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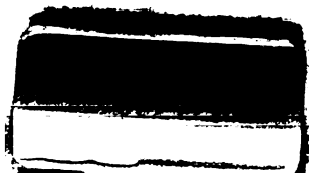
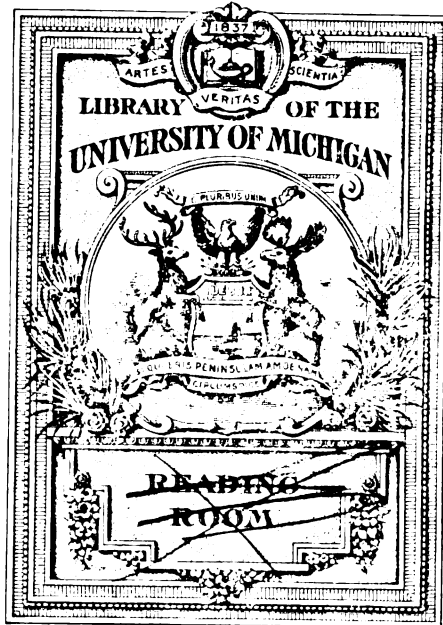
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**APPLETON'S
NEW PRACTICAL
CYCLOPEDIA**

APPLETON'S NEW PRACTICAL CYCLOPEDIA

*A NEW WORK OF REFERENCE
BASED UPON THE BEST AUTHORITIES, AND SYSTEMATICALLY
ARRANGED FOR USE IN HOME AND SCHOOL*

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UNITED STATES COMMISSIONER OF EDUCATION

VOLUME I

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INTRODUCTION

THE USE OF REFERENCE BOOKS

A WORK of reference is to be judged according to what it is, and not according to what it is not and does not pretend to be. It is an auxiliary to knowledge and education. With some exceptions, to be noted later, it is not a fountain head of either education or knowledge. In modern times such auxiliaries are not only useful, but indispensable to our educational processes beyond the primary grades of instruction. It is the purpose of this article to indicate some of the uses of a cyclopaedia, such as the present work, as tributary to those larger human interests.

All human thought and knowledge that is worth preserving finds its way sooner or later into great books. These are treatises, surveys, essays, biographies; and the history of their appearance is the history of civilization. In this long line, to mention only a few of them, there are Plato's "Dialogues," the "Elements" of Euclid; Aristotle and the mediæval Aristotelians, Newton's "Principia," Kant's "Critique of Pure Reason," Gibbon's "Decline and Fall," De Candolle's "Regni Vegetabilis Systema Naturale," Darwin's "The Origin of Species." From such as these, which are largely scientific, we pass over easily into those that are primarily works of art, and we come to the dramatists, romancers, and poets. Cicero exercised for a long time a dominant influence over early modern education, but it was not so much his popular philosophy as his literary form that men studied and imitated.

It is not to be forgotten, however, that every great scientific work is at the same time a work of art. Doubtless its excellence as a presentation of ideas has more to do than is commonly supposed with giving immediate currency and long-continued acceptance to the ideas which it presents.

The art of a book is its way of reaching the mind of its readers. But readers differ. No two have the same preparation to take in what is written. This is notably true in an age in which hardly any two students have followed the same course of studies. A writer is accordingly at a loss to know how far he must explain the elementary facts and conceptions upon which his discussion rests. If he explain too much he becomes tiresome, especially to the better educated portion of his constituency; if too little, only a few will follow him. His art

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accordingly is to make the best possible compromise between the two extremes. For the most of his readers, then, there will be one part or another of his work, more or less of it, for which they must seek supplemental information elsewhere. If he ran down all of his references and allusions, defined all of his terms, and gave the pedigree of all of his doctrines, his work would become another cyclopedia, and no one would read it to the end.

Some of the great world books are used directly for purposes of education. It would be well if more might be, and the effort is, in fact, made definitely in our best institutions of learning to promote the study of those masterpieces, in science as well as in pure literary art. But in some of the earlier stages of learning recourse must be had to text-books. A text-book ordinarily deals with materials which are suitable for the education of the race and therefore suitable for presentation in one or more of the great books of the world. Often they have already come to exposition in such classic form. But the text-book deliberately undertakes to set forth those materials for the instruction of those who are subject to some common limitation, either as to their immaturity or as to the meagerness of their preliminary training. The writer of a text-book, then, has need of an art of his own. He, too, must assume a variety of lack as regards the knowledge of elementary matters on the part of his readers. But for him this various ignorance is grouped about some one stage of partial education which determines the grade of student for which his text shall be prepared. Yet even here no considerable agreement can be expected among the children or youth for whom the book is written. Some will know well what others never knew or have forgotten. The necessity of being neither bulky nor tedious requires that some possible explanations be left unsaid. The limitations are imperative, and the art of one who can make an effective presentation within those limitations is, as experience shows, extremely difficult of attainment. A really notable text-book, such as occasionally appears, marks an epoch in the history of education.

It is evident that, not only in the making of books, but wherever thought is conveyed by speech or pen or print, the same art must be employed, the same middle course must be followed between the tediousness of too much information and the obscurity of too little. Everywhere some things must be left unexplained. And some or many, and not infrequently all, of those who hear or read, must at some point or at many points seek elsewhere for information which shall make the meaning clear. The most skillful of writers cannot escape this outcome when he gets beyond the most elementary of subjects and the narrowest circle of readers.

It is one province of works of reference to supply, to a reasonable degree, the definite and elementary information which will enable any ordinary reader to make good his individual lack of knowledge on any subject of ordinary discussion.

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Mention has been made of the fact that the elective system in our educational institutions has increased the need of reference books in recent times. The education of the more highly educated does not now represent the possession of a body of common knowledge, such as served at an earlier day as a foundation which might always be taken for granted in any discussion, and upon which any new doctrine might be securely erected. A body of common knowledge is still provided, to be sure, even in our modern schools. But it is more fluctuating and more elementary in its character than that which was formerly presupposed in books written for a literary class. Or at least, it may be said, the common stock is found to constitute a lesser share of any one man's equipment, a greater proportion being now made up of special knowledge, of which he is sole possessor or in which his partners are only those of his group or order or profession.

The widened range of human knowledge is doubtless one chief occasion for the elective curriculum. It is a direct cause, moreover, of the increased demand for works of reference. In a world in which no man can possibly compass all human learning or even a considerable fraction of the whole, the specialist in one field has a growing respect for specialists in fields other than his own; and the man of ordinary attainments has respect for specialists everywhere. All of them have frequent occasion to get some survey of one or another of those fields which may lie neighbor to some affair of their own.

Any one, in such a case, may consult the specialist in that neighboring domain. But such a course is generally impracticable. The specialists are not so many that they can be always at hand. He may consult the latest epoch-making treatise on the subject in question. But that, too, is not always easy to find, and when found it is too voluminous, and, moreover, it makes use of a vocabulary which only the initiated may understand. To have the information for which such search is made all put together in convenient form and in a language which readers of ordinary intelligence can understand, and then to have the same thing done for the ten thousand other subjects which may occasion a similar search, and at last to have the resulting library of universal knowledge so arranged that a man need know only the order of the letters of the alphabet to find his way to what he wants, that surely would be one of the notable inventions of our day, if an earlier age had not already fashioned it and given us models for imitation and improvement.

To learn how to use books of reference, and still more, to form the habit of using books of reference, is, then, a necessary part of modern education. It is necessary not only for the specialist and the scholar, but for the well-informed man in any occupation or manner of life. Generally speaking, if he makes good use of such works and does not abuse their readiness to serve him, he will treat them as subordinate and auxiliary to other sources of knowledge. It is information rather

than knowledge in the deeper sense which they have to offer. But his knowledge, even if it be profound, will have need of such information to help it out and make it serve his need. And one mark of the well-trained man is the promptness and ease with which he turns to such a source of information, in case of need, and makes it render him service without delay. Indeed, men of ability in any field who are accurate in statement and sure-footed in their judgments of matters of fact, are pretty sure to have some favorite reference book, or two or three, to which they turn as naturally when need arises as one puts up an umbrella in a shower. If such habit and facility is not of itself an education, it is an important auxiliary to an education, and well worth cultivation by young practitioners in any field who hope for substantial success.

It is largely the work of parents in the home and teachers in the schools to foster the reference habit before the time of life at which that more serious and exacting practice begins. But nowadays both the home and the school are reinforced by an agency unknown to most readers a generation ago—the reference division of the public library. The library is generally recognized as having a place of its own among educational institutions. It does its educating in a variety of ways, with new ways coming to light every year. The reference librarian does his part of the work by helping people to find what they want to know, whether in regular books of reference or in books of any kind; but he does his part in a further way by familiarizing readers with the use of reference works, till they can find their own way to knowledge under all ordinary circumstances. In this manner the reference librarian renders himself indispensable at first and dispensable afterwards, except as new readers come on, requiring a repetition of his instructions, or older readers delve into more recondite knowledges, where the book expert may still serve the experienced reader of books.

Whether parent, teacher, or librarian, whoever he may be who promotes the formation of this habit, he must teach the sign language of the works in question, a language which must be rather technical in the case of a dictionary or an atlas, but may present but few peculiarities in the case of a cyclopedia. He must teach the leading clues by which the information sought under one heading may be found inadvertently concealed under another. And he must make clear the ways in which a work of one class supplements those of another class, as cyclopedias, biographical dictionaries, an index to current literature, histories, and genealogies, may all be necessary to tell men what they may wish to know about some person or some performance which has just risen into the public consciousness. How far the types of information represented by many such works may be embodied in one comprehensive work depends upon the art of the reference-book makers, who seek to tell the largest possible amount of that which people wish to know in the smallest possible space, while making it still intelligible

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and even attractive to the ordinary reader. A work which combines these advantages in a high degree soon becomes a favorite of reference librarians and of readers generally.

It is not to be forgotten that works of reference are not merely and always subsidiary forms of literature. It is this aspect of their character which has hitherto been emphasized in the present article. A dictionary, an atlas, a cyclopedia, may, however, either as a whole or in some of its parts, be the form chosen by the ripest scholarship to embody results of its finest research. Numerous instances will occur at once to well-informed readers. In these instances the finished work becomes a landmark in its field of knowledge, a milestone in the advance of human learning. Subordinate parts of a great cyclopedia not infrequently present the fine combination of scientific and artistic excellence which we commonly associate with epoch-making treatises. They embody the best that is known in a particular field, in the best form that can be given to it for the purpose in view. Like other scientific works, a book of reference has an art of its own. The writer of a cyclopedia article must study to convey his maximum of information within a minimum of space, while making his contribution still intelligible to readers having an ordinary range of intelligence, and interesting, too, in so far as interest can be secured within its necessary limitations. The best encyclopedic writing becomes, indeed, a model for the compact and clear presentation of definite facts. While as much out of place as legal verbiage would be in such writing as is commonly called Literature, it is as valuable and as worthy of imitation in the domain of fact presentation, as the language of the law in legal documents.

For the great majority of school children, the place where they will form the reference-book habit, if they form it at all, is in the school. It is now common, even in the less populous communities where there is as yet no public library, to provide the public school with one or more reference books. Any teacher of experience well knows what sealed books these works of reference are to many of their pupils unless those pupils have been taught to put them to daily use. This is not the place for detailed directions with reference to this branch of teaching, but a few suggestions may be offered.

It is of considerable importance that the books be so placed as to be readily accessible. If they are kept ordinarily out of sight, in a closet or a closed cupboard, or even if large volumes are placed where they must be moved with some real difficulty before coming into use, as on a low shelf under a table, it will be noticeably harder to establish the habit of consulting them frequently. Pupils should be made as free as possible to use the books during the hours of study, with only so much of restriction by rule as may be necessary to prevent real disorder or the waste of time in aimless thumbing of their pages. While the volumes should be accessible, care should be taken that they be treated with respect. If they should be kept free from the dust of

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disuse, they should also be kept free from the ragging and tattering of careless use.

In the middle grades of the elementary school, pupils will frequently need the teacher's direction to look up this or that point of the assigned lesson in this or that book of reference. By degrees, however, responsibility for such procedure may be shifted to the pupil, as in many other respects he is gradually coming to be self-directed. Instead of being referred by the teacher to a certain book for certain information, he may tell the teacher what are the points on which he will need the help of the reference book, what is the book to which he will refer, and what title he will look for in the alphabetic series of titles. After a fair amount of such training, the most of the pupils can be trusted to recognize their own lack of information at certain points in the lesson they are studying, and to turn, without much fumbling, to the ordinary sources of such information. The teacher can then reserve his special comment for the more occasional and special difficulties. In a large school, which has a well-equipped library in addition to the much-used reference books in the different rooms, the teacher will now be in regular coöperation with the librarian, to whom the pupils will be sent, in cases of special difficulty, for such guidance as will put them in the way of forming the library habit—the habit of looking, in a large collection of books, with the help of catalogues and bibliographies, and at a minimum loss of time in confused rummaging, for such information on their particular subject as that library may have to offer.

In a community in which the chief library facilities are in a large public library, with its numerous departments and branches, the learning of the ways of that institution becomes another step in the same process. Here the pupils will need to be shown the room to which they should go and the library assistant or attendant whom they should seek to put them in the way of getting their questions answered. When once they have been shown this trail and have reached the desk to which it leads, their education through the library is under way. The staff of a modern public library well understands its duty of transforming that institution, for those who use it regularly, from a jungle of concealed dangers and riches into a familiar annex of the daily rounds of home and school.

In what has just been said, it is assumed that a part of the time of the teacher with his class is to be given to going over the work assigned for future recitation and in helping them to the best ways of mastering this work. The importance of some such proceeding can hardly be emphasized too strongly. It is a common fault in our schools, that too much attention, relatively, is devoted to recitation, and too little to teaching the art of study. While this fault is certainly no greater than would be that of giving the pupils too much of guidance and expecting too little of them in return, it is greatly to be desired that both extremes be avoided. The assignment of lessons and the guidance of pupils in the best ways of mastering their lessons is quite

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as important as testing their attainments in their recitation of what they have learned. Under such guidance, wisely given, they will arrive earlier and more surely to that power of self-guidance upon which we properly set great price. Particularly in that part of study which requires the use of reference books, the guidance of a capable teacher up to the point at which the learner can turn to such books readily, confidently, and skillfully, and find what he is seeking if the books have it to offer—such guidance is of great immediate value to the pupil, it economizes time throughout his course of studies, and it equips him with a means of self-education which may serve him well in his after-life.

ELMER ELLSWORTH BROWN.

PREFACE

APPLETON'S NEW PRACTICAL CYCLOPÆDIA is presented with confidence that it will take a permanent place as a popular reference book. The experience of Messrs. D. Appleton and Company in the preparation and publishing of works of reference has extended over fifty years and has covered such well-known works as "The Johnson Cyclopædia," "The American Cyclopædia," "The Cyclopædia of American Biography," "The Annual Cyclopædia," and "The Universal Cyclopædia and Atlas." They have been led to undertake the preparation of a new work by the conviction that, notwithstanding the numerous published works of cyclopædic scope, there is still a lack which should be supplied.

The following of the conventional idea of what a cyclopædia should be, rather than a consideration of the actual use to which the work is to be put, has too often resulted in a collection of learned treatises, useful to specialists, but of little service to most of those who refer to their pages for information. The cost of such works is to many prohibitive; the immense amount of detail which they contain is wearisome, and too often obscures the information which is sought. Except in public libraries they are apt to be carefully guarded in the bookcase instead of being used currently by the owner and his family, and they give little aid in the habit of acquiring exact knowledge upon current topics, which, if consistently followed, is a most liberal and practical form of education. At the other extreme are the briefer "popular" cyclopædias, hurriedly compiled from whatever sources are available, with scanty and inappropriate illustrations, and with a few showy "selling points," but with no attempt at serious preparation. The publishers of APPLETON'S NEW PRACTICAL CYCLOPÆDIA feel that there is a place for a brief, serviceable work of reference which combines moderate size and low price with comprehensiveness, accuracy, and authority.

In the planning and preparation of APPLETON'S NEW PRACTICAL CYCLOPÆDIA the foremost question has been: For what sorts of information are works of reference most often consulted? After making provision for those biographical and geographical data which the student may fairly be expected to require, the problem was to present a clear and up-to-date survey of the various departments of human knowledge and progress, while avoiding the technicalities of mathematics, science, and philosophy, and those mere refinements of learning

PREFACE

which could be of real interest only to the specialist. A constant aim in the preparation of the various articles has been to devote no more space to a subject than is actually necessary to give the essentials, and to present them clearly to the mind of the average reader. The purpose of the work, first, last, and all the time, is to give information which can be used—and especially authentic and up-to-date information of value to the people of the United States and Canada. In matters which are fair subjects of controversy, an endeavor has been made to indicate impartially the attitude of both sides.

The informational attitude of the *CYCLOPÆDIA* is particularly seen in the wealth of illustrations, which do more than ornament its pages. No illustrations have been inserted merely to embellish or to fill space. Pictures have been inserted wherever it was felt that they would amplify and supplement the text. The present work is unrivaled in the number, range, and appropriateness of its illustrations. The maps are clear and simple, while sufficiently detailed for all practical purposes, and the colored plates not only are worthy examples of the engraver's art, but add immeasurably to the understanding and appreciation of the subjects which they illustrate.

The alphabetical arrangement of the articles is supplemented by a carefully prepared analytical and synthetical index. In this index will be found in proper alphabetical order subjects which are not assigned individual articles in the body of the work, but which are treated as parts of articles found under some other key word. It will be evident at once how much this device enlarges the usefulness of the *CYCLOPÆDIA*. If a desired subject is not found in its alphabetical place in the body of the *CYCLOPÆDIA*, on turning to the index it may be found there, with a reference to the article in which it is discussed. No less useful is another feature of the index by which, under proper subject headings, are grouped all of the articles related to that subject which are contained in the *CYCLOPÆDIA*. Each of these headings, with its related references, furnishes a comprehensive survey of the particular department of knowledge with which it is concerned. The publishers believe that the usefulness of the *CYCLOPÆDIA* will be found to be multiplied many times by the index.

The publishers of *APPLETON'S NEW PRACTICAL CYCLOPÆDIA* offer the work in the conviction that it is what its title implies. They believe that it will make an especially strong appeal to those desiring a reliable, concise, and everyday work of reference. They hope that the work will be found especially helpful to the student, and to the busy man wishing to obtain quickly the essential facts upon the subject in which he is interested.

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KEY TO PRONUNCIATION

ä, as in *fata*.

š, as in *fat*.

â, as in *fall*.

ä, as in *father*.

ã, as in *welfare*.

ê, as in *meest*.

ë, as in *met*.

é, as in *her* and *eu* in French *-sur*.

î, as in *stee*.

ÿ, as in *it*.

ö, as in *sober*.

ô, as in *not*.

ó, as in *fool* or *spoon*, or as *u* in *rule*.

õ, as in *foot*.

ö, as in *Göthe* and *eu* in French *nouf*.

ü, as in *mule*.

û, as in *but*.

u, produced with lips rounded to utter *oo* and tongue placed as in uttering *e*.

û, as in *burn* or *burg*.

ch, as in German *ich*.

kh, as *ch* in German *nacht* and Scotch *loch*, and as *g* in German *tag*.

th, as in *thin*.

th, as in *though*.

ñ, French nasal *n* and *m*; pronounce *ang*, *ong*, *ung*, etc., in usual way, but without sounding the *g*.

ñ, Spanish *n-y*, as in *cañon*; French and Italian —*gn*, as in *Boulogne*.

APPLETON'S NEW PRACTICAL CYCLOPEDIA

VOLUME I

A, letter of all phonetic alphabets, first in all except Abyssinian (or Ethiopian) and Runic. Probably placed at head of alphabets because the most easily uttered of the vowels. See ABBREVIATIONS.

A, note in music, major sixth of scale of C major; the standard tone from which most instruments are tuned.

Aa (ä), name of several rivers or streams in Germany, Switzerland, Holland, Russia, and France; supposed to signify "water," and to be etymologically related to Latin *aqua*.

Aachen (ä'kän). See AIX-LA-CHAPELLE.

A1, or **A No. 1**, mercantile symbol, denotes any article of the very highest class. In registering vessels, **A** designates character of the hull; the figure **1** marks the efficient state of anchors, cables, stores, etc.

Aageson (ä'gä-sén), Svend, Danish historian; flourished in second half of twelfth century; wrote "Compendiosa historia regum Danie," the first continuous history of Denmark from Skjold down to 1185.

Aahmes (ä'més). See AMASIS.

Aali Pasha (ä'lä pä-shä'), 1815-71; Turkish statesman; b. Constantinople; several times minister of foreign affairs and grand vizier; represented Turkey at the conferences of Vienna and Paris, 1855; signed treaty of Paris, March 30, 1856. In 1864 presided at conference of European powers for settling Roumanian question, and, 1867, while the sultan toured the continent, was regent of the empire.

Aall (äl), **Jakob**, 1773-1844; Norwegian publicist; b. Forgrund; studied theology, natural history, and mineralogy; a framer of the free Norwegian constitution; published a history of Norway for the period 1800-15.

Aar (är), river of Switzerland, rising in the Grimsel and Schreckhorn Mountains, canton of Bern; forms the remarkable fall of Handeck; traverses the lakes of Brienz and Thun, enters the Rhine opposite Waldshut; length, 175 m.; navigable from Thun to its mouth.

Aard'-vark (earth-pig), mammal of the order *Edentata*, found in Africa; is about 5 ft. long,

including the tail; burrows in the ground beyond the reach of pursuers; breaks down the



AARD-VARK.

walls of ant-hills, catching the insects with its long, prehensile, slimy tongue.

Aard'-wolf (earth-wolf), carnivorous digitigrade quadruped, considered a connecting link between hyena and dog; native of S. Africa, about the size of a fox; resembles a hyena.

Aarhus (är'hös), seaport of Denmark, on the E. coast of Jutland, on the Cattegat, 37 m. SE. of Viborg. It has a grand cathedral, museum, library, and various manufactures. Pop. (1901) 51,909.

Aaron (ä'rön), elder brother of Moses and his spokesman before Pharaoh; first high priest of Israel; maker of the golden calf; d. on Mount Hor, aged one hundred and twenty-three; succeeded in priesthood by his son Eleazar.

Aaron, Egyptian physician of the seventh century; first author to mention smallpox.

Aaron ben-Ash'er, Jewish scholar of Tiberias of the tenth century. One of the two existing recensions of the Hebrew Bible, the occidental or Palestinian, is the work of Aaron ben-Asher, and is generally preferred to that of his rival, Moses ben-Naphtali.

Aarsens (är'séns), **Frans van**, 1572-1641, Dutch diplomatist; b. The Hague; ambassador to France, Venice, and England; after supporting Barneveldt was chiefly responsible for his destruction.

Aasen (ä'sén), **Ivar Andreas**, 1813-96; Norwegian philologist; b. Aasen; studied the Norwegian dialects to construct a new national language as a substitute for Danish.

Aasvær (ās'vār), or **Væ'ro**, Islands, group of small islands near Arctic circle; 10 m. from Norwegian coast; has most important herring fisheries of Europe.

Ab, eleventh month of Jewish civil year, and fifth of ecclesiastical year, corresponding to part of July and part of August.

Ab'acus, a calculating instrument used in mercantile transactions by the ancient Greeks and Romans. It is still used by the Chinese, the Japanese, etc., and in a very simple form in the schools of Europe and America to illustrate addition and subtraction. As thus used, it usually consists of several parallel wires stretched from side to side of a rectangular frame, each wire carrying ten sliding beads, or counters. The wires represent successive *orders* of units, and the counters stand for *units* of the several orders. The Chinese abacus has seven (or six) beads on each wire, divided into two unequal sections by a crosspiece, with five beads on one side and two on the other. Each bead in the larger section represents one, and in the smaller section five (units, tens, hundreds, etc.). Reckoning on the Chinese abacus is decimal. One is represented by pushing up to the crosspiece a single bead on the larger section of the wire chosen to represent unity; six may be added to that by pushing up another bead on the same section of the wire and bringing down one of the two beads on the shorter section; twenty may be added to that by pushing up two of the five beads on the wire next on the left, and so on, the abacus serving merely to set down the successive steps of a mental calculation. It is used for the most elaborate calculations. The word has also an architectural meaning, and signifies the level tablet placed between the capital of a column and the superstructure.

Abad (ā-bād'), name of several kings of Moorish Spain. **ABAD I** was first Moslem king of Seville. Began to reign 1023; d. 1042. **ABAD III**, last of the dynasty, d. 1095.

Abad, affix of Persian origin, signifying "abode," and occurring in names of many cities in the East; as Hyderabad, the "abode or city of Hyder."

Abad'don (destruction), Hebrew name applied to Apollyon, or Asmodeus, the angel of the bottomless pit.

Abæ (ā'bæ), city of Phocis, near Elates, celebrated for its oracle of Apollo, of greater antiquity than that at Delphi. The temple was destroyed in war, but Hadrian built another, though smaller, one.

Abaka Khan (āb'ā-kā khān), second Mongol king of Persia; reigned abt. 1265-80; completed conquests of his father, Haluka; restored Bagdad; and consolidated Mongol sway over W. Asia.

Ab'ana, name of one of the rivers of Damascus mentioned in the Bible (II Kings v, 12); identified with the modern Barada.

Aban'donment, in law, used in several senses. (1) A relinquishment of personal property so

that ownership ceases, as of a ship, which then becomes a derelict. (2) Rights, such as easements, in real estate can be relinquished, but ownership of land cannot be abandoned, but must be conveyed according to law, as by deed, by estoppel, or under the statute of limitations. (3) Abandonment by husband or wife is equivalent to desertion. (4) Under the civil law responsibility for a wrong committed by a slave or animal could be avoided by abandoning the slave or animal to the person injured. (5) In ecclesiastical law, "abandonment to the secular arm" meant the handing over of offenders to the civil power for punishment. Degradation from priestly rank preceded such transfer. (6) In insurance: upon partial loss to transfer the entire property to the insurer, so as to claim a total loss, is termed abandonment; it is particularly applicable in marine insurance.

Abano (ā-bā'nō), **Pietro d'**, 1246-1316; Italian philosopher; Prof. of Medicine at Padua; author of works on philosophy and medicine; condemned to be burned as a sorcerer, but died in prison.

Abantes (ā-bān'tēs), people of ancient Greece, supposed to have migrated from Thrace, and having settled in Phocis built the city of Abæ. One portion removed to Eubæa, a second to Chios, and a third, returning from the Trojan war, settled in the Thesprotian city of Thronium.

Abar'ca, **Joaquin**, 1780-1844; Spanish bishop and leader of absolutist party; made bishop of Leon by Ferdinand VII for zealous advocacy of absolutism; later prime minister of Don Carlos, but fell into disfavor for being too moderate and was banished.

Abarim (āb-ā'rīm), mountain range of Moab, on the E. side of Jordan, opposite Jericho. Pisgah is either the same as Abarim or a part of it. This range rises nearly 3,000 ft. above the Mediterranean, and more than 4,000 ft. above the Dead Sea. The highest peak, still called Mt. Neba or Nebbeh, is thought to be the Nebo from which Moses viewed the Land of Promise.

Abascal (ā-bās-kāl'), **José Fernando**, 1743-1821; Spanish statesman; b. Oviedo; governor of Cuba in 1796; defended Havana against British; a popular viceroy of Peru, 1804-16.

Abas'ia or **Abcha'sia**. See **ABKASIA**.

