES RIVERS, an English financier; born in London, Feb. 19, 1831; educated at Eton and at Balliol College, Oxford. He was appointed clerk in the treasury in 1856; was private secretary, in turn, to James Wilson and G. A. Hamilton, Secretaries of the Treasury, and to the Chancellors of the Exchequer, Disraeli (1867-68), and Lowe (1868-73); was appointed Comptroller-General of the National Debt-Office in 1873. In 1876 he was appointed a British government administrator of the Suez Canal Company; in 1877 a commissioner for the Paris Exposition of the following year; in 1878 vice-president of an international commission to inquire into and propose remedies for the financial disorders in Egypt; and also in that year Finance Minister in the cabinet of the Khedive. He resumed his connection with the National Debt-Office in 1879; was appointed, by a new Khedive, president of the International Commission of Liquidation in 1880; and was a royal commissioner for the negotiation of a treaty of commerce with France in 1881. He was a delegate to the Brussels Monetary Conference of 1892, and also became president of the Grand Trunk railway of Canada in that year.

WILSON, SIR DANIEL, a Scottish archæologist and Canadian educator; born in Edinburgh, Jan. 5, 1816, and educated at the university of that city. In early life he was the secretary, as well as a fellow, of the Society of Antiquaries of

Scotland, and by his researches in archæology he earned distinction. In 1843 he settled in Toronto, Canada, where he became professor of history and English literature, in the university, and lecturer on ethnology. In 1880 he was appointed president of the university, and did much for the advancement of Canadian culture, taking a prominent part in the scientific and literary work of the Canadian dominion. His earliest writings include *Memorials of Edinburgh in the Olden Time* (1847), a work of much antiquarian interest; *The Archaeology and Prehistoric Annals of Scotland* (1851); an elaborate classification of Scottish antiquities illustrated by the author, and said by Hallam, the historian, to be "the most scientific treatment of the archæological evidences of primitive history which had ever been written." In 1862 appeared his *Prehistoric Man: or, Researches into the Origin of Civilization in the Old and the New Worlds*; containing the results of his investigations into the ethnology and antiquities of America, with a discussion on the unity and antiquity of the human race. He was also president of the literature section of the Royal Society of Canada, and in 1888 received the honor of knighthood. He died at Toronto, Aug. 7, 1892.

WILSON, JAMES, American agriculturist and statesman, born in Ayrshire, Scotland, in 1835, and settled in Iowa in 1855. He was elected to the State Legislature in 1867 and served for three consecutive terms, during the last of which he was speaker of the House. Later he was for six years a member of Congress and served on the Agricultural Committee. For four years he served on the Iowa State Railroad Commission, and took charge of the Government's Agricultural Experiment station in connection with the State Agricultural College at Ames, Iowa, at the same time acting as Professor of Agriculture. He has contributed much to the agricultural press of the West and greatly furthered the efforts of the Department of Agriculture in the interests of the farmer. Mr. Wilson was appointed Secretary of Agriculture in 1897.

WILSON, JAMES. See ORNITHOLOGY, Vol. XVIII, p. 13.

WILSON, JAMES F, an American public man; born at Newark, Ohio, Oct. 19, 1828, supported himself for eight years by working as a harness-maker while acquiring an education and studying law, and was admitted to the bar in 1851. He went to Iowa in 1853; was elected a member of the constitutional convention in 1856; was a member of the state legislature in 1857, 1859 and 1861, as a Republican, serving the last year as president of the Senate; was a representative in Congress from Iowa from 1861 to 1869, serving six years as chairman of the Judiciary Committee. He was one of the managers of the impeachment trial of President Johnson in 1868, and was appointed a commissioner for the Pacific railroad in 1869. He sat two terms in the United States Senate (1883-95); declined a re-election in 1895. Died in Fairfield, Iowa, April 22, 1895.

WILSON, JAMES GRANT, an American author;

born in Edinburgh, Scotland, April 28, 1832; educated in Poughkeepsie, New York, where he entered the book business with his father, later moving to Chicago, and there publishing the first literary paper in the Northwest. He was commissioned major of the Fifteenth Illinois Cavalry; served under Banks and Grant; became colonel of the Fourth Regiment Colored Cavalry; and was brevetted brigadier-general in 1865. After the war he settled in New York, and engaged in literary pursuits. Besides being a member of many historical and other societies, he was chosen, in 1884, president of the New York Genealogical and Biographical Society, and was also one of the founders and for three years president of the American Authors' Guild. Besides editing a number of valuable books of history and biography, including *Appleton's Cyclopædia of American Biography* (1886-89), he also published *Andrew Kirkpatrick and His Wife, Jane Bayard* (1870); *Sketches of Illustrious Soldiers* (1874); *Poets and Poetry of Scotland* (1876); *Bryant and His Friends* (1886); *Commodore Isaac Hull and the Frigate "Constitution"* (1889); a *Memorial History of the City of New York* (1892-93); and *The World's Largest Libraries* (1894).

WILSON, JAMES HARRISON, an American soldier; born near Shawneetown, Illinois, Sept. 2, 1837; educated at the common schools, McKendree College and at the United States Military Academy, where he graduated in 1860, and was assigned to the corps of topographical engineers. He became in order second and first lieutenant in 1861; aide-de-camp to General McClellan and lieutenant-colonel of volunteers in 1862; captain of engineers and brigadier-general of volunteers in 1863. After a short service in charge of the Cavalry Bureau, at Washington, he was placed in command of a division of cavalry under Sheridan, where he served from May to October, 1864, when he was given command of the cavalry corps of the Mississippi Division, made several important captures, and was promoted major-general of volunteers. He successfully assaulted five fortified cities in 28 days, taking in them 6,820 prisoners, including Jefferson Davis, 288 guns and 23 stand of colors. He was mustered out of the volunteer service in 1866; was for a short time employed as an engineer in the improvement of the Mississippi; re-entered the army as lieutenant-colonel of the Thirty-fifth Infantry, brevetted major-general; honorably discharged, Dec. 31, 1870. He was extensively connected with railroading, being vice-president of the St. Louis and Southwestern railroad (1870-76) vice-president (1878-80), and president (1880-83) of the New York and New England; and also engaged in engineering on the Illinois River and elsewhere (1871-76). Besides a number of scientific papers and magazine articles, he was the author of a *Life of Andrew J. Alexander* (1887); and of *China: Travels and Investigations in the Middle Kingdom* (1887, 1894).

WILSON, JOHN, an English clergyman; born in Windsor, England, in 1588; educated at Eton

and at King's College, Cambridge; studied law for three years in one of the Inns of Court; took orders in the Church of England, and, having puritanical tendencies and being interested in the colonization of Massachusetts, he emigrated with Winthrop's colony in 1630, landing at Salem and shortly afterward moving to Charlestown; there founded what was later the First Church of Boston. He visited England in 1631 and in 1634, returning in 1635 with his wife and Hugh Peters (q.v., Vol. XVIII, p. 702) in time to ally himself with Governor Winthrop against Wheelwright and Mrs. Hutchinson in the Antinomian controversy. He was chosen chaplain to the forces sent against the Pequots in Connecticut in 1636, later receiving a grant of 1,000 acres of land in Quincy, Massachusetts, for this service; assisted John Eliot (q.v., Vol. VIII, p. 136) in his missionary labors among the Indians, and was especially distinguished for his benevolence and zeal in all good works. Besides a number of occasional productions, he published a theological treatise, *Some Helps to Faith* (1625); and a poem, *Famous Deliverances of the English Nation* (1626), in England; and in America a Latin poem to the memory of John Howard, and a tract, *The Day Breaking, if Not the Sun Rising, of the Gospel with the Indians in New England* (1647, 1665); and a new edition of the poem, *Famous Deliverances*. He outlived his colleagues in the ministry, John Cotton (q.v., in these Supplements) and John Norton, and died in Boston, Aug. 7, 1667.

WILSON, JOHN LEIGHTON, an American missionary; born in Salem, South Carolina, March 25, 1809; graduated at Union College, 1829, and at the Columbia (South Carolina) Theological Seminary, 1833; studied Arabic at Andover; in 1834 went as a missionary of the American Board to Cape Palmas, West Africa, and later, to a point on the Gaboon River, where he organized a mission. While at this latter place, in the pursuit of his studies in natural history, he discovered and named the gorilla, in 1846. At both stations he reduced the local language to writing, translating into it portions of the Bible. On account of ill-health he was compelled to return to the United States in 1852, where he was secretary of the Presbyterian Board of Foreign Missions from 1853 to 1861. At the beginning of the Civil War he entered the service of the Southern Presbyterian Church, and was secretary of Home Missions until 1872 and of Foreign Missions until his death. Besides a number of pamphlets and magazine articles he published *Western Africa: Its History, Condition and Prospects* (1857). He died in Salem, South Carolina, July 13, 1886.

WILSON, THEODORE DELAVAN, an American naval constructor; born in Brooklyn, New York, May 11, 1840; served an apprenticeship in the Brooklyn navy yards; was with the Thirteenth New York Militia for three months in the Civil War; became a navy ship-carpenter in 1861; was in the Hampton Roads battle with the *Virginia*; in 1863 was appointed inspector of vessels being built and repaired in private establishments in

and near New York, and was appointed an assistant naval constructor in 1866, in that capacity serving in the United States yards at Pensacola, Philadelphia and Washington. He was instructor in naval architecture and ship-building at the Annapolis Naval Academy; was appointed naval constructor, July 1, 1873, and chief constructor of the navy in 1882, from which post he resigned in 1893. A member of the naval advisory board which proposed the construction of several vessels for the navy in 1881, he made a reputation by his designs for the White Squadron, and other craft. He was the first American elected a member of the Institute of Naval Architects of England, and the first Vice-President of the United States Society of Naval Architects. He wrote *Shipbuilding, Theoretical and Practical* (1873). Died at Charlestown, Boston, Mass., June 29, 1896.

WILSON, THOMAS, an English divine; born at Burton, in Cheshire, Sept. 20, 1663; educated at Trinity College, Dublin, and was curate of Newchurch, Kenyon, 1686-92. In the latter year he became chaplain to the Earl of Derby, and in 1697 was by him appointed bishop of Sodor and Man, which diocese he governed for 58 years. His *Principles and Duties of Christianity* (1707), the *Manx Catechism*, was the first book printed in that language. He also wrote a number of *Sermons* and other treatises. *The Knowledge and Practice of Christianity Made Easy to the Meanest Capacities* (1755); *Short and Plain Instructions for the Better Understanding of the Lord's Supper* (1736); *Sacra Privata, Private Meditations, Devotions, and Prayer* (1800); *Parochialia, or Instructions for the Clergy* (1788); and *Maxims of Piety and Christianity* (1789). He died on the Isle of Man, March 7, 1755.

WILSON, WILLIAM DEXTER, an American theologian; born at Stoddard, New Hampshire, Feb. 28, 1816; educated at the Walpole (New Hampshire) Academy and at Harvard University, graduating at Cambridge Divinity School as a Unitarian, but in 1842 taking orders in the Episcopal Church. In 1850 he was elected to the Chair of Philosophy in Geneva (now Hobart) College, and in 1868 the same office in Cornell University, holding the latter post until 1886, when he was retired as professor emeritus and became deacon in St. Andrews' Divinity School in Syracuse, New York. Besides many contributions to reviews and magazines, his most important works are *The Church Identified* (1848); *Lectures on the Psychology of Thought and Action, Comparative and Human* (1871-79); *Introduction to Metaphysics and the Study of the History of Philosophy* (1872); *Logic, Theoretical and Practical* (1872); *First Principles of Political Economy* (1875); and *The Foundations of Religious Belief* (1883).

WILSON, WILLIAM LUNE, LL.D., President Washington and Lee University; born in Virginia, May 3, 1843, and died at Lexington, Va., Oct. 17, 1900; educated at Charlestown Academy, Columbian Col., D. C., and at the University of Virginia; served in the Confederate army; was professor in Columbian College; practiced law at Charlestown,

West Virginia; was a delegate in 1880 to the National Democratic Convention at Cincinnati; was president of West Virginia University, in 1882-83, and was elected to Congress as a Democrat from the Second District of West Virginia in November, 1882. In 1883 he received the degree of LL.D. from the Columbian University and Hampden-Sidney College, Virginia, and was appointed a regent of the Smithsonian Institution in 1884 and reappointed in 1886. In Congress he became prominent as an orator and as an advocate of the Democratic doctrine of free trade, and was successively re-elected, serving six terms. In 1892 he was permanent president of the National Democratic Convention at Chicago, which nominated Grover Cleveland for President, and in the Fifty-third Congress he was chairman of the Committee on Ways and Means, the leader of the Democratic majority on the floor, and drafted the bill for the revision and reduction of tariff duties, known as the "Wilson Tariff Bill." He was defeated for re-election in 1894 by A. G. Dayton, Republican, by a vote of 23,343 to 21,392, but on Feb. 28, 1895, before his term of service had expired, he was appointed by President Cleveland Postmaster-General of the United States, to succeed Wilson S. Bissell, resigned.

WILSON, WOODROW, an American historian; born at Staunton, Virginia, Dec. 28, 1856, educated at Davidson College, North Carolina (1873-74); at Princeton College (1875-79); in the Law School of the University of Virginia (1879-81); and studied history and politics at Johns Hopkins University (1883-85). He was an instructor at Bryn Mawr College (1885-88); was professor of history and political economy at Wesleyan University (1888-90); and became professor of finance and political economy at Princeton in 1890. His writings include *Congressional Government: A Study in American Politics* (1885); *The State* (1889); *Division and Reunion, 1829-1889* (1893); *An Old Master, and Other Political Essays* (1893); and a text-book on *The State and Federal Governments of the United States* (1890).

WILSON'S CREEK, BATTLE OF, an engagement which took place Aug. 10, 1861, at Wilson's Creek, Missouri, between the Union forces under Generals Sigel and Lyon and the Confederates under McCulloch. The Union troops numbered five thousand and the Confederates over twelve thousand. Lyon planned a night attack, which was unsuccessful owing to the disparity of force, and in the Union defeat and retreat which followed, Lyon and over twelve hundred of his troops were killed. Sigel withdrew to Springfield, Missouri.

WILTON, a town of Fairfield county, southwestern Connecticut, on the Norwalk River, and on the New York, New Haven and Hartford Railroad, 6 miles N. of Norwalk. Farming and wire-drawing are the local industries. It has two churches and two academies. Population 1880, 1,864; 1890, 1,722; 1900, 1,598.

WILTON, a town of Muscatine county, eastern Iowa, on the Chicago, Rock Island and Pacific

Railroad, 12 miles N. of Muscatine, and 25 miles W. of Davenport. It is in a farming and stock-raising region; has artesian water-system; eight churches; a German-English college; and two weekly newspapers. Population 1890, 1,212; 1900, 1,233.

WILTON, a town of Franklin county, eastern Maine, on the Maine Central Railroad, 8 miles S.W. of Farmington. It has two churches and an academy; and manufactures carriages, coffins, caskets, shingles, bobbins, cabinet-work, etc. Population 1890, 1,622; 1900, 1,647.

WILTON, a town of Hillsboro County, southern New Hampshire, on the Souhegan River, and on the Boston and Maine Railroad, 41 miles S.W. of Concord. It has four churches, a savings bank, lumber and woolen mills, creameries, plow, carriage, trunk and wooden-ware factories. Population 1890, 1,850; 1900, 1,696.

WILTON CARPETS. See CARPET, Vol. V, p. 130.

WIMAN, ERASTUS, an American financier, born at Churchville, Peel County, Ontario, April 21, 1834. In 1864 he began to edit the *Montreal Trade Review*, and in 1867 acquired a partnership in a New York mercantile agency and carried the system of correspondence and reports to high perfection. He was an advocate of commercial union of Canada with the United States; engaged extensively in the development of Staten Island, obtaining for it a system of rapid transit connecting nearly the whole shore of the island with the New York ferry. In 1894 he was convicted, on technical grounds, of forging indorsements on the paper of the mercantile agency which he had built up, the prosecution claiming that he was only an employee and not a partner. In 1896 he received a pardon and exoneration.

WIMPFEN, EMMANUEL FELIX, a French soldier; born at Laon, in Aisne, Sept. 13, 1811; entered the army and served in the wars in Algeria; in 1855 was made brigadier-general of the Imperial Guard; was prominent in the Crimean and Italian wars, and was made general of division in 1859; was in turn commandant at Lyons and governor of Algiers and Oran, suppressing an insurrection on the border of Morocco in 1870. In the Franco-Prussian war he was commander, first of the Twelfth and later of the Fifth Army Corps, and, succeeding MacMahon as chief commander, signed the capitulation of Sedan. Besides a number of letters and memoirs, he published *La Situation de la France et les Réformes Nécessaires* (1873); and *La Nation Armée* (1876). He died in Paris, Feb. 26, 1884.

WIMSHURST INFLUENCE MACHINE. See ELECTRICITY, § 12*b*, in these Supplements.

WINAMAC, a town and the capital of Pulaski County, northwestern Indiana, on the Tippecanoe River, and on the Pittsburg, Cincinnati, Chicago and St. Louis railroad, 25 miles N.W. of Logansport. It is in a farming region, and has four churches, two banks and three weekly newspapers. Population 1890, 1,215; 1900, 1,684.

WINCHELL, ALEXANDER, an American geolo-

gist; born at North East, Dutchess County, New York, Dec. 31, 1824. He graduated at Wesleyan University, Middletown, Connecticut, in 1847; taught natural science in several schools, and was president of the Masonic Female University at Selma, Alabama, in 1853. In 1854 he was called to the chair of physics and civil engineering in the University of Michigan, and a year later was transferred to the chair of geology, zoölogy and botany there, which he held until 1873; also occupying the similar chair in the University of Kentucky for three years in the meantime. After teaching for some time in the Syracuse University, New York, and in the Vanderbilt University, Tennessee, in 1879 he was recalled to the University of Michigan, and assumed the chair of geology and paleontology, which he retained for the rest of his life. A member of many scientific societies both in America and abroad, he was chosen president of the Geological Society in 1890. He established the "Marshall" group in geology, and seven genera and 304 species owe their establishment to his researches. His works include *The Grand Traverse Region* (1866); *Sketches of Creation* (1870); *The Geology of the Stars* (1872); *The Doctrine of Evolution* (1874); *Reconciliation of Science and Religion* (1877); *Preadamites* (1880); *Sparks from a Geologist's Hammer* (1881); *World-Life, or Comparative Geology* (1883); *Geological Excursions* (1884); and *Geological Studies* (1886). He died in Ann Arbor, Michigan, Feb. 19, 1891.

WINCHENDON, a town of Worcester County, central Massachusetts, on Miller's River, and on the Fitchburg and the Boston and Albany railroads, 15 miles N.W. of Fitchburg. It has manufactories of cotton cloth, machinery, furniture, spools and bobbins. It has seven churches, two banks and a weekly newspaper, and at it is located the New England Home for Orphans and Destitute Children. Population 1890, 4,388; 1900, 5,001.

WINCHESTER, a city and the capital of Scott County, western Illinois, on Big Sandy Creek, and on the Chicago, Burlington and Quincy railroad, 18 miles S.W. of Jacksonville. It is in a farming and coal mining region; ships grain, packed meats, lime and sandstone; has a saw-mill, plow and furniture factories, five churches, two banks and two weekly newspapers. Population 1890, 1,542; 1900, 1,711.

WINCHESTER, a city and the capital of Randolph County, eastern Indiana, on White River, and on the Cleveland, Cincinnati, Chicago and St. Louis and the Grand Rapids and Indiana railroads, 75 miles E.N.E. of Indianapolis. It is in a farming and natural-gas region; has some manufactories, two banks, three weekly newspapers, and a soldiers' monument. Population 1880, 1,958; 1890, 3,014; 1900, 3,705.

WINCHESTER, a town and the capital of Clark County, central Kentucky, on the Chesapeake and Ohio, the Louisville and Nashville and the Kentucky Union railroads, 18 miles E. of Lexington. It is one of the many beautiful cities to be found in the Blue Grass region. The city, in addition to its advantages from a business point

of view, is one of the social and educational centers of Kentucky. It contains a courthouse, two weekly papers, and three banks with a combined capital and surplus amounting to \$725,000. The educational facilities embrace the common-school system from primary to high-school departments, also business colleges, and schools conducted under private auspices, together with two academies. There are five churches, three hotels, a number of stores, public halls, etc.; stock-raising is extensively engaged in the vicinity, and there is some lumbering; and the city has planing and flour mills, furniture factories, carriage repositories, electric-light works, etc. Population 1880, 2,277; 1890, 4,519; 1900, 5,964.

WINCHESTER, a town of Middlesex County, eastern Massachusetts, on the Boston and Maine railroad, 8 miles N.W. of Boston. It has extensive tanneries, and manufactures school furniture. It has seven churches; a high and other schools, library, savings bank, a weekly and a monthly newspaper. Population 1890, 4,861; 1900, 7,248.

WINCHESTER, a town of Cheshire County, southwestern New Hampshire, southwest of Keene, the county-seat. It manufactures woolen goods, cotton-warp, palm-leaf hats, and boxes; has a tannery, two banks and one weekly newspaper. Population 1890, 2,584; 1900, 2,274.

WINCHESTER, a town and the capital of Franklin County, central Tennessee, on the Elk River, and on the Nashville, Chattanooga and St. Louis railway, 85 miles S.S.E. of Nashville. It is in a lumbering, mining and agricultural region; has saw, planing and flour mills, wood-working establishments, wagon and marble works. It is at the foot of the Cumberland Mountains, and is a resort of invalids. Population 1880, 1,039; 1890, 1,313.

WINCHESTER, a city and the capital of Frederick Co., Va., in the Shenandoah Valley, 88 miles W.N.W. of Washington, District of Columbia, on the Baltimore and Ohio and the Cumberland Valley railroads. The surrounding country is devoted to agriculture and cattle-raising, for which Winchester serves as a center of supply and distribution. The city has manufactories of shoes, furniture, gloves, etc., and some iron-foundries and tanneries. During the Civil War, Winchester was the scene of many stirring events, being occupied now by the forces of one side, now by those of the other. It was from this point that Sheridan started on his famous ride to save the day at Cedar Creek (q.v., in these Supplements). National and Confederate cemeteries are located in the city. Population 1890, 5,196; 1900, 5,161.

WINCHESTER, ELHANAN, an American clergyman; born in Brookline, Massachusetts, Sept. 30, 1751; began to preach in 1769, and was ordained pastor of an open-communion church at Rehoboth, Massachusetts, in 1771. Becoming opposed to the open communion, he left his church, and several years later, in 1780, was chosen pastor of the First Baptist Church in Philadelphia, founding in the following year, with the majority of his congregation, a Universalist

Church. He then traveled through several states proclaiming the doctrine of universal salvation, and preached in England (1787-94). Among his many publications are *Hymns* (1776); *A Course of Lectures on the Prophecies that Remain to be Fulfilled* (1789, 1800); *The Three Woe Trumpets* (1793); a poem, *The Progress and Empire of Christ* (1793); and a *Plain Political Catechism for Schools* (1795). He died in Hartford, Connecticut, April 18, 1797.

WIND-DOGS. See HALO, Vol. XI, p. 399.

WINDER, WILLIAM HENRY, an American soldier; born in Somerset County, Maryland, Feb. 18, 1775; educated at the University of Pennsylvania; studied law and practiced in Baltimore until March, 1812, when he was appointed lieutenant-colonel of the Fourteenth United States Infantry, being given the command of that regiment on July 6. He commanded a successful expedition to the Canada shore near Fort Erie in November, 1812; was made brigadier-general, March, 1813; was captured at the battle of Stony Creek, June 1, 1813; was released, and appointed adjutant and inspector-general; he commanded and was defeated at the battle of Bladensburg, May, 1814. He was retired from the army in 1815; returned to the practice of his profession in Maryland, where he was a member of the state senate. He died in Baltimore, May 24, 1824.—His son, JOHN HENRY, also an American soldier; born in Maryland, in 1800; graduated at the United States Military Academy in 1820. He became captain of the First Artillery in 1842, and, taking part in the war with Mexico, was brevetted major and lieutenant-colonel for his gallantry at the battles of Contreras, Churubusco, Chapultepec and Mexico. Entering the Confederate Army in 1861, he was given command of Richmond and charge of Libby Prison and Belle Isle; was later transferred to the command of the Andersonville prison, with the rank of brigadier-general. He died at Branchville, South Carolina, Feb. 7, 1865.

WINDERMERE LAKE. See LANCASHIRE, Vol. XIV, p. 252.

WIND-FLOWER, the popular name of species of *Anemona*, a genus of herbaceous plants belonging to the crowfoot family (*anunculacea*). The stem leaves are borne high up and are opposite or whorled, forming a kind of involucre to the showy flowers.

WIND-GALLS, soft tumors about the fetlock joints of horses. They may be temporarily removed by rubbing, tight bandaging and rest, though they are very liable to reappear.

WINDHAM, a town of Cumberland County, southwestern Maine, 12 miles N.W. of Portland, near Lake Sebago, on the Presumpscot River, on the Maine Central railroad. It contains the villages of South and North Windham, Windham Center and Newhall; has a public library and manufactories of woolen goods, lumber, flour, boots and shoes, rakes, carriages, and powder. Population 1890, 2,216; 1900, 1,929.

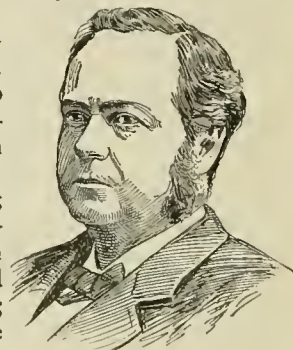
WINDHOVER. See KESTREL, Vol. XIV, p. 53, note.

WINDISCHGRÄTZ, ALFRED, PRINCE, Prime Minister of Austria (1804-62). See AUSTRIA, Vol. III, p. 137.

WINDLASS, DIFFERENTIAL. See MECHANICS, Vol. XV, p. 763.

WINDOM, a village and the capital of Cottonwood County, southwestern Minnesota, 60 miles W. of Mankato, on the Chicago, St. Paul, Minneapolis and Omaha railroad. It is the center of an agricultural and stock-raising district. Population 1890, 835; 1900, 1,944.

WINDOM, WILLIAM, an American statesman; born at Waterford, Ohio, May 10, 1827; received an academical education, studied law, and was admitted to the Ohio bar in 1850. He removed to Minnesota; was a member of Congress from 1858 to 1868; United States Senator (1870-81); Secretary of the Treasury under Garfield in 1881; was again United States Senator (1881-83); and Secretary of the Treasury from 1889 until his death, which occurred in New York City, Jan. 29, 1891.



WILLIAM WINDOM.

WIND-PIPE OR TRACHEA. See RESPIRATION, Vol. XX, p. 475.

WINDOWS, STAINED. See GLASS, Vol. X, pp. 667-673.

WINDS. See METEOROLOGY, Vol. XVI, pp. 126, 127, 143-150.

WINDSOR, a town of Hartford County, northern Connecticut, 12 miles N. of Hartford and 14 miles S. of Springfield, on the Connecticut and Farmington rivers, and on the New York, New Haven and Hartford railroad. There are a number of villages in the township, several of which have railway stations and post-offices. The town, which is the oldest in the state, is in a section devoted to agriculture, fruit, and tobacco growing, is traversed by trolley lines and has a creamery, canning-works and manufactories of electrical goods, machine-screws, tobacco, worsted goods and paper. Population 1890, 2,954; 1900, 3,614.

WINDSOR, a city of Henry County, western Missouri, 208 miles W. of St. Louis and 21 miles S.W. of Sedalia, on the Missouri, Kansas and Texas railroad. The surrounding region contains coal, and produces grain, broom-corn, flaxseed and live-stock, and the city is an important trade-center. Population 1900, 1,502.

WINDSOR, a town and port of entry of Hants County, central Nova Scotia, Canada, 45 miles N.W. of Halifax, at the junction of the Avon and St. Croix rivers, and on the Dominion Atlantic railroad. It is in a region containing gold and other minerals, limestone and gypsum; has large fruit-growing interests; carries on a large shipping trade; contains shipyards, foundries cotton fac-

ories, mills and furniture factories, and is the seat of Kings College, the oldest institution of the kind in the Dominion. Population 1891, 2,833.

WINDSOR, a town and port of entry of Essex County, extreme southwestern Ontario, Canada, 110 miles S.W. of London, and opposite Detroit, on the Detroit River, and on the Canadian Pacific, the Grand Trunk and the Michigan Central railroads. It is an important shipping-point for grain, produce and salt, and has breweries, distilleries and manufactories of tobacco, brooms, leather and carriages. Population 1891, 10,322.

WINDSOR, a town of Windsor County, southeastern Vermont, 33 miles S.E. of Rutland, on the Connecticut River, and on the Central Vermont railroad. It is in a farming region, ships cattle, poultry and maple sugar, and has an iron-foundry, machine-shop, cotton-works and manufactories of machinery, shoes and lumber. The state prison is located here. Population 1890, 1,384; 1900, 1,656.

WINDSOR CASTLE. See WINDSOR, Vol. XXIV, pp. 600, 601.

WINDSOR LOCKS, a town of Hartford County, northern Connecticut, adjoining the town of Windsor, of which it was until 1854 a part, on the Connecticut River, and on the New York, New Haven and Hartford railroad. By means of a canal it obtains a good water-power, and has large mills engaged in the manufacture of various grades of paper, and manufactories of cotton and woollen goods, thread, silk, school apparatus, furniture, and foundry products. Population 1890, 2,758; 1900, 2,997.

WINDTHORST, LUDWIG, a German statesman; born at Kaldenhof, Hanover, Jan. 17, 1812; educated at the Carolinum Gymnasium and in law at Göttingen and Heidelberg; was attorney for Catholic societies, and in 1848 was appointed chief judge of the Court of Appeals at Celle. In 1849 he entered the Second Chamber of Hanover as leader of the Ministerial party, became President of that house in 1851, and was Minister of Justice in the cabinet from 1851 to 1853, influencing George V to receive Roman Catholics at court. He became again Minister of Justice in the Brandis-Platen Ministry in 1862, favored the alliance with Austria against Prussia; retired in 1865, and was appointed Chief Syndic of the crown at Celle, representing the King in the negotiations which resulted in the Prussia-Hanover treaty of Sept. 29, 1867. As leader of the Catholic or Center party he was prominent in the North German Parliament and the Prussian House of Deputies from 1867 until the opening of the German Reichstag in 1871, when he became leader of the Ultramontane party; was Bismarck's most powerful opponent, fighting against the establishment of the May laws, the expulsion of the Jesuits, dictatorial rule in Alsace-Lorraine, the issue of anti-Socialist laws and other propositions of the prince, though he suspended his opposition upon the compromise between the German government and the Holy See, but renewed his resistance upon the refusal of the government to

grant certain concessions. He died in Berlin, March 14, 1891.

WINDWARD ISLANDS, an administrative group under the British government, forming that portion of the West Indian archipelago which stretches in a north and south chain along the eastern side of the Caribbean Sea from Martinique to Trinidad. The Windward Islands, which received their name in allusion to the prevailing trade-winds blowing from the east, officially comprise Grenada and the Grenadines. The capital and governor-general's residence are at St. George's, Grenada. See GRENADA, Vol. XI, p. 184; ST. VINCENT and ST. LUCIA, (both in these Supplements).

WINEBRENNER, JOHN, an American religious leader; born in Frederick County, Maryland, March 24, 1797; educated at Dickinson College, and in theology in Philadelphia. He became pastor of the German Reformed Church at Hagerstown, Maryland, September, 1820; severed his connection with that denomination in 1828, and in 1830 organized a new sect, "The Church of God," maintaining three positive ordinances of perpetual standing—baptism by immersion, the washing of feet, and the Lord's Supper. The organization met with remarkable success, especially in the Central Eastern and Middle Western states, in 1889 having 522 ministers, 479 organizations, 22,511 communicants, and 338 church edifices valued at \$643,185, besides a domestic and foreign missionary society, a book repository, and a printing establishment at Harrisburg, Pennsylvania. Mr. Winebrenner edited the *Gospel Publisher* for a number of years, and also published a *Pronouncing Testament and Gazetteer* (1836); *Brief Views of the Church of God* (1840); *A Treatise on Regeneration* (1844); *Practical and Doctrinal Sermons* (1860); and edited the *Church Hymn-Book*. He died in Harrisburg, Pennsylvania, Sept. 12, 1860.

WINES, ENOCH COBB, an American philanthropist; born at Hanover, New Jersey, Feb. 17, 1806; graduated at Middlebury in 1827; commissioned teacher of midshipmen in the United States navy in 1829; purchased Edgehill School, Princeton, New Jersey, in 1832; was professor of languages in the Philadelphia High School in 1838; and purchased a classical school at Burlington, New Jersey, in 1844. He was licensed to preach in 1849; was pastor of Congregational churches at Cornwall, Vermont, and East Hampton, Long Island; became professor in Washington College in 1853; and president of the St. Louis City University in 1859. He was chosen secretary of the New York Prison Association in 1862; in 1870 organized the National Prison Association, by which he was unanimously elected secretary. As a member of a commission, appointed in 1871 by the New York legislature, he wrote a report on the relations between prison and free labor, strongly denouncing the maintenance of convicts in idleness. Appointed by President Grant United States commissioner to organize an international penitentiary congress, he assembled in London,

July 4, 1872, delegates from 26 nations; and was chosen honorary president at the next congress, convened in 1878, in Stockholm. He received the degree of doctor of divinity from Middlebury College in 1853, and doctor of laws from Washington College in 1857. Among his many works on theological and educational subjects and on prison reform the more important are *Hints on Popular Education* (1838); *Commentaries on the Laws of the Ancient Hebrews* (1852); and *The State of Prisons and Child-Saving Institutions* (1880). He died at Cambridge, Massachusetts, Dec. 10, 1879.—His son, FREDERICK HOWARD, a clergyman; born in Philadelphia, April 9, 1838; graduated at Washington College in 1857, and Princeton Theological Seminary in 1865, having served as hospital chaplain in the United States Army during the war. He became pastor of the First Presbyterian Church, Springfield, Illinois, in 1865, and secretary of the Illinois State Board of Commissioners of Public Charities in 1869, effecting the organization of similar boards under the name of the National Conference of Charities and Correction, of which he was president in 1883. As a result of his observations at the International Penitentiary Congress of 1887, when he was the delegate from Illinois, the hospital for the insane at Kankakee was built. (See ILLINOIS, in these Supplements.) Besides many reports and pamphlets, he is the author of *Punishment and Reformation: An Historical Sketch of the Rise of the Penitentiary System* (1895).

WINFIELD, a city and the capital of Cowley County, southeastern Kansas, on the Walnut River, and on the Atchison, Topeka and Santa Fé and the St. Louis and San Francisco railroads, 38 miles S.E. of Wichita. It is in a rich farming region; has several flouring-mills and machine-shops. It contains the Southwestern Methodist Episcopal college, a German Lutheran college, the state institution for the feeble-minded, and Chautauqua grounds; has four banks, one daily, three weekly and several monthly newspapers. Population 1890, 5,184; 1900, 5,554.

WINFIELD, a village and the capital of Putnam County, southwestern West Virginia, on the Great Kanawha River, 24 miles N.W. of Charleston. It has steamboat traffic to the Ohio River; has a tannery, stave factory, flour-mills, tobacco factory and two weekly newspapers. Population 1880, 305; 1890, 302.

WINGHAM, a village of Huron County, western Ontario, on the Maitland River, and on the Grand Trunk and Canadian Pacific railroads, 33 miles E.N.E. of Goderich. It is in an agricultural and dairying region; has excellent water-power, saw and flour-mills, salt-works, furniture factories, a bank, and two weekly newspapers. Population 1880, 1,918; 1891, 2,167.

WINLOCK, JOSEPH, an American astronomer; born in Shelby County, Kentucky, in 1826. He graduated at Shelby College, Kentucky, in 1845. In 1852 he went to Cambridge to assist in the computations for the *Nautical Almanac*. In 1859

he became professor of mathematics in the United States Naval Academy at Annapolis; and from 1866 till his death he was professor of astronomy in Harvard College and director of the observatory. From this time on he devoted himself to practical astronomy. In 1870 he had charge of a party, sent by the United States Coast Survey to Kentucky to observe the solar eclipse of August, 1869; and later, under the same auspices, went to observe the solar eclipse, on December 22d, at Xeres de la Frontera, in Spain. While preparing for this second eclipse he devised the photoheliograph, a horizontal telescope of very long focus, which was used by the American parties in observing the transits of Venus in 1874 and 1882. He is the author of *Tables of Mercury*, and of many papers in astronomical journals and in the proceedings of scientific societies. He died in Cambridge, Massachusetts, June 11, 1875.

WINNEBAGO, a lake in Winnebago County, east central Wisconsin, the largest in this state, lying 40 miles W. of the middle of the west shore of Lake Michigan, and connected by Fox River with Green Bay. It forms the eastern boundary of Winnebago County, which it separates from Calumet County; the southern portion of the lake being in the county of Fond du Lac. Its length is about 30 miles; greatest width, 11 miles; area, 220 square miles; altitude, 748 feet. The Fox River enters at the west side and issues at the northern end of the lake. Steamboats ply on it, the chief towns on it being Fond du Lac, Oshkosh and Menasha. It abounds in fish.

WINNEBAGO CITY, a village of Faribault county, southern Minnesota, on Blue River, and on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads, 33 miles S. of Mankato. It is in a farming region; has water-works, two banks, two weekly newspapers, and a Freewill Baptist college. Population 1890, 1,108; 1900, 1,816.

WINNEBAGO INDIANS. See INDIANS, Vol. XII, p. 832.

WINNEMUCCA, a village, the capital of Humboldt county, northwestern Nevada, on the Humboldt River and the Southern Pacific railroad. It is in a farming and silver-mining region; ships beef, wool and grain; has one bank and one daily paper. It contains extensive workshops of the Central Pacific railroad. Population precinct, 1900, 1,110.

WINNEMUCCA LAKE, in western Nevada, lying in a desert, without a visible outlet, 27 miles long from north to south, 4 miles wide, from 50 to 57 feet deep, altitude 3,875 feet. It is supplied on the south by the eastern division of the Truckee River, and receives part of the surplus waters of Lake Tahoe. It occupies the extreme southwest strip of Humboldt County, and lying over into Washoe County, its southernmost end lying in Churchill County. It lies between the Truckee range on the east and the Lake range on the west, between it and Pyramid Lake, which receives the western division of the Truckee River.

WINNIPEG, capital of the Canadian province of

Manitoba. Pop. 1891, 25,642; 1898, about 32,000. See Vol. XXIV, p. 613.

WINNIPEG LAKE AND RIVER. See MANITOBA, Vol. XV, p. 490.

WINNIPEGOOSIS LAKE. See MANITOBA, Vol. XV, p. 490.

WINNIPISEOGEE OR WINNEPESAUKEE, a beautiful lake of New Hampshire, between Carroll county and Belknap county, 23 miles N.E. of Concord, 25 miles long by some 10 miles wide, extremely irregular, with deep bays and bold promontories; area 175 square miles, altitude 472 feet. It is drained from the southwest by the Winnipiseogee River, which unites with the Pemigewasset, forming the Merrimac. It is studded with islands, and is much resorted to on account of its scenery.

WINNSBORO, a city and the capital of Fairfield County, north central South Carolina, on the Southern railroad, 34 miles N. of Columbia. It is in a farming and stone-quarrying district; contains two banks, a triweekly and a weekly newspaper. It is the seat of Mount Zion Institute, chartered 1777. Lord Cornwallis made the place his headquarters for a time. Population 1900, 1,765.

WINONA, a city and the capital of Winona County, southeastern Minnesota, on the right bank of the Mississippi (here crossed by an iron railroad bridge), 103 miles S.E. of St. Paul, on the Chicago and North-Western, the Green Bay, Winona and St. Paul, the Winona and Western, the Chicago, Milwaukee and St. Paul and the Burlington, Cedar Rapids and Northern railroads. It contains a state normal school, a seminary for girls, graded schools and a high school, and a public library of 12,000 volumes. It has all modern municipal improvements, a government building, seven weekly and two daily newspapers, a number of flour and saw mills, foundries, carriage, barrel and sash-and-door factories, etc., and ships great quantities of wheat. Population 1890, 18,208; 1900, 19,714.

WINONA, a town and the capital of Montgomery County, north central Mississippi, on the Illinois Central and Southern railroads, 23 miles S. of Granada. It is the commercial center of a large cotton-raising region, and has a variety of small manufactures. Pop. 1890, 1,648; 1900, 2,455.

WINOOSKI, the name of a river and village of Vermont. The village is in Chittenden County, in the northwestern part of the state, on the Vermont Central railroad, 3 miles E. of Burlington. Population 1900, 3,783. The river rises in Caledonia County, northwestern Vermont, and after a northwesterly course of one hundred miles through the Green Mountains in Washington and Chittenden counties, empties into Lake Champlain three miles north of Burlington. Montpelier, the capital, is on this stream.

WINSLOW, HUBBARD, an American author; born in Williston, Vermont, Oct. 30, 1799; educated at Yale College and at the Andover and Yale theological seminaries; preached in Dover, New Hampshire, Boston, Massachusetts, and Geneva, New York; was principal of the Mount Vernon Institute, Boston (1844-53), devoting himself then and afterward to the advancement of higher education.

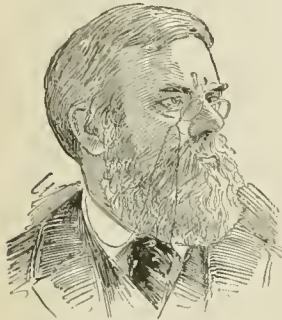
Among his many published works are *Doctrine of the Trinity* (1831); *Natural Science and Revelation* (1841), and *The Young Man's Aid to Knowledge* (1836), the latter having a sale of over one hundred thousand copies. He died in Williston, Aug. 13, 1864.—His brother MYRON, a missionary; born in Williston, Vermont, Dec. 11, 1789; graduated at Middlebury College in 1815, and at Andover Theological Seminary in 1818. In 1819 he went to Ceylon and established a mission, and later, a seminary; founded the mission at Madras in 1836, and remained there during the rest of his life, founding seven schools and a college for the natives. He received the degree doctor of divinity from Harvard, in 1858. He is the author of *Hints on Missions to India* (1856); a translation of the Bible into Tamil; *A Comprehensive Tamil and English Dictionary*; and other works. He died at Cape of Good Hope, Oct. 22, 1864.—His brother, GORDON, a clergyman; born in Williston, Vermont, Sept. 12, 1803; was minister in Episcopal churches in Troy and Elmira, New York, Annapolis, Maryland, and on Staten Island; enlisted as chaplain in the Fifth New York Regiment; was instrumental in establishing the Sanitary Commission, of which he was inspector for the Army of the Potomac. A member of scientific societies, he published papers on their proceedings and received the honorary degree of M.D. from New York University, in 1863. He was drowned in the Potomac River, June 7, 1864.—Hubbard's son, WILLIAM COPLEY, an archæologist; born in Boston, Jan. 13, 1840; graduated at Hamilton College (1862) and at the Episcopal Theological Seminary, New York City, in 1865, acting as assistant editor of the *New York World* (1862-63), and of the *Christian Union* (1864). He engaged in preaching to temporary charges, lecturing and writing for reviews and journals, being regarded as an authority on Biblical and especially Egyptological explorations. A prominent member of many learned societies, he received the degrees Ph.D. from Hamilton College, in 1866, LL.D. from St. Andrew's, Scotland, in 1886, L.H.D. from Columbia, in 1887, and D.D. from Amherst, in 1886. Among his more important books are *Israel in Egypt* (1883); *The Store City of Pithom* (1885); and *A Greek City in Egypt* (1887).

WINSLOW, JOHN ANCRUM, an American naval officer; born in Wilmington, North Carolina, Nov. 19, 1811; entered the navy as a midshipman in 1827; commissioned lieutenant in 1839; for gallantry in the Mexican War was given command of the schooner *Morris*, and subsequently of other vessels, until he was promoted commander in 1855. He was in command of the *Kearsarge* on special service in pursuit of the privateer *Alabama*; found and blockaded her in the harbor of Cherbourg, June 14, 1864; accompanied her outside the neutral ground Sunday, June 19th, and in an engagement of one hour and twenty minutes so shattered her that she quickly sank, thus terminating the only important battle of the war between two vessels; was promoted to commodore, and commanded the Gulf Squadron (1866-67); was on the board of examiners (1868-69); promoted rear-admiral in 1870, and commanded the

Pacific Squadron (1870-72). He died in Boston, Sept. 29, 1873. See also KEARSARGE, MOUNT, and RONCADOR REEF, in these Supplements.