Abate'ment, a legal term of various application: (1) *Title to Real Estate*.—The intrusion or wrongful entry of a stranger upon land after its owner's death, and before the entry of an heir, and thus keeping him out of possession. The wrongdoer is termed an abator. (2) *Nuisances*.—The act of destroying or removing a nuisance, which may take place without legal process. No unnecessary damage must occur, and the act must be done without a breach of the peace. (3) *Legacies and Debts*.—In respect to legacies and creditors' claims, the word means a proportionate reduction of them where there are not sufficient assets to make full payment. (4) *Pleadings*.

—The effect on an action at law of a plea showing that the writ or declaration is defective and incorrect. (5) *Practice*.—The determination of a litigation by the occurrence of some event during its progress, such as the death or disability of a party. (6) *Abatement*.—In heraldry, anything added to a coat of arms to denote inferiority or disgrace. The only abatement in use is the bar sinister.

Abatos (äb'ät-ös), small rocky island in the Egyptian Lake Moeris, where Isis entombed the remains of Osiris.

Ab'attis, or **Ab'atis**, in fortification an obstruction formed by trees felled and ranged with their tops toward the enemy. Sometimes the larger branches are sharpened.

Abbaddie (äb-ä-dé'), Antoine Thompson ä', 1810-97, and Arnaud Michel ä', 1815-93; brothers and French explorers; b. Dublin, Ireland; explored Abyssinia and Upper Egypt between 1838 and 1848; traveled up the White Nile, and visited Darfur. Their collection of Ethiopic and Amnaric (Abyssinian) MSS. was until recently the largest in Europe.

Abbadie, Jacques, 1657-1727; French Protestant divine; b. Nay; preached in Berlin and London; became dean of Killaloe, Ireland; published a defense of the revolution of 1688 and several religious treatises.

Abbas', or, more fully, **Abbas-Ibn-Abd-Il-Moottalib** (äb-bäs'-Ibn-äbd'el-mö-tä'lib), paternal uncle of Mohammed; ancestor of the dynasty of Abbassides; b. Mecca abt. 566 A.D.; fought against Mohammed at battle of Bedr, but was afterwards converted, and assisted the Prophet.

Abbas I, surnamed **THE GREAT**, 1557-1628; fifth shah of Persia; son of Mohammed Mirza; began to reign abt. 1584; distinguished for ability and energy; defeated the Turks 1605, and recovered Persian provinces they had occupied.

Abbas Hilmi (-hí'ímí), 1874- ; seventh khedive of Egypt in the dynasty of Mohammed Ali; son of Mohammed Tewfik; succeeded to throne, 1892; won popularity by reducing taxes and opposing British influence, later yielded to latter, with beneficial results to Egypt.

Abbas-Mirza (-mër'zä), 1783-1833; shah of Persia, son of Shah Fatah Ali; commanded the Persian army which was defeated by the Russians, 1811. Showed superior talents, and promoted European culture and military tactics in Persia.

Abbasides (äb-bäs'idz), celebrated dynasty of caliphs who reigned at Damascus, and afterwards at Bagdad, from 762 to 1258 A.D. Descendants of Abbas, uncle of Mohammed. To this dynasty belonged caliphs Harun-al-Rashid and Al-Mamun.

Abbe (äb'bë), Cleveland, 1838- ; American meteorologist; b. New York; founder of daily weather reports and predictions and of system of standard time; studied engineering and astronomy; served in the Pulkowa (Russia),

U. S. Naval, and Cincinnati observatories; meteorologist, U. S. Weather Bureau, 1891; author of many technical publications.

Abbé (äb'bä), ecclesiastic, or student of theology, supported by the revenue of a monastery, though he did not always become a priest. Before the French Revolution the king could nominate 225 *abbés commendataires*, whose offices were sinecures. Term still applied in France to all who dress as ecclesiastics.

Ab'beas, superior of a convent of women, elected for life, and solemnly admitted to office by a bishop, corresponding in rank and authority to an abbot, except that, not being capable of receiving holy orders, she cannot execute the functions of the priesthood nor perform any act implying real spiritual jurisdiction.

Abbeville (äb-vël'), fortified city of France, department of Somme, on the Somme River, 25 m. NW. of Amiens; contains the magnificent church of St. Wolfram, begun 1488, and a cloth factory, founded 1669. Relics of prehistoric man have been found here. Pop. (1901) 18,598.

Abbeville Trea'ties, one between Henry III of England and Louis IX of France, May 20, 1259; the other between Henry VIII of England and Francis I of France, August 18, 1527. By the former, and more important, Henry III gave up all claim to Normandy, Anjou, Touraine, Maine, and Poitou.

Abbey (äb'bë), Edwin Austin, 1852- ; American *genre* painter and illustrator; b. Philadelphia; has resided in London since 1883; designed a series of paintings on the "Quest of the Holy Grail" for Boston Public Library; member R.A.; chosen by King Edward VII (1901) to paint the scene of his coronation.

Abbo Cernuus (äb'ö cër'nü-üs), or **Abbon the Crooked**, French monk of St. Germain-des-Pres; d. abt. 923; author of a Latin poem on the siege of Paris by the Northmen, 885-7, which Guizot translated.

Abbon (ä-bö'n') of **Fleury** (flë-rë), 945-1004; French monk; b. near Orleans; was one of the most learned men of his age; wrote an "Epitome of the Lives of Ninety-one Popes."

Ab'bot, Joseph Hale, 1802-73; American educator; b. Wilton, N. H.; became Prof. of Mathematics and Modern Languages at Phillips Academy, Exeter, N. H.; recording secretary of the American Academy of Arts and Sciences, to whose "Transactions" he contributed papers on pneumatics and hydraulics; wrote in favor of Dr. Charles T. Jackson in the "ether controversy"; and was an assistant of Dr. J. E. Worcester in the preparation of his "Dictionary."

Abbot, the superior of a convent or monastery, and an ecclesiastic of high rank in the Roman Catholic Church. Abbots are ranked, as prelates of the church, next to bishops; and have the right to vote or speak in the general councils, if the territory to which their jurisdiction extends be not included in a diocese,

or if they be heads of several associated monasteries. In England there were formerly a number of mitred abbots, who sat and voted in the House of Lords.

Abbot of Misrule, or **Abbot of Fools**, called in Scotland the "Abbot of Unreason"; title given in the Middle Ages to the master of revels, and especially to the person appointed to preside over Christmas festivities.

Abbotsford, estate on the Tweed, 3 m. from Melrose Abbey, purchased, 1811, by Sir Walter Scott, who lived here 1812-32.

Ab'ott, Edwin Abbott, 1838-; British Shakespearian scholar, author, and clergyman; b. London; headmaster city of London school, 1865-89; Hulsean lecturer, Cambridge, 1876; select preacher, Oxford, 1877; author of "Shakespearean Grammar," "Francis Bacon," "Anglican Career of Cardinal Newman," "Clue," "Paradosis," etc.

Abbott, Jacob, 1803-79; American educator and author; b. Hallowell, Me.; studied theology at Andover; Prof. of Mathematics, Amherst College, 1825-29; principal Mt. Vernon school, Boston, 1829-34, when he was ordained and took charge of the Eliot Church in Roxbury. His reputation as an author established by the "Young Christian Series"; best known as author of "The Rollo Books"; "The Franconia Stories"; "Harper's Story Books"; and other juvenile works.

Abbott, John Stevens Cabot, 1805-77; American clergyman and author; b. Brunswick, Me.; was pastor in Worcester, Roxbury, Nantucket, and New Haven. Among his works are: "The Mother at Home"; "History of Napoleon Bonaparte"; "History of the Civil War"; his American histories, and his "History of Napoleon III."

Abbott, Lyman, 1835-; American clergyman, editor, and author; b. Roxbury, Mass.; studied law and theology; was pastor in Terre Haute, Ind., 1860-65; in New York, 1866-69; editor of *The Illustrated Christian Weekly*, 1871-76; and from 1876 of *The Christian Union*, now *The Outlook*. He succeeded Henry Ward Beecher as pastor of Plymouth Church, Brooklyn, 1888. His publications include numerous commentaries, "Problems," "Studies," and "A Dictionary of Religious Knowledge."

Abbreviations, customary shortenings of words and phrases used in writing, to save time and space. In mediæval manuscripts abbreviations are so numerous that special study is required to decipher them. For denoting moneys, weights, and measures, characters which are not properly abbreviations are used as such: for instance, ° for degrees, minutes, and seconds; \$ for dollar; £, pound (money), etc.

In law, references to the printed reports of cases are usually abbreviated, thus "97 U. S. 23" signifies that the case referred to will be found in volume 97 at page 23 of the reports of cases decided by the U. S. Supreme Court; "19 Mich. 79" means volume 19 page 79 of the reports of the state court of Michigan.

Sometimes the reporter's name indicates the report as "4 Wheaton, 2 Paige, Abbott's N. C.," etc.

The following are the more important abbreviations in common use:

ABBREVIATIONS

- 4s. ana. Of each.
- ©, ad. At.
- A. Accepted.
- A. A. Associate of Arts.
- A. A. G. Acting Assistant Adjutant-General.
- A. A. G. Assistant Adjutant-General.
- A. B. *Artium Baccalaureus*, Bachelor of Arts; also Able-bodied Seaman.
- A. B. C. F. M. American Board of Commissioners for Foreign Missions.
- Abp. Archbishop.
- A. C. *Ante Christum*, before Christ.
- Ac. Acre.
- Acct. Account.
- A. D. *Anno Domini*, in the year of our Lord.
- Adv., Adv. or adv. Adverb.
- A/d. After date.
- Adj. or adj. Adjective.
- Adj't. Adjutant.
- Ad lib. *Ad libitum*, at pleasure.
- Admr. Administrator.
- Adm'r. Administratrix.
- A. E. I. O. U. *Austria est imperare orbi universo*. (It is given to Austria to rule the whole earth.)
- Æt. or etat. = *etatis* (anno) t. e. in the year of his (or her) age.
- A. G. Adjutant-General.
- A. H. *Anno Hegra*, in the year of the Hegira (flight of Mohammed).
- A. I. A. American Institute of Architects.
- Ala. Alabama.
- A. M. *Anno Mundi*, in the year of the world.
- A. M. *Ante Meridiem*, before noon.
- A. M. *Artium Magister*, Master of Arts.
- A. M. D. G. *Ad majorem Dei gloriam*. To the greater glory of God. (Motto of the Jesuits.)
- An. *Annis*, year.
- Anon. Anonymous.
- Ans. Answer.
- Ant. *Ante*, before.
- A/o, Account of.
- Apr. April.
- A. Q. M. Assistant Quartermaster.
- A. R. A. Associate of the Royal Academy (London).
- Ariz. Arizona.
- Ark. Arkansas.
- A. R. S. A. Associate of the Royal Scottish Academy.
- A/s. Account sales.
- Atty. Attorney.
- A. U. C. *Ab Urbe Condita*, from the Founding of the City (i. e., Rome).
- Aug. August.
- A. V. Authorized Version.
- A. Y. M. Ancient York Masonry.
- b. Born.
- B. A. or A. B. Bachelor of Arts.
- Batt. or Bt. Baronet.
- Bbl. Barrel.
- B. C. Before Christ; British Columbia.
- B. C. L. Bachelor of Civil Law.
- B. D. Bachelor of Divinity.
- B/E. Bill of Exchange.
- B. I. British India.
- B. L. *Legum Baccalaureus*, Bachelor of Laws.
- B/L. Bill of Lading.
- Bor. Borough.
- Bp. Bishop.
- B. P. O. E. Benevolent and Protective Order of Elks.
- Brig.-Gen. Brigadier-General.
- Brit. Britain or British.
- Bro. Brother.
- B. S. or B. Sc. Bachelor of Science.
- B/S. Bill of Sale.
- Bush. Bushel.
- B. V. *Beata Virgo*, Blessed Virgin.
- C. *Centum*, a hundred; also centigrade, central, cent., and cubic; also chapter.
- Ca. *Circa*, about.
- C. A. Chartered Accountant.
- Cal. California.
- Cal. or Kal. Calends or Kalends.
- Cantab. *Cantabrigiensis*, of Cambridge.
- Cap. *Capitulum*, chapter.
- Capt. Captain.
- C. B. Companion of the Bath; also Cape Breton.
- C. C. Calus College.
- c. c. Cubic centimeter.
- C. C. P. Court of Common Pleas.
- C. E. Civil Engineer.
- c. ft. Cubic foot.
- Cent. or c. *Centum*, hundred.
- Cf. *Confer*, compare.
- C. G. H. Cape of Good Hope.
- C. G. S. Centimeter-Gram-Second.
- C.-H. Court-house.
- Chap. or ch. Chapter.
- Chron. Chronicles.
- C. J. Chief Justice.
- C. M. Common Meter.
- Master in Surgery.
- cm. Centimeter.
- C. M. G. Companion of St. Michael and St. George.
- Co. Company; also County.
- C. O. D. Cash on Delivery.
- Col. Colonel; also Colorado Coll. College.
- Colo. Colorado.
- Com. Commodore, Commissioner.
- Con. *Contra*, against.
- Conn. or Ct. Connecticut.
- Cor. Corinthians.
- Cor. Sec. Corresponding Secretary.
- Cos. Cosine.
- Cos. *Consules* or *Consultus*, consuls (of Rome).
- Cr. Creditor.
- Crim. Con. Criminal connection or conversations.
- C. S. A. Confederate States of America.
- C. S. I. Companion of the Star of India.
- Ct. Connecticut.
- Cum. Div. With dividend.
- Cwt. or cwt. Hundred-weight.
- curi. Current, the present month.
- Cyc. Cyclopædia.
- d. *Denarius*, penny, pence; also died.
- D. Five hundred; also Denarius, Dutch.
- D. A. G. Deputy Adjutant-General.
- Dak. Dakota.
- Dan. Danish.
- D. A. R. Daughters of the American Revolution.

ABBREVIATIONS

D. C. District of Columbia; also *da capo*, from the beginning.
 D. C. L. Doctor of Civil Law.
 D. D. Doctor of Divinity.
 D. D. S. Doctor of Dental Surgery.
 D. Lit. Doctor of Literature.
 Dea. Deacon.
 Dec. December.
 Deg. Degree.
 Del. Delaware; also *delinens*, he designed (on engravings).
 Dept. Department.
 Deut. Deteronomy.
 D. F. *Fideli defensor*, Defender of the faith.
 Dft. Defendant; draft.
 D. G. *Dei gratia*, by the grace (or favor) of God.
 D. M. Doctor of Medicine.
 Dia. Diacon.
 Dist. District.
 Div. Dividend.
 Do. Ditto, the same.
 D. O. M. (*Deo Optimo Maximo*). To God the Best and Greatest.
 Doz. Dozen.
 Dr. Doctor; also debtor, drachm, dram.
 D/s. Days' sight.
 D. Sc. Doctor of Science.
 D. S. O. Distinguished Service Order.
 Dub. Dublin.
 D. V. *Deo volente*, God willing.
 Dwt. or dwt. Pennyweight.
 E. East.
 E. & O. E. Errors and omissions excepted.
 Ebor. *Eboracum*, York.
 Eccl. Ecclesiastes.
 Ecclies. Ecclesiastical.
 Ecclus. Ecclesiasticus.
 E. C. East Central (postal district of London).
 Ed. Editor, edition.
 Edin. Edinburgh.
 E. E. Errors excepted; Electrical Engineer.
 e. g. *Exempli gratia*, for example.
 E. I. East Indies.
 E. I. C. East India Company.
 E. M. F. Electro-motive Force.
 Encyc. Encyclopaedia.
 E. N. E. East-northeast.
 Eng. English; Engineer.
 Eph., Ephes. Ephesians.
 E. R. Edward Rex, King Edward.
 E. S. E. East-southeast.
 Beth. Bether.
 Esq. Esquire.
 et al. *Et alii*, and others.
 etc. *Et cetera*, and the rest; i. e., other such things; and so forth.
 Et seq. *Et sequens*, and the following.
 Ex. Example.
 Ex d. or ex div. *Ex distindendo*, without the dividend.
 Exr. Executor.
 Exod. or Ex. Exodus.
 Exon. Exonia, Exeter.
 Exx. Executrix.
 Ex. Era.
 Esck. Ezekiel.
 F. or /f. Franco, Florin.
 F. and A. M. Free and Accepted Masons.
 F. of Fabr., Fahrenheit.
 F. A. A. Free of all Averages.
 F. A. I. A. Fellow of the American Institute of Architects.
 F. A. S. Fellow of the Antiquarian Society; Fellow of the Society of Arts.
 F. B. S. Fellow of the Botanical Society.
 F. C. S. Fellow of the Chemical Society.

F. D. *Fideli defensor*, Defender of the faith.
 Fec. (*Fecit*) He made (or did) it.
 Feb. February.
 F. F. P. S. Fellow of the Faculty of Physicians and Surgeons.
 F. V. First families of Virginia.
 F. G. S. Fellow of the Geological Society.
 fl. Florida, Flourished.
 Fla. Florida.
 F. K. Q. C. P. I. Fellow of King and Queen's College of Physicians in Ireland.
 F. L. S. Fellow of the Linnean Society.
 F. M. Field Marshal.
 Fo. or Fol. Folio.
 F. O. B. Free on Board.
 F. P. A. Free of Particular Averag.
 F. P. S. Fellow of the Philological Society.
 F. R. A. S. Fellow of the Royal Astronomical Society.
 F. R. C. P. Fellow of the Royal College of Physicians.
 F. R. O. P. E. Fellow of the Royal College of Physicians of Edinburgh.
 F. R. S. Fellow of the Royal College of Surgeons.
 Fri. Friday.
 F. R. G. S. Fellow of the Royal Geographical Society.
 F. R. S. Fellow of the Royal Society.
 F. R. S. E. Fellow of the Royal Society of Edinburgh.
 F. R. S. L. Fellow of the Royal Society, London; also Fellow of the Royal Society of Literature.
 F. S. A. Fellow of the Society of Antiquaries.
 F. S. S. Fellow of the Statistical Society.
 Ft. or ft. Foot.
 Fur. or fur. Furlong.
 F. Z. S. Fellow of the Zoological Society.
 g. Gram.
 Ga. Georgia.
 Gal. Galatians.
 Gal. or gal. Gallon.
 G. A. R. Grand Army of the Republic.
 G. B. Great Britain.
 G. C. B. Grand Cross of the Bath.
 G. C. H. Knight Grand Cross of Hanover.
 G. C. M. G. Knight Grand Cross of St. Michael and St. George.
 G. C. S. I. Knight Grand Commander of the Star of India.
 G. M. Grand Master.
 Gen. General; Genesis.
 Ger. German.
 G. O. P. Grand Old Party. (In Am. politics the Republican Party.)
 Gov. Governor.
 G. P. O. General Post Office.
 Gr. Greek.
 Gr. or gr., Grain.
 G. T. Good Templars; Grand Tiler.
 Gtt. Guttæ, drops.
 H., h., hr. Hour.
 Hab. Habakkuk.
 Hag. Hagral.
 H. B. C. Hudson's Bay Company.
 H. B. M. His (or Her) Britannic Majesty.
 Hdk. Handkerchief.
 h. e. *Hoc est*, this is.
 H. E. S. His Eminence; His Excellency.
 Heb. Hebrew.
 Hhd. or hhd. Hoghead.

Hist. History.
 H. I. H. His (or Her) Imperial Highness.
 H. M. S. His (or Her) Majesty's Ship.
 Hon. Honorable.
 Hos. Hosea.
 H. P. Horse-power.
 H. R. House of Representatives.
 H. R. H. His (or Her) Royal Highness.
 H. S. H. His (or Her) Serene Highness.
 H. S. S. *Historia Societatis Socius*, Fellow of the Historical Society.
 I., is., or Isl. Island.
 Ia. Iowa.
 Ibid. or Ib. *Ibidem*, in the same place.
 Id. *Idem*, the same.
 Id. Idaho.
 I. e. or i. e. *Id est*, that is.
 I. H. S. *Jesus Hominum Salvator*, Jesus Saviour of men.
 Ill. Illinois.
 In. or in. Inch.
 Incog. *Incognito*, unknown.
 Ind. Indiana.
 Ind. Ter. Indian Territory.
 Inf. or Inf. *Infra*, below.
 In Rim. *In Rimis*, at the outset.
 In loc. *In loco*, in the place.
 I. N. R. I. *Jesus Nazarenus Rex Judæorum*, Jesus of Nazareth, King of the Jews.
 Inst. Institute.
 Inst. *Instante* (*mensis*), in the present month.
 Int. Interest.
 Inv. Invoice.
 I. O. O. F. Independent Order of Odd Fellows.
 I. O. S. M. Independent Order of the Sons of Malta.
 I. O. U. I owe you.
 I. q. *Idem quod*, the same as.
 Ira. Ireland.
 Is. or Isa. Isaiah.
 It. Italian.
 J. Judge or Justice.
 J. A. Judge Advocate.
 Jam. Jamaica.
 Jan. January.
 Jas. James.
 J. C. Jurisconsult, Jesus Christ.
 J. C. D. *Juris Civilitis Doctor*, Doctor of Civil Law.
 J. D. *Juris Doctor*, Doctor of Law.
 Jer. Jeremiah.
 Jno. John.
 Jona. Jonathan.
 J. P. Justice of the Peace.
 Jr. or Jun. Junior.
 Jud. Judith.
 J. U. D. or J. V. D. *Juris utriusque Doctor*, Doctor of both Canon and Civil Law.
 Judg. Judges.
 K. King.
 Kal. or Cal. Calends.
 Kan. Kansas.
 K. B. Knight of the Bath.
 K. C. King's Counsel.
 K. C. B. Knight Commander of the Bath.
 K. C. S. I. Knight Commander of the Star of India.
 K. G. C. B. Knight Grand Cross of the Bath.
 K. G. Knight of the Garter.
 Kilo. km. Kilometer.
 Kilog. Kilogram.
 K. P. Knight of St. Patrick.
 K. T. Knight of the Thistle.
 Kt. Knight.
 Ky. Kentucky.
 L., £, or l. *Libra*, pound (money).
 L. A. H. Licentiate of the Apothecaries' Hall.
 La. Louisiana.
 Lam. Lamentations.
 Lat. Latitude.

Lat. or L. Latin.
 lb. *Libra*, pound.
 l. c. *Loco citato*, in the place cited; also (in printing) lower case, that is, small letters.
 L. C. J. Lord Chief Justice.
 Lev. Leviticus.
 L. H. D. *Litterarum Humantorum Doctor*, Doctor of Literature.
 L. I. Long Island.
 Lib. *Libri*, book.
 Lib., lb., l. *Libra*, a pound.
 Lieut. Lieutenant.
 Lit. or lit. Literary.
 Lit. D. Doctor of Literature.
 LL. B. Bachelor of Laws.
 LL. D. *Legum Doctor*, Doctor of Laws.
 LL. M. Master of Laws.
 Lon. Longitude.
 L. R. C. P. Licentiate of the Royal College of Physicians.
 L. R. C. S. Licentiate of the Royal College of Surgeons.
 L. S. *Locus stigitis*, the place of the seal.
 L. S. A. Licentiate of the Apothecaries' Society.
 L. S. D. *Libri, Soldati, Denarii*, pounds, shillings [and] pence.
 LXX. The Septuagint (version of the Old Testament).
 M., Monsieur, mille (a thousand) a mile; noon.
 m. Meter; mile.
 M. A. Master of Arts.
 Macc. Maccabees.
 Mad. or Mme. Madame.
 Mag. Magazine.
 Maj.-Gen. Major-General.
 Mal. Malachi.
 Mar. March.
 Masc. Masculine.
 Mass. Massachusetts.
 Mat. Matthew.
 M. B. Bachelor of Medicine.
 M. C. Member of Congress.
 Md. Maryland.
 M. D. *Medicinis Doctor*, Doctor of Medicine.
 M. Dip. Master of Diplomacy.
 Me. Maine.
 M. E. Methodist Episcopal or Mechanical Engineer.
 Mem. *Memento*, Remember.
 Mem. Memorandum.
 Mex. Mexico or Mexican.
 M. H. S. Massachusetts Historical Society.
 Messrs. or MM. *Messieurs*, gentlemen.
 min. Minute.
 Mic. Micah.
 Mich. Michigan.
 Minn. Minnesota.
 Miss. Mississippi.
 Mlle. *Mademoiselle*.
 mm. Millimeter.
 Mme. Madame.
 M. N. A. S. Member of the National Academy of Sciences.
 Mo. Missouri.
 mo. Month.
 Mons. *Monseigneur*, Mr.
 Mont. Montana.
 M. P. Member of Parliament.
 M. P. P. Member of Provincial Parliament.
 Mr., Master or Mister.
 Mrs., Mistress or Missis.
 M. R. A. S. Member Royal Academy of Sciences; Member of the Royal Asiatic Society.
 M. R. C. P. Member of the Royal College of Physicians.
 M. R. C. S. Member of the Royal College of Surgeons.
 M. R. I. A. Member of the Royal Irish Academy.
 MS. Manuscript; pl. MSS.

M. S. Master of Science.
 Mt. Mount or Mountains.
 Mus. B. Bachelor of Music.
 Mus. D. Doctor of Music.
 N., North, or noon; also, now.
 N. A. North America.
 N. A. S. National Academy of Science.
 N. B. *Nota Bene*, mark well; also New Brunswick.
 N. C. North Carolina.
 N. D. No date.
 N. Dak. or N. D. North Dakota.
 N. E. Northeast; New England.
 Neb. Nebraska.
 Neh. Nehemiah.
 Nem. Con. *Nemine contradicente*, or Nem. Disa. *Nemine disidente*, no one contradicting or opposing.
 Nev. Nevada.
 N. F. Newfoundland.
 N. G. New Granada; North German.
 N. H. New Hampshire.
 N. J. New Jersey.
 N. M. New Mexico.
 N. N. E. North-northeast.
 N. N. W. North-northwest.
 No. Numero, Number.
 N. O. New Orleans.
 North Britain (i.e., Scotland).
 Nov. November.
 N. P. Notary Public; also New Providence Island.
 N. S. Nova Scotia, New Style.
 N. T. New Testament.
 Num. Numbers.
 N. W. Northwest.
 N. W. P. Northwest Province.
 N. W. T. Northwest Terr.
 N. Y. New York.
 N. Z. New Zealand.
 O. Ohio.
 Ob. *Obit*, died.
 Obad. Obadiah.
 Obad. Obident.
 Obs. Obsolete.
 Oct. October.
 O. H. M. S. On His (Her) Majesty's Service.
 Okla. Oklahoma.
 Ol. Oleum, oil.
 Ol. or Olym. Olympiad.
 % Per cent.
 6/00 Per thousand.
 Or. Oregon.
 O. S. Old Style; also Ordinary Seaman.
 O. T. Old Testament.
 Oxon. *Oxonienis*, Oxonian or of Oxford.
 Oz. or oz. ounce.
 P. Page.
 P. Père, Father.
 Pa. or Penn. Pennsylvania.
 p. a. Participial adjective.
 Parl. Parliament.
 P. C. Privy Councillor.
 P. E. I. Prince Edward Island.
 P. E. Protestant Episcopal.
 Per ann. Fr. an., *Per Annum*, by the year.
 Per Cent. *Per centum*, by the hundred.
 Per pro. *Per procuratorem*, by procurator; on behalf of.
 Pet. Peter.
 Ph. D. *Philosophia Doctor*, Doctor of Philosophy.
 Phil. Philippians, Philip.
 Phila. Philadelphia.
 Philom. Philemon.
 Philom. *Philomathes*, a lover of learning.
 Pint. or pnt. *Pintil*, he painted.
 Pk. Peck.
 pl. plu. or plur., Plural.
 plff. Plaintiff.
 plupf. Pluperfect.
 P. M. *Post Meridiem*, after noon.

P. M. Postmaster.
 P. O. Post-office.
 P. O. O. Post-office order.
 Pop. Population.
 Port. Portuguese.
 P. P. *Patres*, Iathers.
 P. P., Parish Priest.
 pp. Pages.
 P. P. O. *pour prendre congé*, to take leave.
 p. p. *Per pro*, on behalf of.
 P. Q. Province of Quebec.
 P. R. A. President of the Royal Academy.
 P. R. Porto Rico.
 Pres. President.
 Priv. or priv. Private.
 Prof. Problem.
 Prof. Professor.
 Pro tem. *Pro tempore*, for the time, temporary.
 Prox. Proverbs.
 Prox. *Proximo* or *Proximo mense*, in the next month.
 Ps. Psalm.
 P. S. Postscript; privy seal.
 Pt. or pt. Part; pint.
 P. T. O. Please turn over.
 Pub. Doc. public document.
 q. quadrans, farthing.
 Q. Queen; question; Quintus.
 Q. C. Queen's Counsel.
 Q. C. or q. d. *Quasi dicit*, As if he should say.
 Q. E. D. *Quod Erat Demonstrandum*, which was to be demonstrated.
 Q. E. F. *Quod Erat Faciendum*, which was to be done.
 Q. M. Quartermaster.
 Qr. Quarter; farthing.
 Q. S. *Quantum Sufficit*, a sufficient quantity.
 Qt. or qt. Quart.
 Qu. or qu. query; question.
 Q. V. or q. v., *Quod vide*, which see (in the plural q. v.), or *quantum vis*, as much as you please.
 R. Rex, King, or Regina, Queen.
 R. *Récepté*, take.
 R. A. Royal Academician, or Royal Artillery.
 R. A. M. Royal Academy of Music.
 R. C. Roman Catholic.
 R. E. Royal Engineers.
 Rec. Sec. Recording Secretary.
 Ref. Ch. Reformed Church.
 Reg. Prof. Regius Professor.
 Rev. Reverend, Revelation.
 R. I. Rhode Island.
 R. I. P. (*Requiescat in pace*) May he rest in peace.
 R. M. Royal Marines.
 R. M. S. Royal Mail Steamer.
 R. N. Royal Navy.
 R. N. R. Royal Naval Reserve.
 Ro. or Robt. Robert.
 Ro. or ro. Rood.
 Rom. Romans.
 R. R. Railroad.
 Rs. Rupees.
 R. S. D. Royal Society of Dublin.
 R. S. E. Royal Society of Edinburgh.
 R. S. V. P. *répondez, s'il vous plait*, Reply, if you please.
 Rt. Hon. Right Honorable.
 Rt. Rev., Right Reverend.
 Ry. Railway.
 s. or sec. second.
 S. south; saint; shilling.
 S. A. South America;
 South Africa.
 Sam Samuel.
 Sans. Sanskrit.
 Sask. Saskatchewan.
 Sc. scr. or s. scruple.
 S. C. South Carolina.
 Sc. or Sa. *scilicet*, to wit; also *sculpit*, he engraved it (on engravings).

S. Dak. or S. D., South Dakota.
 S. D. U. K. Society for the Diffusion of Useful Knowledge.
 S. E. Southeast.
 Sec. Secretary; also second. Sept. September.
 S. G. D. G. (*Sans garant du gouvernement*), Not guaranteed by the government. Phrase placed upon articles in accordance with French patent law.
 sin. Sine.
 S. J. Society of Jesus.
 S. J. C. Supreme Judicial Court.
 Skr. Sanskrit.
 S. M. *Sa Majesté*, His (or Her) Majesty.
 Sp. or Span. Spanish.
 S. P. (*sine prole*), Without offspring.
 S. P. G. F. P. Society for the Propagation of the Gospel in Foreign Parts.
 S. P. Q. R. *Senatus Populusque Romanus*, the Roman senate and people.
 Seq. or seq. *Sequens*, the following; pl., *Sqq.*, *sequentes*.
 Sq. or sq. Square.
 SS. Saluts; also *esses*, a collar worn by knights and others in heraldry.
 Ss. or ss., *scilicet*, to wit; namely; *semis*, half.
 S. S. C. Solicitor before the Supreme Courts (of Scotland).
 S. S. Sunday-school.
 S. S. E. South-southeast.
 S. S. W. South-southwest.
 St. saint; street; stone.
 S. T. D. *Sacrosanctas Theologiae Doctor*, Doctor of Theology.
 S. of T. Sons of Temperance.
 S. T. P. *Sacrosanctas Theologiae Professor*, Professor of Theology.
 Sup. (*Supra*), Above.
 s. v. *Sub voce*, under the word (or heading).
 S. W. Southwest.
 Syr. Syriac.
 T. C. D. Trinity College Dublin.
 T. E. Topographical Engineer.
 Tenn. Tennessee.
 Tex. Texas.
 Text. Rec. *Textus Receptus*.
 Thess. Thessalonians.
 Tk. Titus.
 Trans. Translated, translation.

Trib. Tributary.
 u. c. Upper case, that is, capital letters.
 U. K. United Kingdom.
 Ut. *Ultimo*, *ultimo mense*, in the last month.
 U. P. United Presbyterian.
 U. S. United States.
 U. S. A. United States of America; United States Army.
 U. S. M. C. United States Marine Corps.
 U. S. N. United States Navy.
 U. S. P. United States Pharmacopoeia.
 U. S. S. United States Ship or Steamer.
 U. T. Utah Territory.
 Vid. vid. or *Vide*, See.
 V. or vs. *Versus*, against.
 V. Volt or volts.
 Va. Virginia.
 V. C. Vice-Chancellor; Victoria Cross.
 V. D. M. *Verbi Dei Minister*, minister of the word of God.
 Ven. Venerable.
 V.-G. Vicar-General.
 Viz. or viz. *Videlicet*, namely.
 V. P. Vice-President.
 V. R. *Victoria Regina*, Victoria the Queen.
 V. S. Veterinary Surgeon.
 vs. *versus*, against.
 Vt. Vermont.
 W. West.
 W. Watt or Watts (in electricity).
 Wash. Washington.
 W. I. West Indies.
 Wis. Wisconsin.
 W. N. W. West-northwest.
 W. S. Writer to the Signet (Scotland).
 W. S. W. West-southwest.
 W. Va. West Virginia.
 Wyo. or Wyo. Wyoming.
 X. Gr. *Xpōstos*, Christ.
 Xmas. Christmas.
 Xtan. Christian, etc.
 Yd. or yd. Yard.
 Yr. Year, your.
 Ys. Yr. The. That. (This use of Y originated in the Anglo-Saxon character *ƿ*, which was equivalent to the modern *th*. In manuscripts this character degenerates into a form like a black-letter *y* which was retained after its origin and real sound had been lost sight of.)
 Zech. Zechariah.
 Zep. Zephaniah.
 Z. And.
 &c. *Et cetera*, and so forth.

Abbre'viator, notary of the papal court and of the church councils, prepares briefs and performs secretarial service.

Abcheron'. See APSHERON.

Abd, Arabic, signifies servant or slave, prefix of many oriental names, as Abd-Allah, "servant of Allah," Abd-er-Rahman, "servant of the Merciful" (i.e., of God).

Abdallah ben Abd-el-Mottalib (Abd-ā'l'ā b'n Abd-el-mōt'ā-llib), 545-70; Arab merchant; father of Mohammed.

Abdallah ben-Yassin (b'n-yā-sēn'), founder of the tribe of Almoravides in Barbary, A.D. 1050, conspicuous in subjugating part of Spain and in founding a Moorish dynasty.

Abdallah ben Zobair (b'n zō-bār'), A.D. 622-92; Mohammed's nephew by marriage; sultan of Mecca, A.D. 685; conquered by Abd-el-Malek,

caliph of Damascus; killed in the Kaaba, where he had sought refuge.

Abdal-Malek (äbd'al-mä-läk'), son of Mirvan; fifth caliph of the Ommiades; reigned A.D. 684-709; conquered the Indies; penetrated Spain; made himself master of Medina and Mecca.

Abd-el-Kader (äbd-äl-kä'dir), 1807-83; Arab chieftain; b. near Mascara, Algeria. Algeria having been invaded by the French, 1830, he was chosen emir by the Arabs of that country. Defeated the French at Macta, 1835. A treaty of peace was concluded, 1837. In 1839 hostilities were renewed, and in the war which followed Abd-el-Kader displayed extraordinary energy, but was obliged to yield 1847. In violation of the terms of capitulation, was taken to France and detained till 1852. In 1860, when the Christians of Syria were threatened with massacre by the Mohammedans, Abd-el-Kader, at the risk of his life, protected them.

Abd-el-Wahab (wä'häb), 1691-1787; founder of the sect of Wahabites or Wahäbees; b. Nejed, Arabia; recognized the Koran; endeavored to reform Mohammedan religion.

Abdera (äb-dä'rä), ancient city of Thrace, noted as the birthplace of Democritus. The stupidity and ignorance of its people was proverbial.

Abd-er-Rahman (äbd-är-räh'män) I, 731-87; caliph of Cordova; b. Damascus; founded Moorish dynasty in Spain; became independent sovereign; maintained himself against rebellions and an expedition sent by Charlemagne; built the grand mosque, now cathedral, at Cordova.

Abd-er-Rahman III, 888-961; caliph of Cordova; began to reign 912; was distinguished as a patron of learning and the arts. During his long reign the Moslem empire in Spain was raised to the highest pitch of prosperity.

Abdica'tion, in political history, the resignation of a throne. The most famous of voluntary abdications were those of the emperors Diocletian and Maximian, 305; Emperor Charles V, 1556; Christina of Sweden, 1654; Louis Bonaparte of Holland, 1810; Louis of Bavaria, 1848; Ferdinand of Austria, 1848; Isabella of Spain, 1870; and Amadeus of Spain, 1873. Among involuntary abdications were those of Napoleon, 1814 and 1815; Charles X of France, 1830; Louis Philippe, 1848; Alexander of Battenberg, prince of Bulgaria, 1886; King Milan of Serbia, 1889; Yi-Heui, emperor of Korea, 1907.

Abdo'men, in human anatomy, the part of the body which lies below the diaphragm and above the pelvis. It is lined with a serous membrane, the peritoneum, which is reflected over the organs—the liver, pancreas, stomach and intestines, spleen and kidneys—which occupy the abdominal cavity. The stomach lies to the left and immediately beneath the lower ribs. The spleen is situated laterally at the left extremity of the stomach; the liver occupies a position on the right side similar to that occupied by the stomach and spleen on the

left. The kidneys lie on either side of the spinal column against the posterior wall of the abdomen and about on the level of the lowest ribs. The small intestines take up the central part of the abdominal space; the large bowel passes from the right groin upward toward the liver, then transversely across the abdomen, and finally descends along the left side into the pelvis.

Abduc'tion, in law, forcible or fraudulent carrying away of a person. Usually confined to removal of females with a view to marriage or seduction. Allied to kidnaping (*q.v.*), which would include the case of males.

Abd-ul-Aziz (äbd-öl-a-zëz'), 1830-76; sultan of Turkey; son of Mahmud II; succeeded his brother, Abd-ul-Medjid, June 25, 1861; greatly reduced imperial civil list; abolished among other barbarous practices that of assassinating the sons of the princesses; favored W. manners and customs; and did much to destroy the old traditions of the Turks; was deposed May 29, 1876, and supposed to have been assassinated.

Abd-ul-Hamid (-hä'mid) II, 1842- ; sultan of the Turkish Empire, thirty-fourth of the dynasty of Othman; b. Constantinople; son of Abd-ul-Medjid. On the deposition of Abd-ul-Aziz (May 29, 1876), Murad, eldest son of Abd-ul-Medjid, succeeded, but being insane, was deposed August 31st, and Abd-ul-Hamid was invested with the sword of Othman, September 7, 1876. Principal events of reign: defeat of Turkey by Russia, 1877-78; practical loss of Bulgaria, Bosnia, and Herzegovina in Europe, and of Ardahan, Kars, and Batum in Asia, under the treaty of Berlin; war with Greece, 1897; evacuation of Crete, forced by European powers, 1898; long controversy with the powers concerning atrocities and administrative reforms in his European provinces; raising of American legation to rank of embassy, 1906; edict prohibiting removal from Turkey of archaeological treasures and antiquities, 1907; restoration of Turkey as a constitutional monarchy, 1908. Abd-ul-Hamid was deposed on April 26, 1909, as a result of an uprising of the constitutional party called the "Young Turks."

Abd-ul-Medjid (-mä-jëd), 1823-61; sultan of Turkey; eldest son of Mahmud II; succeeded his father July 1, 1839, when his capital was menaced by the victorious army of Mehmet Ali, viceroy of Egypt. He favored religious liberty and the reforms which his father had initiated, but his good will was partially frustrated by his subjects.

Abd-ur-Rahman (äbd-är-räh'män), 1778-1859; sultan of Morocco; succeeded his uncle 1823; occupied four years in quelling insurrections. Upon the refusal of Austria to pay tribute for safety against pirates, he relinquished this blackmail, formerly levied by Morocco on European ships in the Mediterranean. The religious war, under Abd-el-Kader against the French in Algeria, involved the sultan in its movements, and the piratical habits of his subjects brought him to the brink of war with several European countries.

Abd-ur-Rahman Khan (äb-ër-räh'män kän), 1844-1901; ameer of Afghanistan; b. Kabul; son of Ufzul Khan and nephew of famous Ameer Shere Ali. In the Civil War, 1864, he sided with his father against his uncle, and gained several battles; the victories of Shaikhabad and Khelat-i-Ghilzai were mainly due to his ability. He was governor of Balkh, where his moderation made him popular. In 1868, his cousin, Yakoub Khan, son of Shere Ali, defeated him at Bajgah, near Bamain, and at Tinah Khan. Abd-ur-Rahman fled to Russia and resided at Samarkand till 1879. In July, 1880, he was chosen ameer, and so acknowledged by the British Indian Govt., from which he received a subsidy of \$800,000 a year, with large gifts of artillery, rifles, and ammunition. In March, 1900, he made an official declaration of his sympathy with England, because of annoying Russian intrigues.

Abeceda'rians, sect founded in sixteenth century by a person named Storck, who professed that learning was not necessary, not even knowledge of the alphabet (A B C, hence their name), for proper understanding of the Scriptures.

A'Beck'ett, Gilbert Abbott, 1811-56; British humorous writer and lawyer; b. London; contributed to London *Times* and *Punch*. Among his works is "The Comic Blackstone," 1844-46.

A'Becket, Thomas. See BECKET.

Abel (ä'bél), second son of Adam and Eve; killed by his brother Cain; regarded as a type of faith and as the first martyr.

Abel (ä-bél'), Carl, 1837-1906; German philologist; b. Berlin; traveled in Europe and America in interest of linguistic research; Prof. of Linguistics, Berlin, Humboldt Academy of Science; credited with mastery of fifty-two languages.

Abel (ä'bél), Sir Frederick Augustus, 1827-1902; British chemist; b. London; chemist to war office for thirty-four years; author of several works on explosives. Best known by his invention of standard gunpowder of British military service.

Abel (ä'bél), Niels Henrik, 1802-29; Norwegian mathematician; b. Findö; gained distinction by discoveries in the theory of elliptic functions; highly eulogized by Legendre.

Abelard (äb'ë-lärd), or **Ab'ailard, Pierre**, 1079-1142; French philosopher and dialectician; b. near Nantes; succeeded William de Champeaux in the school of Notre Dame abt. 1116, and there gathered pupils from all parts of Europe; became tutor of Heloise, niece of Canon Fulbert. He fell in love with her, and his affection was returned. Upon the interference of her uncle they fled together into Brittany, where Heloise bore a son. They were married, but afterwards Heloise denied the marriage and returned to her uncle's house that she might not interfere with Abelard's advancement. She was brutally treated by her uncle and fled to Abelard, who placed her at her own request in the nunnery of Argentéuil. Fulbert, for revenge, waylaid and terribly mu-

tilated Abelard. Repentant and in deep humiliation, Abelard retired to the Abbey of St. Denis. Afterwards, solicited as a teacher, he founded the monastic school at Nogent-sur-Seine, known as Paraclete, which, when he became abbot of St. Gildas-de-Rhuys, he gave to Heloise and a sisterhood under her care. He died while on the way to Rome to defend himself against a charge of heresy. The remains of Abelard and Heloise lie in a single sepulcher in *Père la Chaise*, Paris. Abelard was the most prominent of the founders of scholasticism, and exerted a powerful influence upon the intellectual activity of his time.

A'belites, or **Ab'e'lians**, sect of Christians who lived near Hippo, N. Africa, in the fourth century. They enjoined marriage without carnal intercourse in order not to propagate original sin, claiming in support of their practice the example of the patriarch Abel. They were extinct before the time of Augustine.

A'ben, Ebn, or Ibn, prefix to many Arabic proper names, denoting "son of."

Abencerrages (ä-bën'së-räg-ës), noble Moorish family in kingdom of Granada whose feud with the Zegrís in the fifteenth century contributed to the fall of that monarchy. Chateaubriand founded his "Les Aventures du dernier Abencerrage" on the Spanish chronicles of the feud and the destruction of the family in the royal palace of the Alhambra; but the historical accuracy of the chronicles is questionable.

Aben Ezra (ä'bën èz'rä), or **Abenezra, Abraham**, abt. 1088-1167; Jewish biblical commentator; b. Toledo, Spain. His commentaries on Isaiah, Canticles, and Proverbs have been translated into English, and show great progress in biblical exegesis.

Abensberg (ä'bëns-bërk), town of Bavaria, 18 m. SW. of Ratisbon. Here Napoleon defeated the Austrians, April 20, 1809; has a noted castle, and excavations near by have disclosed remains of large Roman buildings.

Abeokuta (ä-bë-ö-kö'tä), large town of W. Africa; capital of the kingdom of Egba, in Yoruba; built on granite hills around a rock, 250 ft. high; on the Ogun River 120 m. NW. of Benin. The city was founded in 1825, has rapidly increased, and has become an important missionary station. Pop. est. 150,000.

A'ber, Cymric term signifying "meeting-place of waters," occurs as a prefix to names of places in Great Britain—e.g., Aberdeen. Probably related to the Persian *ab*, water. The corresponding Gaelic term is *Inver*—e.g., Inverness.

Abercrombie (äb'ër-krüm-bi), James, 1706-81; British army officer; in 1758 took command of 50,000 men in New York, to recover fort taken by French. July 8th, attacked Ticonderoga, but was repulsed with great loss and soon removed from command.

Aberdeen (äb-ër-dën'), George Hamilton Gordon, fourth earl of, 1784-1860; British statesman; b. Edinburgh; began public life as a

tory; ambassador to Vienna, 1813; made Viscount Gordon, 1814; secretary of state for foreign affairs, 1828 and 1841; gradually abandoned high tory principles, and favored a pacific policy; 1853 prime minister in a cabinet formed by a coalition of parties. To England's war against Russia (1854) he gave a reluctant support till his resignation, 1855.

Aberdeen, John Campbell Hamilton Gordon, seventh earl of, 1847- ; British statesman; succeeded to title January 27, 1870; began political life as a conservative; but, 1880, having become a liberal, was appointed lord-lieutenant of Aberdeen; 1881-85 high commissioner to general assembly of the Church of Scotland. Appointed lord-lieutenant of Ireland, 1886, became popular by carrying out home-rule policy of that time; governor-general of Canada, 1893-98.

Aberdeen, capital of Aberdeen Co., Scotland; on North Sea, 93 m. NE. of Edinburgh; has a good harbor and extensive trade; chief exports are fine cotton and woolen fabrics, granite, grain, cattle, and fish. Here are flourishing manufactories of cotton and woolen goods, combs, machinery, etc. Free Church Divinity College was built 1850. Pop. (1901) 153,108.

Aberdeen, University of, at Aberdeen, Scotland; formed 1860 by union of King's College and Univ., founded 1494, and Marischal College and Univ., founded 1593; has upward of 850 matriculants; represented together with Glasgow Univ. in Parliament.

Abernethy (äb'er-nëth-i), **James**, 1815-96; Scottish civil engineer; b. Aberdeen; in youth assisted his father in extending London docks; designed and built docks at Aberdeen, Swansea, Newport, Cardiff, and Hull; Cavour canal in Italy; designed improvement of the Danube at Vienna; reclaimed Lake Aboukir, Egypt; proposed Manchester ship canal; first to apply hydraulic power for working lock gates. President Institute of Civil Engineers, 1881.

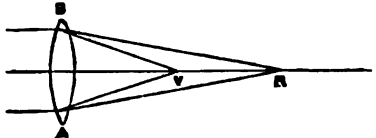
Abernethy, John, 1764-1831; British surgeon; b. London; chief surgeon of St. Bartholomew's Hospital, London, 1815. As a lecturer on anatomy and surgery gained immense popularity; wrote "On the Constitutional Origin and Treatment of Local Diseases," a valuable contribution to surgery. Many anecdotes are related of his eccentric manners and witty or petulant speeches to his patients.

Abernethy, town in Perthshire, Scotland, near junction of Earn and Tay. Here first Culdee monastery was built, and the Pictish kings had their capital. A curious round tower, 73 ft. high, still exists, resembling round towers of Ireland.

Aberra'tion, a term variously employed in optics and in astronomy.

1. **Chromatic Aberration**.—A convex lens brings rays of light which fall upon it to a focus by virtue of its refracting power. But since the variously colored rays which form white light are differently refracted, it follows that when light is converged by a convex lens it is refracted to different foci. The violet rays,

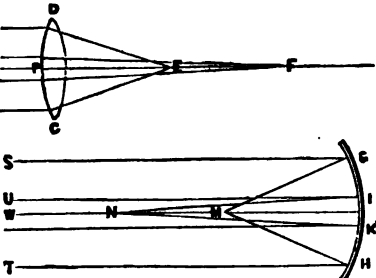
being the most refrangible, form a focus nearest to the lens; while the red rays, being the least refrangible, form a focus farthest from the lens. There are an almost infinite number of foci, in order of violet, indigo, blue, green, yellow, orange, red. Hence the rays do



CHROMATIC ABERRATION.

not meet at the same focus of the lens; and this deviation of the foci is called the chromatic aberration of a lens.

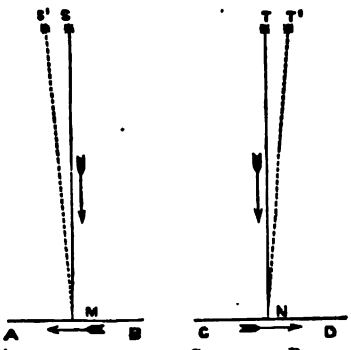
2. **Spherical Aberration**.—The rays of light reflected from the edges of a concave mirror cross each other at a point nearer to the mirror than those which are reflected from portions of the mirror near its center. The rays which pass through a spherical lens near its



SPHERICAL ABERRATION.

circumference are refracted to a point nearer to the lens than those which pass through its central portion. This aberration is called spherical aberration and is remedied in the construction of specula for astronomical purposes by giving lenses and mirrors parabolic surfaces.

3. **Aberration of the Celestial Bodies**.—This is an apparent displacement of a celestial ob-



ABERRATION OF THE CELESTIAL BODIES.

ject, due to the progressive motion of light. This aberration is caused—1, by the motion of the earth in its orbit; and—2, by the motion

of the observed celestial objects. It was discovered by Bradley in 1727.

If the direction in which the earth is moving in its orbit at any instant be regarded as the forward direction, every star constantly appears on the forward side of its true place, so that, as the earth moves once round its orbit in a year, each star describes in this time a small apparent orbit about its true place. The phenomenon is explained in the same way as the familiar fact that a shower of rain falling vertically seems, to a person running forwards, to be coming in his face.

Let A B represent a small portion of the earth's orbit, and S M the ray of light from a fixed star S; the motion of the earth from B toward A will cause the light to come in the direction S' A, and the star will appear to stand in S'. If C D represents a small portion of the earth's orbit half a year later, thus moving in an opposite direction, the star T will for the same reason appear to stand in T'.

The correction of the observed position of a celestial object for aberration gives the true position for the moment when the light which makes it visible left it; but it is not the true position for the moment of observation, except on supposition that the observed object is at rest. If the body itself is in motion, then, in addition to the correction of position for aberration, there must be a correction for the amount of proper motion which has taken place in the interval since the light which makes it visible left it. A body moving in the same direction as the earth, and with the same velocity, is unaffected in apparent position by aberration.

Abert (ä'bért), John James, 1787-1863; U. S. military engineer; b. Shepherdstown, Va.; graduated West Point, 1811; became lawyer; fought at Bladensburg, 1814; brevet major U. S. Topographical Engineers, November 22, 1814; in charge of that bureau, 1829; chief, 1838; retired, 1861. Largely influenced the development of earlier national civil engineering works in the U. S.—*e.g.*, canal around falls of the Ohio at Louisville; Chesapeake and Ohio canal, Potomac aqueduct, etc.

Abeyance, a legal term signifying expectation or suspense, used to indicate the condition of property where there is no person in whom its ownership is vested. In the law of real estate it is generally applied to a fee, which is said to be in abeyance when there is no particular owner of the inheritance. A fee can be in abeyance only while there is a freehold estate (or life interest) in the land vested in some person. The term has been applied in some instances to personal property, as in case of captures at sea in time of war, as to the title after capture and before condemnation in the prize court.

Abgar (äb'gär), or **Ab'garus**, written also **AB'AGARUS**, **AG'BARUS**, and **AUG'ARUS**, name common to several kings of Edessa, Mesopotamia. The fourteenth of these, Abgar Uchomo, said to have corresponded with Christ. The genuineness of this correspondence found defenders even as late as the nineteenth century.

Abgillus (äb-gil'lüs), John, son of the king of the Frisii; became Christian; accompanied Charlemagne in several expeditions; received title of prester, or priest, on account of excessive severity of his life.

Abhor'ers, supporters of Charles II in his disapproval of petitions for the reassembling of parliament (1680); their addresses expressed abhorrence of the petition of the Whigs, who were termed petitioners or addressers.

Abiathar (äb-rä-thär), Jewish high priest, long favorable to David; banished by Solomon for aiding Adonijah's rebellion.

Abib (ä'bīb), after Babylonian captivity called Nisan, first month of Hebrew sacred year and seventh of civil year, beginning with new moon of March.

Abila (äb'ī-lä), capital of tetrachy of Abilene; identified with Suk, on Barada, near where it breaks through the Antilibanus Mountains toward the plain of Damascus. Another Abila E. of the Jordan, a few miles S. of the Yarmuk (or Hieromax), the N. boundary of Gilead.

Abilene (äb'ī-lē'nē), ancient tetrachy, whose capital was Abila (*q.v.*). Luke iii, 1, speaks of it as the tetrachy of Lysanias, apparently a son of the Lysanias mentioned by Josephus.

Abimelech (ä-bīm'ē-lēk), "royal father." I. King of Gerar, a Philistine city in time of Abraham. II. King of Gerar in Isaac's time. III. Philistine king (Ps. xxxiv, title). IV. A son of Gideon (Judg. ix), during three years a self-constituted king over part of Israel.

Abingdon (äb'ing-dön), town and capital of Washington Co., Va., 315 m. SW. of Richmond; has several female colleges. Immense deposits of salt, gypsum, and iron ore are found, and most of the salt used in the South during the Civil War was obtained from wells bored here. Pop. (1900) 1,306.