WINSLOW, JOSIAH, a colonial governor, son of Edward Winslow (q.v., Vol. XXIV, pp. 613, 614), was born in Plymouth, Massachusetts, in 1629. He was chosen a deputy to the general court in 1643; an assistant-governor in 1657; holding the office for 16 years; a commissioner of the United Colonies for 14 years, beginning in 1658; and governor for seven years, beginning in 1673. He was a signer of the Articles of Confederation of the New England colonies and of the declaration of war against King Philip, and in 1675 was elected general-in-chief of the colonial military forces, being the first New England born general as well as governor. He died at Marshfield, Massachusetts, Dec. 18, 1680.—His grandson, JOHN, a soldier; born in Plymouth, Massachusetts, May 27, 1702; was appointed in 1740 captain of the Boston Company in the expedition against Cuba; in 1755, by order of Governor Shirley, he removed the Acadians from Nova Scotia; in the following year served against the French with eight thousand men, and was major-general in the expedition of 1758-59 against the French. He became chief justice of the court of common pleas for Plymouth County in 1762, and died in Hingham, Massachusetts, April 17 1774.

WINSOR, JUSTIN, an American librarian; born in Boston, Jan. 2, 1831; studied at Harvard, in Paris



JUSTIN WINSOR.

and at Heidelberg; was superintendent of the Boston public library (1868-77), and became librarian of Harvard in the latter year. He was first president of the American Library Association (1876-86); was president of the American Historical Association and secretary of the Massachusetts Historical Society. Widely known as a librarian and historian, he contributed largely to periodicals, and also wrote *Bibliography of Original Quartos and Folios of Shakespeare* (1875); *Christopher Columbus* (1891); *Cartier to Frontenac* (1894); and *The Mississippi Basin; The Struggle in America Between England and France from 1697 to 1763* (1895). Died in Cambridge, Mass., Oct. 22, 1897.

WINSTED, a borough of Litchfield County, extreme northwestern Connecticut, on Mad River, and on the Philadelphia, Reading and Northeastern and the New York, New Haven and Hartford railroads, 26 miles N.W. of Hartford. It has an abundant water-power, and contains manufactories of cutlery, hardware, pins, hoes, scythes, clocks and silk goods. Population 1890, 4,846; 1900, 6,804.

WINSTON, a city and the capital of Forsyth County, northwestern North Carolina, on the Southern and the Norfolk and Western railroads; 27 miles W. of Greensboro. It is a manufacturing center, having over one hundred factories, including iron-works, cotton and woolen mills, and shuttle and

bobbin works. Salem, one half mile distant, is generally included in Winston. Population 1900, 10,008.

WINSTON, JOHN ANTHONY, an American public man; born in Madison County, Alabama, Sept. 4, 1812; was educated at LaGrange College and at the University of Nashville. He was a member of the state assembly (1839-40); of the senate (1843-52); and was the first native-born governor of Alabama (1853-56). Although he had been opposed to secession, he raised the Eighth Alabama Infantry, and commanded it as colonel in the Confederate service until forced to retire because of ill health. He was a delegate to the state constitutional convention of 1865, and was elected to the United States Senate in 1866, although not admitted to a seat. He died in Mobile, Alabama, Dec. 21, 1871.

WINTER, JOHN STRANGE. See STANNARD, in these Supplements.

WINTER, WILLIAM, an American poet and dramatic critic; born in Gloucester, Massachusetts, July 15, 1836; educated in Boston, at the Cambridge High School, and at the Harvard Law School; received the degree of Bachelor of Arts, and was admitted to the Suffolk bar. After a few years spent in lecturing in and around Boston, and in writing for the Boston *Transcript* and *Gazette*, he removed to New York in 1859. For six years he wrote for the *Saturday Press* and other publications; became managing editor and dramatic



WILLIAM WINTER.

and literary critic of the New York *Weekly Review* in 1865; and also in that year accepted the position of dramatic critic on the New York *Tribune*, bringing that department in a few years to be recognized as the leading American authority on the drama. He visited England in 1877, and began a series of works descriptive of English scenes and memorials, beginning with *The Trip to England* (1879-80); and following that with *English Rambles and Other Fugitive Pieces in Prose and Verse* (1884); his most popular work, *Shakespeare's England* (1886-95); *Gray Days and Gold in England and Scotland* (1891-95); *Old Shrines and Ivy* (1892-95); and *Brown Heath and Blue Bells, being Sketches of Scotland, and Other Papers* (1892). Besides many articles contributed to various periodicals he was the author of a number of books on dramatic subjects, including a *Life of Edwin Booth* (1872-94); *The Jeffersons*, in the American Actor series (1884-94); a *Life of Henry Irving* (1885); *The Stage Life of Mary Anderson* (1886); and *Shadows of the Stage* (three series, 1892-95). He also produced some excellent verse in the volumes *My Witness* (1871); *Thistledown* (1877); and *Wanderers* (1888-93).

WINTERBERRY. See HOLLY, Vol. XII, p. 102.

WINTERGREEN, a name given to various species of the heath family (*Ericacea*): (1) *Gaultheria procumbens*, also called checkerberry, a common

running evergreen in low woods, sending up low stems which bear oval leaves at the summit and one or two nodding white flowers, followed by edible red berries, which, with the leaves, are aromatic and yield the oil of wintergreen; (2) species of *Pyrola*, low plants with leaves more clustered at the base, and a raceme of delicate flowers; and (3) *Moneses uniflora*, a plant of the cold woods, with roundish, veiny leaves, and a naked stem bearing a rather large white or rose-colored flower.

WINTERGREEN, OIL OF. An oil obtained from the flowers of *Gaultheria procumbens* (wintergreen), one of the ericaceæ. Its chief constituent is the methyl ester of salicylic acid. This acid is used largely in medicine, but all our supply is made artificially from phenol (carbolic acid).

WINTERHALTER, FRANÇOIS XAVIER, a German portrait-painter; born at Menzenschwand, in the Black Forest, April 20, 1805; studied in Munich and Rome, and in 1834 settled in Paris, where he received medals at the salons of 1836-37 and at the Exposition of 1855. He was a favorite portrait-painter in royal circles, executing portraits for the ruling families of Great Britain, France, Austria, Prussia, Belgium and other countries. In his will he directed that twelve pictures, which he had allowed no one to see, should not be exhibited until fifty years after his death, in order that an unprejudiced judgment of his merits as a painter might be arrived at. His wishes being disregarded, the boxes were opened, and found to contain some excellent paintings, a portrait of Queen Caroline of England being considered especially a masterpiece. The recipient of many decorations, he was an officer in the Legion of Honor in 1857 and a member of the Order of the Red Eagle in 1861. He died at Frankfort-on-the-Main, July 8, 1873.

WINTER PARK, a town of Orange County, eastern central Florida, on the Savannah, Florida and Western and the Florida Central and Peninsular railroads, 5 miles from Orlando. It is in the midst of an orange-raising district, and is a popular winter-resort. Population 1900, 366.

WINTERPORT, a town of Waldo County, southern Maine, on the Penobscot River, being a stopping-point of steamships plying between Bangor and Boston; nearest railroad station Bucksport, 5 miles E. on the Maine Central railroad, 12 miles S. of Bangor. Clothing is manufactured here. Population 1900, 1,623.

WINTERSET, a city in Madison County, southwestern central Iowa, on the Chicago, Rock Island and Pacific railroad, 30 miles S.W. of Des Moines. It is in a farming region which produces live-stock, grain and general produce; has four weekly newspapers and a good system of graded schools. Population 1890, 2,281; 1900, 3,039.

WINTHER, CHRISTIAN. See DENMARK, Vol. VII, pp. 92, 93.

WINTHROP, a village of Kennebec county, western central Maine, on the Maine Central railroad, 10 miles west of Augusta. It has manufactories of oil-cloths and blankets, and of agricultural implements. Population 1900, 2,088.

WINTHROP, a town of Suffolk County, east-

ern Massachusetts, on the Boston, Revere Beach and Lynn railroad, on Boston harbor, five miles N.E. of Boston, of which city it is a suburb and summer-resort; has a public library and sundry manufactories. Population 1890, 2,726; 1900, 6,058.

WINTHROP FAMILY. FITZ-JOHN, a New England Puritan governor, son of the second John (q.v., Vol. XXIV, p. 614); born at Ipswich, Massachusetts, March 14, 1638; educated at Harvard; accepted a commission in the Parliamentary army, and was in active service in Scotland; returned to New England upon the disbandment of his regiment at the Restoration. He served in Indian wars; was a member of Sir Edmund Andros' council, and spent four years at the court of William III as London agent of the Connecticut colony. In recognition of his services in that capacity he was elected governor soon after his return to Connecticut, and continued in that office until his death, at the home of his brother, in Boston, Nov. 27, 1707.—His grand-nephew, JOHN, a physicist, born in Boston, Dec. 19, 1714; graduated at Harvard in 1732, and in 1738 became professor of mathematics and natural philosophy in that institution, holding the office throughout his life. The foremost American scientist of the eighteenth century, he made observations of the transits of Mercury and Venus in 1740 and 1761, going in the latter year to St. Johns, Newfoundland, in a vessel of the colonial service, to make the observations—this being the first purely scientific expedition sent out by an American state. He accomplished much in the development of astronomy, in the explanation of earthquakes, and in other branches of mathematical science. He was for several years Middlesex County judge of probate, and in the governor's council in 1773-74. The University of Edinburgh, in 1771, conferred on him the degree LL.D., and he was elected a member of the Royal Society of London. Among his more valuable works are *A Lecture on Earthquakes* (1755); *Two Lectures on Comets* (1759); *Account of some Fiery Meteors* (1765); and *Two Lectures on the Parallax* (1769). He died at Cambridge, Massachusetts, May 3, 1799.—His son JAMES, a jurist and author; born at Cambridge, Massachusetts, in 1752; graduated at Harvard in 1769; fought and was wounded at Bunker Hill; served as librarian at Harvard (1772-87); was judge of the court of common pleas for several years, and was register of probate for some time. He published *An Attempt to Translate the Prophetic Part of the Apocalypse of St. John into Familiar Language* (1794); *A Systematic Arrangement of several Scriptural Prophecies relating to Anti-Christ* (1795); and *An Attempt to Arrange, in the Order of Time, Scripture Prophecies yet to be Fulfilled* (1803). He died in Cambridge, Sept. 26, 1821.—ROBERT CHARLES, a statesman and orator; born in Boston, May 12, 1809; graduated at Harvard in 1828; studied law with Daniel Webster, and was admitted to the bar in 1831; a member of the Massachusetts assembly (1836-40); speaker of that body (1838-40); a member of Congress (1840-50); speaker of the House (1847, 1849); and was appointed to Webster's seat in the Senate in 1850, where he served for one year. He then retired from political

activity, only occasionally speaking during Presidential campaigns or other important occasions, and devoted himself to literary, historical and philanthropic occupations, acting as president of the Boston Provident Association for 25 years, of the Massachusetts Historical Society for 30 years, and of the Harvard Alumni for 8 years, besides occupying many other positions of honor and usefulness. A man of fine polish and learning, he is famous as the fervidly eloquent orator of great historical anniversaries, his productions being collected in four volumes of *Addresses and Speeches* (1852-86). In addition to contributing to the *North American Review* and other publications, he is the author of a *Memoir of Hon. Nathan Appleton, LL.D.* (1861); *Life and Letters of John Winthrop* (1864-67); and of Washington, Bowdoin and Franklin, with a few brief pieces on kindred topics (1876). He died in Boston, Nov. 16, 1894.—Another descendant of John Winthrop, THEODORE, an author; born in New Haven, Connecticut, Sept. 22, 1828; graduated at Yale in 1848; traveled in Europe (1849-51); entered the service of the Pacific Mail Steamship Company; joined the expedition under Lieutenant Strain to survey a canal across the Panama Isthmus (1853); studied law in 1854, and was admitted to the bar in 1855. He then gave his attention to literary pursuits, writing *Cecil Dreeme* (1861; 17th ed., 1864); *John Brent* (1862; 14th ed., 1864); *Edwin Brotherhood* (1862); *The Canoe and Saddle* (1862); and *Life in the Open Air* (1863). He enlisted in the Seventh New York Regiment at the opening of the war; was General Butler's military secretary with the rank of major, and was killed in action at Big Bethel, Virginia, June 10, 1861.

WINYAW BAY, an inlet on the coast of South Carolina, in Georgetown County, lat. 33° 10' N. It is formed by the union of the Black, Pedee and Waccamaw rivers, 2 miles wide and 14 long; is navigable to Georgetown for large vessels.

WIRE. The drawing of wire has greatly increased within recent years, as the manufacture of small articles has called for greater quantities. The annual production of wire-rods, as the material is called before it is drawn, in the United States, is now about seven hundred thousand tons a year, exceeding the combined product of all the other mills in the world. Pennsylvania, Ohio, Illinois and Massachusetts are the leading wire-making states, in the order named. About four hundred kinds of round wire are made, one hundred sorts of flat wire, and an innumerable number of forms of odd cross-section, as for commutators, pinions, pivots, typewriter bars, eye-glasses, etc. The largest size of wire, properly so called, is .300 of an inch in diameter, and it has been drawn as fine as $\frac{1}{7000}$ of an inch. Diamond or ruby dies are used for drawing very small sizes. About one third of the wire used in this country goes into fences, mostly of the barbed-wire style, and nearly another third is used in the electrical industries. Since 1884 basic Bessemer steel has largely superseded iron wire for many purposes. Telegraph and telephone wire is still most commonly made of iron, because it is a better conductor than steel, though steel is often preferred on

account of its greater strength; and a bimetallic wire having a steel core for strength, surrounded by a coating of copper for conductivity, is coming largely into use. For long-distance telephony an all-copper wire is necessary. Aluminum wire, having more than half the conductivity of copper, and much greater tensile strength, is increasing in use. Brass wire is principally used for springs, etc., that are exposed to moisture prohibiting the use of iron, which would rust. Platinum wire is used largely for incandescent lamps, and for scientific and chemical apparatus, where intense heats are created. About sixty million square feet of wire-netting are made annually in the United States, the wire used being called weaving-wire or stone-wire. The latter name originated from the English custom of putting it up in 14-pound coils. In this country 12-pound coils are used for this wire. Most wire is put up in 63-pound bundles, a survival of an old English custom. Telegraph-wire, however, is ordered by the mile, and put up in any convenient size. Copper trolley-wire is frequently shipped in mile lengths on large reels. Music or piano-wire, which forms the strings of musical instruments, the spokes of bicycles, etc., is made of highly tempered steel, and often has a tensile strength of two hundred tons per square inch. The covering-wire used for the bass notes of musical instruments is a soft, untempered wire of no great strength. The smaller sizes of screws, bolts, rivets, pinions and similar articles are made almost wholly from wire, which is cut up and shaped by special machinery. Some of the names applied to varieties of wire are confusing and far from self-explanatory. Bail-wire is used for the handles of tin-pails, kettles, etc.; baling-wire is a soft annealed wire for tying up bales. Bonding-wire is a copper or galvanized iron wire for connecting rail-joints of an electric railway; binding-wire is the same as bailing-wire, and is also called bundling or binder-wire. Market wire is any common size of soft steel or iron wire, suitable for the retail hardware trade. Slug-wire is a rectangular corrugated wire used for pegging shoes. Patented wire is that tempered by what is known as the Horsfall process. Cooperage wire is of coppered steel, and is used for strengthening barrels in connection with wooden hoops. Feeder-wire is a heavy copper wire used for feeding or transmitting a current of electricity to distant points on a trolley-line where the current requires to be increased or renewed. Magnet-wire is a wire of soft, pure copper, wrapped with silk or cotton, for use in induction-coils, etc. Much confusion exists as to the sizes by which wire is gauged. The Birmingham wire gauge, usually indicated as B.W.G., is numbered 1 for .300 of an inch and 36 for .004 of an inch, while the Brown and Sharpe gauge (B. and S.) is numbered 1 for .2893 and 36 for .005. The new British standard is 1 for .300 and 36 for .0076.

C. H. COCHRANE.

WIRE-GLASS. When glass came to be used for the roofs of large buildings, such as railway stations, to which light could not be admitted conveniently in any other way, it was found to endanger people below because of the frequency with which broken

pieces fell down. The difficulty was met by the use of protective gratings or stout wire-screens, until 1892, when Shuman's patent wire-glass appeared. It is cast glass, commonly from three sixteenths to three eighths of an inch in thickness, within which is imbedded wire-netting made in meshes of from three inches down to one quarter-inch. In manufacture, the molten glass is poured on a large iron table, over which four heavy iron rollers are passed, the hot wire netting being fed in automatically between the first and second rollers. The iron table is set in the floor, and heated from below by means of gas-flames, so that it may not chill the glass. The wire-netting is heated almost to the temperature of the molten glass. The rollers are very heavy, delivering a pressure of fifty pounds to the square inch. They are connected by a firm, truck-like framework. The first roller serves to smooth and spread the glass evenly. The hot wire-netting slides down with the second roller, which is corrugated, so as to depress it into the glass, which then requires further smoothing, which is done by the third roller. This rolling renders the glass plastic, and the fourth roller is used to prevent it from curling up, as well as to give a further smoothing. The glass is then annealed, to secure toughness, after which it is trimmed down at the edges to the size of the netting, and is ready for the market. Wire-glass can be made thinner than other glass for the same use, because of the added strength given it by the wire. It is therefore an economical article, and has come into use so rapidly that two large factories, one at Tacony, Philadelphia, and one at St. Louis, were established within two years after the Shuman process was patented. It is particularly suitable for use in the roofs of railway stations, as it is not readily damaged by vibration, and as it will sustain a great weight of snow. Its use in business buildings, dwellings, etc., in skylights is on the increase.

C. H. COCHRANE.

WIRE-ROPE. See ROPE, Vol. XX, p. 846.

WIRE-WAYS. See ROPEWAY, in these Supplements.

WIRELESS TELEGRAPHY. See TELEGRAPHY (Wireless) in these Supplements, p. 2868. There is little to add to what has already been said, under Telegraphy, as to this subject. What experiments have recently been made by M. Marconi in electro-magnetic wave-telegraphy, oscillation or radiation, emphasizes the value of the discovery, with a view at least to commercial utilization. Its practical application would, however, appear to be limited, as compared with submarine cable use, since messages transmitted by continuous wire, the present metallic-circuit system, can be sent at the rate of 600 words per minute, while the Marconi wave-telegraph, so far as developed, can transmit only about 20 words per minute. For communications between the shore and lightships or moored vessels and lighthouses on the mainland, or in signaling between ship and ship in fleet manœuvres, the discovery must nevertheless be of moment. In the recent South African war, Lord Roberts, it is understood, successfully utilized the invention by maintaining communication between headquarters

and detachments of the army, to a distance of some fifty or sixty miles. The British Admiral at Delagoa Bay was also able, by the Marconi wireless process, to send messages a distance of from eighty to a hundred miles. Wireless telegraphy is a remarkable instance of the development of laboratory experiments, which demonstrate that electric wave motions, like waves of light, can be reflected, refracted, and polarized, while they can even pass not only through dense fogs, but through rock masses and other obstacles. Already there is a literature springing up on the subject. See Lodge's *The Work of Hertz and His Successors; Wireless Telegraphy*, by R. Kerr; and *A History of Wireless Telegraphy, 1838-1899*, by J. J. Fahie.

WISCONSIN had in 1900 a population of 2,069,042; that of 1890 was 1,686,880, the gain being 382,162. Of the 56,040 square miles of territory comprised within the boundaries of the state, 1,590 square miles are water surface, leaving 54,450 square miles of land surface. The density of population increased from 24.16 to the square mile in 1880, to 38.0 in 1900. At the last-named date there were in Wisconsin 20 cities of 8,000 or more population, in which resided 546,095 of the inhabitants of the state, constituting 26.08 per cent, an increase in urban residents from 16.59 per cent in 1880. The relative proportion of males and females was 874,951 of the former and 811,929 of the latter; the native-born citizens constituted 69.22 per cent of the entire number, and the number of negroes was 2,444, a decrease of 258 since 1880. Included in the number of inhabitants in 1890 were 3,835 civilized and 8,896 other Indians, of whom 7,915 lived on reservations. In 1895 a state census was taken, which gave the population of Wisconsin as 1,937,915. This gain of 251,035 during the five years 1890-95 was very evenly distributed throughout the state.

AGRICULTURE. The acreage devoted to cereals, according to the census of 1890, was as follows:

	ACRES.	BUSHEL.
Corn	1,120,341	34,024,216
Wheat	744,080	11,698,922
Oats	1,627,151	60,739,092
Barley	479,914	15,225,872
Rye	275,058	4,250,582
Buckwheat	77,458	1,064,178

COMPARATIVE AGRICULTURAL STATISTICS FOR 1880 AND 1890.

	1880.	1890.
Number of farms	134,322	146,409
Number of acres in farms	15,353,118	16,787,988
Value of farms, fences, buildings, machinery and live-stock	\$419,865,346	\$560,475,894
Number of horses	352,428	460,740
Number of mules and asses	7,136	5,752
Total number of cattle	1,129,141	1,647,947
Number of milch cows, included above	478,374	792,620
Number of swine	1,128,825	1,347,750
Number of sheep	1,336,807	984,972

Much attention is given to sheep-raising in Wisconsin, and the number of merinos and grades has been constantly increasing since 1880. From that time until 1889 the weight of fleeces was increased from 5.25 to 6.54 pounds.

Of tobacco, Wisconsin produced 19,389,166 pounds, raised on 17,241 acres.

STATE CENSUS OF PRODUCTS IN 1895.

	NUMBER.	VALUES.
Improved farms -----	150,801	-----
Acres of improved land -----	9,446,410	-----
Value of farms -----		\$488,754,021
Value of the agricultural products -----		149,690,087
Horses -----	525,671	21,693,691
Cattle -----	1,510,788	21,458,627
Sheep and lambs -----	1,321,544	2,243,877
Number of milch cows -----	842,039	17,442,144
Cheese factories -----	52,480,815 lbs.	3,984,103
Butter -----	74,653,730 lbs.	12,310,373
Wheat -----	8,565,071 bu.	4,223,728
Corn -----	26,694,488 bu.	10,129,169
Oats -----	61,984,311 bu.	16,783,763
Rye -----	4,216,055 bu.	1,848,709
Barley -----	13,704,889 bu.	6,630,273
Hay -----	2,507,863 tons	15,848,616
Irish potatoes -----	10,755,738 bu.	5,070,937

The amount found invested in the dairying interests of the state was \$160,000,000, and the aggregate value for 1895 was \$30,000,000.

MINERALS. The mineral industries of the state as reported for 1889 were valued at \$19,183,861. The out-



STATE SEAL OF WISCONSIN.

put of iron-ore, from 16 mines, was 837,399 tons, of the value of \$1,178,403. The amount invested in the iron-mines of the state was \$4,385,269, the amount in 1879 being only \$186,000. Lead and zinc to the value of \$464,630 were produced, the zinc-ore being 24,832 tons and the lead-ore 1,678 tons. Stone of all kinds, to the value of \$1,264,016, was taken from 119 quarries. The leading kinds were granite, \$266,095; limestone, \$813,963; sandstone, \$183,958. Metallic paint is found in several parts of the state in paying quantities and of excellent quality. Wisconsin produced mineral waters from 20 springs, to the extent of 2,292,910 gallons, valued at \$409,179.

FISHERIES. The fisheries of the state, by the census of 1890, had a value of \$455,030; gave employment to 1,484 persons, and employed a capital of \$326,744. Inland fisheries gave \$92,000 of the total returns, the remainder coming from the great lakes. In 1895 the state commissioner of fisheries reported the number of persons then employed at 1,440, boats engaged at 733, and the value of all investments \$1,016,278. The catch for the year was 28,998,942 pounds, 12,000,000 pounds less than that of 1893. More than one half the catch came from

Green Bay, about one fourth from Lake Michigan, the remainder being almost equally divided between Lake Superior, Lake Winnebago and the Mississippi River. The kinds, in order of importance, were herring, lake-trout, whitefish, blue-fins, perch and black-bass. Large sums have been expended under the supervision of the state in stocking the waters of Wisconsin. In 1895 the distribution amounted to 3,600,000 brook-trout, 2,550,000 rainbow-trout, thousands of black and white bass and whitefish, in addition to 10,000,000 lake-trout eggs. Wisconsin has 420 square miles of rivers and streams, 1,170 square miles of lakes and ponds, and the trout-streams aggregate more than 5,000 miles in length.

MANUFACTURES. The eleventh census showed that Wisconsin had specified manufacturing industries to the number of 10,417, with a capital of \$246,515,404, in which 132,031 persons were employed, to whom \$51,843,708 was paid as wages. The cost of material used was \$145,437,016, and the value of the products \$248,546,164. Leading among the products were lumber and timber in its different forms, which amounted to \$67,262,254; followed by flouring and grist-mill products to the amount of \$24,252,297; malt liquors, \$14,193,057; leather, tanned and curried, \$11,161,850; foundry and machine-shop products, \$8,467,290; slaughtering and meat-packing, wholesale, \$8,393,754. Other industries were iron and steel, cheese, butter, condensed milk, carriages and wagons, agricultural implements and paper.

FORESTS. Much of the state was once covered with heavy forests of oak, ash, hickory, poplar, maple, pine, hemlock and spruce, the three last named occupying the northern section. Forest-fires have swept the timber from thousands of the best wooded areas. In the southern and western portions of the state the hardwood districts furnish valuable timber. The output of the mills of Wisconsin, which are very numerous, is given in the preceding paragraph.

WEALTH AND TAXATION. The railroad mileage of the state in 1895 was 6,003; capital stock of all companies, \$112,393,960; debts, \$160,388,000; earnings for the year, \$28,318,544; operating expenses, \$18,285,467.

The taxable property of Wisconsin in 1895 was assessed at one third of the real value. It was distributed as follows:

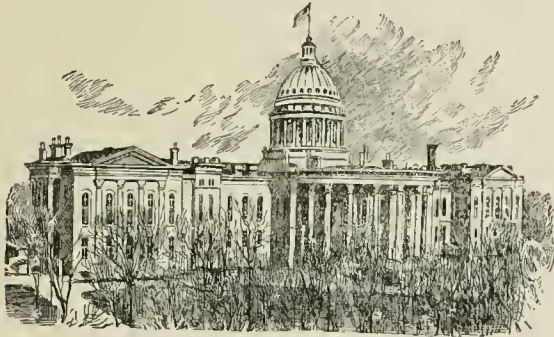
Real estate and improvements -----	\$1,098,350,591
Live-stock, implements and machinery ---	82,951,387
Mines and quarries and products on hand-	8,388,551
Gold, silver coin and bullion -----	27,934,449
Machinery of mills and products on hand-	81,874,031
Railroads, including street-railways, and all equipments -----	299,269,054
Telegraph, telephone, shipping and canals,	14,738,945
Miscellaneous -----	224,801,515

Total ----- \$1,838,308,523

The receipts from all sources for the fiscal year ending Sept. 30, 1895, amounted to \$1,788,809, of which railways paid \$1,175,752; telegraph companies, \$9,999; telephone companies, \$9,838; insurance companies, for licenses, \$131,574. The balance from the preceding year was \$977,315, making the amount available \$2,766,124. The disbursements for this fiscal period were \$2,729,506; the balance remaining on hand was \$36,618. The following

are among the chief items of expense: State Hospital for the Insane, near Madison, \$113,702; Northern Hospital for Insane, near Oshkosh, \$137,694; maintenance of chronic insane in county asylums, of which there are 23 in the state, \$301,796; state prison at Waupun, \$87,399; School for the Deaf, at Delavan, \$41,050; School for the Blind, at Janesville, \$30,978; Industrial School for Boys, at Waukesha, \$74,161; State School for Dependent Children, at Sparta, \$47,036; militia, \$93,684; free high-schools, \$47,600. The total investment of state trust funds was \$5,674,553, as follows: School fund, \$3,371,657; university fund, \$212,204; agricultural fund, \$271,270; normal-school fund, \$1,819,421. The semi-state institutions include the Milwaukee Insane Hospital, the Milwaukee House of Correction, the Wisconsin Industrial School for Girls, at Milwaukee, and the Wisconsin Veterans' Home, at Waupaca. All receive aid and supervision from the state.

EDUCATION AND CHURCHES. The public schools of Wisconsin are of exceptionally high grade. The state superintendent of schools reported for 1898 an



CAPITOL BUILDING, MADISON.

enrollment of 430,827, which was 60.2 per cent of the school population. There were 6,940 school-houses, with a seating-capacity for 452,708 pupils; male teachers numbered 2,307, female 10,274, the former receiving, in the country, average wages of \$47.30 per month, the female country teachers receiving \$33.15 per month. There were school libraries in 563 towns of the state, the total number of volumes being 75,597. The total distribution for educational purposes for the year amounted to \$5,290,506, of which \$340,623 went to the normal schools and \$500,000 to the state university. There were 152 free high-schools, with a four-years' course, and 7,000 students in attendance, instructed by 333 teachers, the graduates during the year numbering 960. There were 57 similar schools with a three-years' course, their students numbering 2,400, their teachers 84 and the graduates 288. The normal schools of Wisconsin are located at Platteville, White-water, Milwaukee, Oshkosh, River Falls and Stevens Point. For buildings alone at the places above named there has been expended since 1891 the sum of \$200,000. Throughout the state, school-grounds have been beautified by trees, shrubs and flowers, more than twenty thousand trees having been planted in a single year.

Denominational educational institutions are: Lawrence University, Appleton, Methodist Episcopal;

Mission House, Franklin, Reformed; Gale College, Galesville, Presbyterian; Milton College, Milton, Seventh-Day Baptists; Marquette College, Milwaukee, Roman Catholic; Ripon College, Ripon, Congregational and Presbyterian; Seminary of St. Francis of Sales, St. Francis, Roman Catholic; Northwestern University, Watertown, Lutheran; Beloit College, Beloit; and the University of Wisconsin, Madison, nonsectarian.

In 1890 Wisconsin had 3,722 church organizations, 3,286 edifices, 556,355 communicants (which constituted 32.98 per cent of the population), and church property of the value of \$14,521,341. All Baptist bodies numbered 250; the Roman Catholic 646; Congregationalists, 182; Evangelical Association, 224; Lutheran Synodical Conference, 388; Lutheran Independent Synods, 410; all Methodist bodies, 784; all Presbyterian bodies, 180; Protestant Episcopal, 133.

NATIONAL GUARD. The report of the adjutant-general of Wisconsin, 1895, shows the strength of the National Guard to have been 187 commissioned officers and 2,464 enlisted men, making a total strength of 2,653 men. The expenditures of the adjutant-general and the quartermaster-general for the years 1893 and 1894 amounted to \$226,362. The Federal appropriation for 1895 was \$10,351.

NEWSPAPERS. Jan. 1, 1899, there were published in Wisconsin, 673 newspapers, of which 63 were daily, 15 semiweekly, 549 weekly, 2 fortnightly, 2 semimonthly, 1 every third week, 40 monthly, and 1 quarterly. Papers were published in all of the 70 counties of the state, and in 277 of the cities, towns, and villages, of which 70 were county seats.

PRINCIPAL CITIES AND TOWNS OF WISCONSIN, WITH POPULATION IN 1890 AND 1895.

PLACE.	1890.	1900.
Appleton.....	11,860	15,085
Ashland.....	9,956	13,074
Beloit.....	6,315	10,436
Chippewa Falls.....	8,670	8,094
Eau Claire.....	17,415	17,517
Fond du Lac.....	12,024	15,110
Green Bay*.....	9,069	18,684
Janesville.....	10,836	13,185
Kenosha.....	6,532	11,606
La Crosse.....	25,090	28,895
Madison.....	13,426	19,164
Manitowoc.....	7,710	11,786
Marinette.....	11,523	16,195
Memomonee.....	5,491	5,655
Merrill.....	6,809	8,537
Milwaukee.....	204,468	285,315
Oshkosh.....	22,836	28,284
Racine.....	21,014	29,102
Sheboygan.....	16,359	22,962
Stevens' Point.....	7,896	9,524
Superior.....	11,983	31,091
Watertown.....	8,755	8,437
Waukesha.....	6,321	7,419
Wausau.....	9,253	12,354

List of governors of Wisconsin: Nelson Dewey, 1848-52; Leonard J. Farwell, 1852-54; William A. Barstow, 1854-56; Coles Bashford, 1856-58; Alexander W. Randall, 1858-62; Louis P. Harvey, 1862; Edward Salomon, 1862-64; James T. Lewis,

* Fort Howard consolidated with Green Bay since 1890.

1864-66; Lucius Fairchild, 1866-72; C. C. Washburn, 1872-74; William H. Taylor, 1874-76; Harrison Ludington, 1876-78; William E. Smith, 1878-82; Jeremiah M. Rusk, 1882-89; William D. Hoard, 1889-91; George W. Peck, 1891-95; William H. Upham, 1895-97; Edward Scofield, 1897-.

See also WISCONSIN, Vol. XXIV, pp. 616-619.

WISCONSIN, UNIVERSITY OF, a co-educational institution, established and maintained by the state, at Madison, Wisconsin. It was chartered in 1838, but was not organized until 1848. In 1833, 1854 and 1862, grants of land were made to the institution by Congress, amounting in all to 332,160 acres. In 1889 the agricultural department was benefited



UNIVERSITY BUILDING.

by the Agricultural Experiment Station Act. In 1898 the productive funds amounted to \$225,000, and the total income was \$400,000. By act of the legislature a state tax of nine-fortieths of a mill is levied annually, which yields about \$150,000. In addition to the regular collegiate department, instruction is given in law, pharmacy, agriculture, engineering, and music. In 1898 there were 1,767 students in attendance, 120 instructors, and a library of 54,000 volumes.

WISCONSIN RIVER, the principal stream of the state of Wisconsin, rises in Vilas County, northern Wisconsin; flows southerly through Vilas, Oneida, Lincoln, Marathon, Portage and Wood counties; forms the boundary-line between Adams and Juneau, Sauk and Columbia counties; flows westerly, forming the boundary of Sauk, Iowa, Richland, Grant, and Crawford counties; flowing into the Mississippi at Prairie du Chien. The principal towns on its banks are Portage, Grand Rapids, Stevens' Point, Wausau, Merrill and Rhinelander. It is six hundred miles in length and is navigable to Portage, where it is connected by canal with Fox River, and thus with Lake Michigan.

WISDOM OF SOLOMON. See APOCRYPHA, Vol. II, pp. 181, et seq.

WISE, HENRY ALEXANDER, an American lawyer and public man; born at Drummondtown, Virginia, Dec. 3, 1806; graduated at Washington College, Pennsylvania, in 1825, and studied law at Winchester. Elected to Congress in 1833, he was involved in a duel with his opponent, whose arm he fractured. In 1840 he secured the nomination of John Tyler as vice-president; and Tyler becoming President by the death of General Harrison, Wise had a powerful influence in his administration. Nominated minister to France, he was rejected by the senate, but confirmed for Brazil, where he re-

sided until 1847. In 1854 he was elected governor of Virginia, and in 1859 signed the death-warrant of John Brown (q.v., Vol. IV, p. 385). Wise entered the Confederate service in 1861, and was appointed brigadier-general, but his career was a succession of disasters, ending with the capture of his forces at Roanoke Island, North Carolina, Feb. 7, 1862, where his son, Obadiah J. Wise, was among the killed. After the war, Wise spent his remaining years in the practice of law at Richmond, and published *Seven Decades of the Union; Memoir of John Tyler* (1872). He died in Richmond, Virginia, Sept. 12, 1876.—His cousin, HENRY AUGUSTUS, a naval officer, born in Brooklyn, New York, May 12, 1819; entered the navy in 1834; attended the Philadelphia Naval School (1839-40). After serving in the depot of charts and cruising in the Mediterranean, he was promoted master in 1846 and lieutenant in 1847; served on the Pacific coast during the Mexican War; at the opening of the Civil War was connected with the *Niagara* in the Charleston blockade, and in 1862 was promoted commander and appointed assistant chief of the bureau of ordnance and hydrography, where he served until 1869. He was the author of a number of books, including *Tales for the Marines* (1855); *The Story of the Gray African Parrot* (1859); and *Captain Brand of the Centipede* (1860-64). He was promoted captain in 1866, and was abroad on furlough at the time of his death, at Naples, April 2, 1869.

WISE, JOHN, an American author; born at Roxbury, Massachusetts, August, 1652; graduated at Harvard in 1673, and began to preach at Ipswich in 1680, remaining there during the remainder of his life. He was imprisoned, fined and deprived of his ministerial office, in 1688, for instigating the citizens of Ipswich against the arbitrary taxation of Governor Andros, but in the following year brought a successful suit against the chief-justice for refusing him the benefit of the *habeas corpus* act. In 1690 he was chaplain in Phip's expedition against Canada, and gained a reputation for great courage. By his *Churches' Quarrel Espoused* (1710-15), he utterly defeated the hierarchical scheme proposed by the Mathers in 1705, further discussing the topic in his *Vindication of the Government of the New England Churches* (1717). The two books were bound in one volume in 1772, and were widely read, becoming, apparently, the source of many noticeable expressions in the Declaration of Independence. He died at Ipswich, April 8, 1725.

WISEHART OR WISHART, GEORGE. See BEATON, Vol. III, p. 466.

WISEMAN, NICHOLAS PATRICK STEPHEN, an English Cardinal; born in Seville, Spain, Aug. 3, 1802; educated at a boarding-school at Waterford, in the college at Ushaw, and in the English College at Rome, graduating there in 1824. He was made a priest in 1825; chosen professor of oriental languages in the Roman University in 1827, and also vice-rector of the English College, succeeding to the rectorship of that college in 1828. Returning to England, he became noted as a preacher and lecturer, a series of his lectures on the doctrines and

practices of the Catholic Church being published and passing through many editions. He then published his treatise on the holy eucharist and lectures on the connection between science and revealed religion, the latter running into many editions, and being translated into several languages. Lecturing in Rome in 1837, he persuaded Gregory XVI to increase the number of vicars apostolic in England; returned as coadjutor bishop of the Midland district and president of St. Mary's College, Orcott, and became vicar-apostolic of the London district in 1849. In 1850 he was summoned to Rome, and made an archbishop and then a cardinal, being the seventh Englishman to receive this honor since the Reformation. Acquainted with most European languages, excelling in Hebrew and the other oriental tongues, a proficient Biblical student, and skilled in nearly every branch of science, his talents were of the highest order, and he was universally acknowledged one of the foremost scholars of his time. He died in London, Feb. 15, 1865.

WISSEMBOURG OR WEISSEMBURG, a small fortified town of Alsace, Germany, in what was formerly the French department of Bas-Rhin, on the Lauter, 42 miles N.E. of Strasburg by railway. It carries on a flourishing trade, and manufactures tiles, brick, soap, hats, etc. Besides its fortress, a line of works, called the lines of Wissembourg, extend S.E. to Lauterberg, a distance of nine miles. The cathedral, the only remarkable building, dates from the thirteenth century. Population, 5,151.

WISTARIA, a genus of ornamental woody twiners belonging to the pea family (*Leguminosæ*). *W. frutescens*, the native American species, has pinnate leaves with 9 to 15 ovate leaflets, and a dense raceme of showy blue-purple flowers. *W. sinensis*, the species cultivated from China and Japan, is faster growing and higher climbing than the other, and with longer, more pendent racemes.

WISTER, MRS. ANNIS LEE, an American translator; born in Philadelphia, Oct. 9, 1830. She translated very many novels from the German, including E. Marlitt's *Gold Elsie* (1868); *The Countess Gisela* (1869); *The Second Wife* (1874); and *The Owl's Nest* (1888); Wilhelmine von Hillern's *Only a Girl* (1870); Ernst Werner's *Banned and Blessed* (1883) and *St. Michael* (1886); H. Schobert's *Picked up in the Streets* (1888); and many other excellent works by equally well-known authors. She also contributed to some American periodicals.

WITCH-ELM OR WYCH-ELM. See ARBORICULTURE, Vol. II, p. 317.

WITCH-HAZEL. See ARBORICULTURE, Vol. II, p. 320; and HAZEL, Vol. XI, p. 549.

WITENAGEMOT. See PARLIAMENT, Vol. XVIII, p. 302.

WITHERITE. See MINERALOGY, Vol. XVI, p. 398.

WITHERSPOON, JOHN, a signer of the Declaration of Independence; born at Gifford, Haddingtonshire, Scotland, Feb. 5, 1722; graduated at the University of Edinburgh in 1742; wrote several learned theological treatises; and was a Presbyterian minister at Paisley, Scotland, when he accepted the second invitation to become president of Princeton

College, New Jersey, in 1768. He began an active and fruitful administration, introducing lectures on metaphysics, political science, international law, mathematics, and the study of French and Hebrew. The latter he taught himself, besides theology, moral philosophy and rhetoric. In addition to all this, he was pastor and preacher to the town. He was sent to the Continental Congress on June 21, 1776, and almost his first act in Philadelphia was to sign the Declaration of Independence. He sat in Congress till November, 1782, always in clerical attire, and did his full share of the work in the committees and on the floor. After retiring from Congress he did not again take up teaching, but devoted himself to the administration of the college, visiting Europe in 1783 and 1784 to obtain funds, and caring for his farm near Princeton, where he died, Nov. 15, 1794.

WITHROW, JOHN LINDSAY, an American Presbyterian clergyman; born near Philadelphia, Pennsylvania, in 1837; educated at neighboring academies and at Princeton University, where he graduated in 1860, and at the Princeton Seminary in 1863. He held pastorates in Abington, Pennsylvania; Arch Street Church, Philadelphia; Indianapolis, Indiana; Park Street Church, Boston; and the Third Presbyterian Church, Chicago. In 1896 he was elected moderator of the general assembly of the Presbyterian Church in the United States. He contributed the article PRESBYTERIANS IN AMERICA, in these Supplements. Was made LL.D. by Knox College.

WITHROW, WILLIAM HENRY, a Canadian author; born in Toronto, Canada, Aug. 6, 1839; educated at Victoria College and at Toronto; preached in Methodist churches from 1864 until 1874, when he became editor of *The Methodist Magazine* of Toronto. Among his published works are *Catacombs of Rome* (1874); *History of Canada* (1878); *Valeria: The Martyr of the Catacombs* (1884); *Men Worth Knowing* (1886); *Canada: Scenic and Descriptive* (1889); and *China and Its People* (1893).

WITTIKIND OR WIDUKIND, a chief. See SAXONY, Vol. XXI, p. 351.

WITWATERSRAND. See GOLD AND GOLD-MINING, in these Supplements.

WOAD. See INDIGO, Vol. XII, p. 843.

WOBURN, a city of Middlesex County, north-eastern Massachusetts, on the Boston and Maine railroad. The industries, which are largely manufacturing, are connected chiefly with the tanning of leather and the making of boots and shoes. There are also electric-supply works, glue factories and chemical works; in all, 2,000 persons are engaged in about thirty establishments. Population 1890, 13,499; 1900, 14,254. See also WOBURN, Vol. XXIV, pp. 625, 626.

WODEN OR ODIN. See ASGARD, Vol. II, pp. 679, 680.

WOFFINGTON, PEG OR MARGARET, an Irish actress; born in Dublin, Oct. 18, 1720; appeared as Polly Peacham in the *Beggar's Opera* at the age of 12 years, and as Ophelia in 1737. She first played at Covent Garden in 1740, and was most successful then and afterward, especially in male rôles. Without doubt the most excellent actress of her time,

but somewhat wanting in moral reputation, she gave much to charitable objects, and died at Teddington, March 28, 1760.

WOJWODE, WAIWODE OR VOIVODE, a Slavonic title equivalent to the German *Herzog* or leader. See **ROUMANIA**, Vol. XXI, p. 16.

WOLCOTT, EDWARD OLIVER, a U. S. Senator; born at Longmeadow, Massachusetts, March 26, 1848. He served as private in the 150th Regiment of Ohio Volunteers in 1864; entered Yale College in 1866; graduated at the Harvard Law School in 1871, practiced law in Colorado, was elected to the United States Senate in 1889, and again in 1895, and appointed commissioner on international bimetallicism in 1897.