Abiogen'esis, name proposed as a substitute for spontaneous or equivocal generation, *i.e.*, the doctrine that certain animals or plants have spontaneously originated.

Abkasia (äb-käsh'ä-ä), or **Aba'sia**, narrow territory in W. Asia, belonging to Russia, between the Caucasus Mountains and the Black Sea, which bounds it on the SW.; area, est. 3,486 sq. m. The inhabitants, under Justinian, became Christians, but later embraced Mohammedanism.

Ab'laut, vowel-gradation. That variation of vowels among words of the same Indo-European root—as in English, *sing, sang, sung*; which depend upon causes no longer active or discernible in the separate languages of the family. Umlaut (*q.v.*), or mutation, is a phenomenon produced under conditions existing in the distinctly Teutonic languages, as: foot, feet; cow, kine; Frank, French, where a following *t* sound influences the root vowel. The cause of Ablaut is the peculiar conditions of word and sentence accent in the Indo-European parent speech. Thus by withdrawing the ac-

cent the root elements *et, eu, el, er, en, es, etc.*, were reduced to *i, u, l, r, n, s, etc.* The differentiation between the *e* grade and the *o* grade is not so definitely determined but probably originated in a variety of musical pitch—*i. e.*, the *e* grade occurs with stress and high pitch, the *o* grade with stress and lowered pitch. See ACCENT.

Ab'ner (the enlightener), uncle of Saul, first king of Israel; became commander in chief of Saul's army; for some time after the death of the king was chief support of Ishbosheth, his successor; but later sided with David, then king of Judah. Joab, David's chief captain, was jealous and slew Abner.

Abo (ä'bö), Russian seaport, on the Aura-joki near entrance into the Gulf of Bothnia; built by Eric IX of Sweden, 1157, later taken by Russians, and 1809, with the whole of Finland, ceded to Russia; capital of Finland till 1819; now the see of a Lutheran archbishop. The Univ. of Abo, destroyed by fire, 1827, was rebuilt at Helsingfors. Pop. (1903) 41,536.

Abo, Peace of, concluded August 17, 1743, between Sweden and Russia, ended war begun by Sweden at instigation of France, 1741. During this contest, the Russians gained entire possession of Finland. The greater part they restored on condition that Sweden should elect the prince of Holstein-Gottorp successor to the throne.

Abolitionists, name applied to those persons—more particularly in the U. S.—who were distinguished for their zeal against the institution of slavery (*q. v.*).

Abomey (äb-ö-mä'), former capital of Dahomey, Africa; contains several royal palaces; large trade in palm oil, ivory, and gold; often scene of human sacrifices; captured by French, November 21, 1892. Pop. est. 15,000-30,000.

Aborigines, earliest original inhabitants of a country—those who occupied it at the period when it began to be known, and who either were (according to a once prevalent opinion) indigenous to the soil or had emigrated thither before the dawn of history.

Abortion, premature delivery of human foetus or its expulsion before it is viable. Premature delivery may be either natural or artificial. Natural abortion may be caused by accidental or pathological conditions. Artificial abortion is usually caused by drugs, or mechanical means. Artificial abortion may or may not be criminal. Premature labor produced for purpose of saving life of either mother or child is justifiable; but if produced with intent to prevent birth of a living child is criminal.

About (ä-bö'), Edmond, 1828-85, French novelist and political writer; b. Dieuze; contributor to the *Gaulet*, 1868, when that paper was suppressed for his satirical letters; enjoyed special favor of Napoleon III; accompanied army of McMahon as war correspondent, 1870; editor in chief *XIX Siècle*, 1875; championed moderate republicans; elected to Academy, 1884. "Le Roi des Montagnes," his best work.

A. B. Plot, attempt made by Senator Ninian Edwards of Illinois, 1824, to have William H. Crawford, a presidential candidate, impeached for alleged malfeasance in office during his incumbency as head of the treasury department. The charges, made by Edwards in newspaper letters signed "A. B." and in a memorial to the house of representatives, failed of their purpose, and in consequence, Edwards, then minister to Mexico, was recalled.

Abrahamel (ä-brä-bä-nél'), or **Abarbanel'**, Isaac, 1437-1508; Jewish statesman and scholar; b. Lisbon; minister of state to Ferdinand and Isabella of Spain, but exiled as a Jew, 1492; lived mostly in Italy; wrote, besides some commentaries, an elaborate exposition of Jewish doctrine of the Messiah, printed 1526.

Abracadab'ra, cabalistic word, probably of Persian origin, occurring first in writings of Sammonicus (abt. 200 A.D.), and highly prized in former times as a magical formula. Written in the form shown in the annexed figure, and worn as an amulet, it was supposed to be efficacious in the cure of fevers and other ailments.

ABRACADABRA
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Abraham (ä-brä-häm), originally Abram, founder of Israelitish race; b. Ur, Chaldea, date unknown. Migrated to Canaan with numerous tribe, and lived there in tents. Chief point in Bible accounts is promise that God made to him—that in him and his posterity all mankind shall be blessed; his name was therefore changed to Abraham, "father of a multitude."

A'brahamites, Bohemian deists, said to have rejected all the Bible except ten commandments and Lord's prayer; suppressed 1783.

Abrantes (ä-brän'täs), Duke of. See JUNOT.

Abrasives, substances used in polishing or sharpening, as corundum, grindstones, emery.

Abrax'as, gem found in Syria, Egypt, and Spain; used by Gnostics as amulet; of various forms, but all had the word abraxas, or abraxax, engraved on them with mystical symbols, mostly consisting of fantastic figures, composed of the body of a serpent, the head of a bird, and other incongruous parts.

Abruzzi (ä-bröt'së), Prince Luigi Amadeo, (Duke of the), 1873- ; Italian explorer; b. Rome; nephew of King Humbert. First to reach summit of Mount St. Elias, Alaska, 1897; went in search of north pole and the missing balloon explorer, Dr. André, 1899; reached latitude 86° 33' N., surpassing Nansen's furthest N. record; returned to Norway, 1900. 1906 he ascended loftiest peak in Ruwenzori range, identical with Ptolemy's "Mountains of the Moon," Africa.

Absalom (äb'sä-löm), third son of King David by Maacah, a Syrian princess; remark-

able for his personal beauty. Having gained the favor of the people, rebelled against his father and raised a large army, which was defeated. While retreating he was killed by Joab, although David had ordered that his life be spared.

Ab'scess, a circumscribed collection of pus in any part of the animal organism, as distinguished from "purulent infiltration," which designates such a collection not circumscribed. An "acute abscess" is one which is the result of active inflammation. "Cold abscess" is the result of chronic inflammation and is commonly of tubercular origin. The tendency of an acute abscess is to point or come to a head, so that the pus may be evacuated in the direction of least resistance. Symptoms are fever and subsequent rigors, with local pain, heat, redness, and swelling, followed by softness and fluctuation of the pus.

Absentee'ism, habitual absence from one's post of duty or the like; specifically, habitual absence from country or district from which one's revenues are received, as owners of large estates who spend incomes in other countries. Very prevalent among Irish nobility and gentry, and to it some economists ascribe in part the poverty of Ireland.

Ab'sinthe, a liqueur; alcohol mixed with volatile oil of wormwood, oil of anise, and other ingredients; has peculiarly intoxicating effects due to the oil of wormwood. Trembling, vertigo, fearful dreams, and epileptiform convulsions are among its severer consequences. Is a dangerous form of stimulation—the more so because its immediate consequences are usually more agreeable than those of alcohol.

Ab'solute, freed from conditions, independent, unlimited. In science it means the reverse of relative, as absolute velocity. In metaphysics it represents the unconditioned infinite and self-existent. Absolute monarchy is that which is not restricted by constitutional checks.

Absolu'tion, Canon'ical, act of freeing from censure.

Absolution, Sacrament'al, remission of sin which a duly authorized priest in the Roman Catholic Church grants to a penitent rightly disposed.

Absorp'tion, Elec'tric, phenomenon occurring when a dielectric, not perfectly homogeneous, is charged and discharged. When a plate of glass serves as the dielectric of a condenser, coatings of the latter after discharge soon begin to show difference of potential again, the charge continuing to rise for an appreciable interval of time, and reaching a value which is a considerable fraction of the original charge. This residual charge is due to electric absorption.

Ab'stinence, act or state of abstaining, as from food, drink, etc. In Roman Catholic Church, limitation of quantity of food is technically called fasting, the days of abstinence being those on which meat is not eaten. They are Fridays during the year, except Christmas-day if Friday. All fast-days are also days of abstinence from flesh. The practice of the

High Church element in the Church of England is similar. See **FAST**.

Abstinence, To'tal, abstention from intoxicating beverages: was practiced by the Nazarenes and Rechabites. Some of the Hebrew prophets inveigh against drunkenness. The Essenes eschewed flesh and wine. Mohammed forbade the use of wine. The earliest total abstinence society in the U. S. was "The Temperate Society of Milton and Northumberland" (Saratoga Co., N. Y.), founded by Dr. Billy J. Clarke, 1808; it prohibited liquors and wines but not the moderate use of beer. In 1826 the American Temperance Society was organized. In 1833 at a national meeting of friends of temperance in Philadelphia, the principle of "total abstinence from all that may intoxicate" was voted down, but was adopted in convention at Saratoga Springs, 1836. This and the "Washingtonians" (in good part reformed drunkards) gave a great impulse to the cause, which was continued by the "Sons of Temperance," "Good Templars," "Rechabites," "Good Samaritans," "Cadets of Temperance," etc. The Woman's Christian Temperance Union ("W. C. T. U.") and similar organizations have a powerful moral and political effect in the cause of abstinence.

In Great Britain the movement attracted attention in 1831, but the "pledge" of total abstinence was first adopted in a national gathering at Manchester, 1834. It is often called the "blue ribbon" movement from the color of the badge worn by abstainers in Great Britain.

Ab'stinents, Christian sect of Gaul and Spain in latter part of the third century, A.D., who condemned marriage and use of flesh meats and wine.

Ab'stract of Ti'tle, a summary of the facts composing the evidence of a title to real estate, and of the charges and liens thereon. In the U. S. the practice of recording instruments affecting real estate makes it possible for anyone to trace the chain of title to any parcel of land. But this is usually done by title companies, some of which, further, guarantee or insure the validity of the title as shown by their report.

Abstrac'tion, intellectual process by which the mind separates one of the attributes of an object from the others, and thinks of it exclusively, e.g., color, virtue, government, are abstract ideas.

Abt (äbt), Franz, 1819-85; German composer and musician; famous for his song "When the Swallows Homeward Fly"; b. Eilenburg, Prussian Saxony; first compositions published 1838; afterwards conductor of the Leipzig Philharmonic Society; visited the U. S. 1872, and gave concerts in leading cities. Prolific composer; showed remarkable gift of melody.

Abu (ä'bu), Arabic word, signifying father; prefix to many oriental names, as Abu-Bekr, "father of the virgin."

Abu, mountain of India, in Rajputana; celebrated place of pilgrimage for the Jains, who have four temples at Dilwara near middle of

the mountain, one of which is considered the most superb temple of India.

Abubekr (ä'bö-bök-r), or **Abou-bekr**, 570-634; caliph, first of Mohammed's successors; b. Arabia; original name, Abd-ed-Kaaba, changed to Abu-Bekr (father of the virgin), because his daughter Ayesha married the prophet. Began to reign 632 A.D.

Abukir (ä-bö-kër'), fort and village of Egypt, on site of ancient Canopus, on the W. side of Abukir Bay, 15 m. NE. of Alexandria. In the bay the British under Lord Nelson gained a decisive victory over the French, August 1, 1798. Here the Turks were defeated by the French under Napoleon I, July 25, 1799, and the French by the British, March 21, 1801.

Abulcasis (ä-böl-kä'sis), or **Abulka'sis**, written also **ABUL-KA'SIM**, d. abt. 1117; Arab physician and surgical writer; b. near Cordova, Spain. Wrote one of most valuable early treatises on surgery.

Abu-l-Fazl (ä'böl-fäzl), oriental historian; d. 1608; prime minister of Mogul emperor Akbar, 1574; was assassinated. Wrote a history of "Akbar" and "Institutes of Akbar."

Abu-l-Feda (ä'böl-féd'ä), abt. 1273-1331; Moslem prince and author; b. Damascus; fought with distinction for the sultan of Syria against the Tartars; wrote "The Description of the Countries," regarded as the best Arabic work on geography.

Abuna (ä-bö'nä), "our father." Title given to head or patriarch of the Abyssinian Christians.

Abu Sambul (ä'bö säm'böl), **Abusim'bal**, or **Ipsam'bül**, ruined place in Nubia, on W. bank of the Nile, 8 m. above second cataract; contains two well-preserved specimens of the great rock-hewn temples of ancient Egypt; also four colossal, sitting statues, the largest and finest specimens of Egyptian plastic art. One is 50 ft. high as it sits.

Abut'ment, the stone structure which receives the horizontal thrust of an arch, or the pier of a bridge built on the shore and connecting it with the street. The mass of masonry to which the cables of a suspension bridge are anchored is also sometimes called an abutment.

Abydos (ä-b'ädös), ancient city of upper Egypt; 5 or 6 m. from the Nile and about 100 m. below Thebes. Here are ruins of a temple of Osiris and a temple of Memnon, in which Mr. Banke discovered, 1818, the celebrated tablet of Abydos, containing 26 shields, now in British Museum; a second tablet, containing 76 shields, discovered by Mariette, 1865. 1899-1900, Prof. Flinders Petrie unearthed records covering almost whole of first dynasty, previously regarded as mythological, thus adding 1,000 years to the written history of the human race.

Aby'dus, or **Abydos**, ancient city on the Hellespont opposite Sestos, where Xerxes crossed over to Europe on a bridge of boats, 480 B.C.; also celebrated for its connection with the story of Hero and Leander.

Ab'yla and **Cal'pe**, "pillars of Hercules," promontories on either side of Strait of Gibraltar.

Abyssainia (äb-is-ain's-ä), ancient empire in N. Africa, long known as Ethiopia, and now including the kingdoms of Tigré on N. and NE., Amhara and Gojam in center, Shoa in SE., and smaller dependencies of the Shankalla in W., and Galla and Kaffa lands in S. and SW. Lies E. of the Nile and nearly opposite the Strait of Bab-el-Mandeb, with Nubia on N., Eritrea between it and the Red Sea, the Somali and Galla lands on S., and Nubia on W.; area about 150,000 sq. m.; pop. (1907) 3,500,000. In its present form Abyssinia occupies the highlands of Ethiopia which rise abruptly from the lowlands to the E., and consist of extensive table-lands, from 6,000 to 10,000 ft. above the sea, diversified by mountains and river gorges. The principle rivers are tributary to the Nile. The climate is generally temperate and salubrious. The vegetation of the table-lands and mountains is that of the temperate zone, with little forest growth; that of the ravines is more tropical.

The people are essentially pastoral, and tillage is comparatively little practiced, owing to the fact that landed property scarcely exists among the populace. Cattle, sheep, goats and horses are numerous. The chief exports are, coffee, hides, wax, and ivory. Roads in Abyssinia are mere tracks and transport is effected by means of pack horses and donkeys. Government, monarchical, each province under a feudal chief. Teaching, restricted to clergy, consists in instruction in grammar, choral singing, and recitation of sacred texts, is gratuitous, but given to few only, who form an influential class of *literati*. In 1907 compulsory education was enjoined upon all male children above the age of twelve, education to be provided by the state. The Abyssinians, converted to Christianity in the fourth century, are still members of the Alexandrian Church, and consequently Monophysites. The head of the Church is always a Copt, appointed by the patriarch of Alexandria, but his power is shared by a native dignitary who controls the monastic orders. The population is a heterogeneous collection of races—Coptic, Arabian, Negro. Jews are numerous and date from early times; also many Mohammedans and heathen. Political ascendancy belongs to an Arabian race called Ethiopian, who speak a dialect of old Ethiopic—a semitic language. After suffering great defeat near Adua, 1896, Italy recognized the independence of Abyssinia, and, 1906, Great Britain, France, and Italy agreed to maintain her integrity. The U. S. first established trade relations with Abyssinia, 1904.

Aca'cia, genus of *Leguminosæ*, found in Asia, Africa, America, and Australia, comprising many beautiful trees, among which is *A. arabica*, which produces some of the gum arabic of commerce.



ACACIA ARABICA.

Acacians, followers of Acacius, bishop of Cæsarea, 340-65; classed as moderate Arians, but do not hold that Christ was a created being, and differ from the semi-Arians in not believing that He was of like substance or essence with the Father.

Academy, originally a garden or grove near Athens, or the school of philosophy which Plato founded there. Academy in U. S., as in United Kingdom, is used to designate a school intermediate between college or university and common school; also a school for instruction in a special art or science, as the West Point Military Academy. Academy is also applied to a society of authors, savants, or artists, for the improvement of literature, science, or art. First institution corresponding to this idea was the Museum, a society of scholars established at Alexandria by Ptolemy Soter, third century B.C. First institution of this kind in France, the *Académie Française*, founded, 1635, by Richelieu, consisted of forty members, popularly called "Immortals," membership in which is the highest honor attainable by an author. In Great Britain academy has been chiefly confined to associations for promoting the arts, as the Royal Academy of Arts, founded 1768. In Germany the oldest was the *Academia Naturæ Curiosæ*, a scientific association, founded 1662, in Franconia. The Royal Academy of Sciences at Berlin was founded, 1700, by Frederick I of Prussia. The Imperial Royal Academy of Sciences at Vienna, originated 1846. Turkey established a similar institution, 1851, and Egypt 1859. The Imperial Academy of Sciences at St. Petersburg was founded by Catherine I, and endowed by Catherine II with great munificence. Italy has been most prolific in academies of literature and philology. Among the most celebrated was the *Accademia degli Arcadi* at Rome, founded abt. 1690, and still subsisting, having various affiliated societies in other places. The American Academy of Sciences and Arts was founded 1780 by the council and house of representatives of Massachusetts; the National Academy of Sciences of the U. S. incorporated by Congress 1863; the Academy of Natural Sciences of Philadelphia, founded 1812; the American Academy of Political and Social Science organized in Philadelphia, 1889.

Acadia (ä-cä'di-ä), French settlements S. of the Gulf of St. Lawrence, called after 1603 Nova Scotia; originally included New Brunswick and part of Maine; valuable fisheries near coast caused frequent quarrels between French and English; finally ceded to Great Britain, 1713. For refusing to take oath of allegiance to British king or bear arms against the French the Catholic inhabitants were torn from their homes and distributed among other British provinces. Incident furnished subject for Longfellow's "Evangeline."

Acalephæ, or **Acalepha**, a group of the *Cœlenterata*, containing the marine animals commonly known as jellyfishes or sea-nettles. They are umbrella-shaped animals with radiate structure, and are composed of soft, transparent, gelatinous material. On bright days

they are found floating near the surface along nearly all shores, propelling themselves slowly through the water by contractions of their umbrellas. The oral arms and other tentacles of the body are richly provided with stinging or nettle cells, which enable these animals, in spite of their soft, delicate texture, to capture living prey. A nettle cell consists of a small capsule filled with a poisonous or irritating fluid, and contains a spirally coiled filament provided with retrorse barbs. On touching a foreign body the filaments are forcibly ejected, and pierce the outer tissues of the prey, carrying with them some of the fluid contents of the capsule.



ACANTHUS. NATURAL LEAF.

Acanthus, genus of herbaceous plants, natives of S. Europe, belonging to the family *Acanthaceæ*, most remarkable of which are *A. mollis* and *A. spinosus*, with large white flowers and shining leaves of a beautiful form. The leafage of the



ACANTHUS LEAF ARTISTICALLY MODIFIED.

Corinthian and Composite orders and of much Byzantine and other mediæval architecture is considered a study of the acanthus.

A Cappel'la, in music, in chapel (or church) style. This is frequently understood by modern musicians as signifying a vocal composition without accompaniment, as the early church compositions were unaccompanied. When accompaniment is employed with a *cappella* pieces, the word denotes that the instruments are simply to play in unison with the voices, not a separate part of their own. The phrase is Italian, and is sometimes written *alla cappella*.

Acari'na, the mites, small insects belonging to the *Arachnida*. Some are free, living in cheese, sugar, dried fruit, etc. Others are parasitic and possess a sucker, by which they adhere to animals and imbibe nourishment. The itch is caused by a mite (*Sarcoptes scabiei*) which burrows into the skin. Mites are propagated by eggs and are very prolific. Some species are aquatic.

Accad (äc'cäd), in Old Testament narrative, the name of upper Babylonia, reaching from N. boundary near the lower Zab River S. as far as and including Erech (Warka). Name probably derived from chief city, Accad, and in-

cluded the four great cities of Gen. x, 10. Site of city undetermined; apparently identified by Wolfe expedition to Babylon, 1884-85, in the mound Anbar, on Euphrates, almost due W. of Bagdad and NW. of ruins of Babylon.

Acca Laurentia (ăc'ă lâ-rĕn'shĭ-ă), woman to whose grave the ancient Romans brought sacrifices on a festival, the tenth day before calends of January. It was said she was nurse and foster mother of Romulus and Remus.

Acceleran'do, in music, denotes gradually increasing velocity of movement.

Accelera'tion, the rate of change of the velocity of a moving body, such as takes place when the body is falling under the influence of gravity. It is measured by the increment of the velocity in a unit of time.

Acceleration of gravity is the amount of acceleration which is produced by the action of gravity on a body falling in a vacuum. It is independent of the nature or chemical constitution of the body. It is approximately 32 ft. per second; that is to say, if a body be allowed to drop from a state of rest in a vacuum for the period of exactly one second, it will, at the end of the second, be falling with a velocity of 32 ft. per second. The acceleration, however, increases from the equator toward the poles. See **ATWOOD'S MACHINE**.

Ac'cent. Greek grammarians added signs to the letters to mark the long and short quality, the rough or smooth breathings, the apostrophe, etc. The modern definitions of accent include: (a) Marks for acute (´), grave (`), circumflex (ˆ) as used, e.g., in French to indicate vowel quality, or in Greek to distinguish stress or musical pitch. (b) A coloring of the pronunciation, as of dialect or brogue. (c) Increased stress on certain syllables, especially in verse.

The English accent shows in its variety, and sometimes in its uncertainty, how imperfectly the language has as yet assimilated its diverse materials. Thus French accents survive in cavalier', engineer', devotee', balloon', violin', gazette', distress', affair', complete', excess', etc. Other Romance accentuations survive in sona'ta, mulat'to, tobac'co, volca'no. Latin accentuation persists in diplo'ma, diagno'sis, dicta'tor, specta'tor, Septem'ber, etc. The accent often distinguishes words, especially in differentiating between the noun and the verb, as, tor'ment (noun), torment' (verb); cf. minute, frequent, compact, perfume. Derivatives are often influenced by their primitives; as agree'able (agree), divi'ner (divine'), withdraw'al (withdraw'), reli'able (rely'), etc. See **ABLAUT**; **UMLAUT**.

Accent, in music, is the emphasis given to certain parts of a bar. It is divided into—grammatical, and æsthetic or oratorical. The grammatical accent usually falls on the first note of the bar, long measures having a secondary accent also. The æsthetic accent is irregular, depending on taste and feeling, but vocally it should correspond with the accented syllables of words.

Accen'tor, genus of warblers, including hedge accenter or sparrow (*Accentor modularis*); fa-

miliar and abundant European bird, 5½ in. long, brown above, steel colored beneath; song



ACCENTOR.

fine, but short; introduced into U. S. The Alpine accenter is larger.

Accentua'tion, in ecclesiastical music, the pitch and modulation of the voice. Threefold division is usual—simple, moderate, and strong.

Accept'ance, an engagement to pay a bill of exchange at maturity, or the bill itself after it has been "accepted," by writing the word "accepted" across its face, with the date on which it is payable and the name of the acceptor.

Accept'ants, or **Constitu'tionists**, name given 1713 to Jesuits in France who accepted constitution or bull Unigenitus issued by Pope Clement XI. Jansenists who rejected the bull were called Appellants or Recusants.

Acces'sary, or **Acces'sory**, in criminal law, participant in a felony who is not the chief actor, and is not present at its commission, but is connected with it. An accessory before the fact is one who, though not present, procures another to commit it. An accessory after the fact is one who, knowing a felony to have been committed, assists the felon. Below the grade of felony there are no accessories—all are principals.

Acces'sion, in law, a title to property borrowed from Roman law; the right to all which one's own property produces; applies when one manufactures material belonging to another, when generally, the finished product will belong to owner of material. But if manufacturer, in good faith, changes identity of material, as grapes into wine or grain into whisky, he will own the finished product.

Ac'cident, in logic, a predicable; that which may be absent from or present in the subject, the essence of the species to which the subject belongs remaining the same. Thus malle-

ability is an accident of the subject metal because many metals are not malleable.

Accident, in law, an unforeseen event, misfortune, loss, act or omission, not due to negligence or misconduct in a party. An equity court would give relief in such cases, as, for instance, where writings had been lost and no adequate remedy could be had without them in a court of law, or where in an instrument a clause had been inadvertently omitted or inserted.

Accident Insur'ance. See **INSURANCE.**

Accipiter (äk-sip't-ér), order of birds, including the eagle, vulture, hawk and owl, and comprising all true birds of prey. The accompanying illustrations show the adaptability of the beaks and claws of these birds to their predatory habits.

Acclimatiza'tion, process of becoming inured to a climate at first injurious. Plants or animals may become naturalized when transferred to a foreign country as most of the weeds which have invaded the U. S. from Europe, or domesticated, when the new adverse environment is mollified by the protection of man. Acclimatization includes adaptation not only to temperature, but to humidity, progression of seasons, cloudiness, etc. The adaptation may be: through a change in the individual plant or animal through modification of constitution, or through modification of habit, or through variation of offspring in constitution or in habit. It is in variation through offspring that acclimatization is unequivocal. Most of the tender fruit trees illustrate acclimatal variation in constitution. Thus the peach tree endures lower temperatures in New York than in Delaware and Maryland. In certain tropical or subtropical regions the growth of Indian corn extends through six months. As it is taken toward the poles its season shortens in accommodation to the climate, and in some parts of Canada it matures in less than three months. This shortening of season is associated with other variations, as smallness of stature, a tendency to sucker, and the change from dent corn to flint. Acclimatization is only one of the expressions of variation induced in all organisms by change of environment.

Accolade (äk-kö-läd'), embrace by which a sovereign formerly conferred knighthood. Later, gentle blow or "dub" on shoulder of candidate with flat of sword was substituted.

Accommoda'tion and Adapta'tion, adjustment of mind or organism to surrounding conditions. Accommodation of the eye is the reflex muscular adjustment by which the convexity of the crystalline lens is increased or diminished to focus the rays upon the retina.

Accommodation of mental action is the process of taking in new experiences so that they may be treated in future. It is opposed to the routine which we call habit. Many psychologists believe that accommodation is secured by "overproduced or excessive movements" made as near as possible to that which seems suitable. A common illustration of this is the

child's learning to control his hands for writing or any delicate manipulation. He throws his whole body into excessive and convulsive efforts, centering about his hand, and thus increases the chance of producing the right combinations. As he succeeds, the unnecessary movements die away.

Accomp'lice, one of several persons associated in a crime; broadly it includes all connected with the crime whether principals or accessories.

Accord', in music, concord; the relation of two sounds agreeable to the ear.