WOLCOTT, ROGER, an American colonial governor; born at Windsor, Connecticut, Jan. 4, 1679; was apprenticed to a weaver at the age of 12, and in 1700 established himself in business and acquired some property. He was a representative in 1709; justice of the peace in 1710; and commissary of the Connecticut forces in the Canada expedition of 1711. He was chosen a member of the council in 1714; a judge of the county court in 1721; a supreme court judge in 1732; and deputy governor and chief justice in 1741. As major-general of the Connecticut forces he was second in command under Sir William Pepperell at the siege of Louisburg in 1745; and was governor of Connecticut from 1750 to 1754. He published some poetry and letters.—His son **OLIVER**, a statesman; born at Windsor, Connecticut, Nov. 26, 1726; graduated at Yale in 1747. He served on the northern frontier as captain of volunteers until the signing of the treaty of Aix-la-Chapelle; then studied medicine for a time; and was chosen sheriff of the newly-organized Litchfield County. He was a member of the council (1774-86); judge of the county court of common pleas; and judge of probate for the district of Litchfield during the same period. As a commissioner of the Continental Congress in 1775, he was instrumental in persuading the Iroquois Indians to remain neutral in the War of the Revolution, and in compromising the disputes between Vermont and New York and Connecticut and Pennsylvania. A member of the second Continental Congress, he was also a signer of the Declaration of Independence, and it was at his home in Litchfield that the women of that town melted into bullets for the militia the famous Bowling Green statue of George III. He organized and commanded the 14 Connecticut regiments sent to the defense of New York; brought reinforcements of several thousand men to General Putnam on the Hudson River; commanded a brigade of militia under General Gates at the defeat of Burgoyne; returned to Congress in February, 1778; and commanded a division of militia in the defense of Connecticut in 1779. He was again a member of Congress (1780-84); was one of the commissioners to negotiate the treaty with the Six Nations in 1785; was lieutenant-governor (1786-96); and governor from 1796 until his death at Litchfield, Dec. 1, 1797.—His son **OLIVER, JR.**, a statesman; born at Litchfield, Jan. 11, 1760; graduated at Yale College in 1778; studied law in Litchfield, and

was admitted to the Connecticut bar in 1781, when he removed to Hartford and accepted a position in the state treasury department, becoming comptroller upon the creation of that office in 1788. He was chosen the first auditor of the United States treasury under the new constitution in 1789; became comptroller of the treasury in 1791; and succeeded Alexander Hamilton as Secretary of the Treasury in 1795, holding that office until his resignation in 1800, when he was appointed United States circuit court judge for the Second District. In 1802 he engaged in business in New York, being elected president of the Merchants' Bank in 1803, and founding, in 1812, the Bank of North America, of which he was president for two years. He was a member of the Connecticut state constitutional convention of 1817, and governor of Connecticut from 1817 to 1827, when he resumed his residence in New York, and there died, June 1, 1833.

WOLFBORO, a village of Carroll County, eastern central New Hampshire, on Winnepesaukee Lake, and on the Boston and Maine railroad, 40 miles N.E. of Concord. Boot-and-shoe manufacture is the principal industry. The village acquires its importance from being a summer resort. Pop. 1890, 3,020; 1900, 2,390.

WOLF-DOGS. See **DOG**, Vol. VII, p. 326.

WOLFE ISLAND, an island in the St. Lawrence River, in Frontenac County, eastern Ontario, Canada. Population 1891, 2,003. See also **ST. LAWRENCE**, Vol. XXI, p. 180; and **LAKE OF THE THOUSAND ISLANDS**, in these Supplements.

WOLFENBÜTTEL FRAGMENTS. See **LESSING**, Vol. XIV, pp. 481, 482.

WOLFF, ALBERT (1814-92), professor at the Berlin Academy of Fine Arts. See **SCULPTURE**, Vol. XXI, p. 566.

WOLFF, JOSEPH, a German missionary to India; born in 1795, in Weilersbach, near Weimar, of Jewish parentage. He joined the Roman Catholic Church in England, in 1812; afterward changed to the Anglican Church; went to India as a missionary to the Jews, and traveled in Egypt, Persia and India. He familiarized himself with the languages of India and Arabia; visited the United States in 1837-38; was settled in Dublin, Ireland, from 1838 to 1843; made a notable journey to Bokhara in 1843 to ascertain the fate of Stoddart and Conolly, British explorers; was himself imprisoned, but subsequently was released, and returned to England in 1845, where, in Isle Brewers, he died May 2, 1862. Among his published writings are *Mission to Bokhara* (1845) and *Travels and Adventures* (1860).

WOLFFIAN BODIES. See **REPTILES**, Vol. XX, p. 462.

WOLF-FISH. See **SEA WOLF**, Vol. XXI, p. 614.

WOLFRAM AND WOLFRAMITE. See **TUNGSTEN**, Vol. XXIII, p. 607.

WOLF RIVER, a stream of southern Mississippi, which rises in Pearl River County, and after a southeasterly course through Harrison County, empties into St. Louis Bay, an inlet of the Gulf of Mexico. It has a length of one hundred miles.

WOLF RIVER, a stream of northeastern Wisconsin; rises in Pine Lake, in Forest County, and,

flowing southeasterly through Langlade County, the Menomonee Reserve and Shawano, Outagamie, Waupaca counties, empties into Poygan Lake, and thence into Lake Winnebago, in Winnebago County. Its course is two hundred miles long, one hundred of which are navigable for light-draught vessels.

WOLFSBANE. See **ACONITE**, Vol. I, p. 98.

WOLLSTONECRAFT, MARY. For the mother, see **GODWIN**, Vol. X, p. 716; for the daughter, see **SHELLEY**, Vol. XXI, p. 789.

WOLSELEY, GARNET JOSEPH, VISCOUNT, a British soldier; born June 4, 1833, near Dublin, Ireland. He entered the army in 1852, and as ensign served in the Eightieth Regiment in the latter part of the second Burmese War; was dangerously wounded at the head of a storming party in the last and most critical action of the war. As a lieutenant he served in the Crimea from December, 1854, with the Ninetieth Light Infantry, and as assistant engineer, and was



LORD WOLSELEY.

twice wounded. Attaining a captain's rank, he served in India with the Ninetieth, and on the staff in the campaigns of 1857-59, and received a brevet majority. As lieutenant-colonel he served in the China War of 1860; and as colonel of Canada in 1862-70, in which last year he commanded the Red River expedition. As major-general he commanded the troops in the Ashantee War in 1873-74; and as lieutenant-general held the command of the troops in the South African War in 1879; commanded the army in the Egyptian War of 1882, and was raised to the peerage after the victory of Tel-el-Kebir. He also commanded in the Soudan campaigns of 1884-85, and was made a viscount. He received \$125,000 for services in Ashantee, and \$100,000 for his Egyptian campaigns. He held many staff appointments, and was high-commissioner to Natal and to Cyprus. He was appointed adjutant-general in 1882, commander-in-chief of the army in Ireland in 1890, field-marshal in 1894, and commander-in-chief of the British army in 1895. He wrote a *Narrative of the War with China in 1860* (1862); *Life of Marlborough* (1894); and a *Soldier's Pocketbook* (1869).

WOLSELEY, SIR GEORGE, a British soldier; born in 1839; entered the army in 1857; took part in the Shahabad district, India, in suppressing the Indian mutiny; saw service in Bengal, in Egypt, in 1882, and again in 1884, in the Burmah expedition of 1887, and that year was placed in command of the Belgaum district. He was appointed captain in 1868, colonel in 1872, brigadier-general in 1887 and major-general the same year.

WOLVERINE. See **GLUTTON**, Vol. X, p. 696. The name is also used as a nickname for the natives of Michigan.

WOLZOGEN, KAROLINE VON, a German authoress; born in Rudolstadt, Feb. 3, 1763. Her maiden name was Karoline von Lengefeld, and

Baron von Wolzogen was her second husband. The marriage of her sister Charlotte to Schiller brought Karoline into intimate friendship with the great poet. Her *Schiller's Leben* (1830) is perhaps the best biography of Schiller. Among her other works are *Agnes von Lilien* (1798) and *Cordelia* (1840). She died in Jena, Jan. 11, 1847.

WOMB OR UTERUS. See **MAMMALIA**, Vol. XV, pp. 368, et seq., and **REPRODUCTION**, Vol. XX, pp. 408-410.

WOMB, DISEASES OF. See **SURGERY**, Vol. XXII, pp. 190, 691.

WOMEN, COLLEGES FOR. See **EDUCATION IN THE UNITED STATES**, and **WOMEN**, in these Supplements.

***WOMEN, THEIR EDUCATION AND ENFRANCHISEMENT IN THE UNITED STATES.** Suffrage is considered the keynote of the emancipation of man. Only within recent years has universal suffrage made headway, even among male citizens, and the number of men entitled to vote is a very small percentage of the male population of the habitable globe. Slowly but surely the trend of all civilized nations has been to confer on the citizen more and more responsibility. It was but natural that woman suffrage should be the last step in the advancement of woman. Forty years ago almost nothing was heard on this subject. The women who ventured to discuss it were considered radical, and even dangerous; it was tabooed, as a topic of conversation, both in the home and society. These remarks apply only to American women. The French Revolution had accustomed social economists to the idea that woman would gradually secure representation under all republican forms of government, and the justice of such representation was conceded. The socialists in all countries have always been in favor of woman suffrage, and in England women are entitled to representation in the local elections and are on school-boards, poorhouse relief, and most of the boards which dispense government or parish charity. It is singular that in a republic, such as the United States of America, so great a prejudice has existed against woman suffrage. No woman has shown greater adaptability than has the American to conform to the unstable conditions of a new country. She is a colonist by temperament as well as by habit, and is extremely intelligent, comprehending political and economic questions, and ready to adapt herself to different climates, different races and different social conditions. That such a type of woman should so long have been denied even municipal suffrage is incomprehensible to a superficial observer of the conditions of American life.

This restriction arises largely from the dread of increasing the vote. It is not that American men have not full confidence in the judgment and ability of the women of the nation, but they are in deadly fear of the large foreign vote which granting women the suffrage would bring to the fore. They contend, with reason, that the illiterate and depressed immigrant classes, of varied nationalities, from Europe who form a large part of the tenement population in American cities, are not fitted by education to have a voice in the government of the municipality.

Still less do they understand questions of national politics. In the most American of the states, like the Western states, where the American type predominates, woman suffrage is an assured fact. Wyoming, Utah, Colorado and Idaho are full suffrage states, and in the other Western states the tendency is constantly toward increasing woman suffrage.

At the election held on Nov. 5, 1895, the people of Utah ratified the new state constitution, including the clause, "giving to woman full suffrage," and in January of 1896, Utah became the forty-fifth state of the Union and the third in which the full suffrage is accorded to women. The supreme court of Washington holds that in cities of eighteen thousand and over, women are entitled to vote at all elections held to legalize school indebtedness. The legislatures of Nevada and Oregon in 1895, passed a full suffrage bill, which must also pass the legislature of 1897, and then be approved by the people of those states, before becoming a law.

The right of the women of Ohio to vote for members of school boards was sustained by decision of the state supreme court. This decision was rendered in 1895.

The Connecticut legislature, in the same year, refused to repeal the school suffrage laws. In the legislatures of Iowa, Michigan, Wisconsin, Maine and Connecticut full suffrage bills and in Vermont a municipal suffrage bill were defeated during 1894 and 1895. The senate committee of the Rhode Island legislature returned a unanimous report in favor of woman suffrage.

The legislature of New Jersey took the first step in 1895 toward passing a constitutional amendment, conferring on women the right to vote for school trustees, of which they had been deprived by a judicial decision which left unimpaired the right to vote on school appropriations. The amendment has not been adopted.

In June, 1895, the Massachusetts legislature enacted a law, giving to both men and women the opportunity of voting for and against woman suffrage. The state majority against suffrage was 77,000.

In Lexington, Kentucky, there were elected on the school board four men and four women; the election took place in 1895.

The constitutional convention of South Carolina seriously considered the woman-suffrage amendment. It was, however, defeated.

The legal status of woman has undergone many rapid changes during the last ten years. In most of the states women are entitled to their own money and have entire control of their income, which cannot be seized for the debts of the husband. Most of the states are passing laws, giving to the mother equal custody and control, with the father, of the minor children. Thus she has power to select guardians, and this law also prevents the separation of mother and child.

Husband and wife are now free to make contracts with each other, to sue and be sued. The condition of the widow is greatly changed; the old dower law, that is, a life interest in one third the real estate, has been widely modified, and the widow is now entitled to an equal share in her husband's estate,

real and personal, and the courts are very liberal in interpreting the rights of the wife. In all the states the widow and children are entitled to support from the estate for a certain length of time. Some of the states also recognize a homestead estate in the dwelling of the family. The widow is entitled to the use of the dwelling until she re-marries, and the family until the youngest child is 21 years of age. This is, in brief, a summing-up of the political and legal status of woman in the United States. The interpretation of the law by the courts is always more liberal than the law itself, and the tendency is to constantly legislate to better the condition of women and children.

Women are admitted to the bar in all the states. Mrs. Arabella Mansfield, of Iowa, was admitted to the supreme court in 1869, and about the same time women students were received into the law schools of the Universities of Washington, St. Louis and Chicago. There are now 11 law schools open in the United States to women. It would be difficult to give the exact number of women lawyers in the United States. There are probably not more than 300, 11 of whom have been admitted to practice in the supreme court of the United States. Most of the states of the Union allow women to hold public office; even in some states where they do not vote, this is the case. Many offices connected with public charities are held by women in the United States, as factory inspector, state board of charities, managers and trustees of penal institutions, physicians, visitors and trustees of state institutions. By the act of Congress in 1870, the clerkships of the executive departments of the United States government were open to women. A large percentage of the clerks employed in these departments are women.

The government positions are eagerly sought after and are largely held by the widows and daughters of former employees of the government; female relatives of army officers, of judges, and legislators make up the largest percentage of the women employed in Washington.

The beginning of the agitation for woman suffrage was foreshadowed in the anti-slavery movement. The first woman's rights convention of the world was called by Lucretia Mott and Elizabeth Cady Stanton, at Seneca Falls, New York, on the 19th of July, 1845. The platform of the convention was very radical, demanding equal rights in education, the trades and professions, universal suffrage and a share in all political offices. It is an open question whether the movement would not have secured better results had the demands of the organizers been more moderate.

The first movement in the advancement of women was naturally on educational lines. The employment of women as teachers in the public schools of the country was a recognized feature of the American system, and during the Civil War the number of women thus employed was greatly increased. Women have largely usurped the profession of teaching all over the civilized world. Children up to the age of ten, both boys and girls, are usually committed to their care, and in the public schools of the United States women teachers predominate,

from the kindergarten to the high-school. In the higher branches of the profession men have held their own, so that the professorships of the great universities and those of the larger colleges are entirely held by men. The reason for the excess of women over men teachers is not difficult to explain. The teacher's position, comparatively unremunerative and unstable, does not appeal to the spirit of enterprise in which the American boy is educated, and until within the last fifteen years teaching was almost the only profession which gave to women of culture the opportunity to exercise their talents. Antioch and Oberlin colleges were the first co-educational institutions of the country, and Horace Mann was the president of Antioch; it was founded in 1852; Oberlin was founded in 1833; Cornell University in 1862, and Michigan University in 1870. The colleges founded exclusively for women are Vassar, Wellesley, Smith, Bryn Mawr, and Wells Colleges. The great universities and colleges for men are being rapidly opened to women. Radcliffe is the annex of Harvard, Barnard of Columbia, and in both these institutions women receive the same education as that given to the university men. The Massachusetts Institution of Technology, one of the most important institutions of this country, is co-educational. And the high and grammar schools are all co-educational. In 1822 the public schools were first opened to girls. This privilege was accorded them at a town meeting in Northampton, Massachusetts. Most of the state universities, even in the South, are now co-educational.

There still exists, however, some difference of opinion as to the success of co-education in the large universities.

The total number of colleges available to women, whether co-educational or otherwise, returned by the Bureau of Education for the years 1892 and 1893, was 143. The majority of these colleges are in the North Atlantic states, where co-education has made the least progress. In the South there are many women's colleges, but the standard of education of these colleges is not above that of the secondary schools of the North. Along the line of primary, secondary and high-schools, the South ranks well with the North; but for the higher education it is very backward. Such Southern girls as desire to secure the benefits of a university training are obliged to come North.

The denominational colleges are also admitting women to classes. In 1856 the Universalist denomination founded a college for the education of both men and women. The Unitarians, the Free-Will Baptists, the Congregationalists, the Methodists and several of the smaller sects admit women to their schools and colleges. The medical schools and industrial and technical schools are open to women in most of the states.

It is surprising that so few women avail themselves of the advantages of the higher education. American parents are very self-sacrificing, when it is a question of the future of their daughters, and in this age of specialization the fact that so few young girls enter the colleges and universities is to be deplored. Among the so-called wealthy classes the

fashion of introducing young girls into society and making them an influential factor in social life is, of course, in direct opposition to the principles of higher education. The age at which a girl is willing to devote her entire time to dress and pleasure is from 16 to 22, and that is the time in which higher education makes the most exacting demands on the young girl; from 16 to 18 in the preparatory schools and from 18 to 22 in the university. The question of a girl's social life in connection with university life is not yet solved. Men in the higher universities have a delightful social life, but until quite recently the girl was completely cut off from social pleasure while attending a university course. The tendency to build houses for the girls and to allow them to become members of college fraternities, to introduce games in which they can join, is revolutionizing this aspect of university education, and in the near future the problem of social life and higher education will be solved for women as for men. It is too early in the history of the higher education for women to prophesy its effects on the professions. From a careful observation of the women in attendance at the colleges and universities, the writer would say that the majority are in training for the profession of teacher, either in kindergartens, private and technical schools, or in women's colleges. An ever-increasing number are becoming artists, engravers, etchers and decorators. The remainder seem to be ambitious to be all-round, well-educated, sensible women, and the spirit of conservatism among them all is a marked characteristic. See INDUSTRIAL CONDITION OF WOMEN and CLUBS, WOMEN'S, in these Supplements.

ELLEN M. HENROTIN.

*WOMAN'S CHRISTIAN TEMPERANCE UNION, an organization originating in the temperance crusade by women which began in Hillsboro, Ohio, Dec. 23, 1873. The methods of that movement were the holding of prayer-meetings by women in the morning, from which went forth "Praying Bands" to the saloons, where they read the Bible, sang hymns and prayed, after which they repaired to some designated church and continued their prayer-meetings. In many instances the saloonkeepers agreed to close their places of business, and invited the women to break their casks and decanters. As a result of this movement, the attendance in church, Sunday school and public school greatly increased.

The first local Women's Christian Temperance Union was founded in Fredonia, New York, in December, 1873. The first State Union was founded in Ohio, in 1874. In Chautauqua, New York, several crusaders gathered at the Sunday-school conference in August of that year and issued a call for a National Convention, which met in Cleveland, Ohio, Nov. 18-20, 1874, and organized the National Woman's Christian Temperance Union, eighteen states being there represented. Since then, every state has been organized locally, most of them by counties and districts, while every State and Territory of the republic has for many years steadily held its annual meeting. The first President of the Na-

tional Society was Mrs. Annie Wittenmyer, of Philadelphia. Miss Frances E. Willard was corresponding secretary until 1879, when she became president.

The Society's work has been classified under the heads Preventive, Educational, Evangelistic, Social and Legal work, all of which are based upon the Department of Organization.

Total abstinence for the individual and total prohibition for the state are the chief corner-stones of the movement.

In 1883 was founded the World's Woman's Christian Temperance Union, a federation having branches in all English-speaking countries and having for its motto, "For God and home and every land." This organization prepared what is known as the Polyglot Petition, which calls for the universal abolition of the liquor and opium trades, and is addressed to the heads of all governments. This petition has been signed in 50 different countries and languages, and bears nearly two million personal signatures, also endorsements of societies, making the aggregate 7,000,000.

There are forty distinct departments of work connected with this society, the headquarters being located in Chicago. An organized effort has been made to secure temperance instruction in the public-school systems of all nations, and this has already been accomplished throughout the United States with one or two exceptions; also in Japan, the Hawaiian Islands, some of the Australian provinces, and Canada. A like course was recommended by the Minister of Public Instruction in France, while in Great Britain much attention is paid to it, through the efforts of the temperance people in the board schools. Measures have been also adopted for introducing temperance instruction in the Sunday-school system throughout the world. The international lesson-series now admits a quarterly temperance lesson.

There are but two requisites for admission to the society, viz., promises of payments of dues and abstinence from intoxicating drinks. The dues are usually fifty cents a year. In the annual meetings, resolutions are adopted and platforms put forth recognizing the woman's ballot as a method of securing and enforcing prohibitory law, and urging the department of purity with the White Cross pledge upon the attention of all who have the training of the young. There is also a department of suffrage work for those who desire to labor in that cause. Much sympathy has been developed for the wage-worker and the eight-hour law, and many other of the methods urged by the great group of labor reformers have been warmly seconded by the society.

The organization is thoroughly systematized, and the same principles and methods generally prevail, from the local to the world's union. The Woman's Temperance Publication Association has 120 employees, and publishes the *Union Signal*, the organ of the movement. One hundred and thirty million pages of total-abstinence and purity literature have been sent out from this publishing-house in a single year. The National Temperance Hospital, founded in 1883, has for its purpose the demonstration that

alcoholics are not essential in medical practice. The department of evangelistic work is the foundation department of the Woman's Christian Temperance Union, and has developed many women evangelists, bible readers, and Christian workers.

In England there is also a White Ribbon publishing company, their paper, *The Woman's Signal*, being founded by Lady Henry Somerset, president of the White Ribbon societies in England. A woman's lecture-bureau, a home for friendless girls and an industrial farm home for inebriate women, at Duxhurst, near Reigate, Surrey, have also been established. There are ten thousand local unions in the United States, and a membership and following of not fewer than half a million. There are in England about one thousand local societies, and more than one hundred thousand actual members. The work in Australia, New Zealand, South Africa, Japan and India is becoming thoroughly established. In Canada it is almost as far advanced as in the United States. A department of peace and international arbitration co-operates with all the other peace societies of the world. The department of purity is among the leading lines of work. There is also a department of mercy, which opposes vivisection and inculcates kindness to all sentient beings. The department of penal-reform work has secured laws requiring the appointment of women in police-station work.

The first convention of the world's Woman's Christian Temperance Union, was held in Faneuil Hall, Boston, Nov. 10 and 11, 1891; the second, in Chicago at the Art Institute during the World's Fair in 1893; the third in Queen's Hall and Albert Hall, London, England, June 18-20, 1895.

Twenty national organizers are in the field continually visiting those states and localities that most need help, and an equal number of evangelists are steadily at work.

FRANCES E. WILLARD.

WOMAN'S NON-PARTISAN NATIONAL CHRISTIAN TEMPERANCE UNION, organized in 1890, by seceders from the Woman's Christian Temperance Union, as a protest against the attitude of that organization toward the political parties. Article 2 of the constitution provides: "The object of this association shall be to interest and unite the women of the nation in non-partisan, non-sectarian temperance work, and confining itself strictly to such temperance work, it will devise and execute measures to secure, through the blessing of God, total abstinence and the complete extinction of the liquor traffic." Article 5 reads: "Neither the officers of this association, nor the annual meeting, shall directly or indirectly pledge the influence or cooperation of the association, in whole or in part, to any other association, or to any political party, or to any religious sect." The first annual convention of the Union was held at Allegheny, Pennsylvania, in November, 1890.

WOMAN'S RELIEF CORPS. This organization was created by the mothers, wives, daughters and sisters of Union soldiers of the Civil War of 1861-65, for the purpose of aiding the Grand Army of the Republic, and to "perpetuate the memory

of their heroic dead," to "extend needful aid to the widows and orphans," to "cherish and emulate the deeds of our army nurses," and to "inculcate lessons of patriotism and love of country among our children and in the communities in which we live." The organization is composed of departments, which are subdivided into corps. The total membership of the order, June 30, 1894, was 139,081. The annual amount expended in relief during the fiscal year was \$170,584; the amount since organization in 1883, \$1,013,560.

WOMEN'S CLUBS. See CLUBS, in these Supplements.

WOOD. See BOTANY, Vol. IV, pp. 100, 101.

WOOD, DE VOLSON, an American engineer and educator; born in Smyrna, New York, June 1, 1832. After graduation at the New York State Normal School, Albany, in 1855, he was an instructor in mathematics there until 1856, when he attended the Rensselaer Polytechnic Institute, graduating in 1856. From 1857 to 1872 he occupied the chair of civil engineering in the University of Michigan, and in 1872 went to the Stevens Institute of Technology as professor of mathematics and mechanics, and in 1885 was transferred to the chair of engineering. He was a constant experimenter and writer. Among his inventions are an air-compressor, pneumatic rock-drill and a steam pump. He wrote *Resistance of Materials* (1871); *Elementary Mechanics* (1878); *Trigonometry* (1885); *Thermo-dynamics* (1887); and TECHNICAL SCHOOLS IN AMERICA, in these Supplements. Died in Hoboken, N. J., June 27, 1897.

WOOD, ELLEN PRICE. See WOOD, MRS. HENRY, Vol. XXIV, p. 644.

WOOD, FERNANDO, an American public man; born in Philadelphia, June 14, 1812, and became a resident of New York City eight years later. He engaged in commercial business there early in life, and, becoming identified with political organizations, was elected to Congress in 1841. Upon the expiration of his congressional term he returned to New York, and in 1850 was Democratic nominee for mayor of the city, but was defeated. In 1854, however, he was elected to that office, and during its administration brought about reforms that so impressed citizens with the value of his services, that he was re-elected almost unanimously. During his second term a conflict arose between the legislature and the municipal authorities, in respect to the control of the department of police. A riot followed, in which many persons were injured, and at the election held in 1857 he was defeated. In 1859 he was once more elected, and in 1863 was returned to Congress, where he remained until 1865; was re-elected in 1867 and served until 1877. He died in Washington, District of Columbia, Feb. 14, 1881.

WOOD, GEORGE BACON, an American chemist and author; born in Greenwich, New Jersey, March 13, 1797; and educated in New York, also at the Pennsylvania University, where he graduated in 1815. In 1817 he was licensed to practice medicine, and for the two years next succeeding, delivered a series of lectures on chemistry, in Philadelphia; from the latter period until 1860 was continuously employed as a professor of chemistry in

Pennsylvania University and Philadelphia College of Pharmacy. He also provided for the maintenance of five professorships in the former institution, and by his will directed that a sum of money should be appropriated to the support of a ward in the Hahn Hospital, Philadelphia. He was the author (in conjunction with Professor F. Bache) of the United States *Dispensatory*, and of numerous works on *materia medica*; also of a *History of the University of Pennsylvania* (1827). He died in Philadelphia, March 30, 1879.

WOOD, SIR HENRY EVELYN, a British soldier; born in Cressing, Essex, Feb. 9, 1838. He served in the Crimean War, the Indian Mutiny, the Ashantee War and the Zulu War, being promoted to the rank of brigadier-general. He also commanded an expedition in the Transvaal in 1881, and in the settlement of the Transvaal dispute was one of the British commissioners, and had charge of the Egyptian army in the Sondan from 1882 to 1885. He became quartermaster-general of the British army in 1893.

WOOD, HORATIO C., an American physician, nephew of George Bacon Wood; born in Philadelphia, Pennsylvania, Jan. 13, 1841; graduated in 1862 at the University of Pennsylvania medical department; began practice in Philadelphia; was chosen professor of botany in his *alma mater* in 1866; transferred to the chair of therapeutics in 1876 and given charge of the clinics in diseases of the nervous system. He was elected visiting physician to the University Hospital in 1870. Among his numerous writings are *Myriapoda of North America* (1865); *Fever, a Study in Morbid and Normal Physiology* (1880); *Materia Medica and Therapeutics* (1875); *Nervous Diseases and Their Diagnosis* (1886); *Therapeutics* (1888); and edited *New Remedies* (1870-73); *Philadelphia Medical Times* (1873-80); and the *Therapeutic Gazette* after 1884.

WOOD, JAMES FREDERICK, an American Roman Catholic prelate; born in Philadelphia, Pennsylvania, April 27, 1813; in 1836 was a bank cashier in Cincinnati, Ohio, and that year was admitted to the Roman Catholic Church, and went to Rome to prepare himself for the priesthood. He was ordained in 1844; assistant rector of the Cincinnati cathedral from 1844 to 1854; appointed bishop of Gratianopolis in 1857, and sent to Philadelphia as coadjutor to Bishop Newman; and in 1860 became bishop of Philadelphia. He was made an archbishop in 1875. To him were due many of the church institutions in Philadelphia, and to his energy the strength of the church in Pennsylvania. He died in Philadelphia, June 20, 1883.

WOOD, JAMES RUSHMORE, an American surgeon; born in Mamoroneck, New York, Sept. 14, 1816; graduated at the Castleton (Vermont) Medical School in 1834; began the practice of his profession in New York City in 1847; appointed to the staff of Bellevue Hospital, and reformed the methods of management of that institution. He presented the Board of Charities with the "Wood Museum" in 1876, and until his death was active in influencing legislation in behalf of science. He was one of the founders of Bellevue Medical College,

and occupied the chair of surgery in that institution; was the author of *Phosphor necrosis of the Lower Jaw* (1856). Died in New York city, May 4, 1882.

WOOD, JOHN GEORGE, an English naturalist; born in London in 1827; graduated at Merton College, Oxford, in 1848; took orders in 1852; from 1856 to 1862 was assistant chaplain at St. Bartholomew's Hospital, London; and in 1868 was chosen precentor of the choral union of Canterbury. He was a constant student of natural history, and wrote *The Illustrated Natural History* (1859-63); *Homes Without Hands* (1865); *The Natural History of Man* (1868-70); *Man and Beasts Here and Hereafter* (1874); and *Horse and Man* (1886). Died in Coventry, March 4, 1889.

WOOD, LEONARD, American physician, army officer, and administrator; was born at Winchester, N. H., Oct. 9, 1860. In 1881-84 he went through the Harvard Medical School; in 1883-84 was house surgeon in the Boston city hospital; in 1884 was contract surgeon; and on Jan. 5, 1886, was made assistant surgeon and first lieutenant. In the same year he served under General Miles in Arizona and New Mexico, in the difficult campaign against the Apaches under Geronimo and Natchez (April-Sept., 1886), doing duty as commanding officer of detachments sent out to perform peculiarly arduous and dangerous duties, and winning a medal of honor for his conspicuous gallantry. During the war with Spain he was colonel of one of the regiments of Rough Riders (First Volunteer Cavalry), and took part in the fight at Las Guasimas (June 24, 1898) and in the battles at San Juan, near Santiago de Cuba (July 1-3, 1898), in the latter of which, in consequence of General Young's illness, he commanded one of the two brigades of General Wheeler's division of dismounted cavalry. On July 8 he was made brigadier-general of volunteers; and three days after the surrender of Santiago (July 17) was appointed military governor of the city, and later succeeded General Brooke as governor-general of Cuba. Gen. Wood, by his energy, firmness, common sense, and moderation, effected a marvelous improvement in sanitary conditions and in the enforcement of order and good government generally.

WOOD, THOMAS JOHN, an American soldier; born in Munfordville, Ky., Sept. 25, 1823. After graduating at the United States Military Academy in 1845, he saw active service during the Mexican War and on the frontier until the outbreak of the Rebellion; was commissioned brigadier-general of volunteers and later colonel of the regular army, and assigned to the cavalry; saw active fighting at Shiloh, Corinth, Murfreesboro, Missionary Ridge; assigned to the command of the Fourth Corps against Hood; was present at the battles of Chickamauga and Nashville, and was promoted major-general. He was retired March 3, 1871.

WOOD, THOMAS WATERMAN, an American painter; born in Montpelier, Vt., Nov. 12, 1823; was in the studio of Chester Harding in Boston, in 1846-47. In 1858 he went to Paris, where he remained three years. On his return to America he devoted himself to portrait-painting until 1867. Among his paintings exhibited at the National Academy are *The Sharpshooter* (1867); *Politics in the Workshop* (1868); *The Country Doctor* (1869); *Not a Drop*

Too Much (1878); and at the Water-Color Exhibition, *A Poor White* (1874) and *Arguing the Question* (1877). He became vice-president of the National Academy in 1878, and president of the American Water-Color Society (1878-87).

WOODBERRY, GEORGE EDWARD, an American author; born at Beverly, Mass., May 12, 1855; was graduated at Harvard in 1877; professor of English literature at Nebraska State University from 1878 to 1882, with the exception of 1879; and in 1892 became professor of English literature at Columbia College, New York. He wrote a *History of Wood Engraving* (1883); *The North Shore Watch, and Other Poems* (1883); and *Life of Edgar Allan Poe* (1885).

WOODBINE. The name is applied by some to the Virginia creeper, a variety of ampelopsis. See HONEYSUCKLE, Vol. XII, p. 140.

WOODBURIDGE, a village of Middlesex Co., N. J., 25 miles S.W. of New York city; has tile and drain-pipe works, and large deposits of fire-clay and fire-brick. Pop. borough, 1900, 582.

WOODBURIDGE, WILLIAM, an American statesman; born in Norwich, Conn., Aug. 20, 1780; removed to Marietta, Ohio, in 1791; educated in Connecticut, and was admitted to the Ohio bar in 1806. In 1807 he was elected to the assembly; was prosecuting attorney for New London County and a member of the state senate (1808-14); secretary of the territory of Michigan (1814); and Michigan's first delegate to Congress (1819-20). He was judge of the superior court of Michigan (1828-32); a delegate to the state constitutional convention (1835); state senator (1837); governor (1840-41); and United States Senator (1841-47). Died in Detroit, Oct. 20, 1861.

WOODBURY, a town of Litchfield Co., Conn., 25 miles N.W. of New Haven, on the Pomperaug river; includes the villages of Woodbury, North Woodbury, Hotchkissville, and Minortown; is the seat of Parker Academy, and has factories of woolen goods, stockinets, powder flasks, and cutlery. Pop. 1900, 1,988.

WOODBURY, a city, the capital of Gloucester Co., N. J., 8 miles S. of Philadelphia; has gas and electric lights; electric street-railways, connecting it with Philadelphia; water-works, a large private school, a public library, piano factories, glass-works, and chemical works; is an important shipping-point for fruit and vegetables. Pop. 1890, 3,911; 1900, 4,087.

WOODBURY, LEVI, an American jurist; born at Frankestown, N. H., Dec. 22, 1789; graduated at Dartmouth in 1809; studied at the Litchfield (Conn.) Law School; admitted to the New Hampshire bar in 1812 and commenced practicing at Frankestown; became a supreme court judge (1817); governor (1823-24); speaker of the state house of representatives (1825); United States Senator (1825-31); Secretary of the Navy (1831-34); Secretary of the Treasury (1834-41); again United States Senator (1841-45); and justice of the United States Supreme Court from 1845 until his death. A collection of *The Writings of Hon. Levi Woodbury, Political, Judicial, and Literary*, appeared in 1852. Died in Portsmouth, N. H., Sept. 4, 1851.

WOODCHAT. See SHRIKE, Vol. XXI, p. 846.

WOODCHUCK OR GROUND-HOG, a well-known American marmot (*Arctomys monax*), of the

family *Sciuridae*. It is the most common marmot in North America. The animal has coarse fur, brownish gray above and reddish brown beneath. The skin is of little value, but when tanned makes a very strong leather. The animal lives alone, to which habit the specific name refers. It hibernates during the winter. According to the well-known rural myth, the winter's sleep is supposed to be broken on February 2d, and the ground-hog becomes for the day a prophet of the weather. The animal is so destructive to many cultivated plants that in many states rewards are paid to the hunters who kill them.

WOODBURYTYPES. The Woodburytype, or photoglyph, was invented by W. B. Woodbury. A sheet of bichromatized gelatine is exposed under a negative; it is then washed to remove the unchanged gelatine that was protected from the negative, and finally dried. This relief film is then placed upon a sheet of lead and forced into it by hydraulic pressure, thus producing an intaglio mold. This mold is placed in a horizontal press, and flowed with a solution of warm gelatine colored with pigment. A sheet of paper is then laid upon it, and the excess of covered gelatine is forced out by pressure. The paper print is hardened in a solution of alum. The result is a gelatine pigment picture. A sheet of glass is sometimes substituted for the paper, and transparencies and lantern-slides of great beauty are obtained. The stannotype is a modification in which tinfoil, properly backed by electrotyping or otherwise, is substituted for the lead plates. The photo-filigrane or photo-diaphanic process consists in attaching the gelatine relief to a plate of steel and using it to produce, by pressure, transparencies in white paper, which resemble water-marks.

WOOD-DUCK. See **DUCK**, Vol. VII, 506.

WOOD-ENGRAVING. See **ENGRAVING**, Vol. VIII, pp. 436-439.

WOODEN VESSELS, in the United States navy. See **NAVY**, in these Supplements.

WOODFALL, HENRY SAMPSON, an English editor; born in London in 1739; succeeded his father in the publication of the London *Public Advertiser* in 1760, and continued in that business 33 years, publishing the famous *Letters of Junius* (see **JUNIUS**, Vol. XIII, p. 775), and being prosecuted at law for so doing. He became master of Stationers' Hall in 1797, and died at Chelsea, Dec. 12, 1805. See also **NEWSPAPERS**, Vol. XVII, p. 417.

WOODFORD, STEWART LYNDON, an American lawyer; born in New York City, Sept. 3, 1835; entered Yale, and graduated at Columbia in 1854, and began practicing law in New York City in 1854. He was appointed United States assistant attorney for the southern district of New York in 1861; entered the Union army in 1862; became, in turn, chief of staff to General Gillmore in the Department of the South, military commandant of Charleston and Savannah, and was brevetted brigadier-general of volunteers. He was lieutenant-governor of New York (1868-70); was elected to Congress in 1872, and was United

States attorney for the southern district of New York (1877-83). He was the author of addresses and papers on literary, legal and political subjects. Appointed Minister to Spain in 1897.

WOOD-GROUSE. See **CAPERCALLY**, Vol. V, p. 54.

WOODHOUSELEE. See **TYTLER**, Vol. XXIV, pp. 713, 714.

WOOD-IBIS. See **IBIS**, Vol. XII, p. 607.

WOODLAND, a city and the capital of Yolo County, northwestern central California, 22 miles W.N.W. of Sacramento and 86 miles N.E. of San Francisco, on the Southern Pacific railroad. It is in an agricultural and fruit-producing region. The chief industry is raisin-culture. It has wineries, woolen and planing mills, ice factories, and is the seat of the Academy of the Holy Rosary and of Hesperian College (Christian). Population 1890, 3,069; 1900, 2,886.

WOOD-LOUSE. See **CRUSTACEA**, Vol. VI, p. 642, 658.

WOOD-OIL. See **BALSAM**, Vol. III, p. 293.

WOOD-RAT, the common name for rodents of the genus *Neotoma*. They live in forests, and construct houses by collecting great quantities of brush and leaves into heaps, into which they burrow. The best known, perhaps, is the Florida wood-rat (*N. floridans*). Several other species occur in the Southern and Southwestern states, in Mexico, and in Central America. See **MOUSE** Vol. XVII, p. 6.

WOODROW, JAMES, an American educator; born at Carlisle, England, May 30, 1828; educated at Jefferson College (Louisiana), Lawrence Scientific School, and Heidelberg. He was professor of natural science in Oglethorpe University (1853-61); studied theology and was ordained in the Presbyterian Church (1860); was professor of natural science in connection with revelation in the Presbyterian Theological Seminary at Columbia, South Carolina (1861-84). He was also professor of science in South Carolina College (1869-72), and in South Carolina University (1880-91), in the latter year becoming president of South Carolina College. He was editor of *The Southern Presbyterian Review* (1861-85); and of the *Southern Presbyterian*, beginning in 1865, and is author of numerous review articles.

WOODRUFF, the local name of *Asperula odorata*, a European plant of the madder family (*Rubiaceæ*). It dries with a pleasant fragrance, and is used by European peasants in flavoring various domestic drinks.

WOOD-RUSH. See **LUZULA**, in these Supplements.

WOODS, HENRY, a British artist; born at Warrington, Lancashire, April 23, 1847; studied in the South Kensington Art School, and engaged in magazine-illustration, especially on the *Graphic*. His first exhibitions at the Royal Academy were *Going Home* and *Haymakers*. He went to Venice in 1876, and produced a number of pictures of Venetian life; among them, *A Venetian Ferry*; *A Gondolier's Courtship*; and *Preparing for the Fiesta*.

Among his later pictures are *Bargaining for an Old Master*; *Cupid's Spell*; *On the Riva of the Giudecca*; and *Waiting for a Ferry, Venice*, executed in 1894.

WOODS, LEONARD, an American clergyman; born at Princeton, Massachusetts, June 19, 1774; was graduated at Harvard in 1796; studied theology at Somers, Connecticut, and was ordained a pastor at Newbury, Massachusetts, in 1798. He became first professor of Christian theology at the Andover Theological Seminary upon its founding in 1808, and retained that position until made professor emeritus in 1846. He was instrumental in organizing the American tract and temperance societies and the Board of Commissioners of Foreign Missions, being a member of the latter's prudential committee for twenty-five years. Among his publications are *Letters to Unitarians* (1820); *Memoirs of American Missionaries* (1833); and *Lectures on Swedenborgianism* (1846). He was an ardent defender of Calvinism, and died at Andover, Aug. 24, 1854.—His son, LEONARD, JR., a scholar; born at Newbury, Massachusetts, Nov. 24, 1807; was graduated at Union College in 1827 and at Andover Theological Seminary in 1830, and was licensed to preach in 1834. He edited the *Literary and Theological Review*, New York (1834-37); was professor of sacred literature at Bangor Theological Seminary (1836-39); and president of Bowdoin (1839-66). In 1866 he was commissioned by the state of Maine to procure materials in Europe for a history of that state, and in 1868 published his *Discovery of Maine*. He was engaged in further literary work when his library and materials were destroyed by fire. Harvard conferred on him the degree of D.D. in 1846, and Bowdoin that of LL.D. in 1866. He died in Boston, Dec. 24, 1878.

WOODS, WILLIAM BURNHAM, an American soldier; born at Newark, Ohio, Aug. 3, 1824; educated at Western Reserve and Yale universities, graduating at the latter in 1845. He studied law in Newark, practiced there, and was elected mayor in 1856 and 1857; was elected to the legislature in 1857 and 1859, and was speaker of the house in 1858. He entered the army as lieutenant-colonel of the Seventy-sixth Ohio Volunteers at the opening of the war, and was prominent throughout its course, commanding a division in General Sherman's march to the sea. He was brevetted brigadier-general of volunteers, Jan. 12, 1865; major-general of volunteers, March 13, 1865; full brigadier-general, May 31, 1865. After the war he settled in Alabama, practiced law and became state chancellor in 1868; was appointed United States judge of the fifth circuit in 1869, and an associate justice of the United States supreme court in 1880. He died in Washington, District of Columbia, May 14, 1887.

WOODSFIELD, a village and the capital of Monroe County, southeastern Ohio, 30 miles S.W. of Bellaire and about 48 miles E.S.E. of Zanesville, on the Bellaire, Zanesville and Cincinnati railroad. It is in a hilly region, devoted to agricultural pursuits and sheep-raising, and has a

number of unimportant manufactures. Population 1890, 1,031; 1900, 1,801.

WOOD'S HALFPENCE. See SWIFT, Vol. XXII, p. 766.

WOOD'S HOLL, a village of Barnstable County, southeastern Massachusetts, 72 miles S.E. of Boston, on a strait connecting Buzzard's Bay and Vineyard Sound, and on the New York, New Haven and Hartford railroad. It has a deep harbor, affording a refuge for large vessels in stormy weather, and is best known for its large fish-hatcheries, and its thoroughly equipped marine biological laboratory, supported by the United States government. The laboratory is located on a plat of government land with a shore-line of one third of a mile, and in 1895 had 15 instructors and 188 students and investigators. Population 1890, 512; 1900, with Falmouth township, 3,500.

WOOD'S METAL. See CADMIUM, Vol. IV, p. 628.

WOOD-SORREL, the common name of species of *Oxalis*, a genus of plants belonging to the geranium family (*Geraniaceæ*). They are herbs with sour and watery juice, leaves of three obcordate leaflets, which droop at nightfall, and regular flowers of various colors.

WOOD-SPIRIT. See METHYL, Vol. XVI, p. 195.

WOOD-SPITE OR WOOD-SPEIGHT. See WOODPECKER, Vol. XXIV, p. 651.

WOODSTOCK, a town of Windham County, extreme northeastern Connecticut, on the Quinebaug River. It is a noted summer resort, and the seat of an excellent academy. It contains the villages of Woodstock, North, South, East and West Woodstock and Woodstock Valley, and is chiefly interested in agriculture and the manufacture of cotton twine. Population 1900, 2,095.