Accord and Satisfac'tion, in law, an agreement that something different from a complete payment or discharge shall be received in satisfaction thereof. The thing to be done must be certain, advantageous to the injured party, and the agreement must be fully performed.

Accor'dion, a musical instrument invented by Daman abt. 1829, in which metallic springs are made to vibrate by wind applied by a bellows.

Account', a computation; a statement of receipts and expenditures; a detailed statement of the transactions between merchants or others. An account current is one that is running, open, and unsettled. An account stated is one that has been adjusted, and a balance struck. It may become stated by implication as where a statement of account is received and no objection made to it within a reasonable time. The person receiving it is presumed to assent to its correctness. Books of account upon proper proof of their authenticity may be used in a court of law as evidence of the transactions they record. But the volume containing a description of a transaction in its first form (called a "book of original entry") should be submitted to the court and not a summary or abstract compiled from such original entries.

Account'ant, the officer of a business who has the care of its accounts, or who prepares and certifies to the correctness of its balance sheets. In Great Britain and the U. S. the business is recognized as a distinct profession. In the U. S. certified public accountants (C. P. A.) receive their certificates from the state.

Accre'tion, in law, a gradual accumulation of soil along a river bank or seashore. It belongs to the owner of the adjacent land. If the increase be sudden the land formed belongs to the state.

Accuba'tion, reclining posture in which ancient Greeks and Romans took their meals. Couches were spread around the dining table each accommodating three persons.

Accu'mulated force, the power of a moving body to overcome resistance. If a heavy mass be suspended by a long chain, the constant application of a very small force would at length, by accumulation, communicate a rapid momentum to the mass which a force applied in an opposite direction and a thousand times as great could not suddenly overcome.

Accu'mulator. See **STORAGE BATTERIES.**

Aceldama (ä-säl'dä-mä), a potter's field, said to have been purchased by Jewish priests with money received by Judas for betraying Christ; set apart for a burial place for strangers dying in Jerusalem, and is still shown on the hills S. of Mt. Zion.

Aceph'ala, a class of mollusks, usually called the *Lamellibranchiata*, and including the oyster, clam, mussel, etc.

Acephali (ä-säf'ä-lö), in the early Christian Church, bishops exempt from the jurisdiction of their patriarchs; also the Eutychians, who broke away from Peter Mongus, patriarch of Alexandria.

Acetab'ulum, depression in innominate bone in which the femur is articulated, forming hip joint.

Ac'etates, salts derived from acetic acid. They are all soluble in water and most of them crystallize readily.

Aluminium acetate is used as a mordant (substance for fixing the dye) in dyeing. It is prepared and used in solution only by precipitating alum with lead acetate. A solution of ammonium acetate is used in pharmacy as *Spiritus Mindereri*.

There are three basic copper acetates, all contained in verdigris which is used as a pigment and mordant. It is obtained by submitting copper to the action of air and acetic acid. Copper *aceto-arsenite* (or arsenic green, imperial green, Paris green, Schweinfurt green), obtained by boiling verdigris with arsenious acid, is a beautiful but very poisonous pigment. Ferric acetate is made from ferri sulphate and lead acetate. Pyrolignite of iron, a crude mixture of ferrous and ferric acetate, is used as a mordant. Normal lead acetate (sugar of lead) is used in medicine as an astringent, and a solution of the tribasic acetate, *liquor plumbi subacetatis*, is used as Goulard's extract.

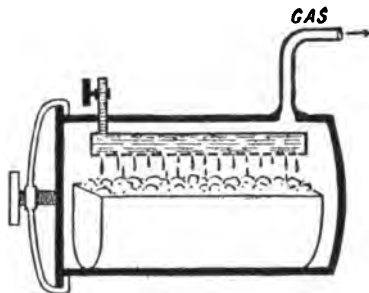
Potassium acetate exists in many plant juices, and is obtained by neutralizing acetic acid with potassium carbonate. Sodium acetate has medicinal properties similar to the potassium salt and is similarly prepared from sodium carbonate.

Ac'etic Ac'id (Latin *acetum*, vinegar), $C_2H_4O_2$, is prepared from weak alcoholic liquids, as wine, cider or beer, by oxidation and acetous fermentation. The concentrated, crystallizable or glacial acetic acid is made by distilling dry acetates with strong sulphuric acid.

Acetic E'thers, acetates of the alcohol radicals, such as ethyl acetate ($C_2H_5C_2H_3O_2$); methyl acetate ($CH_3C_2H_3O_2$) found in crude wood vinegar; amyl acetate ($C_5H_{11}C_2H_3O_2$) made by distilling potassium acetate, fusel oil and sulphuric acid.

Ac'etone or **Py'ro-ac'e'tic Spir'it**, mobile liquid of agreeable odor and biting taste, like that of peppermint. Made from calcium acetate, and used in making chloroform. It dissolves many fats and resins. It belongs to the *ketones*.

Acet'ylene, a compound of hydrogen and carbon having the composition represented by the formula C_2H_2 . It was discovered in England in 1836 by Edmund Davy, a relative of the great chemist Sir Humphry Davy. In 1807 the latter discovered potassium by electrolysis of fused potassium hydroxide; later Curaudau calcined potassium tartrate, thus

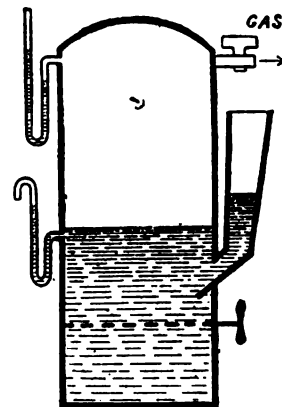


TYPE 1.

obtaining a mixture of potassium carbonate and carbon which on distillation yielded potassium. Edmund Davy, experimenting with this method, obtained a black substance which decomposed water, yielding a combustible gaseous compound of carbon and hydrogen; the black substance was impure potassium carbide, C_2K_2 , the gas acetylene C_2H_2 . In 1862 Berthelot in Paris prepared acetylene by different methods. Berthelot studied the properties of acetylene and gave it its name. He also discovered a method of making acetylene by the incomplete combustion of coal gas, which is still the usual laboratory method of preparation. In the same year, 1862, Wohler in Göttingen heated an alloy of calcium and zinc together with carbon to a very high temperature and obtained calcium carbide C_2Ca .

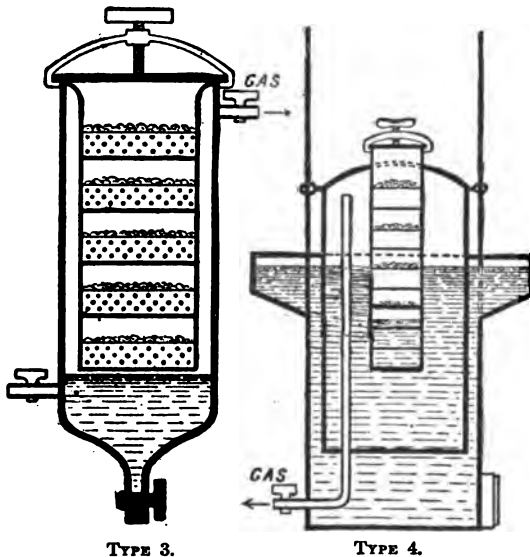
During the period 1892-95, Thomas L. Wilson of Canada and Prof. Henri Moissan of Paris, discovered practically the method of making calcium carbide cheaply, by the action of very high heat, on a mixture of lime and carbon, the products being calcium carbide and carbon monoxide, $3C - CaO = C_2Ca - CO$. The calcium carbide decomposes water, yielding calcium hydroxide (slaked lime) and acetylene, $C_2Ca - 2H_2O = C_2H_2 - CaO.H_2$.

Acetylene ignited in an open vessel burns with a luminous and very smoky flame, giving off clouds of fine soot, owing to imperfect combustion. If mixed with enough air to render the combustion complete, the flame is white



TYPE 2.

and clear. The actinic power of the clear acetylene light is high; light colors appear lighter and dark colors darker than in sunlight. The light is white and has none of the bluish tint of the electric arc light, or the greenish tint of the gas-flame of the Welsbach burner. Four cubic feet of acetylene burned in a gas-



stove would do the same work as about 9 cu. ft. of illuminating gas; yet for illuminating purposes, with an equal light, acetylene gives off much less heat than illuminating gas.

Lewes classes acetylene generators as follows: (1) Those in which water drips or flows slowly on a mass of carbide; (2) those in which water rises, coming in contact with a mass of carbide; (3) those in which water rises, coming in contact with a mass of carbide suspended on trays, one tray above the other; (4) those in which the carbide is dropped or plunged into an excess of water. He proves that the first two classes are dangerous on account of over-heating, the heat generated in experiments with generators of class (2) being in some cases so great that the temperature may rise to over 800° C., at which temperature all acetylene in contact with the glowing mass is decomposed into carbon and hydrogen, while at temperatures above 650° C. acetylene is polymerized, forming benzene and tar. He shows, further, that the heat decomposes the acetylene in part, lessening the yield of gas and greatly impairing its illuminating power; and that the decomposition products (tar and benzene) ruin the burners. Many generators of the third class are good; those of the fourth class are the best. See GAS.

Achæan (ä-kä'in) League, confederation of Grecian cities formed abt. 280 B.C., for mutual protection. In 191 B.C. included Sparta, Athens, and nearly all cities of the Peloponnesus, and for fifty years maintained Grecian independence against the Ætolians and the encroachments of Rome. The confederates under

Diæus were defeated at Corinth by the Roman general, Mummius, and S. Greece was made a Roman province under the name of Achaia, 146 B.C.

Achæans, one of the four races of inhabitants of ancient Greece. Name is often extended in the Homeric poems to the whole Greek people. The Achæans proper inhabited parts of Thessaly and the Peloponnesus, remaining an obscure people till the founding of the Achæan League.

Achard (ä-shär'), **Franz Karl**, 1753-1821; German chemist; b. Berlin; "father" of beet-sugar manufacture; discovered method of separating the sugar from the plant; director of physics in Academy of Science, Berlin.

Achates (ä-kä'tës), friend and companion of Æneas, noted for his fidelity. The proverbial phrase *fidus Achates* is often applied to a man who is a devoted follower of his chief.

Acheen (ät-chën'), **Achin'**, or (Dutch) **Atjeh'**, former independent sultanate, in NW. part of Sumatra, now a province of Dutch East Indies; area, 20,470 sq. m.; pop. est. above 100,000. Dutch declared war against the sultan, 1873; extended their administration over his dominions, 1878; but after spending \$100,000,000 and 80,000 lives, had failed to subjugate the people, 1907.

Achelous (äk-ë-ló'üs). See ASPERO-POTAMO.

Achenwall (ä'këm-väl), **Gottfried**, 1719-72; German statistician; b. Elbing; reputed to have originated statistical tables; Prof. of Philosophy at Göttingen, 1750; introduced term *Staatswissenschaft* (politics), to signify all the knowledge essential to statesmanship.

Acheron (äk'ë-rön), ancient name of river of Elis; also river of Epirus; also applied in mythology to a river of infernal regions; the bitter stream over which the souls of the dead were ferried by Charon.

Acheron'tia, or **Death's-head Moths** (Greek *Acheron*, a view of the dead), a genus of moths of the *Sphingidæ*. There is found in Great



ACHERONTIA, OR DEATH'S-HEAD MOTH.

Britain and Europe the *Acherontia atropos*, having on the back of the thorax a representation of a human skull. The superstitious feel it an omen of evil.

Acherusia (äk-ë-rü'shi-ä), cavern in Bithynia, near Haraclea; through it Hercules is said to have dragged Cerberus to the light of day.

Achilles (ă-kil'les), Grecian warrior, hero of Homer's "Iliad"; son of Peleus, king of Thessaly, and the sea nymph Thetis; also called Peli'des. At siege of Troy preëminent for courage, strength, and swiftness, but, having been offended by Agamemnon, refused to fight. When, however, his friend Patroclus had been killed, he returned to the war to avenge his death; slew Hector and many other Trojans. According to legend, his mother, by dipping him in the river Styx, rendered him invulnerable in every part except his heel, by which she held him; killed with an arrow by Paris, who shot him in the heel.

Achilles Tatiüs (-tä'shi-tüs), Alexandrine author of fifth century whose popular "Story of Leucippe and Clitophon" is said to have been largely borrowed from the romance of Heliodorus.

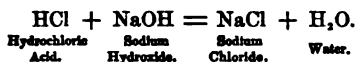
Achil'es' Ten'don, or **Tendon of Achilles**: the tendon which connects the muscles of the calf of the leg with the bone of the heel; the strong band which is felt at the rear part of the foot behind the ankle. The name is given in allusion to the mythological tale of the famous Grecian warrior Achilles, who was said to have been held by the heel by his mother Thetis as she bathed him in the river Styx shortly after his birth. This is said to have rendered him invulnerable in all parts save that which was held above water, and his death was finally caused by an injury to the heel. This tendon plays an important part in one of the forms of club-foot in which it becomes contracted, so that the toe is kept permanently drawn downward.

Achmet (ăk'mët). See AHMED.

Achromat'ic, term applied to lenses and telescopes through which objects appear colorless, or without the discoloration which arises from unequal refrangibility of rays of light.

Achromatin, in biology, that constituent of the nucleus of a cell which does not stain, or only slightly so, with coloring reagents.

A'cid, class of chemical compounds of which acetic acid, sulphuric acid and nitric acid are examples. All acids have a sour or acid taste, change blue litmus to red, and combine with bases to form salts. For example: when hydrochloric acid and sodium hydroxide (a base) are brought together they form sodium chloride (common salt) and water, the change being represented thus:



Other examples of the formation of salts are: potassium nitrate, KNO₃, derived from nitric acid and caustic potash; sodium carbonate, Na₂CO₃, from carbonic acid and sodium hydroxide; copper sulphate, CU₂SO₄, from sulphuric acid and copper hydroxide.

All acids contain hydrogen, and most of them contain oxygen. If the acid molecule contains one atom of replaceable hydrogen it is called monobasic, if two atoms, dibasic, if three atoms, tribasic, etc. Thus HCl, hydrochloric

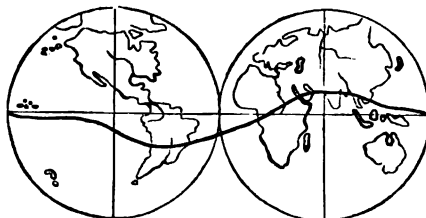
acid, is monobasic; H₂SO₄, sulphuric acid, is dibasic; and H₃PO₄, phosphoric acid, is tribasic. Sometimes not all of the hydrogen is replaced by a base. Chemists distinguish between strong acids such as hydrochloric, nitric and sulphuric, and weak acids such as boric, citric and tartaric. See SALT.

Acireale (ă'chê-ră-ă'lă), seaport of Sicily; at mouth of the Aci River near foot of Mt. Etna, 7 m. by rail NE. of Catania; built mostly of lava, an important health resort; contains the cave of Polyphemus. Pop. (1901) 26,900.

Acknowledgment, in law, the act by which one who has executed an instrument declares, before some authorized officer, as a notary, commissioner, justice of the peace, etc., that it is his act or deed. The term is also applied to the officer's certificate of this fact. The purpose is to comply with the recording acts, and to authenticate the document so that it can be put in evidence in court without further proof of its execution.

Ac'land, Sir Henry Wentworth Dyke, 1815-1900; British physician; b. Devon, England; accompanied Prince of Wales, now King Edward VII, to America, 1860; a founder of Oxford Univ. Museum, Regius Prof. of Medicine at Oxford, 1858-94; Radcliffe librarian and curator of the Univ. galleries and Bodleian library; an expert on cholera and plague.

Acin'ic Line, variable imaginary line on earth's surface where the compass needle has



ACINIC LINE.

no inclination; also called the magnetic equator, being about 90° from the magnetic pole. See AGONIC LINE.

Accemetae (ăs-ê-mê'tê), order of monks, sometimes called Watchers, founded at Constantinople early in the fifth century; established many monasteries, and were held in high esteem.

Ac'olyte, the highest of the four minor orders in the Roman Catholic Church; assists at mass by presenting the wine and water and by carrying the lights. The order is mentioned by Pope Cornelius in the third century, and must still be received by candidates for priesthood, though its functions are often performed by laymen.

Acô'ma, an Indian pueblo in Valencia Co., N. M.; about 60 m. W. of Albuquerque. With Isleta, it has the distinction of occupying its sixteenth-century site and is the oldest continuously occupied town in the U. S.

Ac'onite (*Aconitum napellus*), also called wolfsbane and monkshood; a perennial herbaceous plant growing in mountain regions of Europe, and cultivated somewhat in gardens as an ornamental flower. The root is spindle-shaped, and is sometimes mistaken for horseradish. The leaves are dark green on the upper surface, shiny, and are deeply divided. The flowers are large, of a violet-blue color, and with the upper of the five petals developed into a hoodlike appendage. The fruit consists of three small pods. All parts of the aconite are highly poisonous, but the root and leaves only are used in medicine. Their virtues depend on an alkaloid, *aconitine*, which is one of the most virulent poisons known. Aconite produces sensory and motor paralysis, and especially affects the heart, directly lessening the force and frequency of its beats. In fatal dose it kills by cardiac and respiratory paralysis, the symptoms resembling those of death by hemorrhage. Aconite is used to moderate the heart's action in acute febrile complaints and in cases of inflammation of the tonsils and throat. Digitalis is its physiological antidote. Preparations of aconite are used externally to relieve local pains.

Ac'orus Cal'amus (sweet flag), a medicinal plant of the family *Araceæ*. Its aromatic stem (rhizoma) is used as a stomachic and tonic. It is a native of both continents.

Acotyledonous (ä-köt-l-ëd'ün-üs) Plants, old term applied to flowerless plants, as ferns, mosses, fungi, etc.; now rarely used. See DICOTYLEDON; MONOCOTYLEDON.

Acous'tics. See SOUND.

Acqui (äk'wë), town of Italy, province of Alessandria, on the Bormida; 21 m. SSW. of Alessandria. Here are a royal college and ruins of an old Roman aqueduct. Acqui is of great antiquity; and its hot sulphur baths were known to the Romans, who called the place *Acquæ Statiellæ*. Pop. (1901) 13,786.

Acquit'tal, a release from any obligation; in criminal law a judicial deliverance from a charge of guilt. The U. S. Constitution provides that "no person shall be twice put in jeopardy for the same offense." This prevents a second trial for the same offense after an acquittal.

Acre (ä'kër), **Ak'ka**, or **St. Jean d'Acre**, port of Syria, on Mediterranean, 30 m. S. of Tyre. It was taken by the Crusaders, 1104; retaken by Saracens, 1187; in 1191 recovered by the Crusaders (under Guido of Jerusalem, Philip of France, and Richard I of England), and held till they were driven out of Palestine in 1291. Bonaparte unsuccessfully besieged it for sixty days in 1799. In 1840 it was bombarded and captured by the English fleet. Pop. abt. 10,000.

Acrelius (ä-crill'ë-ös), Israel, 1714-1800; Swedish clergyman; b. Ostaker; in charge of Swedish congregations on the Delaware, 1749; returned to Sweden, 1756; wrote description of Swedish colonies in America, 1759.

Acroceraunia (ä-crö-së-rä'n-i-ä), ancient name of chain of mountains on W. coast of Greece, extending into sea; so called because violent thunderstorms frequent the region. Modern name is Chimara. The Acroceraunian promontory is Cape Linguetta.

Acro-Corinthus (ä'krö-kö-rin'thüs), steep, rocky hill near Corinth, Greece, about 2,000 ft. high, where stood the Acropolis of Corinth.

Acro'lein, **Acryl'ic Al'dehyde**, C₂H₃O. A pungent body produced when neutral fats are subjected to destructive distillation. It is acrolein that acts so strongly on the eyes in cooking when fats are heated too high.

Acromegaly (äk-rö-mëg'ä-ll), an abnormal growth chiefly in the bones of the face and extremities, usually associated with headaches, somnolence and eye symptoms. The disease may persist for fifteen or twenty years, and is supposed to be caused by a disordered action of the pituitary gland. Certain persons exhibited as giants, or who have been "strong men" and wrestlers, have become acromegalic, and the skulls of some giants show enormous enlargement of that portion of the skull called the sella turcica, upon which the pituitary gland rests. It is thought that the abnormal growth of giants is, like acromegaly, due to superfunction of the pituitary gland.

Acrop'olis, citadel of an ancient Grecian city, usually built on the top of a hill. The Acropolis of Athens was especially celebrated, and was adorned with the Temple of Minerva or Athena, called the Parthenon, the Erechtheum, the Propylæa or gatehouse, and a number of smaller buildings, monuments, and statues, among which was a colossal statue of Athena which must have been visible many miles at sea.

Act, in dramatic literature, a division of a drama, subdivided into scenes; in legal and political language, a law or statute approved and ordained by legislation, as an act of Congress, act of Parliament, etc.; in English universities, a debating exercise performed by students before they receive a degree.

Act of Set'tlement, in British history, the title of statutes 12 and 13 of William III, c. 2, by which the Crown was limited to the house of Hanover, and all Roman Catholics excluded from the throne.

Act of Suprem'acy, statute by which the supremacy of the British Crown in ecclesiastical matters within the realm was established (1 Eliz. c. 1).

Act of Uniform'ity, any one of the acts passed by parliament of England, 1549, 1559, and 1662, to secure in every congregation of the Church of England the same form of public prayer, administration of sacraments, and other rites. The act passed 1662 is still in force, in amended form.

Act'a Diur'na (daily acts), also called **ACTA POPULI**, official gazette or journal published by authority in ancient Rome; contained brief notices of transactions of public assemblies,

legal tribunals, etc., as well as of private events—births, marriages, divorces, deaths, etc.

Acta Eruditorum (acts of the learned), first literary journal founded in Germany; established at Leipzig, 1682, by Otto Mencke and others; it continued till 1782.

Acta Martyrum (acts of the martyrs), collection of the lives of Christian martyrs; most noted is that of Ruinart (Paris, 1689), commemorating the martyrs of the first four centuries.

Acta Sancto'rum (acts of the saints), collection of the lives of Christian saints of all ages; most extensive is that of the Jesuit Bollandists, which begins with January and follows the calendar. The first volume appeared in 1643; the sixty-fifth in 1892.

Actæon (äk-tě'ôn), in Greek mythology a famous hunter, grandson of Cadmus; said to have been changed into a stag and killed by his hounds because he had seen Diana bathing.

Actian Games, games celebrated at Actium, Greece, in honor of Apollo; were restored by Augustus to commemorate his victory over Antony at Actium, 31 B.C.

Actiniidæ, a family of radiated marine animals, the sea-anemones, closely allied to the coral polyps, but growing singly instead of in colonies, and possessing no hard skeleton. They are cylindrical in form, with very contractile muscular walls, and attach themselves very firmly by one end, the pedal disk. The upper end of the cylinder is closed by the oral



ONE OF THE ACTINIDÆ.

disk, which bears around its margin several rows of hollow tentacles. The mouth is an oval slit in the center of the disk, and from its edge an esophageal tube, often called the "stomach," hangs downward, and opens freely below into the general body cavity. Its peripheral portion is divided into a number of compartments by means of thin partitions, which extend inward from the body wall, many of them joining the esophagus. Below the latter their inner edges are free, and bear the gastric filaments together with other long, slender threads, richly provided with batteries of stinging cells. A nervous system is developed, but special sense organs seem to be wanting. They occur in vast numbers along the shores, and often fairly carpet the rocks exposed at low tide. When disturbed, or when

thus exposed, they contract themselves into an unsightly ball, withdrawing from view the sensitive oral disk and its tentacles, leaving exposed only the tougher body wall. The latter is often covered with sand and broken shells, and the contracted animals thus simulate in color the rocks to which they are attached.

Actinism, the chemical action of light. The rays of the sun produce heat, light and chemical action. All rays, without exception, produce heat when intercepted, in direct proportion to their kinetic energy. All, so far as known, have chemical action; a single group only, lying between narrow limits as to wavelength, affects the eye. The actinic or chemical action of light is essential to many processes in nature, such as the formation of chlorophyll and the accompanying reactions so necessary to plant life, and it is the underlying principle of photography. The actinic property or force begins among the green rays and extends a long way beyond the visible spectrum. See LIGHT.

Actinom'eter, an instrument for measuring the sun's radiation. The principle made use of consists in determining the initial rate of heating of a thermometer bulb when exposed to the direct rays of the sun, the water equivalent of the bulb being known. The loss by radiation, etc., is controlled by surrounding the bulb by a spherical shell, which is maintained at a constant temperature.

The name has also been applied to instruments for measuring the brightness of daylight or sunlight by means of its chemical action.

Actinomorph'ic Flow'ers, those whose parts, especially the petals, are regularly repeated about a center, as in the rose and daisy. Zygomorphic flowers, such as the sweet pea, have no such regularity of structure.

Actinomycosis (äk-ti-nō-mi-kō'sis), a chronic infective disease more commonly affecting cattle than men, produced by the ray-fungus, *Streptothrix actinomyces*. In most cases the mouth and adjacent parts are greatly swollen, hence called "big jaw." The treatment is surgical, but potassium iodide has proved beneficial.

Act'ion, a proceeding before a court of law to obtain redress for the infringement of a right. Such a proceeding in equity is termed a suit. These are civil actions. Criminal actions are prosecuted in the name of the state against the person charged with a crime. If an action must be brought in a particular locality it is local, otherwise it is called transitory. Statutory actions are based on statutes; those not founded on statute are common-law actions. The tendency in law now is to abolish the old subtle distinctions and establish a single form of civil action embracing both law and equity. See CASE; SUIT.

Actium (äk'shē-ūm), now called AZIO, promontory and town of ancient Greece, in Acarnania, near the entrance of the Ambracian Gulf, where occurred the great naval battle,

31 B.C., between Octavius Cæsar and Mark Antony, in which the former gained a decisive victory.

Acts of the Apostles, fifth book of the New Testament, usually attributed to Luke; contains the history of the period from the ascension of Christ to the first captivity of Paul in Rome, that is, from abt. 30 to 63 A.D.

Ac'tuary, a clerk; one who keeps records; especially those officers of insurance and business corporations who apply the mathematical doctrine of chances to financial affairs.

Acupunc'ture, surgical operation for puncturing a diseased part with needles, for curative effects; practiced in the Orient from prehistoric times; also in vogue among W. nations, and largely used in Europe during Middle Ages.

Adagio (ä-dä'jō), at ease, Italian musical term, denoting slow movement of measure of time.

Adal (ä-däl'), narrow tract of E. Africa, bordering on Red Sea, and extending from Massowah to the Strait of Bab-el-Mandeb; has two great salt plains, Asali in the N. part and Aussa in the S. Noted salt lake of Bahr Assal is 570 ft. below sea-level.

Adalbert (äd'al-bért), abt. 1000-72; German ecclesiastic; b. Saxony; archbishop of Hamburg and Bremen, 1043; 1050, Leo IX made him legate to the North. Planned to combine Germany and Scandinavia into a N. patriarchate; but was frustrated by resistance of the Norwegian king Harald, by intrigues of Cardinal Hildebrand, and by death of his patron, Henry III.

Ad'am, first man; supposed to have been created, according to Hebrew chronology, 4004 B.C., and according to Septuagint chronology 5411 B.C.

Adam (äd-än'), **Mme. Edmond** (*née Juliette Lamber*), 1836- ; French authoress; b. Verberie; married first M. la Messine, and afterwards Edmond Adam. Mme. Adam remained in Paris during the siege, and published her experiences in "Le Siège de Paris: Journal d'une Parisienne," 1873, which was followed by numerous works on political and social subjects. Founded the *Nouvelle Revue*, and conducted it, 1879-86.

Ad'am, Robert, 1728-92; British architect; b. Kirkcaldy, Scotland; designed the university, St. George's Church, and the Register House, Edinburgh; wrote on ruins of palace of Diocletian at Spalatro, 1764, considered most important archæological book of eighteenth century after that of Stuart and Revett.

Adam of Bre'men, d. 1072; German ecclesiastic; author of "The Propagation of the Christian Religion in North Germany and Scandinavia" from time of Charlemagne to Henry IV, to which is added "A Geographical Description of Denmark and the Countries beyond Denmark." It contains a distinct mention of America, which had been discovered by the Norsemen.

Adam of Mur'imuth, abt. 1286-1370; English chronicler; ambassador to Rome, 1323; vice-general to archbishop of Canterbury, 1325; his chronicle covered the period 1306-46 and was continued to 1380.

Adam of Orl'ton, d. 1345; English prelate; b. Hereford, Eng.; successively bishop of Hereford, Worcester, and Winchester; aided barons against Edward II; tried for treason. Had great political influence under Edward III.

Ad'amant, ancient name for diamond; also used to denote any substance of extraordinary hardness and strength or durability.

Adamawa (ä-dä-mä'wä), or **Fumbina** (föm-bé'na), semi-independent territory in central Africa; formerly considered province of kingdom of Sokoto, now within sphere of interest of German Kamerun protectorate; is in part on upper waters of Benue River, in part in Kongo basin, and in part drained directly into the Bight of Benin. Occupied by various African tribes, but political ascendancy is held by race called the Fulbe; capital Yola.

Adami (ä-dä'mé), **John George**, 1862- ; British educator; b. Manchester, England; fellow and director of natural science studies at Jesus College, Cambridge, 1891-92; then Prof. of Pathology at McGill Univ., Montreal, Can.; pathologist of the Montreal General Hospital, 1892-95, of the Royal Victoria Hospital, 1894, and Middleton Goldsmith lecturer of the New York Pathological Society, 1896.

Ad'amites, heretical sect said to have sprung up in N. Africa in the second century. Rejected marriage and appeared naked in their assemblies. Name also assumed by a sect of fanatics in Bohemia in fifteenth century, who advocated a community of wives.

Ad'amnan, Saint, abt. 625-704; abbot of the early Irish Church; b. Donegal; elected abbot of Iona, 679; author of "Vita Sancti Columbæ," the chief source of information about early Scotch-Irish Church.

Ad'ams, Alvin, 1804-77; founder Adams Express Company; b. Andover, Vt.; started opposition to William Arnden's express route between New York and Boston, first in the U.S., from which the present concern has grown.

Adams, Charles Francis, 1807-86; American diplomatist; son of John Quincy Adams; b. Boston; nominated for vice-president by the Freeholders, 1848; elected to congress by Republican Party, 1858 and 1860; minister to Great Britain, 1861-68, the duties of which position were, during the Civil War, arduous and critical; an arbitrator on the Alabama Claims, 1871. Published "Life and Works of John Adams."

Adams, Hannah, 1755-1832; American author; one of the first women in the U. S. to engage in literary pursuits; b. Medfield, Mass.; wrote "View of Religions"; "History of New England"; "Evidences of Christianity"; "History of the Jews"; "Letters on the Gospels," etc.

Adams, John, 1735-1826; second President of the U. S.; b. Braintree, Mass.; admitted to bar, 1758; removed to Boston, 1768; became a courageous and prominent advocate of the popular cause; and was chosen a member of the general court (legislature), 1770. Member of First Continental Congress, in which he advocated the movement for independence when the majority were inclined to temporize and to petition the king. May, 1776, he moved and carried a resolution in Congress that the colonies should assume the duty of self-government. In June a resolution that the U. S. "are and of right ought to be free and independent" was moved by Richard Henry Lee, seconded by Mr. Adams, and adopted by a small majority. Mr. Adams was a member on the committee of five appointed June 11 to prepare a declaration of independence, in support of which he made an eloquent speech. Chairman of the board of war, appointed June, 1776; sent as commissioner to France, 1778, returned, July, 1779. With Franklin and Jay he negotiated a treaty of peace and commerce with Great Britain, 1782; minister to Great Britain, 1785-88; vice-president, 1789 and 1792; president 1796, receiving 71 electoral votes, while his competitor, Thomas Jefferson, received 68 votes. Federal candidate for the presidency 1800, but was defeated by Jefferson; then retired from public life.

Adams, John Couch, 1819-92; British astronomer; b. Cornwall, England; president R. A. S., 1851; Lowndean Prof. of Astronomy and Geometry, Cambridge, from 1859 till his death; director Cambridge Observatory from 1861; ascertained that the irregularities in the motion of Uranus were caused by attraction of a planet then unknown, thus sharing with Leverrier the honor of the discovery of Neptune.

Adams, John Quincy, 1767-1848; sixth President of U. S.; b. Braintree, Mass.; son of President Adams; admitted to bar, 1791; minister to The Hague, 1794, and to Berlin, 1797; U. S. Senator, 1803-08, separated from Federal Party; minister to Russia, 1809; peace commissioner, 1814; minister to Great Britain, 1815; U. S. Secretary of State, 1817-25. In 1824 received eighty-four electoral votes for the presidency, Jackson 99, Crawford 41, and Clay 37. As none had the requisite majority, the election devolved on the House of Representatives, which chose Mr. Adams, owing to the influence of Henry Clay, whom Mr. Adams nominated Secretary of State. His administration was opposed by a powerful party, formed by a coalition of the Jacksonians with the friends of Crawford. This party, uniting on Jackson as their candidate, triumphed in 1828, when Adams received only 83 out of 261 electoral votes. After retiring from the presidency he represented his district in Congress for seventeen years, maintaining a nonpartisan position.

Adams, Samuel, 1722-1803; American patriot; b. Boston; elected to the general court of Massachusetts, 1765; was such an unflinching advocate of the popular cause that he was

one of the two leading patriots who were excepted from a general pardon offered, 1775; member of the First Continental Congress; a signer of Declaration of Independence; member of the State Convention which ratified the Federal Constitution, 1788. His political affinities connected him with the Republican (or Jeffersonian) Party. Elected governor of Massachusetts, 1794; reelected twice; retired to private life, 1797.

Adams, Sarah Flower, 1805-48; British poet; b. Great Harlow, England; author of hymn, "Nearer, My God, to Thee."

Adams, William Taylor, 1822-97; popularly known as OLIVER OPTIC; American author; b. Medway, Mass.; published about one hundred works for children—viz., "The Riverdale Series"; "Young America Abroad Series"; "Great Western Series," etc.; edited *Student and Schoolmate*, 1858-66; *Our Boys and Girls*, 1867-75; *Our Little Ones*, 1886; and *Oliver Optic's Magazine*.

Adam's Bridge, chain of sand-banks and coral reefs extending from the NW. point of Ceylon to the coast of India. More than 30 m. long.

Adam's Peak, mountain in Ceylon; height, 7,230 ft.; considered by Buddhists as the holy center of the world. A temple is situated on the summit, under which footprints of Buddha and Sripadam (i.e., luck) are shown. The Mohammedans consider it a holy mountain, but ascribe the footprints to Adam, who is said to have here mourned, standing on one foot, for one thousand years, his expulsion from Paradise.

Adansonia, genus of plants of family Sterculiaceae; named in honor of the naturalist, Adanson. The *A. digitata*, or baobab, found in tropical Africa, is one of the largest trees in



ADANSONIA.

the world, its trunk often being more than 20 ft. in diameter. The fruit of the baobab is called monkey-bread. Some of these trees said to be five thousand years old.

A'dar, sixth month of the civil and twelfth of the ecclesiastical year of the Jews, beginning with the new moon of February.

Adda (äd'dä), river of N. Italy (ancient Ad'dua); rises among the Rhaetian Alps, flows through Lake Como, and empties into the Po 7 m. above Cremona. Napoleon gained several victories over the Austrians on its banks.

Ad'dams, Jane, 1860-; American philanthropist; b. Cedarville, Ill.; founder of social settlement of Hull House, Chicago; writer and lecturer on social and political reform; author "Respect for Law"; "Democracy and Social Ethics," etc.

Ad'dax, an antelope of N. Africa and Arabia with broad hoofs which enable it to stand



ADDAX.

firmly upon yielding sand. Its general color is milk-white with a patch of black hair on the forehead and a dark brown mane.

Ad'dison, Joseph, 1672-1719; British author and statesman; b. Milston, England. He enjoyed the friendship and patronage of

Dryden, Lord Somers, and Montague (Lord Halifax), the last of whom persuaded him to enlist as a Whig in the civil service of the state. Having, in 1699, received a pension, he visited France and Italy, and wrote a "Letter from Italy," in verse, addressed to Lord Halifax (1701). His next work was "The Campaign," a poem on the battle of Blenheim (1704), followed by "Travels in Italy," and "Rosamond," an opera. He was appointed under-secretary of state, 1706, and was elected to Parliament in 1708. His diffidence disqualified him for public speaking, but this defect was compensated by his success as a political writer. In 1709 he began contributing to *The Tatler*, of which his friend Richard Steele was the editor. In 1711, Addison and Steele began to issue daily *The Spectator*, the most famous periodical and miscellany that ever appeared in England. Addison wrote the best of essays, which form an epoch in literary history.

The Spectator ceased to appear daily in December, 1712, but was revived as a tri-weekly paper in 1714. Among his other works are the tragedy of "Cato," 1713; "Dialogue on Medals," and a series of able political papers called "The Freeholder," 1715. Addison was distinguished for his wit and colloquial powers.

Addison's Disease, an affection probably due to loss of the internal secretion of the adrenal glands. Its symptoms are weakness, irritability of the stomach, and bronzing of the skin. It is commonly due to tuberculosis of the adrenals, but may be preceded by injury such as a blow upon the back, or caries of the spine. The disease lasts from a few weeks to ten years and is usually fatal, but recoveries have taken place. Treatment consists of rest, to avoid syncope, tonics, bismuth, light diet, and suprarenal extract.

Adelaer (ä'däl-ër), Cort Siversten, 1622-75; Norwegian naval commander; b. Brevig; served in Dutch navy under Tromp, 1637-45; entered Venetian service; distinguished in many actions; with one ship broke through a Turkish fleet of 67 in the Dardanelles, and

destroyed 15 of the vessels, May 13, 1654; re-modeled Danish navy.

Ad'elaide, capital of S. Australia; on the Torrens River, 8 m. from its mouth; founded 1836; seat of an Anglican and a Roman Catholic bishop; contains government house, assay office, and extensive manufactures. Pop. (1901), with suburbs, 163,430. Port Adelaide, 7 m. NNW., is its commercial center.

Aden (ä'dën), Gulf of, sea lying between Arabia and Aden, from Strait of Bab-el-Mandeb to Indian Ocean or Arabian Sea; sometimes mapped as the Arabian Gulf; length, about 500 m.

Ad'enoids, popular term for overgrowth of lymphoid tissue in the upper throat, usually associated with enlargement of the tonsils and cervical glands. Occurs principally in children, who become mouth-breathers on account of the obstructed air passages. Adenoids cause faulty pronunciation, and produce a stupid expression with general dullness, catarrh, deafness and pigeon-breast. Unless they are removed the child tends to stunted growth and idiocy.

Aderno (ä-där'nö), ancient Adranum, town of Sicily; at foot of Mt. Etna; 17 m. NW. of Catania; remarkable for its convents and nunneries and the portions of the ancient city still extant. Pop. (1901) 25,859.

Adet (ä-dä'), Pierre Auguste, 1763-1832; French politician; b. Nevers; sent by the French directory as ambassador to the U. S. 1795, but suspended his functions 1797, for the alleged reason that the U. S. Govt. had violated its neutrality.

Adhe'sion, Force of, the resistance of friction which exists between two surfaces at the moment when one begins to slide on the other. It is approximately proportional to the normal pressure between the two surfaces. The adhesion of the driving-wheels of a locomotive upon the rails of a track is about one fourth or one fifth of the weight that rests upon them. If the frictional resistances are greater than the adhesion, the wheels will revolve and the locomotive move forward; if the frictional resistances are less than the adhesion, the wheels will slip on the rails, and no forward motion will result. The force of traction is measured in any particular case by the horizontal pull required to start a locomotive with its train, and the greatest load which a locomotive can draw is that which has a frictional resistance equal to the adhesion. See COHESION.

Adhesive Plaster. See STICKING PLASTER.

Adiaph'orites, name given to Melanchthon and his adherents charged with making serious concessions to the Roman Catholics in the Leipzig Interim of 1548, under adiaphora or non-essentials. Chief opponents of Melanchthon were Flacius and Amsdorf.

Adige (ä'dë-jä), river of Italy; rises among the Alps in the Tyrol, where it is called the Etsch, and falls into the Gulf of Venice about 13 m. NE. of Adria; a rapid stream, about 220 m. long.

Adipocere (ăd'ī-pō-sēr), corpse fat; a result of the decomposition of animal bodies; it resembles spermaceti, or a mixture of wax and fat. Corpses buried in wet ground without access to air are often reduced to adipocere and supposed to be petrified.

Ad'ipose, of the nature of fat; fatty. Adipose tissue is an animal tissue which contains the fatty matter. It presents an aggregation of very small spherical pouches or vesicles filled with fat or oil. This tissue is organized and vital, but the fat is not. See **FAT**.

Adiron'dack Moun'tains, tract in NE. New York, including parts of Hamilton, Essex, Franklin, and Clinton counties; area 5,000 sq. m. Among its peaks are Mt. Marcy, 5,379 ft.; Mt. McIntyre, 5,183 ft.; and Mt. Dix, 4,916 ft., the highest summits in the state.

Ad'jective Law, rules of procedure or practice, as distinguished from substantive law which the courts are established to administer.

Ad'jutant-Gen'eral, the principal agent of the commander of an army in publishing orders. The laws of the U. S. provide for one adjutant-general, with the rank of brigadier-general, made by regulations chief of a bureau of the war department, and charged, under the general, with details affecting army discipline, with the recruiting service, records, returns, etc. The bureau duties of adjutants-general are: publishing orders in writing; making up written instructions, and transmitting them; reception of reports and returns; disposing of them; forming tables showing the state and position of corps; regulating details of service; corresponding with the administrative departments relative to the wants of troops; corresponding with the corps, detachments, or individual officers; and the arrangement and care of the records and papers of his office. The active duties of adjutants-general consist in establishing camps; visiting guards and outposts; mustering and inspecting troops; forming parades and lines of battle; the conduct and control of deserters and prisoners; making reconnaissances.

Ad'ler, Felix, 1851- ; American educator; b. Alzey, Germany; Prof. Hebrew and Oriental Literature, Cornell, 1874-76; established Society for Ethical Culture, 1876; Prof. Social and Political Ethics, Columbia, 1902.

Admetus (ăd-mē'tūs), son of Pheres, mythical founder and first king of Pheres, Thessaly. One of the Argonauts; took part in the Calydonian Hunt; won Alcestis by coming to the suit in a chariot drawn by boars and lions, a condition imposed by the bride's father, Pelias. Apollo procured from the Fates a grant that Admetus might be exempt from death if his father, mother, or wife should die for him. The story of Alcestis and her devotion, death, and restoration to life, forms the subject of one of the most celebrated tragedies of Euripides.

Administra'tion, the action of the executive department of government. In law it signifies

the management or disposition of the personal estate of an intestate or of a testator having no executor; in the U. S. generally under the jurisdiction of the probate or orphans' or surrogates' courts, administration is in general committed preferably to the widow or husband, to the children, if both parents are dead, and if there are no children then to the other next of kin. The court grants the administrator letters of administration as evidence of his authority. He must make an inventory of the personal estate, collect the assets, convert the property into cash, pay the debts, render an account, and distribute the balance in his hands among the persons entitled to it. When there is a will but no executor, the administration is granted to an administrator "with the will annexed," as the will is to guide him. Should an administrator die before his duties are fulfilled, another is appointed to perform the residue of his functions, called "administrator *de bonis non*." Where there are assets in another state or country, a subordinate administrator is appointed, under the direction of the foreign court, who remits any funds to the principal administrator.

Admin'istrative Law, that branch of public law which deals with the various organs of the sovereign power considered as in motion. It includes such subjects as collection of the revenue, the collection of statistics, sanitary measures, regulation of military and naval forces, organization of schools, supervision of places of amusement, protection of the coinage, poor laws, etc.

Ad'mirable Crichton (krī'tōn), The. See **CRICHTON**.

Ad'miral, the title of a naval officer of the highest rank, vice-admiral is the title of the officer next in rank, and a rear-admiral is the third in the scale. Admirals are frequently called flag-officers, from the fact that the symbol of their rank is a flag.

The grades of rear-admiral and commodore in the U. S. navy were first established by Act of July 16, 1862, which provided that the number of each grade shall not exceed 9 rear-admirals, 18 commodores, 36 captains, etc. In December, 1864, the President was authorized to appoint from the rear-admirals one vice-admiral, who should be the ranking officer in the navy of the U. S., and whose relative rank with officers of the army shall be that of lieutenant-general in the army. This grade was created for and bestowed upon Rear-admiral Farragut. Following the Act of July 25, 1866, the rank of admiral was bestowed upon Vice-admiral David Farragut, succeeded by D. Porter. A law was passed abolishing grades of admiral and vice-admiral when they became vacant by the deaths of the distinguished officers who held them. The grade of admiral was revived and conferred upon George Dewey in February, 1899.

Ad'miralty, the tribunal which has cognizance of maritime causes, civil or criminal, such as maritime contracts, affreightment, repairs of ships, bottomry bonds, pilotage, seamen's wages, salvage, collisions, and maritime

trespasses in general. The principles and practice in civil admiralty cases are in the main derived from the Roman or civil law. See SHIPPING LAWS.

Admiralty Droits, in Great Britain one tenth of the amount realized from the sale of derelict property found at sea; now payable to the public treasury, but formerly claimed by the lord high admiral.

Admis'sions, acknowledgments by a person of the existence of certain facts which are admissible in evidence against the party making them. An admission may be either direct or implied from conduct, or in some instances even from silence.

Ado'be, sun-dried bricks made of sandy loam, of which houses are built in Mexico, Arizona, California, and Central America.

Adolphus (ä-döl'fūn), or **A'dolph of Nassau**, abt. 1252-98; emperor of Germany; succeeded Rudolph of Hapsburg, 1292. In 1298 the German princes transferred the imperial crown to Albert; Adolphus refused to abdicate; war ensued; and Adolphus was killed in battle near Worms.

Adolphus Fred'rick, 1727-71; duke of Holstein-Gottorp; became king of Sweden April 5, 1751. The Swedish nobles so continued their arrogance that he threatened to resign, and in consequence Parliament revoked the restrictions of the royal prerogatives.

Adonai (äd-ō-nā'i), applied in Hebrew scripture to God. Owing to the veneration of Hebrews for the name of the Deity, Jehovah (or Yahveh) was not pronounced, but Adonai was read instead.

Adonis (ä-dō'nīs), youth celebrated in ancient poetic legends as a model of beauty and a favorite of Venus; addicted to the pleasures of the chase, he was killed by a wild boar. An annual festival in his honor was celebrated in Asia Minor and other countries on the Mediterranean. He was called Thammuz by Hebrew writers.

Adopt'ian Con'troversy, a controversy which originated in Spain near the end of the eighth century. Felix, bishop of Urgel, and Elipandus, archbishop of Toledo, advanced the doctrine that Christ was by nature and generation the Son of God only as regards His divine nature, but as to His human nature He was merely the Son of God by adoption. Those who espoused these views were called Adoptionists (in Latin *Adoptiani*). No particular notice was taken of them so long as they confined the propagation of their opinions to Mohammedan territory, but when they undertook to spread the new doctrine in the Frankish Empire Charlemagne promptly put a stop to it by convening two synods, one at Ratisbon (792), another at Frankfort (794), both of which condemned Adoptionism as heresy.

Adora'tion, in the Roman Catholic Church, the worship of God, honors given to the Virgin Mary or to angels and saints. In art, an adoration is a representation of the Magi.

Adowa (ä'dō-wā). See ADUA.

Adrastea (äd-rās-tē'ä), Greek surname or epithet for the goddess Nemesis, who administered retribution for iniquity. Also a nymph of Crete, to whom, with Ida and the Curetes, Rhea intrusted the infant Zeus in the Dictæan grotto.

Adrastus (ä-drās'tūs), king of Argos, and contemporary of Theseus; father-in-law of Polynices. Commanded the so-called war of the "Seven against Thebes," to restore Polynices to the throne. The enterprise failed, but was a favorite theme of ancient poets.

Adria (ä'drī-ä), or **Ha'dria**, ancient town of Italy, between the Po and the Adige, 13 m. E. of Rovigo; once a seaport on the Adriatic; now 14 m. inland. Pop. (1901) 11,310.

Adrian (ä'drī-än), emperor of Rome. See HADRIAN.

Adrian, the name of six popes. The most important were, ADRIAN I, d. 795; b. Rome. His dominions were invaded by the Longobards, against whom he was defended by Charlemagne. ADRIAN II, d. 872; b. Rome. During his pontificate, Photius, patriarch of Constantinople, withdrew from the church of Rome, starting the schism between the Greek and Latin Church. ADRIAN IV (Nicholas Breakspear), the only English pope, b. near St. Albans; d. 1159; he was a strenuous asserter of papal supremacy; he granted Henry II a bull for the conquest of Ireland, excommunicated the king of Sicily and consecrated Emperor Frederick king of the Romans.

A'drianists, disciples of Simon Magus, who flourished abt. A.D. 34; probably a branch of the Simonians, named from some prominent disciple.

Adrianople (äd-rī-än-ō'pl), ancient *Adrianopolis*, "Hadrian's city"; Turkish *Edrench*. City of European Turkey; on Tundja River, near its confluence with the Maritza (ancient *Hebrus*), 137 m. WNW. of Constantinople; capital of Ottoman Empire, 1361-1453. Contains famous mosque of Sultan Selim, finest Moslem temple extant. City has extensive manufactures of silk, cotton, and woolen stuffs. Pop. 81,000.

Adua (äd'wä), capital of Abyssinian province of Tigré; on a plain 6,500 ft. above sea-level, near ruins of Aksum, the former capital; most important commercial center of Abyssinia. Near Adua the Abyssinians under Menelek defeated the Italians under Gen. Baratieri, March 1, 1896, and recovered the province that Italy had annexed. Pop. abt. 3,000.

Adullam (ä-dül'äm), city of Judah; ancient seat of a Canaanite king; here is the famous cave of King David in a hill about 500 ft. high.

Adultera'tion, addition to an article of any substance for the purposes of gain, or deception. Nearly every article made for man's use is or has been so debased. It is urged that popular taste demands certain adulterations; *c.g.*, pickles and peas colored green with cop-

per salts often find a readier sale than those uncolored; that the public demands cheapness; so articles more or less spurious are produced; that certain additions must be made to preserve perishable foods. Numerous substances are employed according to the aim. For increase of bulk or weight a cheaper inert substance is added. To increase attractiveness, coloring matter is used; to add flavor, a cheap compound, usually made from essential oils or ethers. Adulteration for bulk so reduces the natural color and flavor that artificial coloring and flavoring essences are necessary to conceal the fraud. Owing to the disclosure of methods employed in meat packing, 1905-6, Congress enacted a stringent meat inspection law; also a pure-food bill which went into effect January 1, 1907.

The most serious adulteration is in connection with the milk supply. Milk is often the exclusive food of babies and invalids, so that any deleterious substance added to it affects a most susceptible class. It is very easy to adulterate milk, and the profits are enticing. The adulteration of milk is now usually effected by the addition of water, of coloring matter such as annatto, turmeric, and of antiseptics or antiferments, such as carbonate of soda, borax, etc., or by the removal of the cream, either wholly or in part. See PURE FOOD LAWS.

Adultery, sexual intercourse between two persons who are not husband and wife, and one or both of whom are married. Among some nations this act was rigorously punished—often with death. A civil action, for criminal conversation, for damages may by common law be brought by a husband against one who has committed adultery with his wife. It is also a ground for divorce. In some states adultery is a crime, in others the English law prevails, and only civil proceedings are allowed.

Ad valo'rem Du'ty, a tax calculated upon the value of an article.

Advance'ment, a provision made by a parent for a child in anticipation of the distributive share such child would receive at the parent's death. An expenditure for education and maintenance of a child is not an advancement; it must be made with a view to a portion or settlement in life. An advancement reduces the child's share, estimating the value as of the time of the receipt. It differs from a debt as it cannot be recovered but only deducted from a distributive share. Advancement is also used in the law of trusts to indicate that a purchase of land made in the name of a wife or child or other person to whom the purchaser stands in the place of a parent shall actually belong to such person, and shall not, by the fiction of a resulting trust, revert to the purchaser.

Ad'vent, the four weeks preceding Christmas. Catholics and many Anglicans observe advent by abstaining from public amusements and nuptial festivities. The Greek Church makes the period six weeks.

Ad'ventists, a Christian sect who believe in the speedy advent or second coming of Christ.

They are congregational in church government, practice immersion, and in general hold orthodox views. Except the evangelical Adventists, they believe in the ultimate annihilation of the wicked, and the sleep of the dead until final judgment. They are divided among six denominations (Adventists, Seventh-day Adventists, The Church of God, Life and Advent Union, Age-to-Come Adventists, Advent Christians). All branches report (1908) 1,569 ministers, 2,544 churches, and 99,298 church members.

Ad'verb, a part of speech in grammar. The adverb in all languages is indeclinable, though sometimes subject to the change of form known as comparison, and expresses some modification of a verb, adjective, or other adverb, as to place, time, cause, manner, intensity, certainty, conditionality, quality, quantity, etc. Its function is often performed by a sentence or part of a sentence. Most English adverbs are formed by adding *ly* to an adjective or its root.

Advertise'ments, in ecclesiastical history, certain principles, rules, suggestions, and directions drawn up by the Elizabethan bishops, and issued for the guidance and direction of the church.

Ad'vocate, Lord, the public prosecutor of criminals and the senior counsel for the Crown in civil causes in Scotland; sometimes styled king's, or queen's, advocate.

Ad'vocate of the Church, in Middle Ages, a canon or layman, often a prince or baron, who assumed protection of a bishop's see, monastery, or a particular church.

Advoca'tus Diab'oli (i.e., the devil's advocate), in the Roman Catholic Church, one whose business is to magnify the faults or detract from the merit of those who are proposed to be canonized as saints; he is opposed by an *advocatus Dei*, or God's advocate.

Advow'son, in English law, the right of presentation to a benefice in the church; defined by Blackstone as an incorporeal hereditament, of which no bodily possession can be had, but which exists solely in contemplation of law. The lord of a manor by building a church acquired the right of nominating the minister; this is called an advowson appendant. When the advowson is a personal right, independent of any manor or land, it is said to be in gross.

Ædile (æ'dīl), Roman magistrate who superintended the temples and other public buildings, the public games and spectacles, and performed various other duties.

Ædon (æ-ē'dōn), in Greek mythology a daughter of Pandareus of Ephesus. According to the "Odyssey" she was the wife of Zethus, king of Thebes. Envious of Niobe, her brother Amphion's wife, she attempted to slay the eldest son of the latter, but by mistake killed her own child, Itylus. Zeus changed her into a nightingale, whose sad notes are the expression of her woe.