WOODSTOCK, a city and the capital of McHenry County, northeastern Illinois, 51 miles N.W. of Chicago and 32 miles E. of Rockford, on the Chicago and North-Western railroad. It is in an agricultural and dairying region; has a butter and cheese factory, feed and planing mills, foundry and machine-shops, pickling and canning works, and is the seat of Todd Seminary, a school for boys. Population 1900, 2,502.

WOODSTOCK, a town and port of entry, the capital of Carleton County, western New Brunswick, Canada, on the St. John River and on the Canadian Pacific railroad, 12 miles E. of Houlton, Maine, and 61 miles N.W. of Fredericton. It is in a fertile region, and has several mills, manufactures of iron castings, leather, furniture and mill machinery. Large deposits of hematite iron ore charged with manganese were formerly found here, but have been exhausted. Population 1891, 3,288.

WOODSTOCK, a town and port of entry, the capital of Oxford County, southwestern Ontario, Canada, on the Thames River and Cedar Creek, and on the Canadian Pacific and the Grand Trunk railroads, 49 miles W. of Hamilton and 29 miles E.N.E. of London. It is the center of a large

trade; has considerable water-power, and contains mills, piano and organ factories, furniture factories, tanneries, foundries and manufactures of agricultural implements. Woodstock is the seat of Woodstock College (Baptist), and is visited by many tourists during the summer. Population 1891, 8,612.

WOODSTOCK, a village and the capital of Windham County, southeastern Vermont, on the Ottaquechee River, and on the Woodstock railroad, 14 miles W. of White River Junction and 40 miles S. of Montpelier. It is an important trade center of an agricultural region, and has woolen-mills, machine-shops, saw-mills, carriage and sleigh factories, and manufactures of soap, sash, doors and blinds. Population 1900, 1,284.

WOODSTOCK, a town and the capital of Shenandoah County, north-northwestern Virginia, 160 miles N.W. of Richmond and 100 miles W. of Washington, District of Columbia, on the North Branch of the Shenandoah River, and on the Baltimore and Ohio railroad. It is in an agricultural region, has separate schools for white and colored children, and contains a foundry and machine-shop. Population 1900, 1,069.

WOOD-SWALLOW, the swallow-shrikes of the family *Artamidae*, a small group of Australian birds, which are shrike-like in form. The best known is the common wood-swallow (*Artamus sordidus*). They are said to cluster on branches, like a swarm of bees. The birds cling to each other, forming a cluster, suspended beneath the supporting branch.

WOOD-TAR. See TAR, Vol. XXIII, p. 57.

WOOD-TIN. See TIN, Vol. XXIII, p. 400.

WOODVILLE, a town of Wilkinson County, southwestern Mississippi, 15 miles E. of the Mississippi River, 24 miles N. of Bayou Sara, Louisiana, and 35 miles S. of Natchez, on the Illinois Central railroad. It is in a cotton, corn and fruit raising district; has a carriage factory, and is the seat of an academy. Population 1890, 950; 1900, 1,043.

WOODVILLE, a town and the capital of Tyler County, eastern Texas, 110 miles N.E. of Houston, on the Southern Pacific railroad. It is the center and trading-point of a region devoted to farming and stock-raising. Population 1890, 518.

WOODWARD, BERNARD BOLINGBROKE, a British archæologist, brother of Henry Woodward; born in Norwich, May 2, 1816; graduated at London University in 1841, and entered the Congregational ministry. In 1849 he abandoned the ministry for literature and published a *History of Wales* (1852); a *History of the United States of America to the End of the Administration of President Polk* (1855); *First Lessons on the English Reformation* (1857); a translation of Reclus's *The Earth and The Ocean, Atmosphere and Life*; and began *The Encyclopædia of Chronology*, which was incomplete at his death in London, Oct. 12, 1869.

WOODWARD, HENRY, a British geologist, son of Samuel Woodward; born in Norwich, Nov. 24, 1832; studied at the Royal Agricultural College, Cirencester; was appointed an assistant in the geological department of the British Museum in

1858; in 1860 was a member of the MacAndrew Mediterranean expedition, and again in 1863; became the editor of the *Geological Magazine* in 1864; and in 1880 became keeper of the department of geology in the British Museum. Among his writings are over two hundred papers and monographs, including *Fossil Merostomata*, a *Catalogue of British Fossil Crustacea*, and the article on CRUSTACEA, in this ENCYCLOPÆDIA.

WOODWARD, JOSEPH JANVIER, an American surgeon; born in Philadelphia, Pennsylvania, Oct. 30, 1833; graduated at the University of Pennsylvania medical department in 1853; practiced in Philadelphia and was placed in charge of the surgical clinics in his *alma mater*; served throughout the Civil War, first in the field, and later in the surgeon-general's office in Washington, attaining the rank of lieutenant-colonel. He made a special study of microscopy and was given the rank of major in the regular army. He was a consulting-physician in attendance upon President Garfield when the latter was dying, and was a member of the National Academy of Sciences. He was a constant investigator and contributed numerous papers to scientific publications. Among his collected writings is *Chief Camp Diseases of the U. S. Armies* (1863). He died Aug. 17, 1884.

WOODWARD, ROBERT SIMPSON, an American scientist; born in Rochester, Michigan, July 21, 1849; studied at the University of Michigan, and was successively engineer on the United States Great Lakes survey; astronomer United States commission to observe the transit of Venus (1882); astronomer to the United States Geological Survey; and in 1893 professor of mechanics in Columbia College, New York. He published many scientific treatises, chiefly in contributions to scientific periodicals. Among them are *On the Free Cooling of a Homogeneous Sphere* (1887); *The Mathematical Theories of the Earth* (1889); and *Mechanical Interpretation of the Variations of Latitudes* (1895).

WOOL. See WOOL AND WOOLEN MANUFACTURES, Vol. XXIV, pp. 653-658; and AGRICULTURE, in these Supplements.

WOOL, JOHN ELLIS, an American soldier; born in Newburg, New York, Feb. 20, 1784. He was at first a bookseller, and later a lawyer, but in 1812 received a commission in the United States army and rendered distinguished services during the War of 1812. In 1816 he was inspector-general of the forces, and in 1841 had attained the rank of brigadier-general; took part in the Mexican War and was second in command. He was in command in various departments until the beginning of the Civil War, when he again was engaged in active service until 1863, being assigned the command of the Department of the East, with headquarters at New York. In August of that year he was placed on the retired list with the rank of major-general. He died in Troy, New York, Nov. 10, 1869.

WOOLEN MANUFACTURES IN THE UNITED STATES. The latest reliable statistical summaries relating to wool are furnished in the following table:

YEAR ENDING JUNE 30.	PRODUCTION.	IMPORTS.	TOTAL WOOL EXPORTED.	PER CENT IMPORTED.
	Pounds.	Pounds.	Pounds.	Per cent.
1870----	162,000,000	49,230,199	1,862,945	23.3
1880----	232,500,000	128,131,747	3,840,071	35.5
1885----	308,000,000	70,596,170	3,203,345	18.8
1889----	265,000,000	126,487,929	3,404,670	31.7
1890----	276,000,000	105,431,285	3,519,509	28.4
1891----	285,000,000	129,303,648	2,931,045	31.8
1892----	294,000,000	148,760,652	3,210,019	33.6
1893----	303,000,000	172,435,838	4,310,495	36.2
1894----	298,057,384	55,152,585	6,497,654	15.6
1895----	309,748,000	206,033,906	6,622,190	39.8
1896----	272,474,708	230,911,473	12,972,217	45.9
1897----	259,153,351	350,852,026	8,699,069	57.8

The above was prepared by the Bureau of Statistics of the Treasury Department.

The census report for 1890 gives the following statistics of wool manufactured in the United States in 1890: Number of manufacturing establishments, 2,770; capital employed, \$320,417,304; miscellaneous expenses, \$19,547,200; average number of hands employed, males 99,318, females 106,112, children 15,657, total 221,087; total amount paid in wages, \$76,768,871; cost of materials used, \$203,095,642; value of products, \$338,231,109.

The total production of wool in the world in 1891 was 2,456,773,600 pounds. There were 45,048,017 sheep in the United States in 1894, with a total estimated value of \$89,197,000.

COMPOSITION OF WOOL PRODUCTS. The necessity of proper food for sheep, in order to insure successful wool-culture, is rapidly becoming practically understood by American wool-growers. It is now well known that wool is as much a product of food as fat or flesh, or milk. The composition is much the same, as will be seen by the following analysis:

COMPOSITION OF FLESH, WOOL, HAIR AND SKIN.

	FLESH.	WOOL.	HAIR.	SKIN.
Carbon, per cent	51.83	50.65	51.53	50.99
Hydrogen, per cent	7.57	7.03	6.69	7.07
Nitrogen, per cent	17.23	17.71	17.94	18.72
Oxygen, per cent	23.37	24.61	23.84	23.32
Total -----	100.00	100.00	100.00	100.00

So that it is quite as important to feed for wool as to feed for flesh—indeed, it is the same thing—for the wool is nourished by the blood quite as much as the flesh is, and the weight of the wool is equivalent to so much flesh. Consequently, sheep-food that goes to make flesh will make wool, but food that makes fat will not.

But there is a most important matter to consider in regard to the fleece of a sheep, which must not be lost sight of. This is, that healthy wool requires a large quantity of grease and yolk for its preservation. Without this grease and yolk the wool would be harsh and dry and would tangle and fall on the sheep's back and be of no service to the manufacturer. A fleece of a merino, as shorn from the sheep, has a very large quantity of these fatty matters in it, which are lost in the washing, and in some cases these amount to one half or three fourths the weight of the unwashed wool. Necessarily, as the grease and yolk are indispensable for the welfare of the wool for its protection from the weather, one cannot have a good healthy

fleece without them, and the feeding must be such as will afford an adequate supply of this large secretion from the skin.

COMPOSITION OF YOLK IN WOOL. But there is a difference between the mere grease in the wool and the yolk. The latter is not grease, but a soapy matter which is soluble in water, and which is made up, as other kinds of soap are, of fat combined with alkalies. The composition of this yolk is as follows:

	PER CENT.
Carbonate of potash-----	86.78
Chloride of potash-----	6.18
Sulphate of potash-----	2.83
Other substances-----	4.21

Total----- 100.00

The yolk forms nearly twenty-two per cent of the weight of the ordinary clothing wool fleece, while there is from seven to ten per cent of oil in the wool. The yolk, therefore, from its special composition, calls for the attention of the shepherd in regard to the food, which necessarily must contribute the large quantity of potash required by the yolk. In fact, some of the large and most intelligent wool-growers favor as large a product of yolk in the fleece as possible, believing, and reasonably so, that it is an important advantage to the fleece.

VALUE OF ROOT-FOOD IN WOOL-CULTURE. The most successful American wool-growers affirm that the food for sheep should contain an ample quantity of the potash, and chlorine and sulphur combined with it, for the supply of this part of the fleece. Just here it might be mentioned that turnips contain just these necessary elements of the yolk in large proportion, and thus it is accounted for that sheep fed upon these roots to a sufficient extent thrive much better, and produce better and more wool, than those which are not supplied with them. The ash of turnips contain—

	IN THE ROOTS.	IN THE LEAVES.
Potash, per cent-----	39.3	22.9
Sulphuric acid, per cent-----	14.3	9.9
Chlorine, per cent-----	4.1	8.2

No other food-substance contains so large a proportion of these component parts of the yolk, and as the albuminoids of the flesh of the sheep and the ash of the wool contain, also, considerable sulphur, it follows that these roots are really indispensable to the best condition of the sheep, both as regards the growth of flesh and the product and quality of the fleece. Thus the culture of roots, including mangels and beets, which possess the same character as the turnips, in this respect, for the proper feeding of sheep, becomes a subject of much importance to the wool-grower and shepherd.

No doubt, this has been too much neglected by American wool-growers, who rarely grow roots for the feeding of their flocks, laboring under the erroneous idea that it is difficult or impossible to grow roots in our climate. Climate, however, is not the reason for this difficulty. It exists mostly in our prevalent careless culture of the soil in regard to weeds, with which the land is so abundantly stocked as to cause great ex-

pense in working these crops, which will not grow in weedy soil. In its earliest stage, a crop of roots is of very weak growth, and the young plants are easily smothered by the stronger-growing and more abundant weeds. And hence, as the land is not kept under clean cultivation and the weeds reduced in number, there must be a large amount of hand-labor in hoeing the crop. This is the chief reason why roots are not grown for sheep, and one cause of the failure to produce such varieties of wool as are urgently required by the wool manufacturers.

In regard to the best system of feeding sheep for wool, it is unquestionable, for the reasons above stated, that a large portion of the winter and spring feeding of the flocks should consist of some kinds of roots, turnips, beets or mangels. As mangels are most easily grown, and yield more than any other kind of roots, and the field sugar-beets come next to these in regard to these points, these two roots are especially worthy of cultivation by the farmer and the wool-grower. They should form the bulk of the winter and early spring feeding, when dry fodder necessarily makes up the remainder of the subsistence. Next to roots, clover-hay, as containing a large proportion of nitrogen, required for the full growth of the fleece, should form a large part of the food. Pea-straw is quite as valuable as clover-hay, and may be given as an acceptable and agreeable change. For flocks in the South, pea-vines, with the peas, and green fodder crops to be pastured, such as, chiefly, the scarlet annual clover sown in August and turnips sown in September, which may be eaten from the ground in the form of pasture, would form an excellent subsistence.

The most helpful aid to the wool-grower lies in his own hands, and consists in the most skillful feeding of his flock and the production of better and more varied classes of wool, making better fleeces and rearing better sheep, and by the best system of cultivating feeding-crops, to enrich the soil and increase its productiveness.

LABOR-SAVING MACHINERY IN WOOLEN MANUFACTORIES. Up to July, 1890, the United States Patent-Office reports showed a total of 8,895 patents issued for textile machinery alone. These were divided as follows: Felting and hat-making, 1,231; carding, 1,194; knitting, 1,189; spinning, 1,921; weaving, 2,954; cloth-finishing, 401. A large share of these inventions have been made within the last few years. Referring to the remarkably rapid progress which has been made in the manufactures, S. N. Dexter North says, in an admirable paper in the *Popular Science Monthly* of August, 1891: "Surveying the whole field, we are struck by two features in this evolution, the combination of which includes the sum of the advance. Not less wonderful than the succession of power-machines for the automatic handling of the fiber, in the several stages of its manipulation, is the series of mechanical contrivances for the automatic delivery of the material from machine to machine without the touching of human hand. The ingenuity of man

has been constantly directed, in these latter years, to devices for the accomplishment of two purposes: first, to increase production; second, to diminish waste. Both tend to reduce the cost to the consumer, the first by reducing the number of operatives required to make a given amount of product and by increasing the productive capacity of machines otherwise perfect. Perfect as these machines now appear to be in their operation, every one among them is susceptible of improvement, and the patent-offices of every manufacturing nation are burdened with the plans and specifications of new devices. Most of these inventions come to naught; many of them are constantly introduced into the mills. Some few of these advances, not previously spoken of, may be enumerated here. Self-feeders on the first breaker and finisher have been applied to card-machines, dispensing with half the help formerly necessary in the card-room. Self-operating mules have been introduced in clothing-mills, effecting a saving of from 20 to 40 per cent in the cost of spinning. Improved winders, driers and cloth-presses give greatly increased rapidity to the processes of finishing. In weaving flannels, a width of 3 yards at once, 75 or 80 picks a minute are woven as economically and as excellently as 40 or 50 picks were 30 years ago. In making cassimeres, the broad loom has been generally substituted for the narrow loom almost universally employed as recently as 1860. Fifty-six yards of Brussels carpet can now be woven in a day by one girl, in the improved looms, where 14 yards a day was a good product in 1860, with the same help. Similar illustrations might be multiplied almost infinitely. While there has been no new departure or novel idea of transforming effect in the wool-manufacture, the general advance in mechanical efficiency, during the last quarter-century, has been so great as to equal an economical gain in manufacture, equivalent to that which took place when power was first substituted for hand-labor. In our great yarn-mills there is constant progress in the direction of an increased product, of a finer quality, from the same machinery.

"This paper may properly conclude with some indication of the nature of the world's gain from the evolution of the wool-manufacture. It is difficult to obtain a proper standard for such comparison. Statistics, even were they attainable, present the contrast very inadequately. The total gain secured over hand-labor can hardly be estimated at an absolute value, for the present efficiency cannot be obtained. In the principal operations of the manufacture the increase has been about as follows: In olden times a woman could card one pound of wool a day by hand. At present one operative, with the proper machinery in hand, can card 150 pounds a day. Hence the improvement is about 125. On a spinning-wheel a woman could produce daily two skeins. An average "mule" to-day spins about 500 pounds; hence the improvement is about 500 times. On a hand-loom it took a day to weave two to three

yards. Power-looms produce from 35 to 50 yards a day, or an improvement of 17. Hence, disregarding all other factors but these, and placing a modest estimate, it is possible to produce over 700 times more goods to-day than in the olden time, with the same number of hands, disregarding the quality, design, etc.

"The individual capacity of the operative, thus enormously increased by machinery, has been accompanied by an increase in the total number of persons solely occupied in the manufacture of wool. The number who were thus employed in the period of household industry cannot, of course, be estimated. But a vastly larger number of persons now depend directly and solely for their livelihood upon employment in woolen factories than was ever the case before the introduction of power-machinery and the factory system, and they are able to earn quite double the wages of the hand-operative of olden times. It follows that the increase in the production of woolen goods to-day is very much greater than would be indicated by the fact that the labor of one operative is now equivalent to that of one hundred operatives one hundred and fifty years ago. This deduction is borne out by the extraordinary increase in the world's wool-clip. It is safe to put the annual product of wool at two billion pounds, in the greasy state. Of this amount nearly one half comes from three countries—Australia, South America and South Africa—whose wool-clip is a development subsequent to, and undoubtedly caused by, the substitution of machine for hand manufacture. The clip of the United States has increased from a few hundred thousand pounds, at the time of the Revolution, to over three hundred million pounds, and the product of the Continental countries has also increased very greatly in the interval.

"To fully realize the quantity of raw material now consumed in what is commonly known as woolen goods, we must estimate the quantity of waste and substitutes utilized as equal to that of wool, and thus we have four billion pounds of raw material passing annually through the looms of the world. Hand-manufacture knew no such thing as a substitute for wool. The raw material has only been kept abreast of the manufacturing capacity by the discovery of methods for the utilization of these substitutes.

"Something of what the world has gained in quantity has been lost in quality at certain points. It cannot be pretended that the utilization of wastes and substitutes does not involve a certain element of deterioration. Nevertheless, it is a distinct gain to the world, as is every new development that reduces the waste in any branch of industry. Within a few years a machine has been invented, known as the Garrett machine, which enables manufacturers to comb out all their waste, whether from cards, mules, spinning-frames, or from whatever source tangled and twisted fibers are produced in the various processes of manufacture, and to so restore it that it may be again utilized in connection with the original fiber. The

saving thus effected is enormous. The machine, as the illustration shows, is, in principle, the same as the carding-engine. Its strong, sharp-pointed steel teeth gradually untwist and teazel out the kink in yarn or thread, restoring the fibers of wool in nearly their original length of staple.

"The fiber of wool has a wonderful capacity of endurance. Once used, it may be, and is, used again and again, reproduced, not with all its original virtues, but still with many serviceable qualities, and called, according to its form, shoddy, mungo, waste, wool-extract. The French, by a happy conceit, call this material *renaissance*; and it is literally wool born again. By chemical processes the wool in mixed goods is separated from the cotton or other fibers employed for its adulteration, and wonderful machines tear it apart, readjust its fibers and prepare it again for the spindles. Thus it goes into new garments, of a cheap grade to be sure, but if properly prepared, of a serviceable quality. It is customary to speak contemptuously of shoddy and of those engaged in its manufacture and use. But those who do so do not understand how important is the part now played by this preparation in the cheapening of the people's clothing and in the well-dressed appearance of the community."

WOOLLEY, CELIA PARKER, an American authoress; born in Toledo, Ohio, in 1848. She removed with her parents to Coldwater, Michigan, and graduated from the seminary in that city in 1866. She began her literary career with periodical contributions to Eastern journals; in 1884 published a short story in *Lippincott's* and later on several longer ones in the same magazine; in 1887 appeared her first novel, *Love and Theology* (later changed to *Rachel Armstrong*); in 1889, *A Girl Graduate*; *Roger Hunt* (1892). She married J. H. Woolley in 1868; and resided in Chicago, and in Geneva, Illinois.

WOOLMAN, JOHN, an American preacher; born at Northampton, New Jersey, in August, 1720; became a clerk in a store at Mount Holly in 1741, and there opened a school for poor children. Having learned the trade of tailoring, he set out, in 1846, to make preaching tours among the Friends of the back settlements of Virginia, spending the greater part of his life in this way, preaching and writing much against slavery. Among his writings are *Some Considerations on the Keeping of Negroes* (two parts, 1753, 1762); *Considerations on Pure Wisdom and Human Policy, on Labor, on Schools, and on the Right Use of the Lord's Outward Gifts* (1768); and *Considerations on the True Harmony of Mankind, and How It is to be Maintained* (1770). While attending a meeting of Friends at York, England, he was smitten with small-pox, and died Oct. 7, 1772.

WOOLNER, THOMAS, a British sculptor and poet; born in Hadleigh, Suffolk, Dec. 17, 1825; first exhibited, in 1842, *The Death of Boadicea*, which was followed by *Puck*, *Titania*, and *Eros and Euphrosyne*; was one of the founders of *The Germ*, a publication in the interest of the pre-Raphaelite school; became a member of the

Royal Academy. Among his sculptures are *Constance and Arthur*; *Ophelia*; statues of Lords Palmerston, Cavendish and Macaulay; and busts of Carlyle, Gladstone, and others. His first verse was contributed to *The Germ*. His collected volumes are *My Beautiful Lady* (1863); *Pygmalion* (1881); *Silenus* (1884); and *Nelly Dale* (1887). He died in London, Oct. 7, 1892.

WOOLSEY, THEODORE DWIGHT, president of Yale College; born in New York City, Oct. 31, 1801. He graduated at Yale in 1820, studied law in Philadelphia and theology at Princeton, and was a tutor at Yale for two years. He then spent three years in Germany, studying Greek at Leipzig, Bonn and Berlin. On his return in 1831, he was made professor of Greek at Yale College, and held that chair for 15 years. In 1843 he assisted in founding the *New Eng-*



T. D. WOOLSEY.

lander, and was one of its editors. In 1846 he was chosen president of Yale College, and held this office for 26 years, during which time the institution was enlarged and improved in many ways. He was president of the American company of revisers of the English New Testament from 1871 to 1881, and was engaged in a variety of literary work. Besides many editions of Greek plays, Dr. Woolsey published *Introduction to the Study of International Law* (1860); *Political Science* (2 vols., 1877); *Communism and Socialism* (1880). He also contributed to the leading reviews. He died in New Haven, Conn., July 1, 1889.

WOOLSEY, THEODORE SALISBURY, son of preceding, also an educator; born in New Haven, Oct. 22, 1852; graduated at Yale College in 1872, and at Yale Law School in 1876. After traveling for two years in Europe and Asia, studied in Germany, and in 1877 became instructor of public law at Yale, and in 1878 instructor of international law in that college. He edited *Pomeroy's International Law* (1886) and *Woolsey's International Law* (1891); and wrote *America's Foreign Policy* (1898).—His cousin, SARAH CHAUNCEY WOOLSEY; born about 1845, in Cleveland, Ohio; later settled in Newport, R. I.; wrote many books for children, under the pseudonym "Susan Coolidge." Some of her books are *What Katy Did* (1872); *What Katy Did at School* (1873); *A Round Dozen* (1883); and *A Little Country Girl* (1885). She also wrote *A Short History of the City of Philadelphia from its Foundation to the Present Time* (1887); and published some very pleasing verse.

WOOLSON, CONSTANCE FENIMORE, an American novelist; born at Claremont, New Hampshire, March 5, 1848; educated at Cleveland, Ohio, and at Madame Chegaray's school in New York City. Upon the death of her father in 1869, she commenced writing; removed to Florida

in 1873, and resided there and in other Southern states until the death of her mother in 1879, when she went to England. She was a frequent contributor to magazines, and is the author of *Castle Nowhere* (1875); *Rodman the Keeper* (1880); *Anne* (1882); *For the Major* (1883); *East Angels* (1886); *Jupiter Lights* (1889); *Horace Chase* (1894); *Dorothy, and Other Italian Stories* (1896); and *Mentone, Cairo and Corfu* (1896). She died, while visiting in Italy, in Venice, Jan. 24, 1894.

WOONSOCKET, a city of Providence County, northern Rhode Island, on the New York, New Haven and Hartford railroad, with manufactures of iron, rubber, and especially cottons and woollens. Population 1890, 20,830; 1900, 28,204. See also WOONSOCKET, Vol. XXIV, p. 665.

WOOSTER, a city and the capital of Wayne County, northeastern central Ohio, on the Baltimore and Ohio and Pennsylvania railroads, 25 miles W. of Massillon. It is contiguous to productive mines of bituminous coal and quarries of limestone. Among the lines of industry carried on in the city are manufactures of engines and machinery, plows, reapers and mowers, paints and varnish, harness and saddles, tiles, furniture, lumber, sashes, doors and blinds. The city contains, in addition, 6 weekly papers, 2 monthly periodicals, 14 churches, a courthouse, high and graded schools; also the Wooster University (a co-educational institution founded in 1870, under Presbyterian auspices, and having in 1895 a faculty of 25, with 450 students, and a library of 17,000 volumes). The city is illuminated by gas and electric light. Population 1900, 6,032.

WOOSTER, DAVID, an American soldier; born at Stratford, Connecticut, March 2, 1710; graduated at Yale in 1738, and entered the provincial army as a lieutenant in 1739. In 1745 he was in command of the *Connecticut*, which conveyed the troops to the siege of Louisburg, at the same time serving as captain in Aaron Burr's regiment. He became colonel in 1755 and brigadier-general in the same year, serving through the French war of 1756-63. One of the expedition that captured Ticonderoga in April, 1775, and later a member of the Connecticut assembly, he was appointed a brigadier-general in the Continental army, served in Canada, and held the chief command for a short time after the death of General Montgomery. Resigning from the army, he returned to Connecticut and was made first brigadier-general of the militia; was in command of the town of Danbury when it was attacked by Tryon's troops, April 26, 1777, was wounded in the defense, and died at Danbury, May 2, 1777.

WORCESTER, a city and the capital of Worcester County, central Massachusetts, on the Blackstone River, 44 miles from Boston, and on the Boston and Albany, the Boston and Maine, the Fitchburg, the New York, New Haven and Hartford, and the Worcester and Shrewsbury railroads. The city contains, besides excellent public schools, the State Normal School, two state lunatic asylums, a military institute, high school, Jesuit college, Baptist academy, a large women's school, an

industrial school, Clark University (q. v., in these Supplements) and Worcester Polytechnic Institute (q. v.). Its churches include many handsome buildings, and from the porch of the Old South Church the Declaration of Independence was first read in Massachusetts. It has a public library containing one hundred thousand volumes, and other libraries having a total of over three hundred thousand volumes; has a flourishing trade, but it is more notable for its many manufactures. Of these, the chief are boots and shoes, iron products and woollens. Its wire-mills are the largest in the world. The total value of all products annually is about forty million dollars. Population 1890, 84,655; 1900, 118,421. See also WORCESTER, Vol. XXIV, p. 668.

WORCESTER (EDWARD SOMERSET,) MARQUIS OF, the second of the title, an English mechanical engineer and mathematician; born at Raglan Castle, England, about 1601. His taste for mechanical pursuits developed early in life, and for many years he devoted himself to experimenting and research. He was created Earl of Glamorgan in 1644, having previously borne the title of Lord Herbert. Having entered the military service of Charles I, he was sent to Ireland in 1645 to raise troops for the king's service. His secret mission failed and he was imprisoned for a short time, Charles, meanwhile, treacherously disowning him. After his release he succeeded his father, who, as a devout Catholic, had defended Raglan Castle against the Roundheads. In 1648 he voluntarily exiled himself by going to France. Returning to England in 1652, he was imprisoned in the Tower for three years. While there he drew up his work *A Century of Inventions*, which he first printed in 1663, but subsequently reprinted more than twenty times. In it he briefly describes mechanical appliances, signals, ciphers and devices of various sorts, a hundred in number. Among them is an account of a steam-engine as "an admirable and most forcible way to drive up water by fire" (for a description of which see STEAM-ENGINE, Vol. XXII, p. 473); also one of the most famous perpetual motions of history (see PERPETUAL MOTION, Vol. XVIII, p. 554.) He died April 3, 1667.

WORCESTER, JOSEPH EMERSON, an American lexicographer; born in Bedford, New Hampshire, Aug. 24, 1784; graduated at Yale in 1811. In 1830 he visited Europe, and in 1847 received the degree of LL.D. from Brown, which was duplicated by Dartmouth in 1856. Dr. Worcester delivered lectures, edited a variety of gazetteers, geographies, histories and almanacs, and finally made a life-work of his *Dictionary of the English Language* (1830). He died in Cambridge, Massachusetts, Oct. 27, 1865.



JOSEPH E. WORCESTER.

WORCESTER POLYTECHNIC INSTITUTE, a school of engineering at Worcester, Massachusetts; was founded in 1865, owing to a gift of one hundred thousand dollars by John Boynton of Templeton, Massachusetts. Ichabod Washburn added to this gift a donation of a spacious and finely equipped machine-shop in which students were to be trained in mechanical-engineering, together with a large endowment for its maintenance. The commonwealth of Massachusetts followed with other gifts, resulting in the erection of extensive buildings occupying a fine tract of 11 acres in the city of Worcester. There are five courses of study; i. e., chemistry, general science, and civil, mechanical and electrical engineering. One of the most prominent features is the extensive hydraulic laboratory, which embraces an eighty horse-power water-power, turbine wheels, water-rams, weirs, meters—including a large Venturi—and a complete testing-plant. The institution also includes the Washburn machine-shops, Salisbury laboratories of physics and chemistry, Boynton Hall, an elaborate engineering-laboratory contributed by the state, the Power laboratory, and a magnetic laboratory. The institute confers the degree of bachelor of science. The constructive idea is uppermost, every student working from the beginning on some portion of a machine which he afterward is obliged to assemble, and the whole submitted to tests of practical use. In 1896 the institute had 30 instructors, over 200 students, a library of 6,500 volumes, a productive fund amounting to \$600,000 and a total income of \$160,000.

WORCESTER, WYNKIN DE, an English (or Flemish) printer; born probably at Worth, Belgium, about 1455. He was a pupil of William Caxton, who introduced printing into England. (See CAXTON, Vol. V, pp. 279, 280.) He succeeded to Caxton's business at Westminster upon the latter's death in 1491, and later introduced many improvements in the art of printing, especially in type-cutting. It has been claimed that he introduced Roman letters into England, although this is uncertain. (See TYPOGRAPHY, Vol. XXI I, p. 695.) Worde printed more than four hundred books, which are famous for their high typographic quality, rather than their literary value or their accuracy. See also GESTA ROMANORUM, Vol. X, p. 555.

WORDEN, JOHN LORIMER, an American naval officer; born in Sing Sing, Westchester Co., N. Y., March 12, 1818; died in Washington, D. C., Oct. 18, 1897. He entered the United States naval service in 1835, and early in the Civil War was arrested and imprisoned by the Confederates. Subsequently he was exchanged, ordered to superintend the completion of Ericsson's *Monitor* and appointed to command. In this vessel he left New York, and after a stormy passage arrived at Hampton Roads. On March 8th the Confederate ironclad ram *Merrimac* had destroyed the wooden ships of war *Congress* and *Cumberland*, deeming herself invulnerable. The

commander of the *Monitor* only reached there in time to hear the news, and finding the *Minnesota* aground on the shoal, anchored alongside, prepared to defend the wooden fleet of the government from further disaster. On March 9th the Confederate ram prepared to destroy the *Minnesota*, but when she had approached within a mile the *Monitor* steamed forth to intercept her progress. In the ensuing action the *Merrimac's* broadsides glanced off from the turret of the *Monitor*, while the latter's broadsides struck fairly, but failed to penetrate the *Merrimac's* armored sides. This cannonade continued for more than two hours, and ended in a drawn battle. Later, Worden destroyed the Confederate privateer *Nashville*, which had taken shelter under the guns of Fort McAllister, and took part in the attack on the forts of Charleston harbor under Admiral Dupont. On May 27, 1868, he was promoted commodore, and from 1870 to 1874 he served as superintendent of the United States Naval Academy. He was commissioned rear-admiral, Nov. 20, 1872, and Dec. 23, 1886, was retired at his own request.

WORD-FORMATION. See SANSKRIT, Vol. XXI, pp. 271, 272; PHILOLOGY, Vol. XVIII, pp. 769-771.

WORDSWORTH, CHRISTOPHER, an English clergyman and author, brother of the poet William Wordsworth; born at Cockermouth, Cumberland, England, June 9, 1774. He studied at Trinity College, and took his degree in 1796. He was elected a fellow of Trinity in 1798; took orders in the Church of England. In 1804 he became rector of Ashby, Norfolk. From 1820 to 1841 he was master of Trinity College, Cambridge, and was influential in obtaining the construction of the new "Court." He died at Buxted, Feb. 2, 1846. He was the author of several works; among them were *Ecclesiastical Biography* (6 vols., 1810; 4 vols., 1853); and *Who Wrote Eikon Basilike?* (1824-25).—His son, CHRISTOPHER WORDSWORTH, bishop of Lincoln, was born at Bocking, Essex, England, Oct. 30, 1807; graduated at Trinity in 1830; became a fellow the same year, and took orders in 1833. After traveling in Greece, he wrote *Athens and Attica* (London, 1836); *Inscriptiones Pompeianæ* (1837); *Greece* (1839). Until 1844 he was head master of Harrow School, in which year he was made canon of Westminster Abbey by Sir Robert Peel. He became archdeacon of Westminster in 1865, and was consecrated bishop of Lincoln, Feb. 24, 1869. He participated in the "Old Catholic" Congress at Cologne, September, 1872. He died at Lincoln, March 20, 1885. Among his numerous other works are *On the Canon of the Scriptures of the Old and New Testaments, and on the Apocrypha* (1848); *Memoirs of William Wordsworth* (1851); the Greek text of the *New Testament* (4 parts, 1856-60), his chief work. He contributed largely to Smith's *Dictionary of the Bible*.—His son, JOHN WORDSWORTH, bishop of Salisbury, was born at Harrow, Sept. 21, 1843; graduated at Oxford in 1865. He became prebendary of Lincoln in 1870; canon of Rochester in 1883; and

bishop of Salisbury in 1885. He is the author of a large number of works upon Latin classical literature; among others, *The Education Question; The Old Catholic Monument; and Church History*.

WORK. See LABOUR, Vol. XIV, pp. 165-175; DYNAMICS, Vol. VII, p. 583 (mechanical); and STEAM-ENGINE, Vol. XXII, pp. 489-490; (relation to heat).

WORKHOUSE. See POOR-LAWS, Vol. XIX, pp. 475, 476.

WORKING-GIRLS' SOCIETIES. See CLUBS, WOMEN'S, in these Supplements.

WORKINGHAM OR OAKINGHAM, a small market town of England, seven miles S.E. of Reading, at the junction of the Reading and Staines and the Reading and Guildford railways. Shoes are here made, and gauze and silks woven. In the original Rose Inn, Gay, Swift, Pope and Arbuthnot, being detained here by wet weather, composed among them the old song of *Molly Mog*. The ancient amusement of bull-baiting was continued here until recent years. Population, 2,600.

WORLD, THE. See *Earth*, under ASTRONOMY, Vol. II, pp. 766, 767, 792-795; and *Earth*, under GEOLOGY, Vol. X, pp. 214-227, 371-375.

WORLD'S CONGRESSES OF THE WORLD'S COLUMBIAN EXPOSITION. The World's Congresses of 1893 were first publicly proposed Sept. 20, 1889, by Charles C. Bonney. The idea was received with approval at once; and on Oct. 15, 1889, Mr. Bonney was made chairman of an executive committee to carry it into effect. A year's systematic work was carried on after that, and on Oct. 30, 1890, the World's Congress Auxiliary of the World's Columbian Exposition was formed, with Mr. Bonney as president and general director. Mr. Bonney was born in Hamilton, New York, Sept. 4, 1831; was educated at Hamilton Academy and Madison (now Colgate) University, from which he afterward received the degree of LL.D. He taught school, studying law meanwhile for several years, and after removing to Peoria, Illinois, which he did in 1850, he was vice-president of a state teacher's institute, and took a leading part in establishing the present educational system of Illinois. He was admitted to the Illinois bar in 1852, and to that of the United States supreme court in 1866; was president of the Illinois State Bar Association, and vice-president of the American Bar Association in 1882.

The first congress was opened May 15, 1893, and the last session of the series was held October 28th. Its sessions were held in a permanent memorial building, now known as the Art Institute, a dark-gray classical structure of 319 feet frontage, on the lake shore, at the foot of Adams Street. The following account is compiled from official reports:

As finally organized, the World's Congress Auxiliary consisted of 2,170 members, divided into 214 local committees of organization. Mixed committees of men and women were not appointed, but in all cases suitable for the participation of women, a committee of women was appointed to act in co-operation with the committee of men. These committees of women constituted what was called the Woman's Branch of the World's Congress Auxil-

lary. The general officers of the Auxiliary were a president, vice-president, secretary and treasurer; and the Woman's Branch had also its own president and vice-president.

To these local committees of organization were adjoined what were called advisory councils, which consisted of eminent persons selected from the various participating countries to advise and assist the committees of organization in selecting writers and speakers for the different congresses, and in perfecting the plans for them. The aggregate membership of these advisory councils was 14,528. The chairman of each committee of organization was the director of the congress committed to its charge, and the president of the Auxiliary was the general director of the whole series of the congresses.

As finally settled, the World's Congress work was divided into 20 departments and 224 general divisions, in which congresses were held. These, in their chronological order, were as follows:

1. Woman's progress, 25 divisions; 2. Public press, 6 divisions; 3. Medicine and surgery, 6; 4. Temperance, 12; 5. Moral and social reform, 15; 6. Commerce and finance, 10; 7. Music, 9; 8. Literature, 9; 9. Education, first series, 17; second series, 16; 10. Engineering, 9; 11. Art, 5; 12. Government, 7; 13. General department, 1, besides 4 held out of their regular order and here transferred to their proper places; 14. Science and philosophy, 13; 15. Social and economic science, 4; 16. Labor, 1; 17. Religion, 46 (of which the marvelous Parliament of Religions was the chief); 18. Sunday rest, 1; 19. Public health, 1; 20. Agriculture, 11.

The programmes also show 125 sections, of which 29 were of the nature of the general divisions.

These congresses held 1,283 sessions, aggregating 753 days. The printed programmes show 5,978 addresses delivered or papers read, including 5,454 formal contributions, 131 addresses of welcome, 176 addresses of response and 217 agricultural reports. But these are much less than the actual number, for many papers and addresses were admitted after the programmes were printed, and were inserted in the corrected programmes used by the presiding officers.

A carefully prepared alphabetical index shows 5,822 speakers and writers whose names appear on the printed programmes, including 368 cases in which the name of the paper to be read or subject discussed is not given. These participants in the congresses represented all the continents in the world, and 97 nations, states, provinces, territories and colonies, besides fifty states and territories of the American Union, making a total of 147 actually represented.

The managers set forth the aims of this organization to be—

“To establish fraternal relations among the leaders of mankind; to review the progress already achieved; to state the living problems now awaiting solution; to suggest the means of further progress; to bring all the departments of human progress into harmonious relations with each other in the Exposition of 1893; to crown the whole work by the formation and adoption of better and more comprehensive plans than have hitherto been made; to promote the progress, prosperity, unity, peace and happiness of the world, and to secure the effectual prosecution of such plans by the organization of a series of world-wide fraternities, through whose efforts and influence the moral and intellectual forces of mankind may be made dominant throughout the world.”

WORLD'S FAIRS. Industrial fairs of great magnitude and interest have been held at frequent dates for many years. For a list of national and international exhibitions held previous to 1880 with descriptions of the more important ones, see **EXHIBITIONS**, Vol. XVIII, pp. 803-805.

During the decade following the Paris Exhibition of 1878, the chief industrial displays were the following: Sydney and Berlin (1879); Melbourne (1880); Berlin, Moscow and Buenos

Ayres (1882); Louisville (Kentucky), Caracas and Amsterdam (1883); Calcutta and New Orleans (1884); Antwerp (1885); Edinburgh and Liverpool (1886); Manchester, England (1887); Melbourne Centennial, Glasgow and Brussels (1888).

There have been held, also, numerous special exhibits engaging considerable attention on the part of the public. The following were held in London: An Electrical Exhibition (1882); an International Fisheries Exhibition (1883); a Health Exhibition (1884); an Inventions Exhibition (1885); a Colonial Exhibition (1886); an American Exhibition (1887); the Italian, Irish and Anglo-Danish exhibitions (1888); and a Spanish Exhibition (1889). In Paris there were held, in 1881, an Electrical Exhibition and Congress; in 1884-85, an “Exhibition of Manufactures and Processes.”

I. FOURTH PARIS INTERNATIONAL, 1889. May 9, 1889, the “Paris Universal Exposition” was opened in the Champs de Mars. It occupied an area of 173 acres, and in magnitude and comprehensiveness excelled all its predecessors. One of the principal attractions was the Eiffel Tower (see **EIFFEL, GUSTAVE**, in these Supplements). On the opening-day there were present, exclusive of official sight-seers and invited guests, 112,294 persons. During the first week the paying visitors numbered 350,000.

During the year 1889 there were also held industrial and largely attended exhibitions as follows: “Exhibition of Arts and Industries,” at Hamburg; the “Accident Prevention Exhibition,” at Berlin; and the “Goldsmith's Exhibition,” at Vienna.

II. THE WORLD'S COLUMBIAN EXPOSITION, CHICAGO, 1892-93, a great international universal exposition, held in Chicago during the summer of 1893. The act of Congress which definitely selected Chicago was approved by President Harrison, April 25, 1890. In accordance with its provisions, the task of raising the required \$5,000,000 was accomplished. Pending the action of Congress, citizens of Chicago had formed the Exposition Company and invited subscriptions at \$10 per share. The responses were quick and generous, and 29,374 shareholders subscribed \$5,467,350. The legislature of the state authorized the city of Chicago to bond itself for \$5,000,000 in aid of the Fair, the bonds to be available as soon as \$3,000,000 of the capital stock had been paid in.

1. Organization. The management of the Exposition was committed to four organizations:

1. National Commission (authorized by act of Congress).
2. World's Columbian Exposition (organized under the laws of the state of Illinois).
3. Board of Lady Managers (authorized by act of Congress).
4. World's Congress Auxiliary.

The National Commission, which was a supervisory body, was composed of eight commissioners at large, with alternates appointed by the President, and two commissioners and two alter-

nates from each state and territory and the District of Columbia, appointed by the President, on nomination of their respective governors. The commission practically delegated its authority to eight of its members, who constituted a Board of Reference and Control, and who acted with a similar number selected from the World's Columbian Exposition.

The World's Columbian Exposition was composed of 45 citizens of Chicago, elected annually by stockholders of the organization. To this body fell the duty of raising the necessary funds and of the active management of the Exposition.

The Board of Lady Managers was composed of two members, with alternates, from each state and territory and nine from the city of Chicago. It had supervision of women's participation in the Exposition.

For the World's Congress Auxiliary, see WORLD'S CONGRESSES, in these Supplements.

The director-general was the chief executive officer of the Exposition, and the work was divided into the following great departments:

A—Agriculture, food and food-products, farming-machinery and appliances.

B—Viticulture, horticulture and floriculture.

C—Live-stock, domestic and wild animals.

D—Fish, fisheries, fish-products and apparatus of fishing.

E—Mines, mining and metallurgy.

F—Machinery.

G—Transportation exhibits, railways, vessels, vehicles.

H—Manufactures.

J—Electricity and electrical appliances.

K—Fine arts, pictorial, plastic and decorative.

L—Liberal arts, education, engineering, public works, architecture, music and drama.

M—Ethnology, archæology, progress of labor and invention, isolated and collective exhibits.

N—Forestry and forest-products.

O—Publicity and promotion.

P—Foreign affairs.