Ægean (æ-jē'an) Sea, or Gre'cian Archipel'ago, name given by the ancients to that part of the Mediterranean between Asia Minor and

Greece; length from N. to S. about 400 m., breadth, about 200; incloses numerous islands, several of volcanic origin, while others are composed of white marble.

Ægina (ē-jī'nā), or **Egi'na**, island of Greece; in Gulf of Ægina (*Saronicus Sinus*), 20 m. SSW. of Athens; 8 m. long and nearly the same in width; area, 33 sq. m.; celebrated for its architectural remains. Pop. 6,000. At the NW. end is the modern town of Egina.

Ægina, Gulf of, portion of the Ægean Sea lying between Attica and the Morea. Contains islands of Ægina and Salamis.

Æginetan (ē-jin-ē'tān) **Sculp'tures**, ancient sculptures discovered on two pediments of a ruined Doric temple in island of Ægina abt. 1811. Removed and sold to the crown prince of Bavaria (afterwards King Ludwig I), who placed them in the Glyptothek at Munich. Much restored by Thorwaldsen, but are still of great value as specimens of Greek sculpture of a period shortly before its culmination.

Ægir (ē'gēr), in Scandinavian mythology, the god that presides over the stormy sea; entertains the gods splendidly every harvest and brews ale for them. The name still survives in provincial English for the sea wave in rivers.

Ægi'ra (ē-jī'rā), one of the twelve cities of the Achæan League. Probably stood near the sea and on the river Crius. Famous chiefly for temples of Zeus, Apollo, Artemis, and Aphrodite Urania, as well as of other divinities. Called Hyperesia by Homer.

Ægis (ē'jīs), shield of Zeus, so called (from *ai*, "she-goat") because, in his contest with the Titans, Zeus wore the hide of the goat Amaltheia, which had suckled him in his infancy, together with the head of the Gorgon.

Ægisthus (ē-jīs'thūs), in mythology, son of Thyestes, and adopted son of Atreus. Seduced Clytemnestra while Agamemnon was absent, and was her accomplice in the murder of that king. Killed by Orestes.

Ægium (ē'jī-ūm), city of ancient Greece; belonged to the Achæan League; after 373 was the chief city in that confederation; of which it was long the capital. Remains of its ancient buildings are yet to be seen.

Ægospotami (ē-gōs-pōt'ā-mī), small river and town in the Thracian Chersonese, where the Spartan Lysander defeated the Athenian fleet in 405 B.C. This victory ended the Peloponnesian war.

Ægyptus (ē-jīp'tūs), son of Belus and brother of Danaus, became king of Arabia, and conquered the country which derived from him the name of Egypt. According to legend he had fifty sons, who were murdered (except one) by the daughters of Danaus.

Ælius (ē'lī-ūs) **Sti'lo**, **Lucius**, a Roman knight from Lanuvium, regarded as the most learned man of his time (abt. 100 B.C.); and the first Roman philologist; teacher of Cicero and Varro; criticised and interpreted the early Latin

poets, the laws of the twelve tables, and the Salian hymn.

Æneas (ē-nē'ās), hero of Vergil's "Æneid," was, according to tradition, son of Anchises and Venus; valiant defender of Troy against the Greeks. According to Vergil, he, after many adventures and disasters, settled in Italy, and married Lavinia, daughter of King Latinus. The origin of the Roman state is traditionally ascribed to him and his heirs.

Æolia (ē-ō'lī-ā), or **Æ'olia**, region of Asia Minor, so called from the Æolians, who founded several cities on the coast. In Lesbos, and along the neighboring shores of the Gulf of Elea, they finally concentrated their principal colonies and formed a federal union, called the Æolian League, consisting of twelve states and several inferior towns.

Æolian Harp, a simple musical instrument, the sounds of which are produced by the vibration of strings moved by wind. It is formed by stretching eight or more strings of catgut tuned in unison, across a wooden box, which is placed in an open window, the overtones producing various chords.

Æolians, a primitive tribe of ancient Greeks; the dominant race of Thessaly and Bœotia; founded on W. coast of Asia Minor many states or cities, among which were Smyrna and Mitylene.

Æolus (ē-ō-lūs), son of Hellen, brother of Dorus, father of Sisyphus; ruled over Thessaly; reputed to be the founder of the Æolic branch of the Greek race. He was an astronomer, and the reputed inventor of sails. Often confounded with Æolus, "god of the winds," who was the son of Hippotas and reigned over the Æolian Islands.

Æ'on, an age, a period of time; also eternity. The Gnostics used the word *æons* as meaning distinct entities or virtues that emanated from God before time began.

Æpyor'nis, group, related to the cassowaries, of gigantic and recently extinct birds, whose remains are found in S. Madagascar. The thigh bone of the largest species exceeds in size that of an ox, and the egg of *Æ. maximus*, 13 by 9 in., has a capacity equal to 148 eggs of the hen. Probably reports of these great birds, or of their eggs, gave rise to the fable of the roc.

Æra'rians, a class of ancient Rome who did not belong to any of the tribes or centuries, and who had no civic rights except the protection of the state. Any citizen for bad conduct might be degraded to the rank of an *æra-rian*, but the punishment was not in all cases for life. The *Cærites* seem to have been *æra-rians*; at any rate, the disfranchisement of a citizen was called "being placed in the list of *Cærites*." This class probably included many merchants who came to Rome from the provinces without authority and were received into no tribe. *Æra-rians* paid a heavy tax, but were exempt from military duty.

Æra'rium, public treasury in the temple of Saturn at Rome, in which money, public accounts, and archives were kept. Besides the regular treasure, there was an *ærarium sacrum*, or reserve, and later a military treasury. The fund belonging to the populus, or patricians, was called publicum, and kept in a separate treasury, though in the same building.

Æ'rated Waters, acidulous or alkaline waters impregnated with carbonic-acid gas; the most common is carbonic-acid water, incorrectly called soda-water, as it seldom contains soda; made by placing marble in a vessel with sulphuric acid, when the carbonic-acid gas is evolved and forced into water under pressure, so that the water dissolves about five times its volume of the gas.

Æ'rians, heretical sect founded in the fourth century by Ærius, a native of Pontus. They were Homoiousians.

Æ'rodynamics (ä-ër-ö-dî-näm'iks), dynamics of the air and gases generally; the phenomena exhibited by gaseous bodies, at rest or in motion under the action of forces.

Æ'rolite. See METEORITE.

Æ'rom'eter, an instrument formerly used to make the necessary corrections in pneumatic experiments to ascertain the mean bulk of gases.

Æ'roplane (ä'ër-ö-plän). See FLYING MACHINES.

Æ'rostatic (ä-ër-ö-stät'ik) Press, machine for extracting by atmospheric pressure the coloring principle from raw material—wood, leaves, insects, etc.—used for dyeing. The material is placed in a vessel between two perforated horizontal partitions. Liquid is poured over the upper partition, and the air drawn from the bottom of a suction pump so that the liquid is forced through the material, carrying with it in solution the required dye.

Æ'rostatics, department of the science of mechanics which treats of the weight, pressure, and equilibrium of æriform fluids, and of the equilibrium of bodies sustained in them.

Æschines (ës'ki-nēs), 389-14 B.C.; Greek orator; greatest rival of Demosthenes; b. Athens; served with distinction at battle of Mantinea, 362 B.C.; in early life opposed to Philip of Macedon. Having been sent with other negotiators on an embassy to the Macedonian court, 347 B.C., he became a friend of Philip and an adversary of Demosthenes, who accused Æschines of receiving a bribe from the king of Macedon. Made a famous oration against Ctesiphon, because the latter proposed to reward Demosthenes with a golden crown, but was defeated in his contest by the eloquence of his rival; exiled 330 B.C.

Æschylus (ës'ki-lūs), 525-456 B.C.; creator of Greek tragedy; b. Eleusis, Attica; eldest of the three great tragic poets of Greece. He gained the first prize in tragedy 485, and composed over seventy pieces and gained thirteen prizes. According to tradition he was killed by a tortoise which an eagle let fall on his

bald head. Of his tragedies, only seven are extant: "Prometheus Bound," "The Seven Against Thebes," "The Persians," "The Suppliant Women," "Agamemnon," "The Choëphori," and "Eumenides."

Æsculapius (ës-kü-lä'pî-ūs), in classic mythology, the god of medicine; a son of Apollo. The poets feigned that he raised the dead to life—that he thus offended Pluto, who complained to Jupiter, who killed Æsculapius with a thunderbolt.

Æsir (ä'sér), general name of the beneficent deities of the Norsemen. The principal Æsir are Balder, Frey, Freyja, Frigga, Heimdall, Odin, Thor, Tyr, Vali, and Vidar.

Æsop (ës'öp), b. 620 B.C.; celebrated fabulist; supposed to have been a native of Phrygia; was a slave in his youth at Athens, but obtained freedom in consideration of his wit. Æsop became a generic name, and it is impossible to discern the original Æsopic fables.

Æsthet'ics, the philosophy of the beautiful; etymologically, the philosophy of perception. The name given to the branch of philosophy or of science which is concerned with that class of emotions, or with those attributes, real or apparent, of objects generally comprehended under the term beauty.

The principles of aesthetics were in ancient times discussed by Plato, Plotinus, and St. Augustine; and in their application to poetry by Aristotle and Horace; and in relation to eloquence by Quintilian, and to style by Longinus. The term was first used in its modern sense in the eighteenth century by Alexander Gottlieb Baumgarten, Prof. of Philosophy at Frankfort-on-the-Oder. Æsthetics relates to objects or qualities which appeal at once to the sensibilities, without any direct reference to the intellectual power.

There may be said to be two distinct schools, which differ radically respecting the true principles of æsthetic development and culture. The one, starting with the standard works of art, or with the most perfect models which nature offers us, and selecting from each what appears most pleasing or graceful, seeks, by means of these, either by direct imitation or indirect suggestion, to create a new work, which shall combine as many as possible of the elements of the original models. The merits of such a work cannot rise above the aggregate of the merits of the productions after which it has been copied. The other school, recognizing the fact that it is possible for transcendent genius to create forms of beauty which shall not only excel in their combined effect, but in their individual elements, everything that has ever been seen in nature or in art, seeks to cultivate the faculty of ideal conception, using the works of nature or the models of the great masters simply to improve the art of expression; or, in other words, the power to translate, as it were, our ideal conception into forms which can be understood and appreciated by the common mind. Those of this school would say that the very power of selecting the most beautiful forms, or the

most beautiful elements of any particular form, implies the existence of an ideal faculty; for if the mind has not some standard in itself, but is wholly dependent on what it sees for its conception of beauty, why should it not copy the faulty as well as the beautiful?

Æstiva'tion, to spend the summer, to retire for the summer season; in botany the manner in which the parts of a flower are folded in the bud before it has opened. The various forms of æstivation are called valvate, imbricated, contorted, induplicate, reduplicate, etc. See HIBERNATION.

Ætians (ä-ë'shî-äns), followers of Ætius, who was in the fourth century a deacon, and afterwards a bishop. He was an Arian, but considered a heretic by both orthodox and Arians. His doctrine was that Father and Son were entirely unlike in all respects; followers condemned in 359 A.D.

Ætius (ä-ë'shî-üs), incorrectly written Æti-us; lived abt. 400-54; Roman general; b. Mœsia. As commander of the Roman army in Gaul he gained important victories over Visigoths, Huns, and other barbarians abt. 425-30. Ætius and Theodoric commanded the army which in 451 checked the victorious hordes of Attila the Hun, and defeated him at Châlons. Ætius was suspected of treachery by Valentinian III, who killed him with his own hand.

Ætolia (ë-tô'llî-ä), state or country of ancient Greece; intersected by the river Evenus, the modern Phidaris or Fidaris. The ancient Ætolians were a warlike, barbarous, and rude people in the age of Pericles. Ætolia now forms, with Acarnania, a nomarchy of Greece.

Affida'vit, literally "he made oath"; an oath in writing made before some person who has authority to administer an oath and who appends an official statement to that effect, termed a "jurat." An affidavit is made *ex parte* and without cross-examination. An affidavit is "extra-judicial" when, though taken before an officer authorized to administer oaths, it is not itself required by law. See OATH; PERJURY.

Affin'ity, the relationship contracted by marriage between a man and his wife's kindred, and between a wife and her husband's kindred. See CONSANGUINITY.

Affinity, Chem'ical, that which holds the constituents together in a chemical compound. Thus water consists of hydrogen and oxygen held together in chemical combination; the attraction of substances for each other, or the tendency of dissimilar substances to unite. See CHEMICAL ANALYSIS; CHEMISTRY.

Affirma'tion, in law, a solemn declaration made by a witness as a substitute for an oath in a court of justice; used by Quakers and others who have conscientious scruples against oaths. In the U. S. the use of affirmations instead of oaths has become common, experience seeming to have shown that the value of evidence and the force of obligations are not

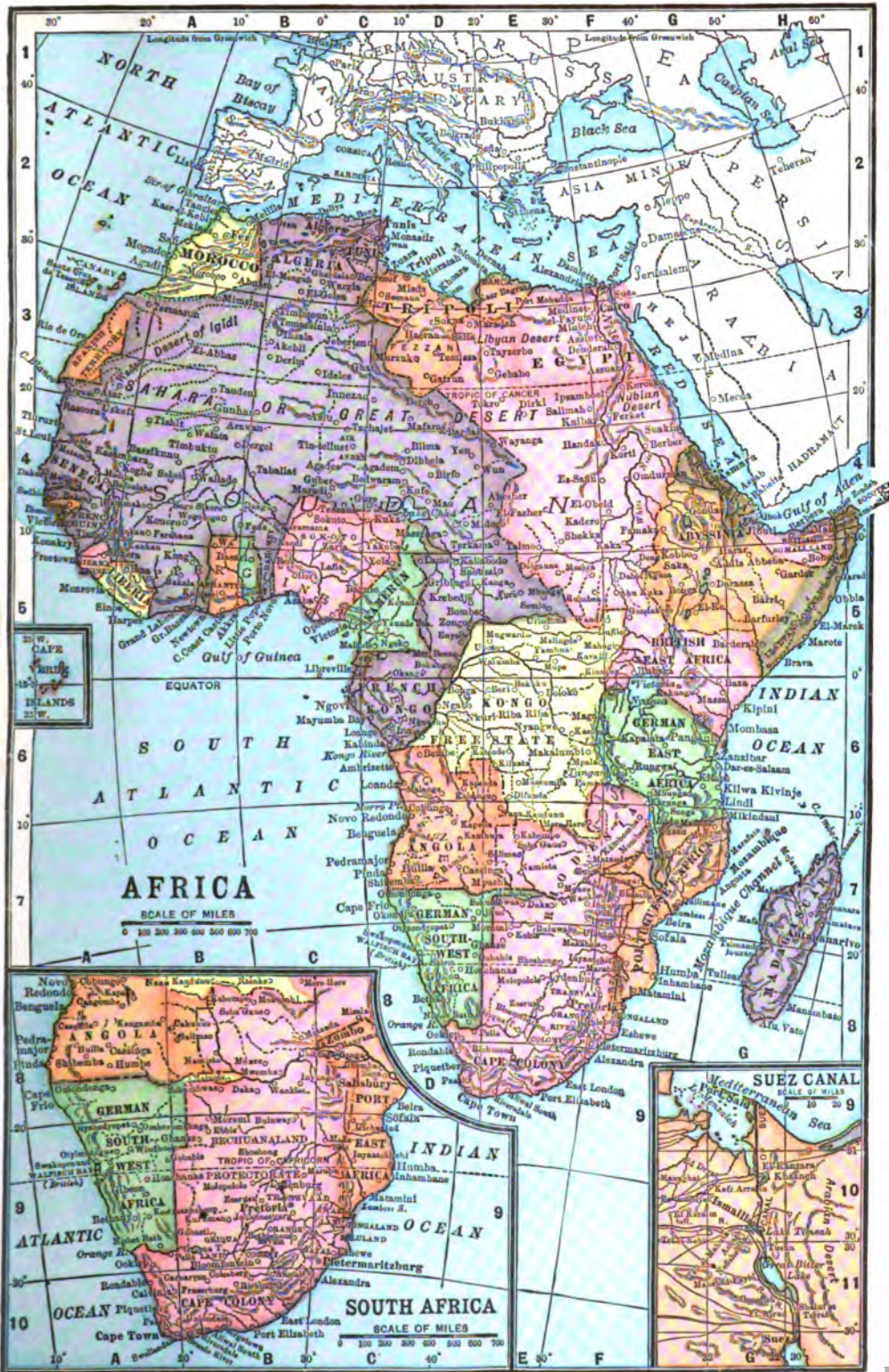
diminished thereby. Punishment for violation is the same as for oath. See OATH; PERJURY.

Affre (äf'r), Denis Auguste, 1793-1848; French prelate; b. St. Rome-de-Tarn; archbishop of Paris, 1840. During insurrection of June, 1848, he tried to end the carnage by an appeal to the insurgents, but while he was speaking hostilities were renewed and he was mortally wounded. Wrote "Essay on the Egyptian Hieroglyphics," 1834, etc.

Afghanistan (äf-gän'is-tän'), country of Asia, bounded on N. by Russian central Asian states; E. by tribes of India under British control; S. by Baluchistan; W. by Persia; area about 257,000 sq. m.; pop. abt. 5,000,000, of whom 3,000,000 are Afghans proper, chiefly warlike tribesmen; Mohammedans. Afghan, an Iranian tongue, is harsh and guttural, and is written in Arabic characters. Chief cities are Kabul, the capital, Kandahar, and Herat. The surface in general is elevated, and one mountain range rises 20,000 ft.; principal rivers, the Helmand, 615 m. long, the Kabul, and the Lora. Very cold in the mountains, and very hot in summer in the valleys; little rain falls, sand and dust storms are frequent; iron, copper, lead, gold, and precious stones are found; maize, wheat, barley, millet, and rice are grown; among fruits are the peach, fig, grape, and pomegranate; there are manufactures of carpets, silks, felt goods, and firearms. The government is a monarchy, but the ameer depends upon Great Britain for advice as to foreign relations and for aid in repelling aggressions. There are four political provinces each under a governor. The ancient Greek kingdom of Bactria included much of Afghanistan. The Indo-Scythian dominion occupied the country at the beginning of our era. After a succession of barbaric and of Mohammedan dynasties, Afghanistan became subject to Persia, 1642, but in 1747 regained independence. In 1838 and 1878 there were wars with Great Britain, the latter resulting in the establishment of British influence. The literature of the Afghans dates from the fifteenth century, and all belongs to the E. region near India. The oldest written work is a history of the conquest of Swät (1413-24) by Shaikh Mati, and a similar history by Khan Khajo. The oldest poetical works are those of the Sufi, Murza, and Ansäri, a religious mystic. Khushal Khan (1613-91) was a favorite secular writer, and Abdul Rahman, his contemporary, the most popular of the mystic poets.

Afium, or Afium-Kara-Hissar (ä-fë-öm' kä-rii-his-ir'), black castle of opium; city in Anatolia, Asia Minor, 53 m. SE. of Kutaieh; is the residence of a pasha; has large opium trade (whence its name), numerous mosques, a citadel, and manufactures of carpets, arms, saddlery, etc. Pop. est. 50,000.

Afranius (ä-frä'ni-üs), Lucius, b. abt. 150 B.C.; Latin poet; regarded by Quintilian as the leading representative of the Fabula Togata—i.e., comedy with subjects drawn from Roman life. More than forty titles and over four hundred verses of his comedies are extant.



Africa, continent extending from N. point of Tunis, in latitude 37° 25' N., to S. point of Cape Colony, latitude 34° 50' S., and from vicinity of Cape Guardafui, longitude 51° 21' E., to Cape Verde, 17° 33' W.; length about 5,000 m.; breadth somewhat less; area about 11,500,000 sq. m.; separated from Arabia by Strait of Bab-el-Mandeb; from Spain by Strait of Gibraltar; connected with Asia by Isthmus of Suez. The coast line has few indentations, the Gulf of Guinea on the W. being the principal one. The surface has two marked features, the N. table-lands, comprising the desert of Sahara, and the central and S. plateaus, from 3,000 to 5,000 ft. high; only four small areas lie below sea-level; chief rivers are the Nile, about 4,000 m. in length, Kongo, 2,900 m., Niger, Zambesi, Shiré, Orange, and Limpopo. There are many lakes, including Victoria Nyanza, Albert Nyanza, and Albert Edward Nyanza in the upper Nile basin, the first named about 180 m. in diameter, Tanganyika, in the Kongo basin, about 400 m. long; Nyassa, SE. of Tanganyika, about 350 m. long; Tchad, in the central Sudan, and Assal, E. of Abyssinia, a salt lake, 571 ft. below the Red Sea. The mountains, forming groups, rather than continuous chains, include the Atlas, on the Barbary coast, 6,000-14,500 ft. high; the Kameruns in W. Africa, 13,000 ft.; the Abyssinian; the Ruwenzori, N. of the Albert Edward Nyanza, 16,500 ft.; the Drakenberge or Kathlamba range in S. Africa. Mount Kenia, E. of Victoria Nyanza, is about 18,350 ft. high; Mount Kilimanjaro, S. of Kenia, 19,750 ft. high; W. of Victoria Nyanza is Mount Kerunga, Africa's only active volcano. Except Madagascar, the islands of Africa are small. The climate is essentially tropical, but much modified by arid tracts to the N. and S. and by the elevation of the interior. The most valuable vegetable productions are dates, oranges, olives, rice, cotton, indigo, bananas, and grains. The date palm abounds in the N.; the sago and oil palms, baobab and cotton tree are common in the central regions. An enormous forest of an average breadth of between 400 and 500 m. lies W. of Lake Albert Nyanza. The wild animals include the elephant, lion, tiger, zebra, hyena, rhinoceros, leopard, quagga, antelope, giraffe, crocodile, hippopotamus, baboon, and gorilla. Many of the birds are of brilliant plumage and singular habits. The largest bird is the ostrich. The camel is used in N. Africa as the principal beast of burden.

The inhabitants are chiefly of Ethiopian or darkest negro race; but Caucasians, both dark and light, people Egypt and Abyssinia. The negro nations of middle and S. Africa, all uncivilized with few exceptions, are divided into great kingdoms and small tribes, some warlike. The Hottentots differ wholly from the rest, resembling the Mongols in their yellow complexions. The Sudan and valleys of the great rivers are the most densely populated regions. Among the many tribes are the Zulu, Kaffir, Bechuana, and Basuto in the S.; the Fan and Fulah are powerful nations of W. Sudan and lower Guinea; the Hottentot-Bushman race includes the small Hottentots and Bushmen of S. Africa and the pygmies of

the great forest region; the Berber race occupies the W. Sahara and Mediterranean coast; the Copts of Egypt are descended from the ancient Egyptians.

N. Africa is largely Arabian, and Mohammedanism prevails. Jews are numerous in the cities. Christianity prevails in Madagascar, Liberia, the British possessions of S. Africa, Algeria, and parts of Abyssinia and Egypt. The mass of Africans are idolaters.

Commerce is small and is carried on chiefly by British and French colonies, which export ivory, timber, palm oil, rubber, gums, wool, cattle, hides, cereals, sugar, wines, ostrich feathers, gold, diamonds, and other articles. Egypt exports much cotton, also cotton goods. The inland trade is large, the circulating medium being cowries, or small shells, instead of money. Dairying and stock raising are important industries in the British S. African colonies. Gold, copper, and iron are mined; rock salt is found; diamonds abound in N. Cape Colony. There are railways in Cape Colony, Algeria, Kongo Free State, and Egypt; one from the Cape to Cairo is under construction. Steam and sailing vessels navigate the Nile, the lower Niger, and the Kongo; and steam vessels the Zambesi and Shiré, and Lake Nyassa.

Egypt was ancient in the time of the Roman and Greek classical authors. The Phœnicians colonized on the Mediterranean abt. 1000 B.C. Egypt was conquered by Cambyses, 525 B.C.; by Alexander the Great, 321 B.C.; annexed to the Roman Empire, 30 B.C. Ethiopia, including Abyssinia, became a great kingdom about the beginning of the Christian era. Several centuries later the Arabs conquered the Mediterranean coast and Abyssinia. The Portuguese explored the W. coast in the fifteenth century; the French occupied parts of the W. coast in the seventeenth century; the English established trading posts in Guinea some time after 1750; the Dutch founded a trading post at the Cape of Good Hope, 1650. Between 1805 and 1901 Great Britain acquired immense tracts in S., central, E., and W. Africa. Kongo Free State was established, 1885. In 1890-91 England, France, Germany, and Portugal agreed to partition among themselves all territory not claimed by other nations. Estimated, 1907, total area apportioned among the powers as follows:

Great Britain.....	2,197,470 sq. m.
France.....	4,102,900 "
Germany.....	931,460 "
Italy.....	88,500 "
Portugal.....	793,980 "
Spain.....	80,580 "
Turkey.....	398,900 "
Egypt and Anglo-Egyptian Sudan.....	1,350,000 "
Kongo Free State.....	900,000 "
Liberia.....	43,000 "
Morocco.....	219,000 "
Abyssinia.....	200,000 "
Total.....	11,305,790 sq. m.

African Meth'odist Epis'copal Church, organized 1816 by colored Methodists who had been under the care of the Methodist Episcopal Church. Elected Rev. Richard Allen their first bishop, 1816. Doctrines substantially the same

as those of the parent church. They report 6,190 ministers and 842,023 members.

African Methodist Episcopal Zi'on Church, formed 1820 by secession of African Methodists from the Methodist Episcopal Church in New York City. Held first annual conference 1821; elected Rev. Christopher Rush their first bishop, 1838. Report 3,659 ministers and 569,305 church members.

Africanus (äf-ri-cä'nüs), **Sextus Julius**, d. abt. 232; Christian writer eminent for learning; wrote a general chronology of the world from the creation to 221 A.D., in which he fixes the date of creation at 5499 B.C.

Afridis (äf-ré'déz), a Mohammedan tribe occupying the district to the S. of the Hindu-Kush.

Afrikan'der, Dutch for African, applied to white persons born in S. Africa. Its antonym is *uitlander*, one born in another country, a foreigner. The *Afrikaner Bund* is an organization of Afrikanders to secure political independence in S. Africa in the interest of the Dutch.

Af'terglows, unusual and brilliant twilight colors after sunset; those before sunrise are called *foreglows*; red colors predominate, but others are seen. Usually occur after great volcanic eruptions and spread to great distances. They are supposed to be due to an immense number of very minute solid particles remaining suspended in the air.

After-im'age, an impression of an object upon the retina which remains for a certain time after the eyes are closed or the object is withdrawn. It may be of the same color as the object or of a complementary color.

Afzelius (äf-zé'l'i-üs), **Adam**, 1750-1837; Swedish naturalist; b. Larf, W. Gothland; tutor in Univ. of Upsala, 1799; Prof. Extraordinary of *Materia Medica*, 1812; edited autobiography of Linnaeus (Upsala, 1823). Several species of plants called *Afzelia* are named after him.

Afzelius, Arvid August, 1785-1871; Swedish scholar; b. Fjellåker. His translation of the "Poetic Edda," collection of popular ballads, "Svenska Folkvisor från Forntiden," and his Swedish history, "Swenska Folkets Sago-Häfder," etc., did much to promote the romantic and national feeling in Swedish literature.

Agamemnon (äg-ä-mém'nön), son of Atreus, king of Mycenæ; a brother of Menelaus; commanded the Greeks at the siege of Troy, where he quarreled with Achilles. After his return to his own kingdom he was murdered by his wife Clytemnestra and Ægisthus. He was the father of Iphigenia, Electra, and Orestes.