2. *Buildings and Grounds.* Seven miles south of the business center of the city, is a tract of nearly six hundred acres, with a frontage of a mile and a half on Lake Michigan, from which a broad avenue one mile long and six hundred feet wide leads west to Washington Park. The northern end of this tract had been laid out in lawns and shore-drives, and was the favorite pleasure-ground of the city dwellers. The entire tract, known as Jackson Park, including nearly one hundred acres of the Midway Plaisance, was selected as the site of the World's Fair buildings.

It was late in 1890 before the construction was definitely planned. The actual work began in the spring of 1891.

At the beginning of the period the outlook for the landscape-gardener was not encouraging. The ground was flat; much of the unimproved land was low and swampy, and, except in the older and finished section of the park, the natural growth of trees was low and straggling. All these

defects were remedied, and the low-lying waste with a sandy lake shore underwent a magical transformation. It was impossible to supply the lack of great forest trees with wide-spreading branches. But the lower foliage was effectively massed, and shrubs and flowery bushes were made to help in this work. A broad avenue, opened across a wide lawn-space, was set with good-sized trees. This avenue was a continuation of Fifty-seventh Street, and was met at right angles north of the Art Palace by two other avenues, along which, on an ample semicircular driveway crossed by these avenues, were placed most of the state buildings.

The railways entered the grounds at Sixty-seventh Street, and reached their terminus to the west and directly in the rear of the Administration Building. In front of this great building was the Court of Honor, which occupied a space two thousand feet in length by seven hundred in width. About this court were grouped some of the finest buildings, and its central space was filled by a water-basin whose eastern end was closed by a classic colonnade, of which the Water Gate was a noble triumphal arch. A broad canal with terraced banks ran south from the basin, between Machinery Hall and the Agricultural Building. The lesser court thus formed was closed in at its southern end by an arcade whose second story was an open colonnade. Its central arch was the entrance to the Live-Stock Department, which was at the southern extremity of the Exposition. Directly opposite to this canal was another, running between the Liberal Arts and the Electricity buildings, and connecting with the lagoon. The Administration Building was the magnificent portal, and the great court, to which it gave entrance, was the heart of the Exposition. Around them were gathered the more splendid structures. On the south side was the great Agricultural Building, with its outlying allies, the Forestry and Dairy buildings, and its rear-guard, the Live-Stock Exhibit. Across the south canal it was connected by bridges with Machinery Hall. On the north side of the court was the immense building of the Manufactures and Liberal Arts. The lake on its east and the northern canal on its west gave it water front on three sides. Across the canal was the Electricity Building, and next to it the Halls of Mines and Mining. These six buildings surrounding the court formed a well-balanced and harmonious group. The architects who designed them adopted a uniform scale, the height of the main building being, in each case, about sixty-five feet, and they adapted a classic Roman motive to their varied requirements. They thus attained a concrete unity which expressed simplicity, symmetry and power. The Administration Building faced the colossal statue of the Republic, and caught the morning sun upon its golden dome.

To the west, and north of the Mining Building, the broad front of the Transportation Building looked across the canal to the pretty Wooded Island. North of this structure was the Horti-

cultural Hall, with its crystal dome, and just beyond it the simple and graceful lines of the Woman's Building. The slope of greensward which bordered the canal afforded space for a fine quay, a fringe of water-plants, and for beds of flowers. On a point of land just east of the Woman's Building was the Illinois State Building, and opposite this, on the northern shore of a pleasant lagoon, stood the solid and stately Palace of Fine Arts. Opposite the north end of the Wooded Island, on the east, the Fisheries Building stood like a palace of fairyland. It faced the canal that connected the lagoon with the lake on the north, and the United States Government Building stood on the other bank of the canal, between the Fisheries Building and the northern end of the Palace of Manufactures and Liberal Arts, where this canal opens into the lake, and where the model man-of-war *Illinois* lay armed and manned for service.

The section east of the Fine Arts Building and the length of the Midway Plaisance was allotted to foreign governments. The Japanese government asked for the northern end of the Wooded Island, and there reproduced a Japanese garden adorned with models of some famous temples. Some of the principal buildings, with the nature of their exhibits, are here described.

The Administration Building was the central point of the Exposition buildings, overtopping all. More than this, it was essentially the entrance to the World's Fair. It stood in the southern part of the grounds, facing east, and at one end of the Court of Honor. Its architect, Richard M. Hunt of New York, president of the American Institute of Architects, furnished the designs. Occupying an area of 250 feet square, the edifice was octagonal in form, having at its corners four wings, each 84 feet square. The central spaces between these wings were pierced by four portals 50 feet high and 50 feet wide, one on each side. These grand doorways afforded passage throughout the building at right angles, and formed triumphal gates to the Exposition. On each of the wings were three sculptured groups of colossal size, and each deeply arched entrance had two groups, making twenty heroic compositions on this structure. Above rose the octagonal second vertical member, having an open colonnade 40 feet high, with columns at its eight angles, crowned with groups of statuary. It terminated in a dome 190 feet in height, octagonal in form, and rising to a height of 275 feet above the pavement. The upspringing lines of this dome and the panels between them, with sculptured decoration, and gleaming with enrichment of gold, could be seen for miles, rising strongly and lightly above the surrounding buildings.

In this building were the board-rooms, the committee-rooms, the rooms of the director-general, of the Department of Publicity and Promotion, and the World's Columbian Commission.

The Palace of Mechanic Arts, popularly called Machinery Hall, occupied seventeen and one half acres of space. Its main part had a frontage of

842 feet on the south side of the court, its grand entrance being opposite the south arch of the Administration Building. It covered nine and a half acres. The annex occupied the remaining space of eight acres. The annex followed the design of the principal building, but somewhat simplified, continuing the naves to the length of 1,400 feet.

Three arched trusses spanned the building, and the interior effect was of three naves crossed midway by a great transept, the total width being 390 feet, and the length 730. Around the main hall were two inner galleries, while exteriorly the façades that connected the main entrances on each side consisted of a cloistered arcade 50 feet wide, superimposed upon a heavy Roman arcade. At the corners of the arcades were domed pavilions. In the center of the north façade was the grand entrance, 75 feet high, with a semicircular portico supported by Corinthian columns, and a pediment filled with an emblematic design in relief, in which Columbia was represented as introducing to the nations a company of inventors and artisans who were showing their various mechanical achievements. Eight symbolic figures of heroic size were placed upon the building. Above each pillared portico were two open towers of three diminishing stories, the finishing spires reaching a height of 102 feet. The architectural motive of the building was the Spanish renaissance, beautiful in the arches and columns of its double colonnade, and the projecting loggias at the corners, and showing the arms of Spain and the portrait of Columbus repeated in its decoration. The great interior was, of necessity, left clear for the machinery placed in it.

The east façade of Machinery Hall looked across the canal which opened from the great basin. Directly opposite, on the east bank, stood the Agricultural Building. Between the two, and closing in the end of the canal, was a corridor, the lower story continuing the Spanish arches of the open porticos of Machinery Hall, and the second story forming an open colonnade.

The middle of the connecting corridor was pierced by a beautiful triumphal arch, which led to the Live-Stock Exhibit. Directly before this arch was an obelisk upon a sculptured base, rising from the canal. Four recumbent lions guarded the corners of its pedestal, and water-jets fell into spray about them.

The Agricultural Building extended 800 feet along the Court of Honor, and had a breadth of 500 feet. The central porch on the north gave a main entrance 64 feet wide, set with Corinthian pillars 50 feet high and 5 feet in diameter. The inner vestibule had an equal width and a depth of 30 feet, and was set with statues symbolizing different branches of agricultural industry. At the four corners were pavilions 96 feet high, surmounted by flattened domes, each of which bore a sculptured group of four colossal female figures holding aloft a great globe. They represented the four great human families—the Caucasian, Mongolian, African and Indian. These pavilions

were connected by curtained walls, making a continuous open arcade around the building. The corner pavilions and the entrances on three sides of the building were set with Corinthian columns smaller than those of the main entrance.

Twelve female figures 12 feet in height were placed above the piers that divided the curtained façades into three members of three arched openings each. They represented the zodiacal signs, each draped figure holding above her head a wreathed tablet that bore the sign of the month.

Some of the interior spandrels had very graceful figure-decorations, and many emblematical groups and single figures found place within the building.

The great interior afforded nearly ten acres of space. The annex covered nearly ten acres more, joined the south wall of the main building, and was in fact an extension of it. The central was covered by a glass dome 130 feet high. The main building was largely devoted to the exhibition of food-products.

In the annex were placed agricultural appliances, showing the development from the early times, when all labor was manual, to the latest inventions.

Through the beautiful arch which occupied the center of the connecting corridor, entrance was given to the Live-Stock Exhibit, and to the east and south the Forestry and Dairy Building supplemented and completed the Agricultural Exhibit.

The space to the northeast of the Administration Building, between the lake and the canal, was occupied by the building of Manufactures and Liberal Arts. The proportions of this gigantic structure were so symmetrical, and it was so surrounded by immense buildings, that one failed at first sight to comprehend its extent. It had a length of 1,687 feet and a breadth of 787 feet; the arcade roof, over the central hall, covered a space of 385 by 1,400 feet, and it reached a height of 210 feet above the floor.

It was no easy task to design a building which covered an area of $30\frac{1}{2}$ acres, and at the same time to fulfill the requirements of beauty, proportion, dignity and suitability. In common with all other buildings of the Exposition, it had an exterior covering of staff, so treated that it gave the effect of white marble. One of the long sides fronted the lake and the other the canal, the view of the building from the water being most imposing.

The method of its construction was no less unique and interesting than its great size and beautiful proportions. The central and main space of the interior was an immense hall without columns, its length of 1,275 feet and width of 385 feet giving an open, unobstructed hall from floor to dome. For the support of this hall there was a length of 22 steel arches, with eight smaller gable-trusses at the ends, the roof thus forming a long rectangle, lighted by the sheets of glass which composed the roof-covering, and by a row of clearstory windows extending around its four

sides. Each of the giant central trusses weighed about 350,000 pounds. They were handled in pairs, and raised into place from the floor. For this purpose a "traveler" of immense size, and with a tower making a total of 225 feet in height, was erected within the building. The floor had been removed, and piles driven to support the great lifting-machine, which moved on a track specially prepared for it, and which weighed twenty thousand pounds. The great arches, starting from the floor-level, were pivoted at the base and held in position by ten-inch steel pins, thus allowing for the expansion and contraction of the metal by the heat and by the cold.

It was the original intention to leave the central space of the Manufactures Building in two open unroofed courts, but notwithstanding the great space reserved for exhibits, it was necessary to cover the entire floor-space, in order to meet the demand for room.

A main avenue 50 feet in width extended through the length of the building, from north to south, and was crossed at the center by another of the same width. A gallery 50 feet wide extended around the interior walls, with many smaller galleries opening from it, from which the great extent of the first floor could be seen. Thirty staircases 12 feet in width formed the approaches of these galleries.

There were four great entrances to the building, one in the center of each façade, in the form of triumphal arches. These arches had a height of eighty feet, and the four immense supporting-columns, which stood in pairs on either side of each portal, were 65 feet in height. Above the entablatures of these entrance-ways, were sculptured pedestals supporting American eagles twenty feet high. At each corner of the building was a pavilion, forming entrance-arches smaller than the grand central portals, but in accord with them, and having clustered Corinthian columns at their exposed corners. The long façades of the building showed a succession of round arches, the upper part forming great windows. The lower part, occupying 25 feet of height from the ground to the gallery floor, was open like a cloister, and formed a continuous, protected promenade.

The sculptures for the interior were admirably designed and as admirably placed. They represented, in groups and single figures, many of the arts and industries which found place in the mammoth building.

The building that filled a part of the fourth space in the Court of Honor was the Electricity Building. It occupied a space 700 feet in length by 350 in width, and was built in the manner of the Italian renaissance, the height of its exterior walls being $68\frac{1}{2}$ feet. A continuous line of Corinthian pilasters extended around the four sides of the building, rising to a height of 40 feet, and supporting an entablature. In the round, arched openings between these pilasters were Ionic columns supporting a transom, above which were glass windows. On

the transoms were the names famous in electrical discovery, but no living electrician had a place in this roll of honor. The two grand entrances occupied the center of the north and south façades. That on the south was a great inward curve, or hemicycle, 78 feet across and 103 feet high. Its outer opening was a semicircular arch, capped with gabled pediments projecting from a square truncated tower. In the center of the hemicycle, on a great pedestal, was a statue of Benjamin Franklin, one of the best known of the World's Fair sculptures. The walls and curved ceiling-space of this hemicycle entrance added to their beautiful staff-decoration the grace of color, the capitals of the interior pilasters showing rich metallic shades. The pediment above the entrance-arch had a relief-decoration covering a space 60 feet long and 16 feet high in the center. A great shield filled the central space, surmounted by a crown of stars. On either side sat a beautiful winged figure, symbolizing the dual development of electricity in the telegraph and telephone and the electric light. Various implements of these industries were laid at the feet of the figures, and filled the narrow spaces at the ends of the pediment.

The north entrance, facing the lagoon, stood between two great apsidal, or outward-curving projections. Above the entrance was a great semicircular window, over which, at a height of 102 feet from the ground, was an open colonnade, from which the visitor could obtain a comprehensive view of the lagoon, the life and color of its moving water-craft, and the north end of the grounds, where were to be seen the classic façade of the Art Palace, and many picturesque state and foreign buildings. Two towers, rising to open lanterns, capped by domes east and west, completed the great north entrance. The sides of the building were columned porticos, flanked by towers having a height of 168 feet. At each of the four corners was a small pavilion crowned with a light, open minaret tower of about the same height. Midway between the center and corner pavilions, on the east and west sides, were lesser projections, finished by a low, square dome above an open lantern. On the four corners, at the base of the domes, were eagles with outstretched wings. The windows of the subordinate pavilions had light balconies supported by decorated brackets. Frieze, cornice, and spandrel spaces were filled with light and graceful ornamentation, showing festoons and garlands with suggestions of electrical appliances. The tinting of the exterior walls had the warmth and richness of old ivory. The motive of the building was that of grace, lightness and aerial life. The glance of sunlight, the gleam of a lightning-flash, the upward springing of a flame, were suggested in its columns, its pinnacles and its open domes. The exterior lighting of the building by electricity was one of the marvels of the Exposition. The nave and transept were covered by a pitched roof, with skylights and clearstory windows. The rest of the roof was flat, and was largely composed

of sheets of glass. The interior decorations were in thorough accord with the purposes of the building. In the matter of electric-lighting, the World's Fair itself was a great exhibition-ground. Every building was thus illuminated, and many strange and beautiful effects were obtained, both indoors and out. The fourth side of the Court of Honor was divided between two buildings which stood with their ends to the court, on the north of the Administration Building, their combined width exactly balancing their *vis-à-vis*, Machinery Hall and its annex. They were the buildings devoted to electricity and mines and mining. The canal separated them from the great Manufactures Building, and connected with the lagoon just north and east of them. The two buildings, separated only by an avenue, were planned for such close neighborhood. The architectural motive in both was the Italian renaissance, modified, in the first instance, to express the lightness and springing of a building intended for a display of the most subtle natural forces, and in the second, strengthened and accented to the requirements of an exhibit of the most solid and palpable of natural products. The Mining Building was 700 feet long by 350 wide, and covered an area of about five and one half acres. Its grand entrances occupied the center of the north and south fronts, facing the Administration Building on one side and looking across the lagoon to the beautiful Wooded Island on the other. In its architectural details the Hall of Mines and Mining was one of the plainest of the great departmental buildings. It had no exterior adornment of sculptured figures, and its relief-ornamentation was concentrated at its strongly accented points, the entrance and corner pavilions, whose lofty and broad surfaces gave admirable decorative opportunities. The remaining spaces of the four great façades were thus left free to express a massive simplicity and dignity, with little decoration except the line of the beautiful frieze, which was broken only by the angles of the projecting pilasters. Over the great arch of the north entrance was the single word "Mining," in the simplest of Roman lettering.

In none of the Exposition departments could the history and progress of the race be more clearly read than in the building which covered so wide a range of industry and invention under the name of the Transportation Building. It was west of the Mines and Mining Building, and was the southernmost member of a group of buildings lying to the west and north of the Court of Honor. It occupied a position between the Mines and the Horticultural buildings, and faced the lagoon and the picturesque Wooded Island. It had an architectural individuality which enabled it to hold its own, even in the neighborhood of the stately Mines Building and the lavishly decorated Horticultural Hall. The Romanesque motive was apparent in its design. It was simple, compact and symmetrical, broad and dignified in its lines, yet with the most careful and intricate elaboration of details. It had a length of 560

feet fronting the lagoon, and a depth of 250 feet, and covered about eight acres. Its width was increased by an immense annex which occupied about nine additional acres of space.

The building had a somewhat modified basilica form, with arched windows in both stories, and a central cupola 165 feet high.

The long eastern façade of the building, with its succession of great windows, the arched parts of which lighted the interior gallery, was broken midway by a grand entrance. It was formed by a massive square pavilion framing an immense opening of receding concentric arches, each member having its own conventionalized floral decoration in relief.

In the annex were to be seen complete trains of cars seeming to await only the signal, "All aboard." Street-railways, through their developments of surface, underground and elevated, were fully shown. Carriages and carts of every degree of comfort and use had a very complete representation. Water-craft, from the most imposing man-of-war to the tiniest pleasure-boat, and from the canoe of the savage to the stanchest merchantman, were shown by model or in actual form and size. The development of many modes of modern travel was illustrated from the earliest and rudest forms to the latest and most improved inventions, and many models of great historic interest were shown.

As a visitor to the World's Columbian Exposition looked northward from the Transportation Building he saw, across the broad avenue which led to the western terrace of the lagoon, a group of buildings which comprised the northern division of the departmental series. The group included the Horticultural, Woman's, Art and Fisheries buildings, all fronting on the devious shores of the lagoon, and supplemented by the United States Government Building and numerous state edifices. The first member of this group, as seen from the south, was the beautiful Horticultural Hall. It consisted of a central and two terminal pavilions, connected by front and rear curtains. This plan gave an uninterrupted length of 1,000 feet, with an extreme width of 250 feet. The connecting curtains gave two interior open courts, each 270 feet long and 88 feet wide. The central pavilion was covered by a great crystal dome 113 feet high and 187 feet in diameter. In front of this dome were two smaller domes flanking the square entrance pavilions, with their lofty arch portals. Within the vestibule of the eastern entrance were two single figures nine feet in height, representing Flora and Pomona.

The Woman's Building was a milestone in the broadening highway of the world's progress. A woman's department under the control of a woman's board of management, successfully developed and ably conducted, was not the least interesting feature of the Columbian Exposition. When the building was decided upon, a number of women architects submitted plans, which were all so excellent that the committee of award found it

a difficult and delicate matter to reach a decision. The design of Miss Sophia G. Hayden, a pupil of the Boston Institute of Technology, was finally accepted, and the first prize of one thousand dollars was awarded to her. The edifice was beautifully and suitably located, standing just south of the entrance from the Midway Plaisance. The Woman's Building showed a classic simplicity and directness, and a grace and certainty of lines which gave an impression at once of strength and delicacy, and made it an example of the best style of the Italian renaissance. The first story had a height of ten feet from the ground-line. The main façade had an extreme length of four hundred feet, and consisted of a central pavilion with a triple-arched entrance, above which was an open colonnade in the second story, capped by a low pediment, and corner pavilions connected by curtain walls, forming open arcades in both stories. The corner pavilions were finished above the second story by balustrades supported by Ionic pillars. The roof-spaces of these corner pavilions formed hanging-gardens filled with trees and blossoming plants. The exterior decorations in cornice and spandrel spaces were simple and consistent. The ends of the building facing north and south had triple entrances, with simple porticos. Within, a lobby forty feet wide opened into a grand central hall spanned by a curved roof of glass. At each end of the hall were six great columns. Four wide staircases led from the lobbies to the second story, where an open arcade extended around the central hall. Upon this arcade opened the committee-rooms, and the north pavilion contained, on this floor an assembly-room, with stage and ante-rooms. Stairways led to the pavilion roof-gardens, from which broad views of park, lake and city were obtained. The interior decoration was entirely women's work, except the relief staff-ornamentation, which was very simple. The library of this building was filled with books written by women in all quarters. Travel, science, archæology and philosophy were represented by women writers of many nationalities. Exhibitions of native work came from Cape Town, Africa, India, Peru, Mexico and many other countries whose women are strange to us. Convent treasures from the Latin nations of Europe told the story of woman's skillful handiwork for centuries in raw laces, embroideries and pictures. The New York School of Industrial Art made an exhibit in the Woman's Building of practical technical designs for carpets, wall-papers, stained glass, book-covers, fabrics and laces.

The exhibits in the Woman's Building represented but a small part of the thought and work of women in the Columbian Exposition. A model house and sanitary kitchen were in operation through the six months of the Fair, and a house where children of visitors were cared for during the day was maintained.

The Fisheries Building stood north of the United States Government Building, on a curve of land formed by the windings of the lagoon on its

way to the lake. The extreme dimensions of this building were 1,100 by 200 feet, but it was broken by curves and turrets so that the general effect was that of lightness and delicacy without any suggestion of great size or massive strength. Its main entrance faced the lagoon opposite the Government Building. The central structure had a rectangular first story, 365 feet in length and 165 in width, crowned by a great central tower having a conical roof. The wings showed a succession of round arches, resting on twin Corinthian pillars, and a clearstory with a like exterior finish. Above this roof rose a light-lantern, and four lantern-turrets sprang from the sides of the circular base. A broad exterior colonnaded gallery supported on brackets surrounded the main tower, joining the four turrets, and giving wide views of the Fair and the changeful, far-reaching lake. Two long curved arcades connected wings with the two end structures, which were polygonal in form, having a diameter of about 135 feet. These smaller structures were one story in height, surmounted by a clearstory, and having, above and below, arched window-openings in triplet series. The main entrances of the Fisheries Building occupied the middle of the central structure, fronting nearly north and south. The entrance-pavilions were 102 feet long and projected 41 feet beyond the main building, and were finished at each end by a circular tower, whose open arched second story was capped by a cone-shaped roof. The main portals were triple arches supported by columns in pairs, with three smaller arches on each side, joining the flanking towers. The Fisheries Exhibit represented the daring and progress of the maritime nations of the world, and displayed the appliances used in the fishing industries of all the ages.

Of the two flanking terminal buildings, the eastern one was devoted to an aquarial exhibit, and the western to a display of angling appliances.

The Aquarial Building was a pavilion of 60 feet in diameter, lighted from a clearstory crowning cupola. The arched spaces between the wall-pillars showed marine forms in high relief, fish swimming through moving waves, frogs on the banks of a rushy stream, and marsh reeds and grasses. The capitals of the columns were sculpture of sea-shells. In the center of the building was a basin 30 feet in width, from which rose mossy rocks, through whose crevices streams and tiny cascades dashed into the basin, edged with rushes and water-plants. A circular walk 16 feet wide extended around the basin. It was set with a series of transparent glass tanks, ten in number, for fresh and salt water fish, varying in capacity from 7,000 to 17,000 gallons each. The sea-water for the marine tanks was obtained by evaporating the necessary quantity at the station of the United States Fish Commission at Wood's Holl to about one fifth of its bulk, the lake-water being used to restore it to its proper density. An outer row of tanks, with a capacity of from 750 to 1,500 gallons, lined the circular gallery. For this aquarium, waters of river, lake and ocean were searched, and their treasures

classified and set in order for the student. Aquatic plant-life was fully illustrated, and sponges, corals and sea-shells were shown by rare and interesting specimens. The western pavilion was the delight of the angler. There, in the atmosphere of romance which surrounds the implements of the gentle craft, the disciples of Izaak Walton meditated and admired and exchanged stories. An exhibit of model log cabins, tents and portable houses, boats, and all the equipment of the camping-sportsman was made in the building.

The United States Government Building stood north of the palace of Manufactures and Liberal Arts, and on the bank of the intersecting lagoon, and south of the Fisheries Building, with which it was in communication by an ornamental bridge. It covered an area 350 by 420 feet, and had a grand central dome 150 feet high, pierced half way up the height of its ribbed curves by a succession of round windows. Above the dome, which had a row of arched windows around its base, rose a lantern, with an exterior balcony. The grand entrances in the center of the east and west façades were great projecting pavilions, flanked by square tower-like pavilions, which rose above the cornice of the main wall. The main entrances were triumphal arches, supported by great pillars. The corner pavilions were square, with low, curved roofs crowned by cupolas. The walls between the entrance and corner pavilions were filled with great windows, those in the upper story above the entablature forming a succession of arches. In its general style it resembled the National Museum in Washington. It was the typical United States Government Building, and gave an impression of dignity and stability. Above the entrances were great eagles with outspread wings. In the interior of the Government Building was a great rotunda, occupying a space, under the central dome, 120 feet in diameter, and open to the vaulted ceiling 150 feet from the floor. This rotunda was kept free from exhibits. The spaces east and west of the central rotunda were given to the Department of State and the Department of Justice. The exhibits which occupied the south half of the building were made by the Post-Office, Treasury, War and Agricultural departments. The exhibits of the Fisheries Commission, Smithsonian Institution and Department of the Interior were placed in the north half. In the great departmental buildings the visitor could study the history of the world. The Post-Office Exhibit included a model post-office in working order, serving as such to the Exposition itself, and a postal museum. The exhibit of ordnance and arms contained a full collection of arms, uniforms, tents and flags in use in the United States army since 1776. The Government Building did not contain the entire exhibit of the government. The Naval Exhibit comprised a model battle-ship, called the *Illinois*, which was built on piling, on the lake front, east of the Government Building. It was a full-sized model of one of the new coast-defense ships of war. It was built of brick and surrounded by water. It was, to all appearances, a stanch

line-of-battle ship at anchor near the wharf. It had all the fittings and armament of such a ship, and was manned by sailors and marines in the United States service, so that the discipline, the employments and all the appliances of a warship could be seen and studied in their reality.

The Indian Exhibit was partly under government control, and presented a living history of the tribes. Esquimaux and Alaskans, the strange tribes of Sioux, Navajos and Pueblos, all told the story of the present life of the descendants of the aborigines, while their past was hinted at by the findings of the Archæological and Ethnological departments, in relics that tell half-truths of a strange people.

To the south, beyond the Peristyle, with its triumphal arch, was located the Live-Stock Exhibit, and east of it, near the lake shore, stood the Forestry and Dairy buildings. This extreme southern division of the Fair was supplementary to the Agricultural Exhibit, whose beautiful building occupied the space on the southern side of the Court of Honor. It could be entered from the arch of the colonnade, which formed the southern screen of the court. Above this arch, and at the entrance of the Live-Stock Building, were several emblematic statuary groups.

The eight immense stock-sheds filled nearly the whole space along the south fence, and were in the form of great haciendas, each being built about an open square, with a central entrance in each of the four sides.

The Forestry Building was as interesting as it was unpretentious. It had been for months devoted to studio uses, and was the birthplace of the heroic figures which found their homes on the Administration and Agricultural buildings. But in its finished state it had no decoration but that which nature furnished. It had a length of 528 feet and a width of 208 feet. Around the four sides of the building ran a continuous veranda 16 feet in width, the roof of which rested on columns of tree-trunks, the frieze-space being filled with rustic panels of interlaced branches. Each of these unique columns was 25 feet in height, the largest one being from 16 to 20 inches in diameter. Nearly all the states and territories were represented in this colonnade, and as the visitor walked the length of the veranda he read the story of the forest primeval with its arboreal wealth and glory. On each trunk was placed a tablet bearing the name of the tree and of the state or territory from which it was sent. The rustic idea was carried out through the entire building. The sides were covered with slabs, the roof was thatched with bark, and the window-frames were left in a state of nature. The main entrance was finished in various woods, polished and carved, and donated by the woodworkers of the world. The building was lighted by its ground-floor windows and a succession of clear-story lights.

The Dairy Building stood near the Forestry Building, and almost on the lake shore. It occupied an area of 100 by 200 feet, and was a plain,

substantial structure, rectangular in shape, with its first-story doors and windows set in round arches. It had a small clearstory set with windows, which, with the glass skylights of the roof, gave light to the central hall or operating-room.

Here the work of the model dairy and the dairy school was carried on. Much interest was shown in the work of this department of the Fair, and the pretty little building was a meeting-place and point of interest for agriculturists and dairy associations. The work of the dairy school extended through four months, and, in connection with it, a series of tests was made for determining the relative merits of different breeds of dairy cattle. Several associations furnished herds of from 15 to 25 cows, and prizes were given to herds and to individual cows.

As the Agricultural group formed the outlying division of the Exposition on the south, the state buildings constituted a similar but much more extensive group on the north.

Between this last-named group and the central division of the Exposition stood the beautiful Art Palace, which, after the close of the Exposition, became the Field Columbian Museum. Without its dome, the building presents no motive that could not be found on the Acropolis of Athens. It has a length of 500 feet and a width of 320. Its north and south façades have great central porticos with broad flights of steps. On the north it fronts the broad avenue which crosses the park from Fifty-seventh Street to the lake; on the south it has a length of grassy terraces and a balustrade, and its steps lead down to a boat-landing on the shore of the lagoon. Before this entrance was placed a statue of Minerva, and the great portico with its beautiful columns was finished with a pediment. Smaller pavilions were placed on each side of the main porticos, and the corner pavilions had columned entrances and low pediments. The east and west entrances are lofty portals with Ionic columns. Outside galleries forty feet in width give continuous covered promenades around the building. The building is of brick, perfectly fire-proof and having a grayish white covering of staff. The interior of the building has a great central nave 500 feet long, crossed by a transept 340 feet long. These two grand aisles are 100 feet wide and 70 high. They are lighted from above, and have broad balconies. At their intersection under the great dome, which has a diameter of 72 feet, is a grand central space 125 feet high. This space forms a lofty central chamber with arched and columned openings. So wide-awake was the interest in this department that it was found necessary to increase the space for pictures by enlarging the two annexes, which were placed on each side of the main Art Building. They were one story in height, with central entrances and low domes. Like the Main Building, they were fire-proof. Their increased size added greatly to the wall-space, two hundred thousand square feet being needed for pictures alone. Sculptures, casts and

models illustrative of Greek art, bas-reliefs in marble and bronze, carvings in wood and ivory, cameos and intaglios, etchings and engravings and drawings helped to fill the great wall-spaces and make up an exhibition which brought the art of all lands and all ages into this great treasure-house.

A number of very attractive buildings were erected on the grounds by the various states and territories of the Union. Some of these edifices were very costly, and the structures of Illinois, New York, California and Pennsylvania might well be ranked among the great buildings of the Fair. Architecturally, these buildings were as diverse as the soils and climates of the republic, while each had some stamp characteristic of the genius, traditions or special products of the state to which it belonged. They were all situated in the northern part of the grounds, grouped around the lagoon and the Art Palace, the New England buildings being nearest the lake shore, those of the Southern states toward the center of the colony, and the Western states forming a semi-circle from the Fifty-seventh Street entrance round the north end of the park. The following States and Territories made appropriations through their legislatures:

Arizona	\$30,000	New Hampshire.....	\$25,000
California	300,000	New Jersey.....	70,000
Colorado	100,600	New Mexico.....	25,000
Delaware.....	10,000	New York.....	300,000
Idaho	20,000	North Carolina.....	25,000
Illinois.....	800,000	North Dakota.....	25,000
Indiana.....	75,000	Ohio.....	125,000
Iowa.....	130,000	Pennsylvania.....	300,000
Kentucky.....	100,000	Rhode Island.....	50,000
Louisiana.....	36,000	Vermont.....	15,000
Maine.....	40,000	Virginia.....	25,000
Maryland.....	60,000	Washington.....	100,000
Massachusetts.....	150,000	West Virginia.....	40,000
Michigan.....	100,000	Wisconsin.....	65,000
Minnesota.....	50,000	Wyoming.....	30,000
Missouri.....	150,000		
Montana.....	50,000	Total.....	\$3,471,000
Nebraska.....	50,000		

The following states raised funds for the same object by stock subscriptions:

Alabama.....	\$20,000	Oregon.....	\$50,000
Arkansas.....	40,000	South Dakota.....	25,000
Florida.....	50,000	Texas.....	50,000
Georgia.....	100,000		
Kansas.....	100,000	Total.....	\$435,000

Many of the states which made legislative appropriations also raised additional amounts, aggregating, in all, \$750,000. The total expenditure by states and territories considerably exceeded \$5,000,000.

The foreign group of buildings was located east of the north pond, on the shore of Lake Michigan, between the state group and the north inlet and naval pier. Beginning at the southern end, the first building was that of Great Britain, known as Victoria House. Passing toward the north, the visitor found the Canadian, New South Wales, Haitian, Spanish, East Indian, Siamese, German, Austrian, Norwegian, Cingalese and French buildings, in the order named. These structures were all costly and beautiful. While not exhibit buildings, in the strict sense of the word, they were filled, nevertheless, with rare and

beautiful objects, which were a continual source of interest to visitors. Following is a list of the foreign countries, provinces and colonies that took part in the Fair, with the amounts appropriated, where the same were made public:

Argentine Republic.....	\$100,000	Tasmania.....	10,000
Austria-Hungary.....	102,300	Trinidad.....	15,000
Belgium.....	57,900	Victoria.....	97,330
Bolivia.....	30,700	West Australia.....	-----
Brazil.....	600,000	Greece.....	57,900
China.....	500,000	Guatemala.....	200,000
Colombia.....	100,000	Haiti.....	25,000
Costa Rica.....	150,000	Honduras.....	20,000
Denmark.....	67,000	Japan.....	630,765
Danish W. Indies.....	1,200	Mexico.....	50,000
Dutch Guiana.....	10,000	Morocco.....	150,000
Dutch West Indies.....	5,000	Nicaragua.....	30,000
Ecuador.....	125,000	Norway.....	56,280
France.....	733,400	Orange Free State.....	7,500
Germany.....	690,200	Paraguay.....	100,000
Great Britain.....	291,990	Peru.....	140,000
Barbados.....	5,840	Russia.....	31,860
Bermuda.....	2,920	Salvador.....	12,500
British Guiana.....	25,000	Santo Domingo.....	25,000
British Honduras.....	7,500	Spain.....	14,000
Canada.....	100,000	Cuba.....	25,000
Cape Colony.....	50,000	Sweden.....	53,600
Ceylon.....	65,600	Switzerland.....	23,160
Jamaica.....	24,333	Turkey.....	17,466
Leeward Islands.....	6,000	Uruguay.....	24,000
New South Wales.....	243,325		
New Zealand.....	\$27,500	Total.....	\$5,944,069

In all there were 50 nations and 39 colonies and provinces.

The table now presented shows, concisely, the area and cost of all the principal Exposition buildings, their dimensions in feet having been given where necessary, with the descriptions furnished above:

BUILDINGS.	AREA IN ACRES.	COST.
Manufactures and Liberal Arts.....	30.5	\$1,500,000
Mines.....	5.6	265,000
Electricity.....	5.5	401,000
Administration.....	1.6	435,000
Transportation.....	5.6	370,000
Transportation Annex.....	8.8	
Woman's.....	1.8	138,000
Art Galleries.....	3.7	670,000
Art Annexes (2).....	1.1	
Fisheries.....	1.4	224,000
Fisheries Annexes (2).....	.8	
Horticulture.....	5.7	300,000
Machinery.....	9.6	1,200,000
Machinery Annex.....	6.2	
Machinery Power-House.....	---	---
Machinery Pumping-Works.....	2.1	85,000
Machinery Machine-Shop.....	---	---
Agriculture.....	9.2	618,000
Agriculture Annex.....	3.8	
Agriculture Assembly Hall.....	1.3	100,000
Forestry.....	2.5	100,000
Saw-Mill.....	.9	35,000
Dairy.....	.5	30,000
Live-Stock (3).....	.9	335,000
Live-Stock Pavilion.....	2.8	
Live-Stock Sheds.....	40.0	210,000
Casino.....	.7	
Music Hall.....	.7	---
	153.3	7,016,000
United States Government.....	3.3	400,000
United States Battle-Ship.....	.3	400,000
Illinois State.....	1.7	250,000
Illinois State Annexes (2).....	.3	
	158.9	\$8,066,000

Great Britain, Italy, Germany, France, Russia and Austria. On the American continent the nations represented were Mexico, Chile, Costa Rica and other Central American states. Various prominent personages visited the exposition, special state and city days were set apart for suitable exercises, and public addresses were delivered by men prominent in the United States. The exposition closed Dec. 31, 1895.

IV. HUNGARIAN EXPOSITION, BUDAPEST, 1896. From May 1 to Nov. 1, 1896, there was held at Budapest, Hungary, an exhibition commemorating the one thousandth anniversary of Hungary's existence as a state. The buildings were erected on the ground where, in 896, the first Magyar Parliament was held. The exposition was divided into two sections, the historic and the modern. In the historic were shown the relics of the Hungarian kings and all state relics, together with, each in a separate building, the manufactures and products of all epochs of the nation. A peculiar feature was that each building was built in the architecture of the age its exhibits represented. The modern section displayed Hungary as it is to-day in its manufactures, products and national life. The influence of the Columbian Exposition at Chicago was noticeable in the arrangement of buildings, in the construction of an administration building and a concert-hall for addresses, concerts and meetings.

WORMS, BARON HENRY DE, an English statesman; was born in London, Oct. 20, 1840; educated in Paris, and at King's College, London. He was called to the bar at the Inner Temple in June, 1863, and practiced as a barrister for about three years. In 1880 he became member for Greenwich, and from that time he took an active part in the debates in the House, especially those relating to foreign affairs. At the general election of 1885, consequent upon alterations caused by the Redistribution Bill, he withdrew from Greenwich, and successfully contested East Toxteth, for which constituency he was returned in 1886, and in 1892. He was the author of *The Earth and Its Mechanism*, and *The Austro-Hungarian Empire*, the latter being an exposition of Count Beust's policy.

WORMSEED, the common name of *Chenopodium ambrosioides*, a weedy herb of the goosefoot family (*Chenopodiaceæ*). It grows in waste ground, is strong-scented, and has variously cut leaves and dense spikes of small flowers. The name comes from the fact of its use as a vermifuge.

WORMWOOD. See HORTICULTURE, Vol. XII, p. 289; ABSINTHE, Vol. I, p. 57.

WORSAAE, JENS JACOB ASMUSSEN, a Danish archæologist, was born at Vejle, in Jutland, March 14, 1821. From the gymnasium of Horsens he proceeded to Copenhagen, where, soon abandoning the study, first of divinity and then of law, he turned his whole attention to the history and archæology of the north, and from 1838 to 1843 was assistant in the Royal Museum of Northern Antiquities. Between 1842 and 1854, when he was nominated to the honorary rank of professor

in the University of Copenhagen, Worsaae made repeated visits to the other Scandinavian lands, to Great Britain, Germany, France, and other parts of central Europe, which retained traces of the former presence of the Northmen. These journeys bore fruit in numerous works and papers of interest. Somewhat inclined to exaggerate Scandinavian influences, Worsaae always showed himself an ardent patriot, and a strenuous opponent of the spread of German tendencies in the duchies, and his views in this direction were forcibly announced in his *Jylland's Danskhed* (1850). The Danish government showed its sense of the estimation in which he was held by placing him at the head of archæological commissions, and by appointing him to important posts in connection with the University and Antiquarian Museums. He was minister of education (1874-75), and died near Holbæk, in Zealand, Aug. 15, 1885.

WORSHIP. See LITURGY, Vol. XIV, pp. 706-712.

WORSTED. See WOOL, Vol. XXIV, pp. 658, 660, 661.

WÜRTH, a village of Alsace, at the junction of the Sulzbach and Sauerbach rivers, having, in 1890, 1,014 inhabitants; and being famous as the scene of the first important encounter between the German and French forces in the Franco-German War of 1870-71. This engagement took place Aug. 6, 1870, and resulted in defeat for the French.

WORTH, CHARLES FREDERICK, a Parisian costumer; born at Bourn, in Lincolnshire, England, in 1825; went to Paris in 1846, and presently started an establishment for the making of fashionable costumes. He achieved great success as a designer of fashions, and his establishment in the Rue de la Paix came to be regarded as the first emporium for the latest Paris fashions, employing a thousand workwomen. Died in Paris, March 11, 1895.

WORTH, WILLIAM JENKINS, an American soldier; born at Hudson, New York, March 1, 1794; entered the army in 1813; fought at the battle of Niagara, and was promoted major; was superintendent at West Point after the war; commanded in the Seminole War, which he ended, and at the opening of the war with Mexico was second in command under Taylor. He displayed great bravery at Monterey, won the brevet of major-general, and after the war, commanded in Texas. He died at San Antonio, Texas, May 17, 1849. A handsome monument was erected to his memory by the city of New York, at the junction of Broadway and Fifth avenue, where his remains lie.

WORTHINGTON, a town of Greene County, southwestern Indiana, 46 miles N.E. of Vincennes, on the Evansville and Terre Haute railroad. It is principally engaged in agriculture and stock-raising, and has flour, woolen and lumber mills. Population 1900, 1,448.

WORTHINGTON, a village and capital of Nobles County, southwestern Minnesota, near Lake Okabena, 92 miles N.E. of Sioux City, Iowa, on the Chicago, Minnesota, St. Paul and Omaha and the Burlington, Cedar Rapids and Northern railroads.

An important shipping-point for a large stock-raising and agricultural district, and has flour mills and grain elevators. Population 1900, 2,386.

WOUNDS. See *PATHOLOGY*, Vol. XVIII, pp. 398, 401; *SURGERY*, Vol. XXII, pp. 677-682.

WOUVERMAN. See *WOUVERMAN*, PHILIP, Vol. XXIV, p. 686.

WRACK OR SEA-WRACK. See *KELP*, Vol. XIV, pp. 29, 30.

WRANGEL, FERDINAND, BARON VON, a Russian explorer; was born in Esthonia, Dec. 29, 1796; educated in the St. Petersburg Naval Academy; made a journey around the world (1817-19) with Golovnin. In 1820 he commanded an expedition to the Polar Sea; (see *GEOGRAPHY*, Vol. X, p. 193.) He was governor of the Russian possessions in North America, 1829-34; and upon his return was made an admiral. In 1839 portions of his diaries were published in German, and translated into English in 1840 entitled *Wrangel's Expedition to the Polar Sea in 1820-23*. He died at Dorpet, June 6, 1870.

WRANGEL, FRIEDRICH HEINRICH ERNST, a Prussian field-marshal and count; born in Stettin, April 13, 1784; joined a dragoon regiment, took a distinguished part in the campaigns of 1807, 1813 and 1814, and rose steadily till in 1848 he was general and commander of the Prussian and Federal troops in Schleswig-Holstein. In that year he marched into Berlin and crushed the insurrectionary movement there; in 1856 he became a field-marshal; in 1864 he had supreme command over Prussian and Austrian troops in the Danish war; and, ennobled in 1866, was still able to be present, though without command, with the Prussian army during the Austro-Prussian war. He died in Berlin, Nov. 1, 1877.

WRATH, CAPE, the northwestern cape of Scotland. It is a pyramid of gneiss, six hundred feet high, projecting from Sutherland into the Atlantic Ocean. There is a lighthouse on the cape four hundred feet above tidewater.

WRAY. See *RAY*, JOHN, Vol. XX, pp. 300-01.

WREDE, KARL PHILIP, marshal (1767-1838). See *ARMY*, Vol. II, p. 600.

WRIGHT, CARROLL D., an American statistician; born in Dumbarton, New Hampshire, July 25, 1840; served in the Union army, becoming colonel; was admitted to the bar, 1865; was chief of Massachusetts bureau of labor statistics, 1873-88, and became first commissioner of labor in the Interior Department in 1884. He published reports of Massachusetts censuses, statistics of labor, on which he was considered an authority, and *The Factory System of the United States*

(1882); *Convict and Labor* (1887); and *The Relation of Economic Conditions to the Causes of Crime* (1893). He contributed the articles, *MUTUAL BENEFIT SO-*

CITIES; *BUILDING AND LOAN ASSOCIATIONS*; and *LABOR ORGANIZATIONS*, in these Supplements.

WRIGHT, CHARLES ROMLEV ALDER, an English chemist; was born at Southend, Essex, Sept. 7, 1844; educated at Owen's College, Manchester, and London University, graduating at the latter institution in 1865. The degree of doctor of science was conferred upon him in 1870 by the same university. In 1871 he was appointed lecturer on chemistry, physics and practical chemistry in the medical school of St. Mary's Hospital, London. He was elected a fellow of the Royal Society in 1881, and was examiner in chemistry in the University of Durham and the Royal College of Physicians. His investigations were prosecuted in nearly every department of chemical science, especially in organic, inorganic and analytical chemistry, chemical physics and various branches of technical chemistry. Perhaps among the more important of his labors were his investigations in the chemistry of iron-smelting, besides which he contributed to the metallurgy of numerous metals and alloys, the manufacture of alkali and soap, waterproof paper, canvas-goods, insulating-materials and disinfectants. He contributed a great number of reports and papers to various scientific societies. Among his books and monographs are *Metals and their Chief Industrial Applications* (1878); *The Threshold of Science* (1892); *Coal-Tar Distillation*; *Fixed Oils, Fats and Waxes*; and the articles on *IRON* and *GLYCERIN*, in this *ENCYCLOPEDIA*.

WRIGHT, ELIZUR, an American journalist; was born in South Canaan, Connecticut, Feb. 12, 1804; graduated at Yale in 1826, and three years later became professor of mathematics and natural philosophy in Western Reserve College, Hudson, Ohio. He was made secretary of the American Anti-Slavery Society, which was formed in Philadelphia in December, 1833, and removing to New York, he assisted in editing *The Emancipator*. Between that time and 1838 he successively conducted a paper called *Human Rights* and the *Quarterly Anti-Slavery Magazine*, and in 1839 became editor of the *Massachusetts Abolitionist* in Boston. In 1846 he established the *Chronotype*, a daily newspaper, which was merged in the *Commonwealth* in 1850. Mr. Wright's house was once besieged by a mob on account of his anti-slavery sentiments. He was several times indicted for libel, in consequence of his editorial strictures on the liquor interests, and once, in 1851, for aiding a runaway slave to escape. Later he gave his attention to invention and mechanics, and to insurance. Died in Medford, Mass., Nov. 21, 1885.

WRIGHT, GEORGE FREDERICK, geologist and theologian; born at Whitehall, N. Y., June 22, 1838; graduated at Oberlin College, and Oberlin Theological Seminary (1859-62); enlisted in the Union Army in 1860; was pastor of Congregational churches in Bakersville, Vt. (1862-72), and Andover, Mass. (1872); and professor of New Testament literature in Oberlin Theological Seminary in 1881. He devoted much study to geology; was assistant geologist on the Pennsylvania survey, and connected with the division of glacial geology on the United States geological survey. He was an associate editor of *Bibliotheca Sacra*, and wrote *The Logic of Christian*



CARROLL D. WRIGHT.

Evidence (1880); *Studies in Science and Religion* (1882); *The Glacial Boundary of Ohio* (1884); *The Divine Authority of the Bible* (1884); *Man and the Glacial Period* (1892); *The Ice Age in North America*; and, with Warren Upham, *Greenland Icefields and Life in the North Atlantic* (1896).

WRIGHT, HORATIO GOVERNEUR, an American soldier; was born in Clinton, Connecticut, March 6, 1820; graduated at United States Military Academy and commissioned second-lieutenant in the engineer corps in 1841. He taught engineering at West Point, and was promoted first-lieutenant in 1848. In 1856 he became assistant to the chief engineer at Washington, where he continued until the outbreak of the Civil War in 1861. He was chief engineer of Heintzelman's division at the first battle of Bull Run, and Sept. 14, 1861, was commissioned a brigadier-general of volunteers. He organized the Port Royal expedition, led the Florida expedition (February–June, 1862), and became major-general of volunteers July 18, 1862. He led a division at Gettysburg, rose to the command of the Sixth Corps, and was with the Army of the Potomac in every engagement up to July, 1864. Summoned from Petersburg with his corps to the defense of Washington, Wright pursued and defeated General Early at Snicker's Gap. He was with Sheridan and the Army of the Shenandoah at Fisher's Hill, Opequan and Cedar Creek. Mustered out of volunteer service in 1866, he returned to duty as lieutenant-colonel of engineers. By gradual promotion through the several grades he became brigadier-general and chief of engineers June 30, 1879. From this position he retired March 6, 1884, and died July 2, 1899.

WRIGHT, WILLIAM, an English orientalist; was born in Bengal, India, Jan. 17, 1830; educated at St. Andrews and Halle universities. He held the professorship of Arabic in University College, London (1855); in Trinity College, Dublin (1856); University of Cambridge (1870). In 1869 he became assistant keeper in the MS. department of the British Museum. He edited and wrote a large number of papers, monographs and books, chiefly upon oriental subjects, among which are, edited in Arabic, *The Travels of Ibn Jubair* (Leyden, 1852); *Al-Makkari's Analectes* (1855); *El-Mubarrad's Kamil* (Leipsic, 11 parts, 1804–82). He published *The Book of Jonah in Four Oriental Versions—Chaldee, Syriac, Ethiopic and Arabic—with Glossaries* (London, 1857); *Contributions to the Apocryphal Literature of the New Testament, Collected and Edited from Syriac MSS. in the British Museum, with an English Translation and Notes* (1865); *The Homilies of Aphraates, "the Persian Sage"* (in Syriac, 1869); and many others. He contributed the article on SYRIAC LITERATURE, Vol. XXII, pp. 824–56, of this ENCYCLOPEDIA. He died in Cambridge, May 22, 1889.

WRIGHT, WILLIAM ALDIS, an English author; born in England about 1836; graduated at Trinity College, Cambridge; became its librarian, and in 1888, vice-master of that institution. He contributed much on geography and biography to *Smith's Dictionary of the Bible* (3 vols., 1863); edited *Bacon's Essays* (1862) and *Advancement of Learning* (1869); with William George Clark, *The Cambridge*

Shakspeare (9 vols., 1863–66), and the *Globe Edition of Shakspeare* (1864). He also edited *The Bible Word-Book* (1866); *Chaucer's Clerk's Tale*, and other works.

WRIGHTSVILLE, a borough of York County, southern Pennsylvania; on the Susquehanna River; 31 miles S.E. of Harrisburg, on the Pennsylvania railroad, and on the Susquehanna and Tide-water canal. It has several manufacturing industries, including lumber-mills, foundries, furniture and tobacco factories. Population 1900, 2,266.

WRITER'S CRAMP. See CRAMP, Vol. VI, p. 543.

WRITERS TO THE SIGNET. See LIBRARIES, Vol. XIV, p. 522–23.

WRITING. The art of recording ideas by the means of letters and characters formed on paper, parchment, stone or other material. There are two divisions of writing: ideographic, i.e., the use of figures, characters or symbols to represent objects and ideas independently of sounds; and phonographic, in which sounds or words are represented by letters or signs. In the Egyptian hieroglyphic writing we have a commingling of ideographs and phonographs. (See HIEROGLYPHICS, Vol. XI, pp. 794–809.) It is generally understood that the art of writing was introduced into Europe by the Phœnicians, and that their system was based on the Egyptian. Scholars claim that all alphabets were originally hieroglyphic, and that all systems of writing may be traced back to four or five parents. The five systems are the Egyptian, the Cuneiform, the Chinese, the Mexican or Aztec, and the characters of Yucatan. (For a treatment of the different alphabets, their differences and supposed origin, see ALPHABET, Vol. I, pp. 600–614.) The system which has exercised the widest influence upon the world is the Egyptian; but the question of greatest antiquity is still mooted, as between the Egyptian and the Cuneiform. Doctors Peters and Hilprecht claim that their most recent excavations at Nippur (1896), have brought to light inscriptions which date from 7000 to 10,000 B.C. (See NIPPUR, in these Supplements.)

The Greeks at first wrote from right to left; next they adopted a method of alternating—first from right to left and then from left to right. In ancient Greek and Latin the words were not separated by spaces, nor were punctuation marks used. In mediæval manuscripts a variety of styles was used in different epochs and for different purposes. The modern German alphabet was introduced about the middle of the thirteenth century. The Norman style came to England with William the Conqueror, and the English court-hand—adapted from the Saxon—was in use from the sixteenth century to the reign of George II. There are no traces of writing at all in Britain before the Roman conquest.

The Runic alphabet of Scandinavia was based on the Roman. (For Runic inscriptions, see SCANDINAVIAN LANGUAGES, Vol. XXI, p. 366, et seq.) The Chinese characters are necessarily syllabic, as all Chinese words are monosyllables, and are therefore ideographic. Their system contains, it is said, fully forty thousand characters. (See CHINA, Vol. V, pp.

653-659.) The most perfect known alphabet is the Sanskrit; its consonants number 43, and its vowel signs 14. It is written from left to right. (See *SANSKRIT*, Vol. XXI, pp. 269-272.) For the history and development of writing, see *PALÆOGRAPHY*, Vol. XVIII, pp. 143-165; also *ARCHÆOLOGY*, Vol. II, pp. 342, et seq.

WRITING-MACHINES. See Vol. XXIV, pp. 697-698; and **TYPE-WRITING MACHINES**, in these Supplements.

WRITING-TELEGRAPH. (See also **TELAUTOGRAPH**.) This name is given to those systems of telegraphy which produce a record in Roman characters. Two new methods are specially worthy of notice. The J. H. Rogers system, used between Washington and Baltimore by the United States Postal Printing Telegraph Company, employs a typewriting machine with a tape-punching device to prepare the message for sending. Any one who can operate a typewriter can write a message, and the speed is, of course, several times that of sending by the Morse alphabet. Transmission of the message is simplified by reducing the Roman characters to eight marks, some combination of which will form any of the letters or figures, and most of the points. The punched tape being run under eight wires, the proper magnetic impulses are sent for their reproduction at the other end of the line. The process of telegraphing consists simply in passing the punched tape into the transmitter, where it is drawn over a small drum under the eight wires, which drop into the holes representing the letters, so that at every rotation of the drum a current passes over the line and operates the impression of the type there by means of magnets. By means of synchronous wheels at either end of the wire in which the synchronism is assisted by the thumb of the receiving operator, two hundred words a minute may be transmitted as a durable speed. The message is sent automatically, and received and printed automatically, the receiving operator having nothing to do but to attend to the synchronism of his wheel. For long distances an automatic relay is provided.

The Wright Typewriter Telegraph has been introduced in Paris for the transmission of race-track and financial news. The sending-instrument is provided with a keyboard, whose operation actuates a special commutator that permits of sending currents into a line containing several receivers. These latter are made without clock-work, and print the message on a roll of paper five and one half inches wide, much as it would appear if done on an ordinary typewriter. The speed is said to be quite rapid.

C. H. COCHRANE.

WULFENITE. See *MINERALOGY*, Vol. XVI, p. 403.

WULFSTAN (1007-1095), a saint in the English calendar; prior and bishop of Worcester; thought to have contributed to the *Anglo-Saxon Chronicle*. See *WORCESTER*, Vol. XXIV, pp. 666, 667.

WURMSER, DAGOBERT SIEGMUND, COUNT VON, an Austrian soldier; born at Strasburg, in Alsace, May 7, 1724. He first entered the French army, but left it and joined the Austrian, serving through

the Seven Years' War, and that of the Bavarian succession. He became military commander in Galicia, and in 1787 was made a general of cavalry. During the war with the French Republic, while advancing toward Mantua (to which Napoleon had laid siege), and whither he had been sent in 1796 with reinforcements, he was attacked by Napoleon's full force and compelled to retreat into the Tyrol. A second time he advanced at the head of another reinforcement, but Napoleon this time attacked him in the rear, beating him in three successive battles—at Roverdo, Bassano and outside Mantua—compelling him to seek refuge within the walls. Repeated attempts to rescue him failed, and he capitulated Feb. 2, 1797. (See *AUSTRIA*, Vol. II, p. 130.) He was afterward appointed military commander of Hungary, but before he could enter upon his new duties he died, Aug. 22, 1797.

WÜRTEMBERG, KINGDOM OF. See Vol. XXIV, pp. 699-702.

WILHELM II, King of Würtemberg; born Feb. 25, 1848; son of Prince Friedrich of Würtemberg (cousin of King Karl I), and Princess Katharine of Würtemberg (sister of Karl); ascended the throne on the death of Karl I, Oct. 6, 1891. Married (1) Feb. 15, 1877, to Princess Marie of Waldeck-Pyrmont, who died April 30, 1882; issue of this union, Princess Pauline, born Dec. 19, 1877; (2) April 8, 1886, to Princess Charlotte of Schaumburg-Lippe; born Oct. 10, 1864. The civil list of the king amounts to 2,014,203 marks, or \$479,380.

The population in 1895 of the eight largest towns was as follows:

Stuttgart	158,321	Cannstatt	22,590
Ulm	39,304	Reutlingen	19,822
Heilbronn	33,461	Ludwigsburg	19,311
Esslingen	24,031	Gmünd	17,282

The area is 7,533 square miles; total population in 1895, 2,081,151, divided into four districts, as follows:

PROVINCES.	AREA IN SQ. MILES.	POPULATION.	
		1890.	1895.
Neckar	1,285	665,049	697,373
Black Forest (Schwarzwald) ..	1,845	481,334	488,431
Jagst	1,985	402,991	398,887
Danube (Donau)	2,418	487,148	496,460
Total	7,533	2,036,522	2,081,151

Würtemberg is primarily an agricultural state, and 4,720 square miles, or about two-thirds of the entire area, are under cultivation, and about three-tenths under forest. On June 15, 1895, the total number of agricultural farms was 306,643. These farms supported 1,080,032 persons, of whom 429,624 were actively engaged upon them. The principal agricultural products for 1897 were hay, spelt, oats, clover, etc., barley, potatoes, rye, and wheat.

In 1897, vines occupied 16,992 hectares, and yielded 249,851 hectolitres of wines.

In 1897 there were produced 3,794,757 hectolitres of beer. The total value of the minerals mined in the kingdom in 1896 was 1,020,866 marks.

In 1897 there were in Württemberg, 1,014 miles of railway, all except 37 miles being the property of the state, which owns, moreover, 110 miles in neighboring states.

REVENUE, EXPENDITURE, AND PUBLIC DEBT. The estimated expenditure for 1898-99 aggregated 73,876,381 marks, of which amount more than one-third was to meet the interest on the public debt. On April 1, 1898, the capital of the public debt was estimated to amount to 471,624,200 marks, of which the bulk bears interest at 4 per cent, and most of the balance at 3½. The debt of the kingdom is divided into two portions—the general debt, and the railway debt. The latter amounted to 436,354,739 marks on April 1, 1898. The total debt amounts to about \$56 per head of the population, and the charge (interest and sinking fund) for 1897-98 to 20,300,506 marks, or about \$2.50 per head. The net income of the railways, all expenses deducted, amounted in 1895-96 to 16,076,804 marks, covering 81 per cent of the interest charge of the whole public debt, and 89 per cent of the interest charge of the railway debt alone.

The value of the mark is 23.8 cents.

PUBLIC INSTRUCTION. Education is compulsory in Württemberg, and there must be one public school or more in every commune. According to recent official returns there is not a person in the kingdom, above the age of 10, unable to read and write. There were 2,319 elementary public schools in 1897, with 4,793 teachers, attended by 297,568 pupils; 83 realschulen, with 9,307 pupils; 67 grammar-schools; 19 classical colleges (gymnasias), of which four are training colleges for the Protestant clergy, and six lyceums, having (1897) together 8,386 scholars. Facilities for higher education are furnished by the University of Tübingen (founded in 1477). There are, besides, the Polytechnic School (Polytechnicum) at Stuttgart, and several other agricultural and other special institutes. The funds appropriated by the state to educational purposes amounted, in 1895-96, to 6,600,000 marks, not including the sum bestowed on public schools by the parishes or out of the revenue of foundation.

ARMY. The total strength of the Württemberg corps d'armée (the 13th of Germany) was, on the peace footing, 1898, 24,156 men, 4,190 horses, and 132 guns. In 1896-97 there were 10,827 recruits.

WURTZ, HENRY, an American chemist; was born in Easton, Pennsylvania, June 5, 1828; graduated at Princeton in 1848. After studying in Cambridge at the Lawrence Scientific School, he was appointed in 1851 laboratory assistant of the Sheffield (formerly Yale) Scientific School at New Haven, Connecticut; and in 1853-55 he was engaged as chemist to the geological survey of New Jersey. In 1857 he was professor of chemistry in the Kingston, Canada, Medical College, and in 1858 became examiner in the chemical division of the United States patent office, in which place he remained until 1861, when he removed to New York. For many years Professor Wurtz was engaged in matters of original chemical research, in the course of which he made some valuable dis-

coveries. In 1876 he was a judge on the international jury of awards at the Centennial Exhibition in Philadelphia. The degree of Ph. D. was conferred on him by Stevens Institute of Technology in 1877. He edited the *American Gas-Light Journal* from 1868 to 1874, and was assistant editor of the chemistry department of an American cyclopædia. In October, 1888, he entered the employ of Thomas A. Edison as chemist. Professor Wurtz published more than fifty scientific papers. Perhaps among his more valuable discoveries are, new modes of producing fuel-gas from cheap coal and the production of paraffin oils, carbolic acid and other liquids from various sorts of coal; a cheap process for the generation of electricity by chemical products; and the use of sodium in the amalgamation of ores. In 1876 he published a paper on the discovery of the geometrical laws of the condensation of chemical molecules.

WURZEN, a small walled town of Saxony, 15½ miles E. of Leipsic, picturesquely situated, and surrounded by romantic valleys, on the Mulde, here crossed by two bridges. It is a station on the Leipsic and Dresden railway. Population about 7,200, employed in brewing, bleaching, weaving and hosiery work.

WYANDOT INDIANS. See INDIANS, Vol. XII, p. 827.

WYANDOTTE, a city of Wayne County, southern Michigan, on the Detroit River, and 12 miles S. of Detroit, on the Michigan Central and the Lake Shore and Michigan Southern railroads. It has important rolling-mills, blast-furnaces and smelting-works, and other industries. Population 1890, 3,817; 1900, 5,183.

WYANT, ALEXANDER H., an American landscape artist; was born in Port Washington, Ohio, Jan. 11, 1836. He studied in England and Germany, and upon his return to America was elected associate of the National Academy in 1868 and an academician in 1869. He was member of the Society of American Artists and of the American Water-color Society; and at the Paris Exposition of 1889 he received honorable mention. Among his works in oil are *Scene on the Upper Susquehanna* (1869); *View on Lake George* (1875); *Wilds of the Adirondacks* (1876); *Any Whither* (1883); and *Evening* (1885). Among his water-colors are *Scene on the Upper Little Miami* (1867); *Sunset on the Prairie* (1876); *Late Autumn, Au Sable River* (1877). He died in New York, Nov. 29, 1892.

WYATT, SIR MATTHEW DIGBY, an English architect and writer on art; was born in Wiltshire, England, in 1820. He was a pupil at the Royal Academy, and also at art schools on the continent. As an architect, he superintended the work upon the Crystal Palace in London in 1851; and in 1852-54 had charge of the decorations and the fine-arts department of the building of the same name at Sydenham. In 1855 he received the appointment of surveyor to the British East India Company. He furnished designs for many architectural structures in India and Great Britain; was connected with the British Universal Exposition of 1862; was knighted in 1869; Slade professor of fine arts at Cambridge

in 1869-72. He was author, among other works, of *Industrial Arts of the Nineteenth Century* (2 vols., 1851); *Metal Work and its Artistic Design* (1852); *Geometrical Mosaics of the Middle Ages* (1848); *Art Treasures of the United Kingdom* (1857); *An Architect's Note-Book in Spain* (1872). He died in London, May 21, 1877.

WYCH-ELM TREE. See ARBORICULTURE, Vol. II, p. 317.

WYCLIFFE COLLEGE, Toronto, Canada, was founded in 1879 as the theological training-hall of the evangelical section of the Church of England in Canada. It was incorporated under the name of the Protestant Episcopal Divinity School, but finally adopted the designation of Wycliffe College, and is affiliated with Toronto University. It has for its aim the imparting of sound and comprehensive theological teaching "in accordance with the distinctive principles of evangelical truth, as embodied in the Thirty-nine Articles."

WYE, river. See HEREFORD, Vol. XI, p. 729.

WYMAN, JEFFRIES, an American anatomist; born at Chelmsford, Massachusetts, Aug. 11, 1814. He studied medicine at Harvard, where he graduated in 1833, afterward studying anatomy at Paris and London. In 1843 he became professor of anatomy and physiology at Hampden College, Richmond, Virginia, and in 1847 he was appointed to the chair of anatomy at Harvard, which position he occupied till his death. At Harvard he began the formation of the Museum of Comparative Anatomy, with which his name is associated. On the foundation of the Peabody Museum of American Ethnology and Archaeology at Cambridge in 1866, he was chosen its curator. He was president (1856-70) of the Boston Society of Natural History; and of the American Association for the Advancement of Science in 1857. He published the first scientific account of the gorilla; discovered human remains in fresh-water shell-heaps in Florida, and made valuable experiments in the development of infusoria, of batrachian larvæ and of mold in eggs. His scientific papers were 64 in number. He died in Bethlehem, New Hampshire, Sept. 4, 1874.

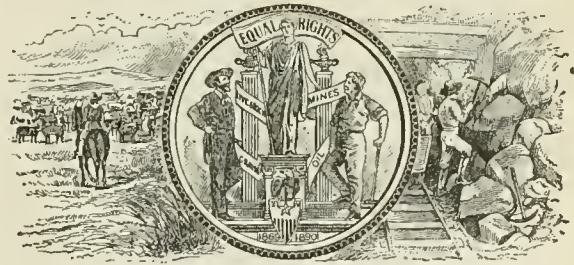
WYMORE, a city of Gage County, southeastern Nebraska, on the Big Blue River, 62 miles S. of Lincoln, on the Chicago, Burlington and Quincy railroad. It has railway roundhouses and shops, and is an important shipping-point for the neighboring agricultural and stock-raising region. Population 1890, 2,420; 1900, 2,626.

WYNANTS OR WIJNANTS, JAN, a Dutch landscape-painter; thought to have been born about 1600, in Haarlem, Netherlands. His works bear dates between 1641 and 1679; and he is supposed to have located in Amsterdam about 1665. Wynant's works are to be found in the galleries of Munich, Amsterdam, St. Petersburg, the National Gallery of London, and in many private collections, such as those of the Earl of Ellesmere, Sir R. Wallace and others. Many of his landscapes have figures inserted by A. Van de Velde, Wouwerman and Lingelbach. He is supposed to have died in Amsterdam sometime subsequent to 1679.

WYNDHAM, CHARLES, an English actor; born

in 1841; educated for the medical profession. His first appearance as an actor was after he went to America, in 1862, playing Osric to John Wilkes Booth's *Hamlet*, at Washington. He entered the army as surgeon after the termination of this engagement; and at one time had medical charge of a regiment of the Nineteenth Army Corps. Returning to England, he again went upon the stage, where he achieved signal success. He filled another theatrical engagement in America in 1869, appearing at Wallack's Theater as Charles Surface in *The School for Scandal*. He afterward played successive engagements in England and throughout the provinces. In 1875 and again in 1887 he visited Germany, playing (during the second tour) *David Garrick* in German, under the title of *Auf Ehrenwort*. His trip embraced the cities of Berlin, Frankfurt and others; and upon leaving Germany he extended his tour to Russia, at the Czar's express invitation, upon which occasion he was presented by the Czar with a jeweled ring, in token of his admiration. Mr. Wyndham made still another trip to America, in 1889; and he won especial laurels as Young Marlow in *She Stoops to Conquer*.

WYOMING, the forty-fourth state to enter the Union, had a population in 1900 of 92,531, an in-



STATE SEAL OF WYOMING.

crease of 31,826 over that of 1890 (60,705). The density of population was 0.62 to the square mile, an increase from 0.21 in 1880. In 1890 there was but one city of 8,000 inhabitants or over, in which resided 11,690 of the people of the state, giving an urban population of 19.26 per cent; the male citizens numbered 39,343, the female 21,362; the percentage of native-born population was 75.43; the negroes numbered 922, a gain of 624 since 1880. There were 465 Chinese and 43 civilized Indians.

(For a history of the territory, see WYOMING, Vol. XXIV, pp. 712, 713.)

The chief features of the constitution, adopted by the convention that adjourned in Cheyenne, Sept. 30, 1889, and ratified by popular vote on the first Tuesday of the following November, are as follows:

Both male and female citizens enjoy civil, political and religious rights and privileges equally.

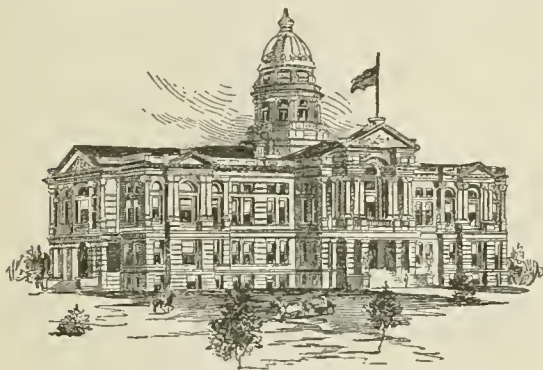
The executive power is vested in a governor, to be elected every four years; a secretary of state, auditor, treasurer and superintendent of public instruction, each having a four-years' term of office.

The judiciary consists of a supreme court, district courts, justices of the peace, courts of arbitration, and such courts as the legislature may by general law establish for incorporated cities and towns. The

supreme court consists of three justices, elected for terms of eight years.

The legislature consists of a senate and house of representatives, the former to be elected for four years and the latter for two years. The sessions of the legislature are limited after the first, which was to continue for sixty days, to forty days, the sittings being biennial. The power to locate public institutions is not to be exercised without submission of the question to a popular vote. No laws are to be passed that create in the public schools any distinction on account of sex, race or color.

The tax to provide a state revenue must not exceed four mills on the dollar of assessed valuation, except for the support of state educational and charitable institutions, the state debt and the interest thereon, and no indebtedness can be created in excess of one per cent of the assessed valuation of



CAPITOL BUILDING OF WYOMING.

the state, except to suppress insurrection or provide for the public defense. Other provisions of this instrument are common to the states of the Union.

Congress was apprised of the result of the election, and on March 27, 1890, the House passed the bill for admission, which was concurred in by the Senate, June 27. On July 10, 1890, the President signed the Congressional bill, just passed for the admission of Wyoming into the Union, and the territory became a state. Besides the usual provisions for granting school lands to every township, the act donated 500,000 acres of government land to the new state for public purposes. Among the grants were the following: For university purposes, 72 sections; for an agricultural college, 90,000 acres; for public buildings at the capital, 50 sections; for the insane asylum, 30,000 acres; for the penitentiary, 30,000 acres; for penal institutions in Carbon County, 30,000 acres; for the fish-hatchery, 5,000 acres; for the asylum for the deaf, dumb and blind, 30,000 acres; for a poor-farm, 10,000 acres; for a miners' hospital, 30,000 acres; additional grants for public buildings at the capital, 75,000 acres, and for state charitable and penal institutions, 260,000 acres.

On Sept. 11, 1890, a full complement of state, county and town officials was selected by the vote of the people.

The latest surveys give to Wyoming 97,890 square miles of territory, of which 315 square miles are water surface. Of the total area, about 16,000,000

acres is susceptible of cultivation with the aid of irrigation. Up to 1896, \$15,000,000 had been expended in making canals and constructing ditches and reservoirs. Water is obtained in abundance, over 600 streams having been utilized up to the date mentioned, at which time there were 2,900 recorded ditches and 5,500 unrecorded, over 5,000 miles in length.

ACREAGE AND PRODUCTION OF CEREALS—1889.

CEREAL.	ACREAGE.	PRODUCTION.
Corn	1,977	25,172
Wheat	4,584	74,450
Oats	14,607	388,505
Barley	486	11,763
Rye	141	2,055
Buckwheat	20	140

COMPARATIVE AGRICULTURAL STATISTICS FOR 1880 AND 1890.

	1880.	1890.
Number of farms	457	3,125
Total acres in farms	124,433	1,830,432
Percentage of improved land	67	127
Value of farms, fences, buildings, implements, machinery and live-stock on farms	\$5,938,484	\$30,331,461
Number of horses	11,975	87,403
Number of mules and asses	671	1,242
Total number of cattle	278,073	695,969
Number of milch cows	3,730	11,684
Number of swine	567	6,794
Number of sheep	140,225	712,520

SIZE OF FARMS.

Under 10 acres	15
10 and under 20 acres	16
20 and under 50 acres	30
50 and under 100 acres	82
100 and under 500 acres	2,494
500 and under 1,000 acres	274
1,000 acres and over	214
Average size of farms, acres	586
Average size of farms, acres, 1880	272

TENURE UNDER WHICH FARMS ARE WORKED.

Cultivated by the owners	2,993
Rented for money	61
Rented on shares	71

More than one half of the hogs reported for 1889 were slaughtered for use on the farms in 1890. Wyoming was one of the few states having a majority of merino or grade sheep. Among other agricultural products than those named were hops, which produced large crops.

State reports of the number and value of farm animals, compiled from the assessors' returns of 1895, make the following showing:

	NUMBER.	VALUE.
Horses	82,524	\$1,589,457
Mules	1,505	50,618
Milch cows	18,706	397,503
Oxen and other cattle	767,193	10,562,332
Sheep	1,222,538	2,004,107
Swine	15,834	102,417
Total	2,108,300	\$14,706,434

The mineral industries were reported in the census of 1890 as having been of the value of \$1,810,515 for the year preceding. Coal was the leading product, the output being given at 1,388,947 tons, of the value of \$1,748,617. Gold and silver combined returned \$14,512; stone of all kinds yielded a revenue of \$17,120, the greater portion of the output being sandstone for building purposes, which amounted to \$16,760. Copper is found in large deposits; salt, sulphur and gypsum abound; and bismuth, graphite, asbestos and fire-clay are found in various portions of the state. The coal deposits are estimated to underlie 15,000,000 acres of territory; the amount mined in 1893 was 2,439,311 tons, valued at \$3,290,904; and the output in 1895 reached almost 4,000,000 tons. Extensive deposits of petroleum have been found, and many springs of superior mineral water have long been known for their medicinal qualities. The great Yellowstone Park (q.v., in these Supplements) lies almost entirely in Wyoming.

The returns of the eleventh census show 190 specified manufacturing industries in Wyoming, in which there were \$1,411,184 invested as capital, 1,144 persons employed, to whom \$878,646 was paid as wages; products turned out were valued at \$2,367,601. Among the leading industries were lumber in various forms, flouting and grist mill products, clothing, boots and shoes, and carriages and wagons.

The public schools of Wyoming are supported by liberal appropriations. Attendance is compulsory, and by the census reports the state has a smaller percentage of illiteracy than any member of the Union. In 1899 a report of the schools for the preceding year was issued, which showed an attendance of 13,042; teachers, 536, of whom 102 were males, receiving monthly wages averaging \$60.40, and 434 were women, receiving wages averaging \$42.86; the school-houses numbered 338 and cost about \$500,000. The cost for the year for the maintenance of the schools was \$236,600.

The leading institution of higher education in Wyoming is the University of Wyoming, at Laramie, a nonsectarian institution, with 14 instructors, 186 students (1898), a library of 7,000 volumes, and a total income of \$47,600.

In 1899 the valuation of all property of the state for taxation purposes was \$30,789,291, a gain over 1895 of \$950,353. Lands and the improvements thereon were assessed at \$6,857,698; town lots and the improvements were valued at \$5,497,842; capital invested in merchandising and manufacturing was placed at \$1,488,271; money and credits amounted to \$524,098; and stocks in companies and corporations bore the valuation of \$307,795. The total assessment was \$186,866 for state purposes. The state treasurer reported the receipts for the fiscal year ending Sept. 30, 1898, together with the balance remaining over, at \$274,581, and the disbursements \$263,290, leaving a balance, 1897-98, of \$103,785, the balance in 1897 having been \$92,495.

The state penitentiary is located at Laramie; a new institution has recently been erected at Rawlins. The State Insane Asylum is located at Evanston.

The cost of maintaining the insane for 1898 was \$15,537. A state hospital is located at Rock Springs, conducted for miners. It was opened in October, 1894, and miners unable to pay the small charge exacted are kept at the expense of the state. The Soldiers' and Sailors' Home is at Cheyenne, and is partially supported by the Federal Government. The blind, numbering in 1897, 2; the deaf and dumb, numbering at the same time, 6; the feeble-minded, and the juvenile offenders, are maintained at the Colorado institutions, at a cost to Wyoming of \$250 annually, each.

In 1890 Wyoming had 141 church organizations; 43 houses of worship; 11,705 communicants or members (which constituted 19.28 per cent of the population); and church property of the value of \$386,625. The Roman Catholic was the leading organization in numbers of congregations, having 67, the Methodist Episcopal had 13, the regular Baptists 9, and the Latter-Day Saints 8.

Wyoming has about 12,000 square miles of timbered lands, the greater portion of which is confined to the mountain-ranges, between 4,500 feet and 10,000 feet above sea-level. Yellow and white pine and white-spruce are the principal varieties. Lodgepole-pine grows extensively in a wide area along the mountain-range north and south of Laramie. It is also common in the northwestern part of the state.

The organized force of the National Guard of Wyoming in 1896 was 450, formed into one regiment of infantry, with headquarters at Evanston. The number of adult males in the state liable to military duty was 12,000. The state appropriations to the Guard amounted, in 1895, to \$3,600, and the Federal appropriation for the two years ending March 31, 1895, was \$2,587.

January 1, 1899, there were published in Wyoming 43 newspapers, of which 4 were daily, 2 semi-weekly, and 37 weekly. Papers were published in all of the 13 counties, and in 22 of the cities, towns, and villages, of which 12 were county seats.

The railroads of Wyoming in 1895 aggregated 1,177 miles, of the assessed valuation of \$7,127,381, the mileage being an increase over the preceding year of 20 miles, and over that of 1893 of 277 miles. The telegraph companies of the state paid taxes in 1896 on an assessed valuation of \$107,186.

The following is a list of the principal cities and towns of Wyoming, the populations being those of 1900: Cheyenne, 14,087; Laramie, 8,207; Rock Springs, 4,363; Rawlins, 2,317; Evanston, 2,110; Green River, 1,361; and Sheridan, 1,559.

List of the Governors of Wyoming: *Territorial*—John A. Campbell, 1869-75; John M. Thayer, 1875-78; John W. Hoyt, 1878-82; William Hale, 1882-85; Francis E. Warren, 1885-86; George W. Baxter, 1886; Thomas Moonlight, 1886-89; Francis E. Warren, 1889-90. *State*—Francis E. Warren, 1890-92; Amos W. Barber, 1892-93; John E. Osborne, 1893-95; William A. Richards, 1895-99; De Forest Richards, 1899-.

WYOMING, a town of Stark County, northwestern Illinois, 30 miles N.W. of Peoria, on the Rock Island and Peoria and the Chicago, Burlington and

Quincy railroads, in an agricultural and coal-mining section; has several machine-shops. Pop. 1900, 1,277.

WYOMING, a village of Hamilton County, southwestern Ohio, on the Cincinnati, Hamilton and Dayton railroad. It is mainly a suburban residential place for people doing business in Cincinnati. Population 1890, 1,454; 1900, 1,450.

WYOMING, a borough of Luzerne County, northeastern Pennsylvania, on the Susquehanna River, five miles N.E. of Wilkesbarre, on the Delaware, Lackawanna and Western railroad. It is in an agricultural and coal-mining district, and has some manufacturing. It is famous in history as the scene of the Wyoming massacre, July 3, 1778, when 800 Tories and Indians descended upon the settlement, completely routed the local garrison of 250 and drove the entire community from the valley, the Indians taking 227 scalps and sparing only the women and young children. These settlers were mostly emigrants from Connecticut, that colony claiming this section by virtue of its original charter. Population 1890, 1,794. See WYOMING VALLEY, below.

WYOMING VALLEY, the fertile valley of the north branch of the Susquehanna River, in Luzerne County, Pennsylvania, containing parts of the townships of Pittston, Jenkins, Plains, Wilkesbarre, Hanover, Plymouth, Exeter and Kingston. It was the scene of the "Pennymite wars," a long series of contests between the Connecticut emigrant settlers of that section and the Pennsylvania authorities and citizens, Connecticut persisting in claiming that region, according to the terms of an ancient charter, until 1782, when Congress decided the dispute in favor of Pennsylvania. The authorities then attempted to eject the settlers, but met with armed resistance, and in 1788 the Pennsylvania legislature confirmed the titles of those holding property in the valley, thus putting a stop to further serious disturbances there, though the courts were busy with disputed claims from this section for a quarter of a century.

WYSE, LUCIEN NAPOLEON BONAPARTE, a French explorer and engineer; born in Paris in 1845; son of Sir Thomas Wyse and Princess Letitia Napoleon; brother of Madame Rattazzi. As an officer in the French marine, he distinguished himself for his explorations in Central America. He negotiated with the Colombian government the extension of the concession for the Panama canal, and published reports upon that enterprise. For his report upon this work, published in 1885, he was honored by the French Academy. He published

several books relating to his travels in South America, among which are *De Valparaiso à Buenos-Ayres à travers les Andes et les Pampas* (1869); *De Montevideo à Valparaiso par le Détroit de Magellan et les Canaux Patagoniens* (1877). He died in Paris, Aug. 13, 1895.

WYSS, JOHANN RUDOLF, a Swiss writer; author of *The Swiss Family Robinson*; was born at Bern, March 13, 1781; became professor of philosophy there in 1806, and later, chief librarian. His larger works, and the great collection of his editing, *Alpenrose*, would hardly have preserved his name, which is known throughout the world for the idyllic simplicity, the vigor and interest of *Der Schweizerische Robinson*, which has been frequently translated—the first series into English in 1820, the second in 1849. He died in Berne, March 31, 1830.

WYTHE, GEORGE, a signer of the Declaration of Independence, was born in Elizabeth City, Virginia, in 1726. His parents died while he was young, and left him in the control of a large fortune, which led him to dissipation. At 30 he began to study law, and was admitted to the Virginia bar in 1757. He became an ardent patriot. As a member of the house of burgesses he acquired great influence. In 1775-77 he sat in the Continental Congress, and was very outspoken for independence and a vigorous prosecution of the war. In 1779-89 he was professor of law at William and Mary College. In December, 1786, he was chosen a member of the convention that framed the constitution of the United States. In the latter part of his life he emancipated his slaves and furnished them with means of support until they learned to take care of themselves. In 1786, when the court of chancery in Virginia was reorganized, Wythe was made sole chancellor. While still exercising the duties of this office he was poisoned—it was supposed, by his nephew. He died in Richmond, Virginia, June 8, 1806.

WYTHEVILLE, a town and the capital of Wythe County, southwestern Virginia, 80 miles W. of Roanoke, on the Norfolk and Western railroad. Located in the valley between Iron and Walker's Mountains, it is a pleasant summer-resort; is interested in stock-raising, lumbering, mining, and the manufacture of woolen goods and iron and wood-work. It is also the seat of Trinity Hall Female College (Lutheran) and of a Protestant Episcopal seminary. Population 1890, 2,570; 1900, 3,003.

WYT TENBACH, THOMAS (1472-1526). See ZWINGLI, Vol. XXIV, p. 832.

X

XANTHIN—X. Y. Z. CORRESPONDENCE

XANTHIN. See NUTRITION, Vol. XVII, p. 683.

XANTHOPHYLL. See PHYSIOLOGY, Vol. XIX, p. 52.

XANTHOPROTEIC ACID, a yellow substance formed by treating albuminous or proteid matters with nitric acid. On neutralizing with ammonia a golden yellow color is produced (xanthoproteine reaction).

XANTHORHAMNIN, a glucoside extracted from Persian berries and used as a yellow dye. On boiling with dilute sulphuric acid it gives a sugar known as rhamnose.

XANTHOXYLUM, a genus of shrubs or small trees of the rue family (*Rutaceæ*). The bark, leaves and fleshy pods are pungent and aromatic. They are prickly, with pinnate leaves, clusters of small greenish or whitish flowers and small pods. The common name is prickly-ash.

XANTIPPE. See SOCRATES, Vol. XXII, p. 231.

XAUXA, river. See PERU, Vol. XVIII, p. 673.

XEBEC (of somewhat uncertain source, probably from Spanish *Xebeque*), a Mediterranean three-masted vessel, which generally carries lateen sails, but is sometimes square-rigged. It has low sides; has pointed bow and stern and a high deck. The deck is cambered. In the days of Mediterranean pirates the xebec was the favorite vessel, as it sails with great swiftness. In the southern Mediterranean, especially along portions of the African coast, it is still employed somewhat for freight-carrying.

XENIA, a city and the capital of Greene County, southwestern Ohio, is situated in the midst of a rich agricultural region, on Shawnee Creek and on the Pittsburg, Cincinnati, Chicago and St. Louis and the Cincinnati, Hamilton and Dayton railroads. It has numerous churches, public and parochial schools, a business college, a city workhouse, daily, weekly and monthly periodicals; is the seat of the United Presbyterian Theological Seminary and the Ohio Soldiers' and Sailors' Orphans' Home. In the suburbs is Wilberforce University (q.v., under WILBERFORCE, in these Supplements). Xenia has manufactories of cordage, paper, shoes, machinery, carriages, and powder, and also interests in marble and granite work. Population 1890, 7,301; 1900, 8,696. See also XENIA, Vol. XXIX, p. 718.

XENOTIME. See MINERALOGY, Vol. XVI, p. 403.

XERES OR JERES, FRANCISCO DE, a Spanish historian; was born about the year 1504. He became secretary to Pizarro, with whom he went to Peru about 1530. He participated in the conquest, and the first installment of Atahualpa's gold was sent to Spain in his charge. In 1547 he published, by Pizarro's order, *A True Account of the Conquest of Peru*, which was published at Seville (1534, 1547). The work has been translated, and there are modern editions. He died some time subsequent to 1547.

XIMENES, FRANCISCO, OR XIMENES DE CISNEROS, called CARDINAL XIMENES. See JIMENES, Vol. XIII, pp. 693, 694.

XINGU, a river and one of the most important southern tributaries of the Amazon. Rising in southwestern central Brazil on the plateau of Matto Grosso, it flows in a general northerly course, obstructed for a great part of its course by falls and rapids, except near its mouth, where it becomes very broad, being navigable for steamers for 110 miles from its junction with the Amazon, in long. 52° W. The whole course of the river was explored in 1885 and its length estimated at over nine hundred miles.

XIPHIIDÆ. See SWORD-FISH, Vol. XXII, p. 804.

XIPHOSURA, an order of arthropods, containing the well-known king-crabs or horseshoe-crabs of the genus *Limulus*. Their affinities are intermediate between the crustaceans and the arachnids. Some authors have classed them in one group, some in the other; but they are now believed to be more nearly related to the arachnids. See CRUSTACEA, Vol. VI, p. 662.

XISUTHRUS, myth. See DELUGE, Vol. VII, pp. 54, 55.

X RAYS. See ELECTRICITY, § 96, and FLUOROSCOPE, in these Supplements.

XYLENE. See TAR, Vol. XXIII, p. 59.

XYLOIDINE, an explosive substance made by dissolving starch in nitric acid and precipitating with water; probably nitrate similar to guncotton.

X. Y. Z. CORRESPONDENCE. See UNITED STATES, Vol. XXIII, p. 754.

Y

YACHT-BUILDING—YALE

YACHT-BUILDING. The long-vexed question as to which model was the better—the centerboard-yacht preferred by American ship-builders, or the deep or fin-shaped keel consistently adhered to by British owners and builders—was no nearer being settled by the victory of the American *Volunteer* over the English *Thistle* in American waters in 1887. Oft-repeated defeats did not convince British yachtsmen that the type they had chosen was, after all, the poorer one. The differing conditions ruling on the American coast were invariably considered to be primarily responsible for the customary result. Yet it was not until 1892 that they sent over another yacht, the *Valkyrie*, to try conclusions yet again, and if possible bring back the *America* cup. After being defeated in three trials by the *Vigilant*, built especially to meet her, the *Valkyrie* returned to England. At the same time the *Vigilant* crossed the ocean for the intended and very sportsmanlike purpose of convincing foreign yachtsmen that the repeated victories of the centerboard type vessels were not altogether or even primarily, as had been claimed, due to the different conditions under which the races had been sailed in American waters. The result of a number of tests off the English coast, however, where the course is much cut up, and where there are many local difficulties in the way of currents, shoals, etc., that had not been encountered off New York harbor, was not at all what had been expected by the owner of the *Vigilant* or by the American yachting public in general. The *Vigilant's* old opponent, the *Valkyrie*, was unfortunately sunk off Cowes in a collision with the *Satanita*, and so never met the centerboard boat in English waters; but other yachts, notably the *Britannia* and *Ailsa*, boats of the traditional deep-keel type, had little difficulty in defeating it a majority of times. The *Vigilant's* centerboard was continually out of order, was once jammed so that it could not be used, and was finally broken and rendered entirely useless by contact with the rocky bottom. The draft of the *Vigilant*, too, with the centerboard lowered, was very considerable—24 feet. The centerboard itself was also one of the largest and heaviest ever used in a vessel of this type, being made of bronze and weighing 7,750 pounds. The result of this series of tests was so little satisfactory to the American yachting fraternity that the next vessel built in this country to defend the *America* cup (named this time the *Defender*, as opposed to the English *Valkyrie III*) was built substantially on British models, though seemingly in advance of them in most respects. The *Defender* was of the most pronounced fin-keel type (in which the bows are sharp and gracefully tapered, and the keel, comparatively shallow forward, slopes downward at a considerable angle, so that the greatest draft of the boat is at a point near the stern),

like its adversary, the only difference between the two boats being in comparatively minor details. Though the meeting on this occasion, owing to various unfortunate circumstances of disagreement, resulted in only one real race, in which the *Defender* was the victor, leaving in the minds of some a doubt as to the relative merits of the contestants, the only point of importance involved was really settled before the race was sailed. For ocean-sailing the deep-keel yacht seems to have supplanted in favor the centerboard, so that there is no longer any essential difference between American and British yachting models. The device for artificially increasing a vessel's draft known as the centerboard, and popularly regarded as a purely American institution, is, however, actually of British origin. It appears that the English admiralty built a brig in 1797 called the *Lady Nelson*, fitted with what was at the time termed three keels—really three centerboards disposed along the length of the keel. This vessel made a voyage to Australia. Another vessel—a yacht—built at about the same time for the commodore of the Cumberland Sailing Society, a Thames yacht club, was equipped with no less than five of such “keels”; but the supposed advantages of the plan did not seem to specially impress the general sailing public of that day.

The progress of yacht-building seems, for the moment, to have come to a standstill, or to have reached its present greatest possible development, only minor improvements being of late suggested. One such suggestion has been the employment of diagonal sails, to obviate the stretching and consequent bellying of canvas after being bent. By this arrangement it is claimed that the sails can be made to fit from the start, standing as well at first as at any subsequent period. The principal stretching takes place in the direction of the warp lengthwise of the cloths, while there is very little stretching in the direction of the weft. By the new arrangement of cloths the weft runs parallel to the foot of the leach. It is claimed that this arrangement is practicable for all descriptions of fore-and-aft-sails.

An attempt was made to introduce aluminum into the hulls of yachts, for the sake of increased lightness; but the corrosive action of salt water upon the alloys used proved an impediment. Some fresh-water craft, however, with hulls mainly of aluminum, have recently been completed in France, with reported satisfactory results. See also YACHTING, Vol. XXIV, p. 722-725. C. H. COCHRANE.

YAKIMA, river. See WASHINGTON, Vol. XXIV, p. 386.

YALE, ELIHU, an English philanthropist; was born in Boston, Massachusetts, April 5, 1648. His father was Thomas Yale, who was one of the original settlers of New Haven, Connecticut, in 1638; who,

later, removed to Massachusetts; but who returned in 1651 to England, followed thither in the following year by his family. Elihu, at about the age of twenty-two, went to India to engage in trade, where, in 1687, he became governor of the East India Company's settlement at Madras, which post he occupied until 1692. Having become wealthy, he returned to England in 1699. While he did not afterward return to New England, his birthplace, he became interested in the "Collegiate School" at Saybrook, Connecticut, to which at different times he contributed books and money to the value of about eight hundred pounds. In 1745 the name Yale College was, in his honor, given to the institution. He died in London, July 8, 1721, and was buried at the seat of his family at Wrexham, North Wales.

YALE, LINUS B., an American inventor; born in Salisbury, New York, in 1821. In early life he developed a rare skill in oil-painting, his canvases being remarkable for richness of color and fine imaginative power. Later he turned his attention to mechanics; with a simple wire picked the most famous locks in England, and in 1850 devised a key for bankers' safes, involving a mechanical principle which, in the noted "Yale lock," soon marked him as a man of inventive genius. The adoption of his dial and shaft in combination-locks and the perfection of clockwork mechanism and other related devices, have deservedly placed his name high in the list of American inventors. He died in New York City, Dec. 24, 1868. See Locks, in these Supplements

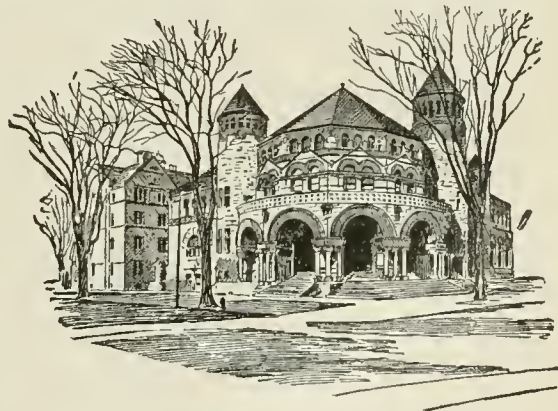
YALE UNIVERSITY, an institution of higher learning at New Haven, Connecticut, the third college, in point of origin, in America, a charter having been formally obtained for it in 1701, under the name of "The Collegiate School of Connecticut," although the earliest founding of the institution may be traced to the associated Congregational ministers of the colony, who, in 1698, raised a fund for "a school of the church." The school, first opened at Saybrook, was, in 1716, removed to New Haven, where the first building connected with the institution was erected, and in 1718 received the name Yale College, in honor of the benefactions of Elihu Yale (q.v., in these Supplements). It received the legal title of Yale University by act of the general assembly of Connecticut in January, 1887.

The college at various times received benefactions in the shape of money and land grants from the state, and for the first hundred and fifty years of its existence, what is now known as the academical department, or college proper, secured pre-eminent attention, and by far the largest attendance; but the schools of theology, of medicine, of law, of science, and of art, have since made great advances.

As constituted by the act of 1887, Yale University is divided into the department of philosophy and the arts, which includes the courses of graduate instruction, Yale College, Sheffield Scientific School and the School of Fine Arts, and the departments of theology, medicine, law and music. Each of the last four departments, as well as each of the three undergraduate sections of the first, is under the administration of a distinct faculty of instruction.

The Library, the Peabody Museum of Natural History and the Observatory are also separately organized. Sheffield Scientific School, next to Yale College the best known and most largely attended department of the university, was founded in 1847 by Joseph E. Sheffield, who gave it an endowment of one million dollars, and was reorganized on a more extensive scale in 1860. Of the other departments, the School of Fine Arts was founded in 1864 by Augustus R. Street; the theological department was opened in 1822, under the denominational control of the Congregational Church, but is open on equal terms to students of every Christian denomination; the law department was begun as a private school about 1800, and recognized as a department of the college in 1824; the medical department was organized in 1813, and aided in 1814 by a grant of thirty thousand dollars from the state; the Peabody Museum of Natural History, devoted chiefly to zoölogy, geology and mineralogy, was established by George Peabody in 1866, and the observatory, situated about a mile and a half from the college, was erected from funds given by Oliver F. Winchester and endowed by Professor Elias Loomis.

The University Library, also a separate department, which is open to all students, has had a constant



UNIVERSITY BUILDINGS.

growth. It contained, in 1895, bound volumes to the number of 185,000, besides many thousand pamphlets, and is constantly increasing, one of the most notable additions being made in 1896 by the purchase of the Von Kneist collection. There are also several special libraries, making the total number of volumes in the libraries of the university about 250,000 at the close of 1895.

Admission to the several departments is restricted to men, with the exception of the graduate courses and the School of Fine Arts, which admit without distinction of sex.

From its foundation, until 1896, Yale had but 12 presidents, their names and terms of service being as follows: Abraham Pierson (1701-07); Samuel Andrew (1707-19); Timothy Cutler (1719-22); Elisha Williams (1726-39); Thomas Clap (1740-66); Naphtali Daggett (1766-77); Ezra Stiles (1777-95); Timothy Dwight (1795-1817); Jeremiah Day (1817-46); Theodore Woolsey (1846-71); Noah Porter (1871-86); and Timothy Dwight (1886). The whole number of degrees conferred, in course, from

the founding of the institution until the close of 1895 was 16,786, and the number of honorary degrees for the same period was 1,150. In the school year 1895-96 the university had 226 professors, instructors and lecturers, and 2,415 students, coming from 45 states and territories and 16 foreign countries. During the above-mentioned year the income of the university was \$729,681; the benefactions received amounted to \$24,445, and its productive funds were valued at over \$3,800,000.

YALU RIVER, BATTLE OF. See **COREA**, in these Supplements.

YAMA. See **BRAHMANISM**, Vol. IV, p. 208.

YAMACHICHE, a village of St. Maurice County, southern central Quebec, on the Yamachiche River, 15 miles W.S.W. of Three Rivers, on the Canadian Pacific railroad. It has good educational facilities, is a shipping-point for lumber and grain, and has some manufacturing. Population 1891, 408.

YAMAGATA, ARITOMO, MARQUIS a Japanese soldier and statesman; born in the province of Cho-



MARQUIS YAMAGATA.

shu in 1838. He entered the military service and took a prominent part in the revolution of 1868, by which the Mikado's power was restored and the Shogunate overthrown. (See **JAPAN**, Vol. XIII, p. 584.) Under the new government he was made second vice-minister of war, and was sent to Russia and France on a military mission in 1869. He displayed much ability in the suppression of the Satsuma rebellion of 1876-77; was

appointed head of the military staff and commander of the Imperial Guard in 1878. He was created count in 1884; served as Minister of the Interior, Prime Minister and Minister of Justice. In the war with China in 1894 he had command of the First Army Corps, and it was owing to his superior ability that within the space of only a few weeks the Chinese were expelled from Corea. (See **COREA**, in these Supplements.) For this service he was created marquis in 1895. For years his policy was to introduce European methods into Japan as far as possible. Marquis Yamagata visited Europe in 1896 as a guest of the Russian court at the coronation of the Czar, passing through the United States *en route*.

YAMASKA, a river of Quebec, rising in Brome Lake, Brome district, and flowing for one hundred miles westerly to West Farnham, in the district of Missisquoi, and thence northerly into that enlargement of the St. Lawrence known as Lake St. Peter.

YANA, a river. See **SIBERIA**, Vol. XXII, p. 5.

YANCEY, WILLIAM LOWNDES, an American publicman; born in Georgia, Aug. 10, 1814; went, in 1836, to Alabama; in 1844 was sent to Congress to fill a vacancy, and was re-elected in 1845 for a full term, but resigned to practice law. In 1860,

when the Democratic convention was held in Charleston, South Carolina, he was a member, but withdrew, in company with other uncompromising extremists, and made a tour through the North, East and West, speaking in New York and Boston, and urging the rejection of the Republican candidate. In the Alabama convention, which met at Montgomery, Jan. 7, 1861, he reported the ordinance of secession. He left New York City in March as a Confederate commissioner, to seek recognition in Europe, but was unsuccessful, and returning in February, 1862, was sent to the Confederate Senate. He died July 28, 1863.

YANCEYVILLE, a township and the capital of Caswell County, northern North Carolina, 16 miles S. of Danville, Virginia, its nearest railway station, on the Southern, Danville and Western and Atlanta and Danville railways. It is in a grain, tobacco and stock raising section. Pop. tp. (1900), 1,550.

YANGTZE-KIANG, a river. See **CHINA**, Vol. V, p. 631.

YANINA. See **JANINA**, Vol. XIII, p. 565.

YANKEE, YANKEE DOODLE. Yankee, the popular name for a New Englander in America, was in its origin a corruption of the word *English* as pronounced by the Indians (Yenghies, Yanghies, Yankees). It seems to have been first applied about 1775 by the British soldiers as a term of reproach to the New Englanders, who, themselves, afterward adopted it. The air known as *Yankee Doodle* was originally *Nankee Doodle*, and is as old as the time of Cromwell, to whom, under that name, the doggerel words belonging to it seem to have had no reference. It was known in New England before the Revolution; and one account of its appropriation in America as a national air is, that after the battle of Lexington the brigade under Lord Percy marched out of Boston playing it in derisive allusion to the then popular nickname of the New Englanders, and that afterward the New Englanders, saying that the British troops had been made to dance to *Yankee Doodle*, adopted the air as they had adopted the nickname.

YANKTON, a city and the capital of Yankton County, southeastern South Dakota, and prior to 1883 capital of the territory of Dakota, stands on the north bank of the Missouri, nearly 200 miles above Omaha and 569 miles N.W. of Chicago, on the Chicago, Milwaukee and St. Paul, the Chicago and North-Western and the Great Northern railways. It is in an agricultural region, and contains mills and breweries, railway shops, Portland cement works and grain-elevators, and has a busy river trade. The Academy of the Sacred Heart and the State Insane Asylum are located here; also Yankton College (Congregational), founded in 1882, and having in 1898 an attendance of 236 students, under 15 instructors. Population 1890, 3,670.

YANTIC RIVER. See **CONNECTICUT**, Vol. VI, p. 285.

YAPOCK. See **OPOSSUM**, Vol. XVII, p. 796.

YAPURA. See **JAPURA**, in these Supplements.

YAQUINA BAY, at the mouth of the Yaquina River, Oregon, 44° 37' N. It is a pleasant summer resort.

YAQUINA HEAD. See FOULWEATHER, CAPE, in these Supplements.

YARD. See WEIGHTS AND MEASURES, Vol. XXIV, p. 489.

YARIBA. See YORUBA, Vol. XXIV, p. 754.

YARMOUTH, a town of Cumberland County, southern Maine, on Casco Bay, at the mouth of the Royals River, 11 miles N.E. of Portland, on the Grand Trunk railway. It has excellent educational facilities, cotton and paper-mills, foundries and stone quarries; and includes the villages of Yarmouthville, North Yarmouth, Yarmouth and Cousen's Island. Population 1890, 2,098; 1900, 2,274.

YARMOUTH, a town of Barnstable County, southeastern Massachusetts, extending from Cape Cod Bay to Nantucket Sound, 75 miles S.E. of Boston, on the New York, New Haven and Hartford railroad. It has a good school system, and is extensively engaged in cranberry-culture, fishing and shipping. It includes the villages of West Yarmouth, South Yarmouth, Yarmouth Farms, Yarmouthport and Yarmouth. Population 1900, 1,682.

YARMOUTH, a town of Yarmouth County, southwestern Nova Scotia, on the Bay of Fundy, 90 miles S. of St. John, New Brunswick, on the Dominion Atlantic railway. Its most important industries are fishing and shipping, and it also has some manufacturing. Population 1891, 6,089.

YARMUK, a river. See PALESTINE, Vol. XVIII, p. 173.

YARRA, a river. See VICTORIA, Vol. XXIV p. 216.

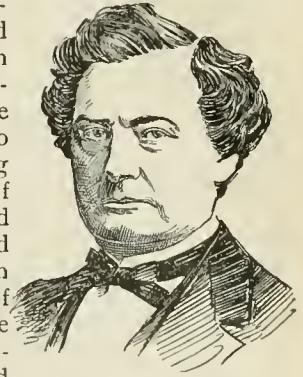
YARROW, the common name of *Achillea Millefolium*, an abundant, aromatic, weedy plant of the composite family, with leaves cut into crowded linear divisions, and heads of whitish or rose-colored flowers crowded in a close cluster.

YARROW, a river. See SELKIRK, Vol. XXI, p. 638.

YATES, EDMUND HODGSON, a British journalist and novelist; born in Edinburgh, July 8, 1831. From 1847 till 1872 he was employed in the London post-office service, where for ten years he was chief of the missing-letter department. From this he retired in 1872 to devote himself to literature. He had a varied journalistic experience, first as one of the editors of *Our Miscellany*, and subsequently as editor of *Temple Bar* and *Tinsley's Magazine*, as theatrical critic of the *Daily News*, and as a constant contributor to *All the Year Round*. In 1872-73 he visited the United States on a lecturing tour. He was also, for a time, London representative of the New York *Herald*, which post he resigned in 1874 to found, with Mr. Grenville Murray, *The World*, a London "journal for men and women." This, the least objectionable of the society weeklies of the metropolis, always bore the impress of his personality and brilliant work. The publication was a success from the start, and Mr. Yates was editor and sole proprietor of it until his death. He wrote many novels, many of which deal with the darker side of life, though all of them are racy and entertaining. The more notable of his stories are *For Better, for Worse* (1863); *Broken to Harness* (1864); *Pages in Waiting* (1865); *Running the Gauntlet*

(1865); *Land at Last* (1866); *Kissing the Rod* (1866); *The Forlorn Hope* (1867); *The Black Sheep* (1867); and *A Waiting Race* (1868). His more recent novels include *Wrecked in Port* (1869); *Dr. Wainwright's Patient* (1871); *Nobody's Fortune* (1871); *The Yellow Flag* (1873); *The Impending Sword* (1874); and *A Silent Witness* (1875). Mr. Yates also wrote several dramas, *The Life and Correspondence of Charles James Mathews* (1860), and *Edmund Yates: His Recollections and Experiences* (1884). In 1884 he was indicted for libel by the Earl of Lonsdale, and was sentenced to two months' imprisonment. Died in London, May 20, 1894.

YATES, RICHARD, war governor of Illinois, was born at Warsaw, Kentucky, Jan. 18, 1818; graduated at Illinois College, Jacksonville, in 1838; studied law and practiced in Springfield. He was elected to the state legislature in 1842, and was sent to Congress in 1850, being the youngest member of that body. He was elected governor in 1860, and again in 1862. He was an outspoken opponent of slavery, and was very active in raising volunteers. Governor Yates was elected United States Senator and served one term (1865-71). He was a United States railroad commissioner at the time of his death, in St. Louis, Missouri, Nov. 27, 1873.



RICHARD YATES.

YATES, ROBERT, an American jurist; was born in Schenectady, New York, March 17, 1738. He was educated and studied law in New York City, where he was admitted to the bar in 1760. He settled in Albany; was a member of the provincial congress in 1775, and of the Committee of Safety in 1776; assisted in drafting the first constitution of the state of New York, and was chief justice of the state supreme court from 1790 to 1798. After the adoption of the constitution of the United States—which measure he opposed in the state convention—he was appointed commissioner to treat with Connecticut and Massachusetts concerning territory in dispute. He also was instrumental in settling the claims of New York against the state of Vermont. He died in Albany, Sept. 9, 1801.

YATES CENTER, a city and the capital of Woodson County, southeastern Kansas, 60 miles W. of Fort Scott, on the Missouri Pacific and Atchison, Topeka and Santa Fé railroads. It is in a region abounding in coal and limestone, and is principally engaged in agriculture and stock-raising. Population 1890, 1,305; 1900, 1,634.

YAVARI, a river. See BRAZIL, Vol. IV, p. 221; and JAVARI, in these Supplements.

YAWNING. See RESPIRATION, Vol. XX, p. 480.

YAZOO CITY, a city and the capital of Yazoo County, western central Mississippi, on the Yazoo River, and 60 miles N.E. of Vicksburg, on the Illinois Central railroad. Situated in a cotton and corn-growing section, it has a large trade in cotton and

planters' supplies, and cottonseed-oil. The town is fully equipped with water, sewerage and electric-light systems, and has two banks with an aggregate capital of nearly a quarter of a million dollars. Population 1890, 3,286; 1900, 4,944.

YAZOO FRAUD, the title applied to the sale of a large portion of her western territory by the state of Georgia in 1795. This transaction involved the sale, under an act authorized by the legislature, of about thirty-five million acres of western lands for the sum of five hundred thousand dollars, to four companies, who were afterward termed the Yazoo companies. The sale aroused great excitement in Georgia, there being decided evidence of corruption among the legislators, and the legislature of 1796 repudiated the entire transaction. It repealed the acts authorizing the sale, and ordered the purchase-money returned. The records of the transaction were then burned in public. In 1802 Georgia ceded all this territory to the United States government, by whom it was recommended that land or money be set aside to be used in compensating the claimants to the lands. Timidity prevented any steps being taken by Congress, however, by reason of the great popular indignation. The claimants appealed to the courts, and, finally, Chief Justice Marshall of the United States supreme court held, in *Fletcher v. Peck* (1810), that the original sale by the state of Georgia must be sustained; that the court could not regard the charge of corruption of the legislature; that the purchasers of the lands must be regarded as innocent holders without notice; and that such rights could not be taken from them by an act of repeal by the Georgia legislature. To quiet all the Yazoo claims, therefore, Congress, in 1814, appropriated five million dollars out of the proceeds of sales of the lands in question.

YAZOO RIVER. See **MISSISSIPPI**, Vol. XVI, pp. 521, 523.

YBREA. See **IBERA**, in these Supplements.

YEAMES, **WILLIAM FREDERICK**, an English artist, was born in 1835, in southern Russia, in the town of Taganrov, on the Sea of Azov, of which port his father—William Yeames—was British consul. He was educated in Dresden, and removed with his family to London in 1848. The following year he attended drawing-classes in anatomy at the University of London; studied art and painting in Florence (1852-54), later in Rome, finally settling in London in 1858. His first painting, exhibited at the Royal Academy in 1859, was a subject-picture, *The Staunch Friends*, consisting of a jester and monkey. Among the large number of his pictures are *The Meeting of Sir Thomas More and His Daughter* (1863); *The Dawn of the Reformation and Bread and Water* (1867); *Dr. Harvey and the Children of Charles I* (1871); *Last Bit of Scandal* (1876); *Amy Robsart* (1877); and *The Fair Royalist*, a pastel study (1878). He became an associate of the Royal Academy in 1867; sent works to Paris in 1878; and the same year was elected academician.

YEAR. See **CALENDAR**, Vol. IV, pp. 666-670.

YEATS, **WILLIAM BUTLER**, an Irish poet, born

at Sandymount, Dublin, June 13, 1865, the son of J. B. Yeats, an illustrator and portrait-painter. As a boy he was noted for his absent-mindedness, his love of natural history, and for a curious habit of carrying small living animals around in his pockets. Removing with his parents to London at the age of nine years, he attended Godolphin School for some years, spending his vacations in the west of Ireland. His parents afterward removing to Ireland, he began, at the age of nineteen, to study art at the Royal Dublin Society, but his literary tastes led him to give this up, and he contributed poems and articles to the *Dublin University Review*. Removing to London in 1888, he, in 1889, published two books, one of verse, *The Wanderings of Oisín*, the other of prose, *Fairy and Folk Tales of the Irish Peasants*. Other works are *Countess Kathleen* (1892); *Legends and Lyrics* (1892); *The Celtic Twilight* (1893); *The Land of Heart's Desire*, a one-act play in verse, acted at the Avenue Theater, London (1894); *A Book of Irish Verse* (1895); and *Poems* (1895). He contributed to the *National Observer* and the *Bookman*.

YEISK. See **JEISK**, in these Supplements.

YEDO. See **TOKIO**, Vol. XXIII, pp. 432-444.

YEKATERINOGRAD. See **EKATERINOGRAD**, in these Supplements.

YELLOW-BIRD. See **SISKIN**, Vol. XXII, p. 99.

YELLOW-EYED GRASS, the popular name of species of the family *Xyoidaceæ*. They are rush-like herbs, with sedge-like leaves, and yellow flowers in a head or spike.

YELLOWHAMMER. In Europe the name is given to the yellow bunting (*Emberiza Citrinella*). (See **BUNTING**, Vol. IV, p. 525.) In the United States the name is incorrectly applied to a bird which is more properly called flicker or golden-winged woodpecker (*Colaptes Auratus*).

YELLOW-JACKET, a popular name for wasps or hornets of the genus *Vespa*, which have yellow marks on the body. The common yellow-jacket of the United States is *V. vulgaris*. It has been introduced from Europe.

YELLOW-LEGS (*Totanus flavipes*), a bird of the snipe family, found in eastern North America. It migrates southward during winters. It is also called tattler and yellow-shanks.

YELLOW RIVER. See *Hwang-ho*, under **CHINA**, Vol. V, p. 630.

YELLOW S OR **CHLOROSIS**. See **PATHOLOGY**, Vol. XVIII, p. 375.

YELLOW SEA. See **CHINA**, Vol. V, p. 629.

YELLOW SPRINGS, a village of Greene County, southwestern central Ohio; nine miles S.W. of Springfield, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad. Having several medicinal springs, it is especially famous as a summer resort for invalids, and is also the seat of Antioch College (q.v., in these Supplements). Population 1890, 1,375; 1900, 1,371.

YELLOWSTONE NATIONAL PARK. (For general and elaborate article on this, the greatest park of the world, see Vol. XXIV, pp. 736-738.) The area was reported in 1891 at 3,575 square miles.

The resident population as reported by the United States census of 1890 was 467. The park, in 1893, could be reached by stage from the west via Beaver Cañon, on the Utah Northern railway (Union Pacific), about one hundred miles from the Lower Geyser Basin. From Livingston, on the Northern Pacific railroad, a branch road diverges fifty miles southward to Cinnabar, at the northwestern entrance to the park, six miles from the Mammoth Hot Springs. From Cinnabar a daily stage line runs to Mammoth Hot Springs, where a fine hotel has been erected, and whence the stage makes a five-days' tour of the park; there being other hotels at convenient points on the route. From Mammoth Hot Springs the stage route covers Upper and Lower Geyser basins, Norris Basin, Yellowstone Lake (over which a steamboat now plies), the Grand Cañon, Falls of the Yellowstone, and return.

As furnishing recent and reliable additional information concerning the great YELLOWSTONE NATIONAL PARK, the following statements are obtained from the annual report made to Congress by J. W. Noble, Secretary of the Interior in President Harrison's administration.

The conditions of government for Yellowstone National Park are anomalous. Congress placed the park under the control of the Secretary of the Treasury by the act of March 1, 1872, and annually makes appropriations for its superintendence.

An act of Congress, approved March 3, 1883, provides that "the Secretary of War, upon the request of the Secretary of the Interior, is hereby authorized and directed to make the necessary detail of troops to prevent trespassers or intruders from entering the park for the purpose of destroying the game or objects of curiosity therein, or for any other purpose prohibited by law, and to remove such persons from the park if found therein. Hunting, capturing, injuring or killing any bird or animal within the park is prohibited. The outfits of persons found hunting or in possession of game killed in the park, will be subject to seizure and confiscation."

The legislature of Wyoming, in the winter of 1884, passed "an act to render operative and effectual the laws of the territory of Wyoming within that portion of the Yellowstone National Park lying within said territory, and to protect and preserve the timber, game, fish and natural objects and curiosities of the park, and to assist in preserving the rights of the United States therein."

This act, which was approved March 6, 1884, made the portion of the park lying within Wyoming territory a part of Uintah County; provided for voting-precincts, and for the election of justices of the peace and constables; extended the laws of Wyoming territory over the portion of the park within that territory, and provided that the rules and regulations of the Secretary of the Interior for the government of the park should have the same force in the park as the laws of Wyoming territory.

Section 7 of this act provided "that it shall be unlawful for any person, whether resident or visitor, to deface, injure or remove any part, portion or particle of the natural curiosities or objects of interest,

or anything whatever within the Yellowstone National Park, whether tree, rock, stone, shrubbery, earth, geyser-formation, grass, or anything whatever, except that it may be permissible to use timber or any other thing not objects of curiosity or of interest, or adding to the scenic attractions of said park, for the necessary purposes of fuel or house-building, or any domestic, useful or necessary purpose not prohibited by the laws of the United States or the rules and regulations of the Secretary of the Interior; and any person so offending shall be guilty of a misdemeanor, and shall, on conviction thereof, be punished by a fine not exceeding one hundred dollars, or by imprisonment in the county jail not exceeding six months.

On the twenty-second day of March, 1889, the Yellowstone Park Association, having surrendered all rights which it had acquired under a lease which had been granted on the ninth day of March, 1883, to Carroll T. Hobart *et al.*, and by the said lessees assigned to the Yellowstone Park Improvement Company, and which had been sold under a decree of the United States court for the territory of Wyoming, and by virtue of which sale the Yellowstone Park Association claimed title; and also all rights under a lease granted on the twenty-ninth day of January, 1884, to George W. Marshall for a certain piece of land in the park, and which had been assigned to the Yellowstone Park Association; and the Yellowstone Park Association, by Charles Gibson, its president, and Charles Gibson individually, having delivered up the lease made by the Department to Charles Gibson, March 20, 1886, for certain lands in the park, and the said lease having been declared canceled,—the Department, on the twentieth day of March, 1889, granted to the Yellowstone Park Association six leases of ground in the Yellowstone National Park as follows: At Mammoth Hot Springs, three acres; at Norris Geyser Basin, one acre; at Lower Geyser Basin, two acres; at the Grand Cañon, two acres; at Yellowstone Lake, one acre, and at the Thumb (so called) of the Yellowstone Lake, or on Shoshone Lake, one acre.

The Department also granted permission, on the fifth day of April, 1889, subject to certain conditions, to the Yellowstone Park Association to place a naphtha-launch on the Yellowstone Lake, the said launch to conform to certain specifications.

On Feb. 14, 1889, the Secretary of the Interior granted permission to Ole Anderson, subject to certain conditions, to engage in the business, within the park, of placing small articles in the waters of the hot springs, to be incrustated with the deposit left by the water, and of selling such coated articles to tourists, the privilege being personal and non-assignable. On the same date the Department granted to Mrs. Jennie Henderson Dewing, postmaster at Mammoth Hot Springs, the privilege of keeping for sale, in the post-office at this place, photographic views, stationery etc., the privilege to continue only during Mrs. Dewing's term of office.

On the 3d of April, 1889, permission, by the Department, was granted to the medical officer attached to the military force to practice medicine in the

park, with the understanding that such practice shall not conflict with any army regulations.

The forests of the park are necessary for preserving, in this great natural zoölogical garden, a remnant of our North American fauna, particularly of the ruminants of the Western plains and mountains, now being so rapidly exterminated. The increase of the deer, antelope and elk within the last few years seems to be highly gratifying, and the reports show that a herd of buffalo continues to find safe refuge there. The carnivora multiplied so rapidly that Captain Boutelle thought some means should be taken to repress their further increase. He remarked upon the increasing tameness of the animals of the park in consequence of their annoyance and slaughter being prohibited.

Mr. McDonald, commissioner of fish and fisheries, reports that he largely stocked many of the streams and lakes within the limits of the park found absolutely void of fish. He placed 5,000 Eastern brook-trout in the main Gardner River; 1,000 rainbow-trout in the Gibbon; 1,000 German or Von Behr trout in the Fire Holes and Nez Percés forks of the Madison; and 1,000 of the native red trout in the east fork of the Gardner. He also transferred 1,000 of the native white-fish to Twin Lakes and 1,000 to the Yellowstone River above the fall. This work will be continued.

Forest fires are a great and increasing danger and damage to the park, and Captain Boutelle's recommendation for an appropriation to clean up the underbrush and fallen timber along the lines of travel deserves attention. There also seems to be a pressing necessity for having the boundaries of the park accurately surveyed and marked out, so that innocent persons may not unwarily trespass over the same.

YELLOW WAR, The. See CHINA; COREA; and JAPAN, in these Supplements.

YELLOW WOOD. See FUSTIC, Vol. IX, p. 855.

YENIKALE STRAIT, sometimes also called Strait of Kertch, a strait which connects the Sea of Azov with the Black Sea, forming a sea-passage 19 miles long, between the Crimea on the west and the Caucasus on the east.

YENISEI, a river. See SIBERIA, Vol. XXII, p. 5.

YEO, I. BURNEY, an English physician; was born at Stonehouse, Devonshire; became a student in King's College, London, in 1858, and resident medical tutor in the same institution in 1866. In 1871, having been appointed a physician of King's College Hospital, he resigned his tutorship and engaged in practice. He was elected fellow of the Royal College of Physicians (1876); fellow and professor of clinical therapeutics in King's College, London (1885). Dr. Burney met with exceptional success in the examination of modes of treating disease in the branch of science known as therapeutics. He also devoted much time and labor to the questions of the influence of climate and of diet in the cure of disease. In 1893 appeared his *Manual of Medical Treatment*, which deals with methods of treating medical diseases as distinguished from surgical maladies. Besides this he contributed many

articles to the *Lancet*, the *British Medical Journal*, the *Nineteenth Century* and *Fortnightly Review*.

YEOMEN. See LAND, Vol. XIV, p. 264.

YEOMEN OF THE GUARD. See ROYAL HOUSEHOLD, Vol. XXI, p. 37.

YERKES OBSERVATORY. See OBSERVATORY, and TELESCOPE, in these Supplements.

YESDIGARD OR YAZDEGERD, the name of three Persian kings. See PERSIA, Vol. XVIII, pp. 610, 611, 615.

YEZD. See YAZD, Vol. XXIV, p. 733.

YEZEEDEES. See DEVIL-WORSHIPERS, in these Supplements.

YEZIDIS. See MESOPOTAMIA, Vol. XVI, p. 49.

YEZO. See JAPAN, Vol. XIII, pp. 569 et seq.

YGGDRASIL. See ASGARD, Vol. II, p. 679.

YIRD-HOUSES. See ARCHÆOLOGY, Vol. II, pp. 338, 339; ARCHITECTURE, Vol. II, p. 384; and EARTH-HOUSES, in these Supplements; called *weems*.

YNCAS. See PERU, Vol. XVIII, pp. 676, 677.

YOGA PHILOSOPHY. See SANSKRIT, Vol. XXI, p. 291.

YOLK. See EGG, Vol. VII, p. 696.

YONGE, CHARLOTTE MARY, an English authoress; born in Otterbourne, Hants, Aug. 11, 1823. She wrote several works of fiction, which have for their purpose the emphasizing of the High-Church school of opinion, most of which have gone through several editions and have been reprinted in a cheap form. Among her well-known books are *The Heir of Redclyffe* (1853); *Heartsease* (1854); *Katherine Ashton*; *The Lances of Lynwood* (1855); *The Daisy Chain* (1856); *Dove in the Eagle's Nest* (1866); and others. She also wrote many historical romances, as well as a compendium of universal history for young people, entitled *Landmarks of History: Ancient, Middle Ages, and Modern*. Other works are *History of Christian Names* (1863); *Cameos from English History* (1868); *Life of Bishop Pattenon* (1873); *Stories of Greek History* (1876); *Aunt Charlotte's German History for Little Ones* (1877); and *The Patriots of Palestine* (1898).

YONKERS, a city of Westchester County, southeastern New York, on the Hudson River, opposite the Palisades, and 15 miles N. by E. of the Grand Central Depot of New York, on the New York Central and Hudson River railroad. It manufactures silk, hats, machinery, mowers, elevators, etc., and with its numerous villas, built upon terraces rising to a height of 425 feet from the river, is a popular suburb of the metropolis, whose northern boundary touches it. Pop. 1890, 32,033; 1900, 47,931.

YORITOMO. See JAPAN, Vol. XIII, p. 582.

YORK, a town of York County, southwestern Maine, on Cape Neddick harbor, nine miles N.E. of Portsmouth, on the Boston and Maine railroad. It is chiefly engaged in agriculture, and is also a pleasant summer resort. It contains the villages of York Center, York Beach, Cape Neddick and York. Population 1890, 2,444; 1900, 2,668.

YORK, a city and the capital of York County, southeastern Nebraska, 50 miles W. of Lincoln, on the Fremont, Elkhorn and Missouri Valley, the St. Joseph and Grand Island, and the Chicago, Burlington and Quincy railroads. It is the center of an agricultural section, and is the seat of the school

of the Holy Family (Roman Catholic) and of York College (United Brethren). Population 1000. 5,132.

YORK, a city and the capital of York County, southeastern Pennsylvania, on Codorus Creek, 28 miles S.E. of Harrisburg, on the Northern Central, the York Southern, the Baltimore and Harrisburg and the Pennsylvania railroads. It has a large granite courthouse, a handsome collegiate institute occupying property valued at \$100,000 and having an endowment of \$150,000, and numerous churches. Its industries include foundries, car factories, railway-shops, planing-mills, shoe-shops and a condensed milk factory, a total, according to the reports of 1890, of 350 industries, with a combined capital of \$3,842,453, paying annually to 4,120 employees \$1,609,453, and producing goods valued at \$5,968,223 from materials costing \$3,170,840. The city is equipped with electric railways and lights and other modern improvements. York dates from 1741, and was the seat of the Continental Congress for a time in 1777. Pop. 1890, 20,793; 1900, 33,654.

YORK, a river of Virginia, formed by the union of the Pamunkey and Mattaponi rivers, and flowing southeast to the Chesapeake Bay, nearly opposite Cape Charles. It is 40 miles long and from one to three miles wide. Yorktown, on the right bank, 11 miles from its mouth, was the scene of Lord Cornwallis's surrender, Oct. 19, 1781.

YORK, GEORGE FREDERICK, DUKE OF, second son of the Prince and Princess of Wales, was born



DUKE OF YORK.

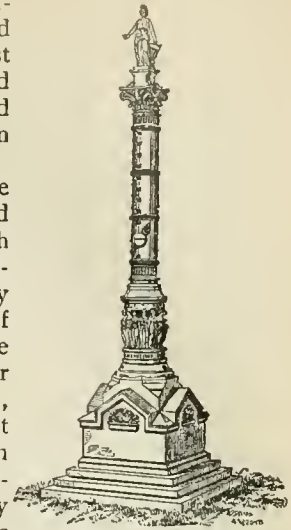
June 3, 1865; entered the British navy as a cadet in 1877; went on a three-years' voyage around the world, on board the *Bacchante*, in 1879, and in 1891 was made commander. In 1892, through the death of his elder brother, the Duke of Clarence, he became the heir to the British throne, and was raised to the peerage as Duke of York. He married the Princess Victoria Mary of Teck, July 6,

1893, the brilliant ceremony being attended by the King and Queen of Denmark and the Czarewitch of Russia. A son and heir was born to them June 23, 1894, and christened Edward Albert Christian George Andrew Patrick David.

YORKTOWN, a town of Yorktown County, Virginia, situated on the Yorktown River, about twelve miles from its mouth. It is distant from Williamsburg twelve miles. Its situation on the bank of the Yorktown River, elevated about thirty feet above the water-line, is extremely picturesque. It was established as a town in 1705, and laid out in streets by Thomas Nelson, the founder of the Virginia family of that name, who emigrated from Penrith, in England. Originally, the town was well built and carefully laid out, but time and two wars have left but little except ruin. Before the Revolution it had all the commerce of Virginia, annually loading six or seven vessels with tobacco for the mother country.

The transfer of the seat of government from Williamsburg to Richmond, and the siege in Revolutionary days, gave Yorktown a material blow, and at the close of the last century its population had dwindled to eight hundred persons, two thirds of whom were negroes.

It is memorable for the siege and surrender of Lord Cornwallis and the British troops, the last great conflict of the Revolutionary War, and as the theater of severe encounters in the Civil War. The surrender took place Oct. 19, 1781, and was the last movement in the campaign, wherein Washington's military tactics shone so pre-eminently clear. Marching with his Continental troops and the



YORKTOWN MONUMENT.

French allies from Phillipsburg, in Westchester County, Aug. 19, 1781, to Stony Point, he passed through New Jersey, Pennsylvania, Delaware and Maryland to the head of water-navigation of the Chesapeake Bay. The entire march was a triumphal procession, the population turning out *en masse* to witness the unaccustomed sight of the French regulars. Sept. 27, 1781, he issued his famous order of battle, and on the following morning the army left its encampment in front of Williamsburg and commenced the march for the investment of Yorktown. On the 29th the American and French troops formed a circle of steel around Cornwallis and his seven thousand veterans. Trenches and parallels were dug and a formal siege commenced. The French fleet under De Grasse arrived and guarded the sea-front from any relief from the British navy. Each day the lines grew closer, and on September 14th two British redoubts were taken by storm. Next day the invaders made a fruitless sortie, and on the 17th displayed a white flag.

It is worthy of notice that the proposal to capitulate was made on the fourth anniversary of the surrender of Burgoyne at Saratoga. The British garrison filed out between the allied armies, the number of those surrendering being 7,247 soldiers and 840 seamen. This disaster utterly crippled the British forces in America and practically put an end to the war.

By resolution of Congress in 1879 it was decided to celebrate the centennial anniversary of this decisive victory. All surviving descendants of the French officers who participated in the siege of Yorktown were invited, and a magnificent monument of Corinthian design erected on the field of the capitulation, with characteristic inscriptions. The dedication ceremonies were held Oct. 19, 1881, and not the least noticeable feature was the order given by Secretary of State James G. Blaine (q.v., in these Supplements), that at the conclusion of the ceremonies the English flag should be run to the

masthead, and saluted by the massed bands assembled with the English national air.

YORKVILLE, a village and the capital of Kendall County, northeastern Illinois, on the Fox River, and on the Chicago, Burlington and Quincy railroad, 51 miles W.S.W. of Chicago. It is in a farming region, and has some manufactures and one weekly newspaper. Population 1880, 365; 1890, 375; 1900, 413.

YORKVILLE, a town and the capital of York County, northern South Carolina, on the Chester and Lenoir and the Ohio and Charleston railroads, 85 miles N. of Columbia. It is in a farming and magnetic-iron mining region. It has buggy, saddle and harness factories, a semi-weekly, a weekly and a monthly newspaper are published. Population 1890, 1,553; 1900, 2,012.

YORUBALAND. See YORUBALAND, Vol. XXIV, p. 754; and AFRICA, p. 65, in these Supplements.

YOSEMITE VALLEY. See CALIFORNIA, Vol. IV, pp. 698, 699; and PARKS, NATIONAL, in these Supplements.

YOUATT, WILLIAM, an English veterinarian; born in 1777; was a professor in the Royal Veterinary College of London, and founded *The Veterinarian* in 1828. In 1831 he published a work entitled *The Horse*, which dealt with the subject from a historical as well as a veterinary standpoint. This was followed by *The Sheep: Breeds, Management and Diseases* (1832); *Cattle* (1834); *The Dog* (1842); *The Pig* (1860); and *The Complete Grazier* (1864). These works on the breeds were all standard, and are still valuable for the matter relating to the history of the breeds, and have been adopted and re-issued in America. He died Jan. 9, 1847.

YOUMANS, EDWARD LIVINGSTON, an American scientist; born in Coeymans, New York, June 3, 1821; He passed his boyhood in Saratoga, where he received an ordinary education. Later he studied medicine and chemistry, and received from the University of Vermont the degree of M.D. From 1852 to 1869 he edited instruction-books in various departments of natural science. In 1872 he established the *Popular Science Monthly*, a monthly published in New York City, of which he continued to be the editor and manager to the time of his death. His published volumes include *Alcohol and the Constitution of Man* (1854); *Correlation and Conservation of Force* (1864); *The Culture Demanded by Modern Life* (1867); and other scientific works. He died in New York City, Jan. 18, 1887.—His brother, WILLIAM JAY, was born at Milton, Saratoga County, New York, Oct. 14, 1838; studied chemistry under his brother, also in the laboratory of Columbia College, New York, and the Sheffield Scientific School, New Haven, Connecticut. He afterward took a course in medicine at the University of the City of New York, where he graduated in 1865. Proceeding thence to London, he studied anatomy and physiology under Professor Huxley in the Jermyn Street School of Mines, after which, returning to America, he practiced medicine in Minnesota for a number of years. He assisted his brother in editing the *Popular Science Monthly* (1872-87), after which he was sole editor. He

published *Pioneers of Science in America* (1895); edited Huxley's *Lessons in Elementary Physiology*; and revised E. L. Youmans's *Class-Book of Chemistry* (1889).

YOUNG, CHARLES AUGUSTUS, an American astronomer; born at Hanover, New Hampshire, Dec. 12, 1834. He graduated at Dartmouth College in 1853, and became professor of mathematics in Western Reserve College, Hudson, Ohio, where he remained from 1857 to 1866. In 1877 he was chosen professor of astronomy at Princeton College. His principal work is *The Sun*; and his *Manual of Astronomy* (1888) has contributed much to the popularizing of the science with which it deals.



PROF. C. A. YOUNG.

YOUNG, JOHN RUSSELL, an American journalist; was born in Downingtown, Chester County, Pennsylvania, Nov. 20, 1841. He was educated in the public schools of Philadelphia and the New Orleans high school. He began his newspaper career as a copy-boy on the *Philadelphia Press*, and when the Civil War began he was sent as a correspondent to Virginia. In 1864 he was with Banks on his Red River expedition, and after the war he returned to Philadelphia and was given editorial charge of the *Press*. He made two unsuccessful attempts to start a paper, and in 1871 went to Europe as a correspondent of the *New York Herald*. For the latter paper he went with President Grant around the world, and when he returned to New York took a position on the editorial staff. On March 15, 1882, he was appointed minister to China, and filled the post until Mr. Cleveland became President in 1885. In 1897 he was appointed librarian of the Congressional Library. He published *Around the World with General Grant* (2 vols., 1879). Died in Washington, D. C., Jan. 17, 1899.

YOUNG, ROBERT, a Scottish Biblical scholar; born at Edinburgh, Sept. 10, 1822; bred a printer, was superintendent of the *Mission Press* at Surat (1856-61), thereafter devoting himself to the preparation, the printing and publishing, in Edinburgh, of a long series of meritorious books of somewhat narrow but remarkable Biblical scholarship, working with unbroken industry down till his death, Oct. 14, 1889. Among his books is the laborious *Analytical Concordance to the Bible*, giving 311,000 references.

YOUNG MEN'S CHRISTIAN ASSOCIATIONS. The first of these associations was organized by George Williams, in London, in 1844. Twelve young men met on June 6, 1844, in a room in St. Paul's Churchyard, and founded the "Young Men's Christian Association" as a "society for improving the spiritual condition of young men engaged in the drapery and other trades." In 1845 a course of lectures was begun. The movement took firm root in London, and at the general conference

of delegates from the associations of Europe and America held in Paris in August, 1855, a basis of alliance was agreed upon; and later conferences at Geneva (1858) and London (1862 and 1868) further aided the movement. Since 1851, when associations were formed in New York, Boston, Philadelphia, and Montreal, the movement has taken firm root in America, and there are splendid buildings in Chicago, Brooklyn, New York, Philadelphia and elsewhere, which, with their gymnasiums, libraries, reading-rooms, devotional meetings, and summer schools, are busy centers of Christian usefulness. In the United States alone, in 1894, there were 1,315 different associations, with a total membership of 232,653. They occupied 291 buildings of their own, valued at \$15,155,950, and had a total net property of \$15,211,039, including 638 libraries, containing 476,572 volumes. They employed 253 general secretaries and other paid officials, and expended, in the year, for current expenses, local, State and national, \$2,354,724.

There were 5,510 branch associations in the world in 1896, distributed as follows:

America—United States, 1,346; Canada, 84; Mexico, South America, etc., 16. Europe—England, Ireland and Wales, 647; Scotland, 240; France, 128; Germany, 1,180; Netherlands, 817; Denmark, 135; Switzerland, 399; Norway, 133; Sweden, 43; Italy, 50; Spain, 7; Greece 1; Belgium, 34; Austria, 16; Hungary, 7; Russia, 9; Turkey, 1; Bulgaria, 1. Asia—India, 78; Ceylon, 17; China, 9; Japan, 35; Turkey, 24; Persia, 2; Syria, 12; Africa, 18; Oceania, etc.—Australia, 13; New Zealand, 2; Hawaii, 5.

The Young Men's Christian Association has developed lay activity, D. L. Moody having begun his evangelistic efforts in the service of a Young Men's Christian Association. The Christian Endeavor Associations, formed at Portland in 1881, had a membership of upward of one and a half millions of young people in 1892, scattered over America, with branches in England, Australia and Japan. This movement is entirely undenominational.

YOUNGSTOWN, a city of Ohio. It is on the Erie, the Pennsylvania, the Lake Shore and Michigan Southern, Pittsburg and Lake Erie and Pittsburg and Western railroads, 65 miles S.E. of Cleveland. The city has a good water-supply, sewerage, gas and electric lights, electric railways, 42 churches, about 30 schools of all kinds, business colleges, kindergartens and six banks. Among its manufacturing industries are bridge, car, tube and boiler works, foundries and machine-shops, lumber-yards and flour-mills, five blast-furnaces, and six rolling, puddling and finishing plant. It has two evening, two weekly, and two monthly newspapers. Population 1880, 15,435; 1890, 33,220; 1900, 44,885. See also YOUNGSTOWN, Vol. XXIV, p. 757.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION, founded in 1857. Its work among women is fourfold: Physical—Systematic training in the gymnasium, health-talks, holiday excursions and outing-clubs. Social—Receptions and socials in home-like rooms, musical and literary entertainments, helpful companionships, noon rest, lunch-rooms, boarding-clubs, employment bureaus. In-

tellectual—Libraries and reading-rooms, educational classes, lecture courses, concerts, library, musical and art clubs. Spiritual—Bible training-classes, evangelistic meetings, personal work, gospel meetings.

In the United States alone, in 1896, there were 340 branches, with a membership of 34,000. The statistics of other countries for the year were as follows: number of associations in Great Britain, 1,340; on the continent of Europe, 20; India, 20; Australia, 25; other places, including China and Japan, 175; total in the world, 1,820.

The International Association was formed in 1886 with a general office at Chicago. An International Committee of 33 members controls the work.

The World's Young Women's Christian Association was founded in 1893 with a general office in London. Nineteen states have organized state associations. Each state holds an annual convention. The International convention occurs biennially. Each year two summer schools are held for the training of young women in secretarial and Bible work. *The Evangel*, the official organ of the associations, is published monthly at Chicago. The second Thursday of October is observed as a day of prayer for young women. A special department is maintained for young women in colleges, and through this department the student volunteer movement is connected with the association work.

YPSILANTI, a city in Washtenaw County, southeastern Michigan, on the Huron River, and on the Michigan Central and Lake Shore and Michigan Southern railroads. It is prominent as an educational and trade center. Considerable manufacturing is carried on and a large number of expert operatives are constantly employed. The city contains ten churches, a public library, a high school and graded schools, and is the site of the Michigan State Normal School, with a faculty of 14 preceptors and from 325 to 350 students. Three weekly papers and a monthly magazine are published, and two banks are conducted. The improvements in the city include, in addition to the above, an opera-house, public halls and four hotels. The productive industries include manufactures of mill-machinery, agricultural implements, wind-mills, buggy-gearing, gasoline-furnaces, silk, woolen, cotton and lisle-thread goods, rubber pumps, paper and paper boxes, lumber, carriages, tables, cigar-boxes, flour, etc. In April, 1893, the city was visited by a tornado, which did great damage to the business center. Population 1890, 6,129; 1900, 7,378.

YPSILANTI, ALEXANDER (1792-1828). See ROUMANIA, Vol. XXI, p. 20.

YREKA, a village and the capital of Siskiyou County, northern California, 300 miles N. of Sacramento. It was once famous for its gold-mines, but is now the trade center of an agricultural and stock-raising country. It has three churches, one bank and three weekly newspapers. Population 1880, 1,059; 1890, 1,100; 1900, 1,263.

YRIARTE, CHARLES ÉMILE, a French writer of Spanish parentage; born in Paris, Dec. 5, 1832. After having studied architecture and been appointed inspector, he abandoned this profession for

journalism, as being more in accord with his tastes, and went, in 1859, to the seat of the Spanish war in Morocco as correspondent of the *Monde Illustré*. In 1860-61, he served in the war in Italy in the same capacity. He became editor-in-chief of the *Monde Illustré* in 1862; resigned his position in 1871 for the purpose of traveling and the study of the history of art. He was appointed inspector of the École des Beaux-Arts in 1881. Among his literary works are war and society sketches in Paris and elsewhere. Life-studies during the period of the Italian renaissance: *La Vie d'un Patricien de Venise au XVIe Siècle* (1874); *César Borgia* (2 vols., 1888). Works pertaining to the history of art: *La Sculpture Italienne au XVe Siècle* (1885); *J. F. Millet* (1885). Historical sketches, *Les Princes d'Orléans* (1872). Yriarte wrote for *Figaro* and other French periodicals and contributed the article VENICE to this ENCYCLOPÆDIA.

YRIARTE, THOMAS B. See IRIARTE, Vol. XIII, p. 275.

YSLETA, a town of El Paso County, western Texas, 12 miles E. of El Paso, on the Rio Grande River, and on the Southern Pacific and Texas Pacific railroads. It is in a highly productive fruit-growing and agricultural district. Not more than a third of the population is American, the greater portion being Mexicans and Indians. The latter are descendants of the Pueblo Indians found here by Coronado in his expedition of 1540, when he built a church and located a settlement. Population 1890, 1,538.

YSSSEL OR IJSSEL, a river of the Netherlands, formed by the junction, at Doesburg, of the Old Yssel, a stream of Rhenish Prussia, and the New Yssel, a stream which issues from the Rhine near Arnhem. It flows north, a distance of eighty miles, entering the Zuyder Zee. The towns of Kampen, Zutphen and Deventer are on the Yssel. See HOLLAND, Vol. XII, p. 63.

YTTERBIUM, a new element described by Marignac, in 1878 as found in gadolite. The atomic weight of 131 was provisionally adopted, but in 1880 it was changed and declared to be 173.01.

YUBA CITY, the capital of Sutter County, central California, on Feather River, and on the Southern Pacific railroad, 57 miles N. of Sacramento. It is engaged in farming and fruit-raising; manufactures agricultural implements and wagons, and has a large cannery. It has two churches and two newspaper-offices. Population of township, 1900, 1,488.

YUBA RIVER, in California, rises by three forks, the south, middle and north, which flow through deep gorges in the Sierra Nevada. They drain Sierra and Nevada counties, the middle fork partly forming the boundary between these counties. The north and middle forks unite first, the south fork joining the main stream above Smartville, in Yuba County. Flowing in a south-westerly direction, the Yuba enters the Feather River at Marysville, Yuba City being opposite the entrance.

YUERDUN OR YUERDON, a town of Switzerland, in the canton of Vaud, 18 miles

N. of Lausanne, in Lake Neuchâtel, near the mouth of the Orbe. It has a good trade in wines. There is an old castle here, which was used by Pestalozzi (1805-25) for his celebrated educational institute. (See EDUCATION, Vol. VII, p. 677.) There is also a library, which contains a collection of Roman antiquities, a gymnasium, a hospital, a church and a school for deaf mutes. Population 1888, 6,300.

YUKON RIVER. See ALASKA, Vol. I, p. 444. Also Supp., Vol. I, p. 110-111*d*.

YULE, SIR HENRY, a British Orientalist; born May 1, 1820, at Inveresk, near Edinburgh; the son of a soldier, he was educated at the Addiscombe Cadet School for the East India Service, which he entered in 1840 as an engineer; served in India, on the Burmese frontier; on irrigation-works in the Northwestern Provinces; as secretary to Sir Arthur Phayre's mission to Ava in 1855; on railway communications in the Ganges valley, during the Sepoy mutiny; and as secretary to the Department of Public Works from 1858 to 1862, when he retired with the rank of colonel; resided for a time in Sicily; a member of the Indian Council from 1875 to 1889, when he was knighted. Besides many contributions to the journals of the Hakluyt and Royal Asiatic societies, of both of which he was president, and to the Geographical Society, he published *Mission to the Court of Ava* (1858); *Cathay, and the Way Thither*, a collection of notes concerning China prior to the sixteenth century (1866); his great work, *Book of Ser Marco Polo* (2 vols., 1871); in collaboration with Dr. Burnell, *A Glossary of Anglo-Indian Terms* (1886); and he edited, with annotations, the *Diary of William Hedges* (3 vols., 1889), for the Hakluyt Society. He died Dec. 30, 1889, in London.

YULE FESTIVAL. See CHRISTMAS, Vol. V, p. 704.

YUMA, a city and the capital of Yuma County, in southwestern Arizona, on the Colorado River, 250 miles S.E. of Los Angeles, California, and on the Southern Pacific railroad. It is an important trading-town, and is the entrepôt of a large river trade. There is steamboat traffic to the Gulf of California. The interests of the district consist of mining, fruit-growing and agriculture. Yuma has two weekly newspapers, a bank, a convent and a church. The Arizona prison is located here. Fort Yuma, California, is on the opposite side of the river. Population 1890, 1,773; 1900, 1,402.

YUMA INDIANS. See INDIANS, Vol. XII, p. 827.

YUNCAN ANTIQUITIES. See PERU, Vol. XVIII, p. 676.

YUN-HO. See CHINA, Vol. V, p. 631.

YUN-NAN, a province. See CHINA, Vol. V, pp. 640, 641.

YUPANQUI, an Inca. See CHILI, Vol. V, p. 618.

YURUA. See JURUA, in these Supplements.

YUSUF BEN TASHFYN. See ALMORAVIDES, Vol. I, p. 596.

YVON, ADOLPHE, a French artist; born at Eschwiller, Moselle, France, Jan. 30, 1817. He received instruction in painting from Paul Delaroche; in 1848 received a first-class medal at the Salon; also received a medal of honor at the Salon of 1857, and other second-class medals. He was sent to the Crimea by the government, in 1855, to paint a series of pictures of the war. In the Versailles museum are a number of his war-scenes. He was professor of drawing in the École des Beaux-Arts, and was made an officer of the Legion of Honor in 1867. Died in Passy, Sept., 1893.

Z

ZACYNTHUS — ZANGWILL

ZACYNTHUS. See ZANTE, Vol. XXIV, p. 767.

ZADOK. See PRIEST, Vol. XIX, p. 728.

ZAFFRE. See COBALT, Vol. VI, p. 82.

ZALEUCUS. See LOCRI, Vol. XIV, p. 764.

ZALINSKI, EDMUND LOUIS GRAY, an American soldier; born in Kurnick, Prussian Poland, Dec. 13, 1849. Removing to the United States in 1853, he attended the high-school in Syracuse, N. Y., where he remained till 1863. When only 15 years of age he entered the Union army, first as volunteer aide-de-camp on the staff of General Nelson A. Miles; later he was commissioned second lieutenant in the Second New York Heavy Artillery for bravery at the battle of Hatcher's Run, Virginia. He remained on General Miles's staff until the surrender of Lee, and was mustered out of the service, September, 1865, and was recommended for an appointment in the regular army; commissioned a second lieutenant in the Fifth United States Artillery, Feb. 23, 1866, and by regular promotion became captain, Dec. 9, 1887. He was on duty from 1872 to 1876 at the Massachusetts Institute of Technology, as professor of military science. His name is widely known in connection with the development of the Zalinski pneumatic dynamite-gun. He was retired in Feb., 1894. See DYNAMITE-GUN, in these Supplements.

ZALUSKI, JOSEPH ANDREW. See POLAND, Vol. XIX, p. 302.

ZAMA, BATTLE OF. See SCIPIO, Vol. XXI, p. 467.

ZAMACOIS, EDUARDO, a Spanish painter; born at Bilbao, Spain, in 1842; pupil of Frederico de Madrazo in Madrid, and of Meissonier in Paris; received medals at the Paris exposition of 1867 and at Munich in 1870. Many of his productions have brought high prices, *The Two Confessors* having sold for \$6,500. Few artists of recent times have been the recipients of greater honors at so early an age (he died at 29), or produced works which have been more widely admired. Eugene Benson, in the *Art Journal* (1869), says: "I should suggest the form and substance of his works as a painter by saying that he has done what Browning did as a poet when he wrote the *Soliloquy of the Spanish Cloister*; what Victor Hugo has done in portraying dwarfs and hunchbacks; but with this difference, that what is *en grand* and awful in Hugo is small, elaborated, and amusing in Zamacois." Among his works are *The First Sword*; *The Favorite of the King*; *The Entrance to the Convent*; *A Good Pastor*; *The Education of a Prince*; *The Two Confessors*; *Faust and Marguerite*. His masterpiece, *Spain—1812*, is in the Walters Gallery, Baltimore. Died in Madrid, Jan. 14, 1871.

ZAMIA, a genus of tropical gymnospermous plants, belonging to the *Cycadaceæ*. The root-like

trunk is often very low, sometimes not rising above the ground, and bears ample fern-like or palm-like leaves. The *Z. integrifolia* of Florida is known as coontie, and furnishes a kind of flower known as Florida arrowroot. Other species are more tree-like in habit.

ZAMOISKI, JAN. See POLAND, Vol. XIX, pp. 293-94.

ZAMORA, a state. See VENEZUELA, Vol. XXIV, p. 140.

ZAMPIERI. See DOMENICHINO, Vol. VII, pp. 348-49.

ZANCLE, a city. See MESSINA, Vol. XVI, p. 57.

ZANESVILLE, the capital of Muskingum Co., Ohio, on the Muskingum river, at the mouth of the Licking, 67 miles by rail from Columbus. The river is navigable for steamboats to this point, and is crossed by an iron railway bridge 538 feet long, and by several others to the suburbs, Putnam and West Zanesville. The city has rich coal-mines close by, and manufactures engines and boilers, flour, iron, cottons and woolens, glass, paper, tiles, etc. Population 1890, 21,009; 1900, 23,538.

ZANGWILL, ISRAEL, an English man of letters; born in 1864, in London. His parentage was Jewish and the circumstances of his youth were narrow. In schools at Plymouth, Bristol, and Spitalfields, where he was placed at the age of nine years, he was the prize-taking boy. He taught in the Jews' Free School, Spitalfields, after taking all its honors, and studied in leisure hours for a London University bachelor's degree, which he took in 1884. During this time he wrote a set of humorous political papers, which, in 1888, were gathered into *The Premier and the Painter*. Some disagreement in pedagogical ideas caused him to leave teaching in the Spitalfields school, and he launched into journalism under adverse conditions. In 1889 he founded *Ariel*; or, *The London Puck*, a serial that was not successful and lived for only two years. Then he published *The Bachelor's Club* (1891), which instantly made him notable. Then followed *The Big Bow Mystery* (1892); *The Old Maid's Club*, a *mélange* of prose and verse (1892); and then he opened a vein quite his own, in *The Children of the Ghetto* (1892), a study, not without humor, of a secluded and wretched sort of outlawed Judaism; then came *Merely Mary Ann* (1893); and *Ghetto Tragedies* (1893). With a fun so exuberant as to lift the story out of satire, he wrote the *King of the Schnorrers* (1894), in which the pride and impudence of a professional Sephardic mendicant are grotesquely blended. He also wrote *The Master* (1894), in which the incidents lie in the artist world; and *Dreamers of the Ghetto* (1898). His comedy, *Six Persons*, had a long run in London. Under the caption of

Without Prejudice he contributed to the *Pall Mall Magazine* a series of gossipy criticisms; and in *Men, Women, and Books* he did a like service for the *New York Cosmopolitan*.

ZAPOLYA, JOHN, the name of two Hungarian kings. See HUNGARY, Vol. XII, p. 369.

ZARATE, AUGUSTIN. See PERU, Vol. XVIII, p. 679.

ZAUSCHNERIA, a genus of the evening-primrose family (*Onagraceæ*), cultivated for ornament, from California. It is one or two feet high, with oval or lanceolate leaves and handsome scarlet flowers, sometimes resembling those of *Fuchsia*.

ZEA, an island. See CEOS, Vol. V, p. 343.

ZEALOTS. See ISRAEL, Vol. XIII, pp. 427, 428.

ZEBRA-CATERPILLAR, the larva of an American noctuid moth; destructive to cauliflowers, cabbages and beets. It is two inches in length, velvety black, with a red head, red legs, and with two longitudinal yellow lines on the sides, between which are numerous transverse white lines, that give it the name. It changes to the chrysalis, within a rude cocoon formed just under the surface of the ground by interweaving a few grains of sand with silken threads. The moth, which is called the "painted mamestra" (*Mamestra picta*) appears in midsummer. It is a prettily marked species; the front wings are purple brown, with round spots; the hind wings are white. There are two broods of this insect each year, one in August and the other in October.

ZEBRA-WOOD, a name given to varieties of wood used as veneers, and striped so as to suggest a zebra's skin. The most important is that of the *Omphalobium lamberti* of the family *Connaraceæ*. It is a large tree, found in Guiana, South America, whence it is imported. Its colors are brown on a white ground. It is also called pigeon-wood. The name is also applied to the wood of a shrub growing in Jamaica, botanically known as the *Eugenia fragrans*, and also to an East Indian work produced by the *Guettarda speciosa*, a tree that bears scarlet flowers and attains a height of between twenty and thirty feet.

ZEBU, a city. See CEBU, Vol. V, p. 282.

ZEBU. See CATTLE, Vol. V, p. 244.

ZEDEKIAH. See EZEKIEL, Vol. VIII, p. 828.

ZEDOARY, the name of an aromatic root, having properties like, but inferior to those of ginger. It is derived from the *Curcuma zedoaria*, and the *C. zerumbet*, a genus of plants belonging to the *Zingiberaceæ*, or ginger family.

ZEISBERGER, DAVID, a Moravian missionary; born at Zauchtenthal, Moravia, April 11, 1721; emigrated to America in 1740. He studied Indian languages in the Indian school at Bethlehem, Pennsylvania, and in 1743 began his missionary labors among the Onondagas and Delawares, which he prosecuted until 1750, when he visited Europe in behalf of his missionary work. Returning in 1752, the outbreak of the French and Indian War compelled a cessation of his labors at his old mission, and he retired to Bethlehem, go-

ing thence to the Indians of Connecticut. During the Pontiac War in 1763 he was in charge of the Moravian Indians. He established a mission on the Muskingum River, in Ohio, in 1771, which was broken up by the Wyandots a few years afterward, and Zeisberger, with his Delaware converts, settled in Canada, from whence, in 1798, he returned, and founded Goshen, Ohio. Zeisberger was master of numerous Indian languages, and was author of a number of manuscripts, and of Indian-English grammars, dictionaries and spelling-books. He died in Goshen, Ohio, Nov. 17, 1808.

ZELA OR SALA. See RABAT, Vol. XX, p. 192.

ZELAYA SAME AS CELAYA, in these Supplements.

ZELAYA, JOSÉ SANTOS, a Nicaraguan general; was born at Managua, Nicaragua, about 1845. He joined the Nicaraguan army, became a general in 1885, and at the head of the liberal party. He co-operated with Zavala in the revolt against President Sacaza, which led to his overthrow in 1893. Under a new constitution, which was promulgated in the summer of that year, General Zelaya was elected president, with dictatorial powers, Sept. 17, 1893. Zelaya occupied the Mosquito territory in 1894; and in May, 1895, a British force took possession of the port of Corinto. This action was on account of the alleged murder of a British subject; and the port was held for a few days as security for the payment of an indemnity. The force was withdrawn upon the agreement of Zelaya to make the payment.

ZELLER, EDUARD, a German theological and philosophical writer; born at Kleinbottwar, in Würtemberg, Jan. 22, 1814, and studied in Tübingen and Berlin. In 1847 he became professor of theology at Bern, in 1849 at Marburg, and in 1862 professor of philosophy at Heidelberg, and subsequently at Berlin, where he afterward remained. Several sections of his *History of Greek Philosophy*, which is still the standard work on the subject, and widely used in the English universities, have been translated into English. Perhaps his chief and most important work is the *History of German Philosophy since Leibnitz*.

ZELLER, JULES SYLVAIN, a French historian; born in Paris, April 23, 1820; received his education in Germany and at the College Charlemagne. He was successively professor of history in the lyceums of Bordeaux, Rennes and Strasbourg. From 1854 to 1858 he occupied the chair of history in the faculty of letters at Aix; when he accepted the appointment of professor of history at the Normal School of Paris. In 1869 he was appointed to a similar position in the École Polytechnique. In 1874 he was made a member of the Academy of Moral Sciences as a successor to Michelet; received the decoration of Legion of Honor Aug. 14, 1863; was promoted officer, Oct. 14, 1873; and commander, Dec. 29, 1886. Among his works are *Histoire de l'Italie* (1852); *Épisodes Dramatiques de l'Histoire d'Italie* (1855); *Les Empereurs Romains* (1863); and other works.

ZENANA (Hindustani; Persian, *Zanan*, women); the women's apartments; corresponding to the Moslem *harem*. The Hindu women, of both high and low caste, but especially those of the Hindu faith, are quite strictly secluded. Down to 1860 not even Christian women were permitted to penetrate a Hindu zenana; but the establishment of zenana missions and the contact with Europeans and educational influences have done much to break down this and many other customs. Whereas formerly the women among the higher castes and wealthy were never seen in public and were strictly confined to their apartments, they now receive instruction from American and British Christian women, and many of the Hindu ladies have themselves become teachers of missionaries.

ZENITH TELESCOPE. See GEODESY, Vol. X, pp. 166, 167.

ZENO. See STOICS, Vol. XXIII, p. 561.

ZENOBIA, QUEEN. See PALYMA, Vol. XVIII, pp. 201, 202.

ZEOLITE. See MINERALOGY, Vol. XVI, p. 420.

ZEPPELIN, COUNT, Bavarian aëronaut and designer of a huge dirigible balloon or air steamer, which passed successful experimentation over Lake Constance, Switzerland. July 2, 1900. The structure which has been built by Count Zeppelin, with the assistance of his own government and the German emperor at an expense of £50,000, is an aluminium car 450 ft. long, with benzine motors and steering apparatus, the whole weighing nine tons. On its trial trip, it carried five passengers a distance of 35 miles at a speed of about 20 miles an hour, the machine ascending and descending easily, and proving easy to direct. The air-ship has a carrying power of two tons; it has been designed not to compete with the transport of passengers, but to reach places and objects, undiscovered coasts or interiors, now reached only with difficulty; to carry persons and despatches, or for the observation of movements of hostile fleets and armies, the positions and armaments of fortresses, etc.

ZERO. See THERMOMETER, Vol. XXIII, pp. 288, 289.

ZEYST, a large village in the Netherlands, province of Utrecht, five miles E. of the city of Utrecht; surrounded by the summer residences of many citizens of Amsterdam. The industries are making soap, candles and vinegar, brass and zinc founding, etc. On a rising ground, and surrounded by fine old trees, stands the Dutch Reformed Church, built in 1180. There is also a Roman Catholic Church. In 1746 a society of Moravian Brethren settled at Zeyst, where they have built a separate quarter, consisting of public and private buildings, erected along the sides of two large grassy squares, called the Easter Plain and the Wester. Besides the church there is an excellent day and boarding school, which is resorted to by children of parents belonging to various Protestant communions. The unmarried members live, the males in the Brothers' House, the females in the Sisters' House. Another building is set

apart for widows. There are family residences, workshops and warehouses. Population, 5,440.

ZHUKORSKII, VASILII ANDRIEVITCH. See RUSSIA, Vol. XXI, p. 107.

ZICK-ZACK. See PLOVER, Vol. XIX, p. 228.

ZIEGENBALG, BARTHOLOMEW. See TAMILS, Vol. XXIII, p. 44.

ZIEM, FÉLIX, a French marine and landscape painter; was born at Beaune (Côte-d'Or), France, Feb. 25, 1821. He studied painting at the Dijon Art School; received a first-class medal at the Salon in 1852; became an officer of the Legion of Honor in 1878. The greater number of his paintings represent Venetian scenes. His *View of Venice* (1852) is in the Luxembourg; and among his paintings are *The Bucentaur Adorned for the Ceremony of the Marriage of the Doge with the Adriatic, Venice, 1426*; *Venice—a September Evening After a Rain*; *View of Antwerp*, purchased by the government; and *Constantinople from the Golden Horn*.

ZIERIKZEE, an old and important town in the Netherlands, Province of Zeeland, situated in the southeast of the Island of Schouwen, in lat. 51°38'2"N. and long. 3°56'E. It was fortified before the beginning of the eleventh century, and owed its prosperity to the shipping-trade and fishing. A grammar-school, school of design and other excellent public schools are maintained by the town. The principal occupations are trade in agricultural products, shipping, ship-building, fishing, weaving calicoes, beer-brewing, drying madder, sawing wood, grinding corn, etc. Zierikzee suffered much in the contests between Flanders and Holland for the possession of Zeeland. It was a member of the Hanseatic League, and is probably the oldest town of Zeeland. Population about eight thousand.

ZIETHEN OR ZIETEN, HANS JOACHIM, VON, was born in Brandenburg, Prussia, May 14, 1699. After a military education he entered the army as lieutenant of dragoons in 1726; became involved in a private difficulty, and was cashiered. He was reinstated in 1730, and served in the campaign against France in 1735; became major-general in the second Silesian War. He distinguished himself at Hennersdorf and Hohenfriedberg, and especially in his famous march through the Austrian lines to Jägerndorf in 1745. He served through the Seven Years' War, and upon his retirement to private life was one of the most popular generals of Frederick the Great. He died in Berlin, Jan. 26, 1786.

ZIKR. See DERVISH, Vol. VII, p. 114.

ZILE OR ZILEH, a town in Asia Minor, the ancient Zela, in the pashalic of Sivas, about 30 miles S.W. of Tokat. It is built on a height with a small, flat, conical hill in the center of the town, evidently the mound or road still seen in part at Thyana, and the construction of which was attributed to Semiramis. Scarcely any remains of antiquity are to be found here; an ugly fortress of the Middle Ages having usurped the place of its beautiful temple. This was the field of Julius Cæsar's battle with Pharnaces, of which he wrote "*Veni,*

vidi, vici." There are several large khans and manufactories of coarse cottons. Its annual fair of fifteen or twenty days, from the middle of November, is often frequented by 40,000 to 50,000 persons from the commercial towns of Asiatic Turkey. There are about two thousand houses, the population being almost entirely Turkish.

ZIMMERMAN, AGNES, pianist and composer; was born at Cologne, Germany, July 5, 1847. She went to England at the age of four; studied under her father, and at the age of nine became a student under Cipriani Potter and Steggall at the Royal Academy of Music. She obtained the King's Scholarship in 1862, and made her first appearance at the Crystal Palace, Dec. 5, 1863. She visited Germany in 1864, playing at Leipzig and other places. Returning to England (which she always regarded as her home), she rapidly grew in public favor. She afterward visited Germany repeatedly, playing in many places publicly, as well as privately to the courts at Berlin and elsewhere. Miss Zimmerman's editions of Mozart's and Beethoven's sonatas are standard among students of music, and her own compositions, both vocal and instrumental, are well known.

ZIMMERN, HELEN, an English critic and biographer; born in Hamburg, Germany, March 25, 1846; removed to England as a child at the age of four; a good linguist, she contributed not only to periodicals in English, but to some in German and Italian. Her best books are *Stories in Precious Stones* (1873); *Schopenhauer* (1876); *Lessing* (1878); *Half-Hours with Foreign Novelists* (1880); *Tales from the Edda* (1882), illustrated by Kate Greenaway; *The Epic of the Kings* (1882), a free version of Firdousi (see Vol. IX, pp. 225-227), which Alma-Tadema illustrated; *Maria Edgeworth* (1883); *The Hanse Towns* (1889), and editions of Goldoni's plays and of the Pentamerone.

ZINC COATING OF METALS. See IRONS, Vol. XIII, p. 357.

ZINCITE. See MINERALOGY, Vol. XVI, p. 385.

ZINCOGRAPHY. See LITHOGRAPHY, Vol. XIV, pp. 699, 700.

ZINC-WHITE. See LEAD, Vol. XIV, p. 379.

ZINDER. See BORNU, Vol. IV, p. 62.

ZINNIA. See HORTICULTURE, Vol. XII, p. 249.

ZION. See JERUSALEM, Vol. XIII, p. 639.

ZION UNION APOSTOLIC. See METHODIST CHURCHES, in these Supplements.

ZIRCUM. See ZIRCONIUM, Vol. XXIV, p. 789.

ZIRKNITZ OR CZIRKNITZ LAKE, a small lake of Austria, in Carniola, 20 miles S.W. of Laibach and 30 miles N.E. of Trieste, situated in a deep valley to the south of Mount Javornik and to the northeast of Mount Slivinza. The lake is about five miles long, and between two and three broad; contains four small islands, on the largest of which is built the hamlet of Ottok, and has no surface outlet. It is about eighteen feet deep, and is notable for an irregular disappearance of its waters. The lake basin is full or empty as

the season is rainy or arid. It lies in a riven and porous limestone formation, through which the waters escape to the surrounding fissures and caves, and perhaps to the Laibach River. When the season is rainy the waters of the hills and caverns return to replenish the lake.

ZITHER, a stringed music-instrument, in its modern form supposed to be a modification of the Greek cithara, and by some, even of the Jewish *nebel* or psaltery. Early in the nineteenth century it became popular among the peasantry of the Styrian and Bavarian Alps. Owing to the skillful playing upon it of Johann Petzmayer, an Austrian peasant who furnished dance-music at balls and concert-halls, the instrument came into wide vogue. At this time it consisted of a shallow sounding-box, over which about a dozen bass strings were stretched, while three traversed the finger-board. It was played with a plectrum. About 1850 it was much improved by Carl Schulz of Dresden and Schunda of Buda-Pest. The sounding-box was made more suitable in shape, the strings were carried over a bridge and were increased to about forty, the limit of effectiveness, and the finger-board was enlarged. The strings are furnished with keys like a harp. Zithers are named according to their pitch, as treble, concert and elegie, which will stand tuning to a third or fourth below concert-pitch.

The bow-zither, so called because played with a bow, is of little value, and is superseded by the violin-zither. This much resembles a violin in shape and tone. These instruments are rested wholly or in part on a table while being played with a plectrum, and they have fretted finger-boards. The best of them are made in Vienna and Munich.

ZLATUST. See ZLATOUST, Vol. XXIV, p. 796.

ZOAN. See EGYPT, Vol. VII, p. 769.

ZOANTHARIA. See CORALS, Vol. VI, pp. 371, et seq.

ZOAR, an ancient city mentioned in Genesis, of which no trace remains. It was first called Bela (Genesis xiv: 2), and its king is mentioned as having been warred upon by the kings of the East. It was one of the five "cities of the plain," which included Sodom and Gomorrah, and when the Lord was about to destroy those wicked places, at Lot's prayer he consented to spare Zoar (is it not a little one? See Genesis xix: 20-22), that it might be a refuge for Lot and his family. Its site is as conjectural as that of Sodom. It is mentioned by Isaiah and Jeremiah, but not as a place of any importance.

ZOETROPE, a mechanical toy dependent on an optical illusion. A rotating drum is mounted on a pivot or spindle about which it may be whirled. In the drum, narrow slits are cut about an inch apart. Within the drum and lying against its circumference are placed strips, on which pictures are printed in such varying postures as represent successive stages of an action, as the trotting of a horse, eating a meal, swinging Indian-clubs, etc. When the drum is made to revolve for the observer the interstices of the slits disappear and

the figures within blend into actions, as of living things.

ZOLA, ÉMILE, a French novelist of the naturalistic school of fiction; born in Paris, April 2, 1840, and educated at the Lycée St.-Louis. He began life in the publishing-house of Messrs. Hachette et Cie, but in 1865 passed from that to the *Figaro*, in which he wrote some of his early studies of Parisian low life. He was also a contributor to *The Voltairre*, and his native abilities and force of character soon enabled him to become a writer of remarkable power. He



ÉMILE ZOLA.

first appeared as a novelist in *Contes à Ninon* (1863); *La Confession de Claude* (1865); *Le Vau d'une Morte* (1866); and *Les Mystères de Marseilles* (1867). In the latter year he began to attract attention by his coarse but powerful delineation of the crimes, weaknesses and loathsomeness of Parisian social life. The early fruit of this period includes, besides *Thérèse Raquin* (1867), the series à la Balzac, known as *Les Rougon-Macquart Family*, sometimes called his "Comédie Naturaliste": *La Fortune des Rougon*; *La Curée*; *Le Ventre de Paris*; *La Conquête de Plassans*; *La Faute de l'Abbé Mouret*; and *Son Excellence Eugène Rougon*. The later volumes of the series, which deal with the official life of the latter days of the second empire, stamped Zola as a great novelist, though pitiless in the fidelity of his revelations of low life in the gay capital of France. To procure his studies for the hideous panorama, Zola, like Eugene Sue, donned a workman's blouse and went down into the slums to view the scenes he depicts with relentness force and realism. In 1877 appeared *L'Assommoir*, depicting the vice of drunkenness; in 1878, *Une Page d'Amour*; in 1880, *Nana*; and in 1882, *Pot-Bouille*. His later works are *La Joie de Vivre*; *Au Bonheur des Dames*; *Germinal*; *L'Œuvre*; *La Terre*; *La Bête Humaine*; and *L'Argent*. In 1892 appeared *La Débâcle*, a vivid narrative of the war of 1870-71, which was followed by *Le Docteur Pascal*, the culminating volume of the "Rougon-Macquart" series. In 1888 M. Zola was made a chevalier of the Legion of Honor, and in 1891 was elected president of the French Society of Men of Letters. He repeatedly aspired to a seat in the French Academy, but its conservative members obstinately declined to admit him. It is said that to appease that body and sweeten the savor of his name, he wrote the charming idyl *Le Rêve* ("The Dream"), but without avail. In 1893 M. Zola visited London at the invitation of the London Institute of Journalists, and was present at a reception given to him at the Guildhall. In 1894 he published *Lourdes*, a novel which gave great offense to the Roman Catholics in its lurid descrip-

tions of the pilgrimages of the faithful to the Pyrenean town of that name. In consequence of the strictures on Roman Catholic credulity contained in the book, its author was denied audience of the Pope on the occasion of a recent visit to Rome. In 1895 the great realist published *Rome*, in which is a vivid description of the Papal court and its *entourage*. The latter work is designed to be followed by one entitled *Paris*. In what respect morals are served by the dishing-up by this author of such filthiness as he has given to the world in *La Terre* and in *Germinal*, bold would be the admirer of Zola who would say, while art in letters is outraged by the work of this representative craftsman of the gutter. Infinitely more wholesome, and not less creditable to French literature, was *Le Rêve*, and the unobjectionable work that came from his pen in the delightful *Contes à Ninon*. Zola's latest works are believed to exhibit a wane of vigor.

ZOLLVEREIN, a customs-union designed to obliterate the boundaries of the states and principalities of Germany as far as their foreign commerce was concerned, and to equalize tariff-rates. An account of its origin may be found under GERMANY, Vol. X, pp. 455-501. On the creation of the new empire in 1871, six free cities were not included in this bund, as Hamburg, Altona, Bremerhaven, etc., but Luxemburg was. In 1888 the free ports were brought into the Zollverein. The system is virtually a compact of the various sovereignties of the empire by which they surrendered the control of tariff-rates to promote freedom of trade between themselves, but it is provided for in the imperial constitution.

ZOÖGYROSCOPE, a modification of the zoetrope, with a view to throwing upon a screen objects having the appearance of motion, by the aid of a magic lantern. It is a mechanism of greater precision and more scientific utility than the zoetrope. Instantaneous photographs of a moving object are mounted on a cylinder, which is placed within the lantern and made to revolve so that they pass in succession under a strong light. -The pictures projected on the screen blend in such a manner as to give the effect of motion in them.

ZOÖPRAXISCOPE, a mechanism on the principle of the zoetrope (q.v., in these Supplements), to be used in connection with a magic lantern and having a series of disks so arranged that when thrown upon a screen the movement of the disks produces an effect which causes the spectator to see the animal move; this is done by making a combination of photographs of the animal in motion and a movement of the disks in opposite directions.

ZOÖSPORE, in botany a name applied to those asexual spores, notably those of algæ, which have the power of swimming. See figure in Supplement under *Oögonium*, where two Zoöspores (*B*) are represented with their swimming hairs or cilia. See also BOTANY, Vol. IV, p. 159.

ZORGITE. See MINERALOGY, Vol. XVI, p. 391.

ZORILLA (*Zorilla* or *Corepatus striata*), a carnivorous mammal of the skunk family, found in South America. It is one of the largest of the

skunk sub-family (*Mephitinae*). One or two broad white bands extend along the back. Like its relatives, it secretes a fluid of a very disagreeable odor.

ZORN DORF. See FREDERICK, Vol. IX, p. 737.

ZORRILLA, JOSÉ (1817-1893). See SPAIN, Vol. XXII, p. 361.

ZORRILLA, MANUEL RUIZ, a Spanish republican; born in Madrid, in 1834. Previous to the revolt of June, 1866, he was a barrister in Madrid and a member of the Cortes, but for his part in the revolt was compelled to flee to France; was Minister of Public Works in the Topete provisional government in 1868; president of the Cortes and Minister of Law in 1869; and supported the Duke of Aosta (Amadeo I) in his candidacy for the throne, and by him was decorated with the order of the Annunziata. When Amadeo abdicated in 1873, Zorrilla went to Portugal, and was implicated in almost every conspiracy from 1876 to 1893, though exiled during the greater part of that period. In 1893, after agitating political reforms for over ten years, he sought election to the Cortes, and was successful. Died in Burgos, June 13, 1895.

ZOUAVES, a name applied to such troops in any army as wear the peculiar form of dress which is known as the zouave. This dress or uniform, as originally adopted and worn, with few modifications, consists of a loose dark-blue jacket and waistcoat, baggy Turkish trousers, yellow leather leggings, white gaiters, a sky-blue sash, and a red fez with yellow tassel. This costume was originally worn by a light-infantry corps of the French army for service in Algeria about 1830. Several regiments wearing this costume were organized during the Civil War in the United States, and militia corps of zouaves are to be found in the militia forces of almost every state.

ZULULAND, a province of the British colony of Natal, comprising an area of about 12,500 square miles. Pop. 181,000, of which only about 1,100 are whites. It is well-watered and capable of cultivation, and has a considerable stretch of coast, with a good harbor in St. Lucia Bay. It is said to be rich in mineral wealth, though as yet (1900) little worked. See Vol. XXIV, pp. 827-829; and under AFRICA, p. 78, in these Supplements.

ZUÑI MOUNTAINS, a range of mountains of Valencia County, western New Mexico, lying E. by N. of the Zuñi Indian Reservation, and about 15 miles S. of the Atlantic and Pacific railroad. It extends from southeast to northwest about 40 miles, and has a breadth of from 12 to 20 miles. At its northwestern end is Fort Wingate.

ZURICH, LAKE OF. See SWITZERLAND, Vol. XXII, p. 777.

ZURITA, GERONIMO DE. See SPAIN, Vol. XXII, p. 359.

ZUYDER ZEE, a gulf of Holland; for reference to which, see HOLLAND, Vol. XII, pp. 59, 60; and NORTH SEA, Vol. XVII, p. 563. The sea is almost a *mare clausum*. Formerly the central portion of the Zuyder Zee was under water. In the year 1282 the sea broke through the intervening strip of land

with disastrous results to the villages in the interior of the country. In 1892 a royal commission was appointed to determine the feasibility of a scheme to reclaim from the sea 450,000 acres, the value of which was estimated at 326,000,000 guilders (the guilder being equal to 40 cents). The cost of this gigantic scheme is computed at 189,000,000 guilders, or, with the accumulated expenditure, including measures of defense and the payment of compensation to the fishermen of the Zee, at 315,000,000 guilders. The commission was unanimous in recommending that the work should be executed by the state. It is not intended to run a dam across the mouth of the Zuyder Zee and reclaim the whole area, but to inclose large tracts along the margin, leaving a lake in the center from which navigable channels will be carried to the more important towns. The middle of the lake proposed to be thus left under water, it was discovered would not have been suitable for cultivation, as it was too sandy. It is calculated that the work will require 33 years to complete.

From the southeast of the Zuyder Zee, a long, narrow arm, called the Y, formerly ran nearly due west, through the Holland peninsula. To cut off the Zuyder Zee from the Y, a strong sea-dyke and locks were constructed, through which a ship-canal (see CANALS, in these Supplements) was made between Amsterdam and the North Sea. On both sides of this canal about twelve thousand acres of rich land have been reclaimed.

ZVENIGORODKA, an old town of northwestern Russia, government of Kiev, on the Tikritch, a tributary of the Bug, about 98 miles S. of the town of Kiev. Situated 22 miles W.N.W. of Shpola Junction; it has an extensive trade in cattle and some manufactures, especially of tobacco products. Population, 11,375.

ZVORNIK, an old town of European Turkey, in the province of Bosnia, on a narrow strip of land on the left bank of the Drina, about 60 miles N.E. of Bosnia-Serai. The town is strongly fortified, standing on the face of a steep hill, at the summit of which is a strong fortress commanding the valley of the Drina. It has several mosques, Greek and Roman Catholic churches, lead-mines, and a considerable trade in timber. Population, about 8,000.

ZWEIBRÜCKEN. See DEUX PONTS, Vol. VII, pp. 134, 135.

ZYGÆNA. See SHARK, Vol. XXI, p. 76.

ZYGOBRANCHIA. See MOLLUSCA, Vol. XVI, pp. 645-648.

ZYGOMORPHY, in botany a term applied to irregular flowers, in which the petals or sepals are not all alike. Actinomorphy is the antithetic term, applied to those flowers in which the parts are similar.

ZYGOSPORE, in botany a name applied to a spore which is produced by the sexual union of two similar gametes (sexual cells). See figure in Supplement, under CONJUGATION. See BOTANY, Vol. IV, p. 159.

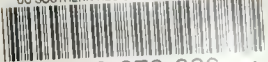
ZYLONITE, same as CELLULOID (q.v., in these Supplements).

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