Agaña (ä-gän'yü), fortified town and capital of Guam, Ladrone Islands; 1,500 m. E. of Luzon. Prior to the Spanish-American War the island belonged to Spain. Naval station established at Agaña, 1890. Pop. 7,500.

Agapæ (äg-ä-pé), love feasts, or feasts of charity, in use among the early Christians.

After communion, meat and bread which had been brought by the rich, were consumed at a common feast.

Agapemone (äg-ä-pém'ö-né), a community of fanatics and free-lovers formed, 1849, at Charlynch, Somerset, England, by Henry James Prince, previously a clergyman. His disciples, known as "Lampeter Brethren" or "Family of Love," hold their property in common, live in splendid style, and pass their time in voluptuous ease. Prince made extravagant pretensions as an apostle or reformer in religion; and was styled "God incarnate" by his followers, who are sometimes called *Princeites*.

Agapetæ (äg-ä-pé'tæ), those virgins and widows among the primitive Christians who lived in a state of spiritual love with monks and other celibates. This practice was condemned by the Lateran council in 1139.

Agape'tus, name of two popes. *Agapetus I* became pope 535, when already old; sent as legate to Constantinople by Theodahad, the Gothic king; d. 536. *Agapetus II* became pope 946; d. 955.

A'gar, or *agar-a'gar*, a substance like isinglass obtained from an E. Indian seaweed; used as food by the Chinese, but principally interesting as a culture-medium in the study of bacteria.

Agardh (ä'gärd), **Karl Adolph**, 1785-1859; Swedish botanist; b. Scania; wrote, besides other works, "Species of Seaweeds" and "Systematic Arrangement of Seaweeds."

Ag'aric, a fungus of the genus *Agaricus*. True agarics have radiant gills, while *boleti* have tubes beneath the cap or pileus. The *Agaricus campestris*, or common mushroom, and some others are articles of food; the *A. muscarius*, and other species called toadstools, are dangerous poisons. The *A. olearius* is remarkable for being phosphorescent.

Agasias (ä-gé'si-üs) of Eph'esus, Greek sculptor; lived abt. 400 B.C. His statue called "The Gladiator" or "Borghese Fighter," or, by modern archæologists, the "Runner in the Hoplitodromos," is one of the finest pieces of ancient sculpture and one of the ornaments of the Louvre Museum.

Agassiz (ä-gä-sé': or ä'gäs-iz), **Alexander**, 1835- ; Swiss-American scientist; b. Neuchâtel; son of Prof. Louis Agassiz; assistant in Museum of Comparative Zoölogy, 1860-65; developed two richest copper mines in world, the Calumet and Hecla, on the shores of Lake Superior; succeeded his father as curator of the museum till 1885; afterwards chiefly engaged in deep-sea explorations in the S. Pacific; gave nearly \$1,000,000 to various Harvard interests; wrote much on deep-sea life, etc.

Agassiz, Elizabeth Cabot, 1823-1907; American author; b. Boston, Mass.; married Prof. Louis Agassiz, 1850; accompanied him on many scientific trips; instrumental in founding Radcliffe College at Harvard; its president till

1899; author, with her son, of "Seaside Studies in Natural History," "Louis Agassiz: His Life and Correspondence," "A Tour in Brazil," etc.

Agassiz, Louis John Rudolph, 1807-73; Swiss-American naturalist and geologist; b. near Lake Neuchâtel; graduate in medicine; studied fossil fishes; Prof. of Natural History at Neuchâtel, 1832; greatly improved classification of fishes; came to U. S. on a scientific excursion, 1846; made his permanent residence here. Prof. of Zoölogy and Geology at Harvard, 1848; curator of Museum of Comparative Zoölogy, 1859. 1865-66 explored the lower Amazon and its tributaries; 1871-72 accompanied the Hassler expedition to the S. Atlantic and Pacific oceans. Probably no one except Hugh Miller did more to popularize science than Agassiz, and no teacher trained so many young and rising naturalists.

Agassiz, Lake, name given by Upham to extinct Pleistocene lake of the last glacial epoch, occupying the plain of the Red River of the North, in Minnesota and North Dakota, and thence N. into Canada; its area, as indicated by well-marked shore lines and deltas, measured from 30 to 100 m. E. and W., and 400 or more m. N. and S.; its depth was from 200 to 400 ft.

Ag'ate, a variety of quartz marked with veins or layers, which are different in color and often concentric. This structure is due to the mode of formation, in successive layers on the walls of cavities, usually in volcanic rocks. Agates are found in all countries, and are much used for ornaments and utensils such as seals, ring and pin stones, vases, cups, mortars, etc. Many polished agates are very beautiful, and their preparation has created an important industry at Oberstein, Germany. Here great skill is displayed in cutting and polishing agates, and still more in coloring them. A large part of the Oberstein agates come originally from S. America.

Ag'atha, Saint, Sicilian virgin and martyr, killed by Quintianus for resisting his advances, 251 A.D.; her veil carried in processions, it is said, has frequently averted eruptions of Mt. Etna.

Agathias (ä-gä'thi-äs), surnamed **ASIANUS,** abt. 536-82; Greek historian and poet; b. Myrina, Asia Minor; his history of contemporary events and some one hundred poems are extant.

Agathocles (ä-gäth'ö-clës), 361-289 B.C.; tyrant of Syracuse; b. Sicily; originally a potter, rose to high military rank, and shone as an orator. Having massacred many prominent men of Syracuse, obtained supreme power, 317 B.C.; subsequently waged war against the Carthaginians, but was defeated.

Agathon (äg'ä-thön), or **Ag'atho,** abt. 450-400 B.C.; tragic poet; b. Athens; friend of Euripides and butt of Aristophanes in the *Thesmophoriazuse*; gained the prize, 416, and the banquet which he then gave furnished the setting for Plato's *Symposium*.

Aga've, a genus of plants of the *Amaryllidaceæ*; mostly natives of tropical America.

The most remarkable species is the *Agave Americana*, the *maguay* of the Mexicans, etc., commonly called *American aloe* or century plant. The latter name originated in an incorrect opinion that it bears no flowers until it is one hundred years old. This age, or near it, is sometimes attained in temperate climates, but in hotter regions it often blossoms when less than ten years old. The Mexican drinks, *pulque* and *mescal*, are obtained from it, and the Aztecs made a paper resembling papyrus from the fiber.



AGAVE.

Agbatana (äg-bät'ä-nä). See **ECBATANA.**

Age, in common usage, (1) whole duration of the life of man or other creature; (2) certain portion or period of human life, which, according to Shakespeare, is divided into seven ages; (3) time when a person is authorized by law to act for himself, and is released from control of parents or guardians. According to the laws of Great Britain and the U. S., a person becomes of age when twenty-one years old. Before this age one cannot vote or make a valid will.

Age, in chronology, sometimes used as synonymous with century, sometimes with a generation. Writers differ in respect to the period included under what is called the Middle Ages, but they are commonly understood to begin about the time of Charlemagne, and to extend to the fifteenth century.

In literature: a period usually bearing the name of some powerful person who lived during that time; as the age of Pericles, the Augustan age, the age of Leo X, and the Elizabethan age.

In universal history or mythology: Greek and Roman poets imagined a series of four ages—golden, silver, bronze, and iron. Ancient and widespread tradition commemorates the pristine innocence, peace, and happiness of the primeval golden age under the reign of Saturn. The other three were regarded as successive degrees of declension from that primitive state. Prehistoric ages in modern anthropology are usually called the older and newer stone ages (Paleolithic and Neolithic ages) and the age of bronze.

Agen (ä-zhän'), ancient *Aginnum*, capital department of Lot-et-Garonne, France; on the Garonne River, 85 m. SE. of Bordeaux: has mediæval cathedral, several notable bridges,

college, public library, and manufactures of serge, cotton prints, and linen goods. Pop. abt. 18,500.

Agen'da, things to be done; practical duties as distinguished from credenda, things to be believed. In the ancient church it signified divine service in general and the mass in particular. The name is also applied to church books giving the order of services.

Agenor (ä-gē'nōr), in classic mythology, king of Phœnicia and a son of Neptune; was the father of Cadmus, Phœnix, and Europa.

A'gent, one who acts for another. Agency may be created by express words or by implication. Should a person act as agent without authority, a later ratification of the act makes it binding upon the principal. Agency is often implied from the course of business, as where a wife sells goods in her husband's shop. Agency is in general revocable either by the principal's act or by some event which makes such act impracticable, as the principal's death. But powers, termed "powers coupled with an interest" are irrevocable, for the agent has an interest in the property over which the power is exercised; as in the pledge of goods for a debt, with power to sell in default of payment.

A principal is liable for the acts of his agent where the agent is not acting within the scope of his employment, but the principal has given him the appearance of authority, and the third person with whom he deals has no adequate means of distinguishing between his apparent and actual authority: for where one of two innocent persons must suffer, that one should sustain the loss who has put it in the power of the wrongdoer to commit the wrong. Under this doctrine usage has great effect upon the power of agents to bind their principals. But many agents have known and recognized functions, such as factors, brokers, and cashiers of banks. It is the well-settled rule that these persons, acting within the usage of their business, may bind their principals, notwithstanding instructions to the contrary, unless these restrictions are brought to the knowledge of the persons with whom they deal. It is a general rule that when a power is conferred upon an agent, he has by implication such incidental authority as is necessary to carry his power into effect. An authority created by writing must be followed, and an act in excess of it is unauthorized and not binding on the principal. The law of agency underlies the law of partnership.

Agesilaus (ä-jēs-I-lä'ūs) II, d. abt. 360 B.C.; king of Sparta; son of King Archidamus II; began to reign at the death of his brother Agis, 398 B.C., two years after which war was renewed between the Spartans and the king of Persia. Agesilaus commanded the army which invaded Asia Minor, and defended the city of Sparta with success when besieged by Epaminondas.

Agglu'tinate Lan'guages, in comparative philology, those languages which are in a certain state of development intermediate between those which are strictly monosyllabic, like the

Chinese, and those which are inflectional, like the Greek or Latin. See LANGUAGE.

Aghrim (äg'rīm), parish of Galway, Ireland; 15 m. N.E. of Loughrea; where William III gained a decisive victory over James II, July 12, 1691.

Ag'ila. See ALOES WOOD.

Agincourt (ä-zhän-kōr'), village of France; 18 m. E. of Montreuil; near which the English king, Henry V, who had about 15,000 men, gained a complete victory over the French of about 60,000, October 25, 1415.

A'gio (Italian "ease"), the difference between the real and nominal values of money, or the percentage difference between the values of the current and standard money of a place; also the premium or discount on foreign bills of exchange.

Agis (ä'jīs) IV, 264-240 B.C.; king of Sparta; began to reign conjointly with Leonidas, 244 B.C., when Sparta was in a degenerate condition. Condemned by the ephori on a charge of subverting the laws, he was strangled.

Aglar (äg'lär). See AQUILEJA.

Agnadello (än-yä-dél'ō), village of N. Italy; 10 m. E. of Lodi. Here the French duke of Vendôme defeated Prince Eugène, August 16, 1705, and Louis XII of France the Venetians, May 14, 1509.

Ag'nates, in Roman law, those descended through males from a common ancestor, in opposition to cognates, i.e., all descendants of a common ancestor, whether through males or females.

Ag'nes Sorel (sō-rèl'), 1409-50; mistress of Charles VII of France; became lady of honor to the duchess of Anjou, 1431. The king, fascinated by her beauty, made her lady of honor to the queen. She exercised great influence over him, stimulating him to action against the English, who were then invading France.

Agni (äg'nī), or **Ag'nis**, in Hindu mythology, the god of fire; sometimes represented with two faces, three legs, and seven arms, his head surrounded by flames.

Agnoëtæ (äg-nē'tē), in ecclesiastical history, sect in the sixth century who maintained that Christ in His human nature was ignorant of many things, particularly of the day of judgment. An earlier sect of this name denied God's omniscience.

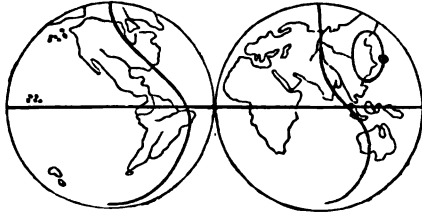
Agnos'ticism, doctrine that human knowledge is limited to experience, and that therefore we can neither affirm nor deny the existence of God, nor know anything of the ultimate nature of things. See ATHEISM; SKEPTICISM.

Ag'nus De'i, prayer at mass shortly before the communion—"Lamb of God who takest away the sins of the world, have mercy on us"; also a portion of the wax from the paschal candles worn as an object of devotion by Catholics.

Agobard', 779-840; b. Spain; ordained a priest, 804; archbishop of Lyons, 816. His writ-

ings refuted the verbal inspiration of the Bible, the worship of images, ordeals and adoptionism, and the belief that hail and thunder storms were raised by sorcerers.

Agon'ic Line, line which joins all places at which the magnetic needle points due N. and S. A line of this kind passes through the E. part of S. America to Hudson Bay, thence to-



AGONIC LINE.

ward the N. pole to the White Sea; passing S. it cuts Arabia; and, after traversing the Indian Ocean and E. portion of Australia, goes through or near the S. pole to join itself again; it is not fixed in position, but is moving slowly W. on American continent. See **ACLINIC LINE**.

Agonistici (äg-ō-nis'ti-cē), ascetic sect of Christians who lived in N. Africa in the fourth century. They renounced labor and matrimony.

Agosta (ä-gōs'tä), or **Augus'ta**, seaport of Sicily, on the Mediterranean, 14 m. N. of Syracuse, built on the peninsula of San Croce; is supposed to occupy the site of ancient Megara Hyblæa. The town was destroyed by an earthquake, 1693. Pop. (1901) 15,817.

Agou'ti, rodent mammal of the *Dasyprocta*, related to the porcupines. The common agouti is a native of Brazil, where it existed in great numbers, but because of its ravages on sugarcane, potatoes, etc., has been almost exterminated. It is about the size of a rabbit, has



BLACK AGOUTI.

long hind legs, round ears, bright black eyes, and a short, stumpy tail, which, as well as the rump and thighs, is covered with long, coarse, bristly hair. The agouti is omnivorous, eating vegetables, fruits, meats, etc. Its habits are all quick, and even while eating it continually turns its head to guard against danger. The animal is easily domesticated, but, as it uses its teeth destructively, it is not valued as a pet. It gnaws with rapidity, taking but a few minutes to cut through a door. In some countries its flesh is eaten, but a prejudice prevails against it. The black agouti is said to have been the largest mammal inhabiting the

West India islands at the time of their discovery.

Agra (ä'grä), or **Akbarabad** (äk-bär-ä-bäd'); capital of division and district of same name, united province of Agra and Oudh, British India; on the Jumna River, 134 m. SSE. of Delhi; capital of the Mogul and Mohammedan emperors of India, 1504-1647; much of it now in ruins; has several magnificent edifices, the most celebrated, the Taj Mahal, a mausoleum, the finest in India, and perhaps in the world, erected by the Emperor Shah Jehan (1627-66) in honor of his favorite queen. Pop. (1901) 188,022.

Agram (ä'gräm), Croatian, **Zagreb** (zä'grëb), capital of province of Croatia and Slavonia, Austria; near the Save River, 172 m. S. of Vienna; seat of Roman Catholic archbishop; contains a Gothic cathedral of the eleventh century, National Museum, Francis Joseph Univ., public library, and South Slavic Academy of Sciences; has large trade and manufacturing of tobacco, leather, and linen; severe earthquake, 1880. Pop. (1901) 57,689.

Agra'rianism, popular name of political movement in Germany, having its inception at Breslau, in May, 1869, when an organization was formed to agitate for the abolition of taxes on land, buildings, and trade. In February, 1876, a constitutional assembly of agrarian reformers was opened, and adopted the official name of Steuer und Wirtschaftreformer. The attempt to negotiate a commercial treaty with Russia led to bitter strife, and a tariff war ensued between the two countries, 1893-94. The government, however, effected treaties with Roumania, Servia, and Spain, in the face of agrarian opposition. Subsequently the agrarians opposed the government movement for better commercial relations with the U. S.; they put several important measures through the reichstag, with the aid of the social democrats, who with the radicals soon separated from them; the former were reduced to four representatives in the reichstag, and in the election of 1907 the social democrats suffered an overwhelming defeat, although they had achieved great success in 1903 on their denunciation of the government tariff policy and their advocacy of direct taxation by income and property taxes.

Agra'rian Law, in ancient Rome, a law to distribute or regulate public land. The consul Spurius Cassius first proposed to divide a portion of public land among the poor, but the measure was defeated by the aristocrats. In 367 B.C. an agrarian law originated by Licinius Stolo, ordained that no man should possess more than 500 *jugera* (330 acres) of the public domain, and that such excess of 500 *jugera* should be distributed among the poor citizens. Later an attempt was made by Tiberius Gracchus to renew this law; with modifications in favor of the Patricians. Tiberius Gracchus was the author of an important agrarian law. Agrarian laws were never executed. In Sparta the attempt of King Agis IV to enforce an agrarian law led to his murder by the ephori (240 B.C.).

Agreement. See CONTRACT.

Agricola, Cneius Julius, 37-93; Roman statesman; b. Forum Julii (Fréjus), Gaul; was appointed governor of Aquitania by Vespasian, 73, and became consul, 77. A year later sent as governor to Britain, which he conquered, and governed with much ability and moderation.

Agricola, Johann (originally SCHNEIDER or SCHNITZER), 1492-1566; German theologian; b. Eisleben; lecturer at Wittenberg, 1536, and court preacher at Berlin, 1540. Agricola and his followers were called Antinomians.

Agricultural Colleges, institutions established for disseminating knowledge connected with agriculture; established in Europe early in the nineteenth century; not till Liebig, 1840, published his celebrated work was any considerable impulse given to agricultural schools. The first in the U. S. were founded before the middle of the nineteenth century. Their development was slow, until the passage of the land grant act of 1862, by which every state and territory received a gift from Congress of land scrip representing 30,000 acres for each senator and representative. The purpose was to provide for the establishment of institutions in each state to teach agriculture and the mechanic arts. Under acts of Congress of 1862 and 1890, there were, in 1904, 50 institutions for white students, and 16 for colored, having a total allotment of 10,320,843 acres. There were 4,252 instructors in all departments, 53,161 students, 1,586,551 volumes and 508,336 pamphlets in the libraries, and an income of \$10,885,550 from all sources.

Agricultural Experiment Station, an establishment to obtain and disseminate information useful to the farming population. Farming must necessarily be an experimental science, because it is not ordinarily practicable to know either the exact constituents of soils, or the way in which growing crops will be affected by climatic and other peculiarities. The best farming therefore is a constant process of carrying on experiments, and observing their results. In 1890 the Act of Congress of 1862, providing for agricultural colleges, was supplemented by another giving to each state for the further endowment of such colleges \$15,000 for the first year, \$16,000 for the second, and thereafter an amount increasing by \$1,000 a year until at the end of nine years the sum should annually amount to \$25,000. Nearly every state and territory now has an experimental station, usually connected with some endowed institution.

Agricultural System, theory of political economy propounded by F. Quesnay (physician to Louis XV), that they only increase the wealth of a country who develop the resources of the earth.

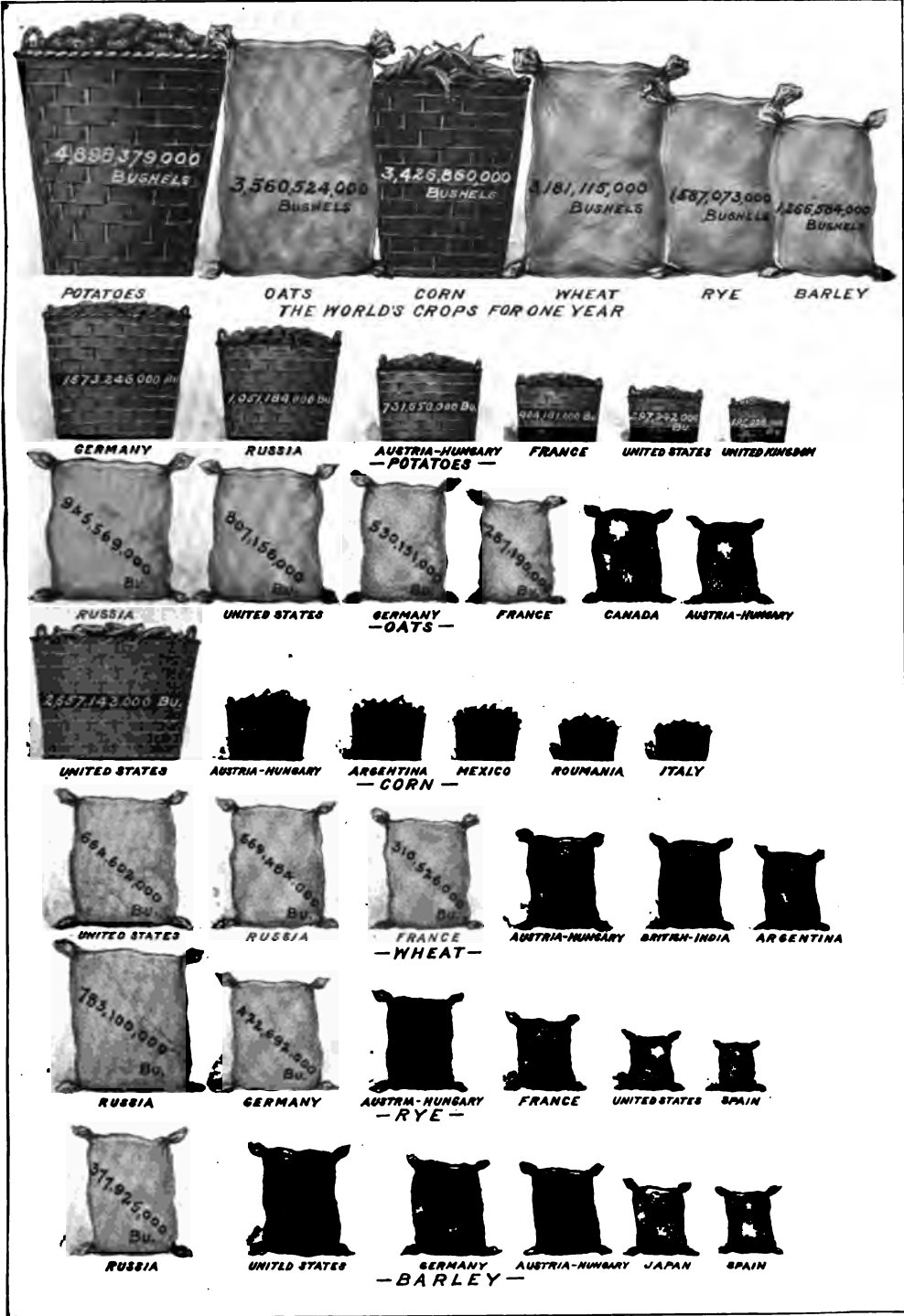
Agriculture, primarily the tillage of land; now understood to comprise all those special industries which are connected with cultivation and care of plants and animals for economic purposes. It deals, therefore, with all those branches of science which have to do with the improvement of soils, with the

breeding and development of domesticated animals, and the improvement of the vegetable kingdom, as well as with the various enemies and diseases of animals and plants and with meteorological conditions. Geology may also be applied to agriculture in a study of the substructure of any district with reference to drainage and water supply, the origin, physical structure, and mineral constituents of soils, the distribution and properties of mineral fertilizers, etc. Agriculture is also an art which rests upon the combined experience of all previous generations. The field in which agriculture operates is the farm, and farming in its broadest sense is therefore synonymous with agriculture.

The Romans introduced their agricultural knowledge into Britain where for many centuries it developed only, on lands belonging to the church, under the care of the monks, who protected it from its deadliest enemies, war, the chase and the feudal system. About the middle of the sixteenth century agriculture began to develop more rapidly in England, which country attained distinction in the development of special breeds of cattle; by the introduction of the practice of drilling; and finally by its system of intensive farming.

The history of agriculture in the U. S. holds little that is distinctive until increased transportation facilities opened up the extensive agricultural territory in the West, when a sufficient number of farm laborers could not be found and rapid improvement of agricultural implements and labor-saving machinery followed, to satisfy the need. The year 1850 practically marks the time when the old cast-iron plows, scythes, sickles, cradles and flails began to give place to cultivators, mowing machines, reapers, thrashers, and binders. Now about one fourth of the machinery manufactured in the U. S. is agricultural machinery. The increase in expenditure for fertilizers was about \$26,000,000 in twenty years. In 1889 there were 3,631,381 acres of land irrigated; in 1908, 13,000,000, and the cost of the construction of irrigation systems was about \$150,000,000. The fixed capital of agriculture, including land, buildings, improvements, implements and stock in 1900 was four times that of manufacture. Judged by a standard of fixed capital agriculture leads manufacture in the U. S. in the ratio of 4 to 1.

The U. S. holds first place as an agricultural nation contributing the largest amount of the world's supply of breadstuffs, meat products, raw cotton, Indian corn, lumber, and swine. The total acreage of farms in the U. S. in 1900 was 838,591,774, with improved acreage of 414,498,487 acres. The value of farms in 1906 was \$23,000,000,000; of farm products, \$6,800,000,000. In 1908 the value of farm products was \$7,778,000,000. In France one half the people earn their living from farms; in Germany less than half, and in England there are five times as many workers in mines, factories and shops as there are on farms. Wheat is the most widely distributed, the most valuable and the most nutritious of all cereals, and in its production the U. S. leads, followed by European Russia, France, and



THE WORLD'S LEADING CROPS.

1. THE TOTAL ANNUAL PRODUCTION OF THE WORLD. 2. THE ANNUAL PRODUCTION IN VARIOUS COUNTRIES.

British India. Russia raises more flax and hemp, rye and barley than any other country. Canada, although it has the largest forest area, is second to the U. S. as a wood producer, and is followed by Russia. Indian corn is the largest cereal crop of the U. S. The hay crop of the U. S. is equal in value to the wheat crop and is equal to four fifths of the corn value. Germany's chief crops are rye, oats, hay, potatoes and sugar beet. Germany produces about one fourth the world's sugar. The wheat fields of France cover about one fourth her area and are of greater value than all the other cereals which she produces. Cattle breeding is her most important animal industry.

Agricultural chemistry is the study of the chemical relations of those substances which compose the products of the farm. It inquires, first of all, what the plant and animal are made of. It finds that both, when living, consist largely of water, to the extent of forty to ninety per cent. The dry plant or animal may be divided into matter volatile by heat, ninety to ninety-nine per cent, and one to ten per cent of ash. The ash of the plant consists of phosphates, sulphates, chlorides, silicates, and carbonates of potassium, sodium, calcium, magnesium, and iron. The organic matters are exclusively generated and organized by the plant. Carbonic-acid gas supplies carbon, water furnishes hydrogen and oxygen, while nitrogen is derived partially from minute particles of ammonia mingled with the air. Nitrogen is, however, chiefly obtained from the nitrates of the soil. All the ash elements come exclusively from the soil. The agriculturist cannot aid the nourishment of his crops except through the soil, and there he can only influence the supplies of water, of nitrogen, and of ash elements.

Soils may be fully supplied with all the nutritive elements in proper quantity and form, and yet be infertile. This may happen on account of faults in physical condition, whereby they are rendered uncongenial to plants. A certain medium porosity, admitting of access and efflux of water, and a quality of being suitably warmed by the sun, and of carrying heat through the cool of the night, are no less indispensable to high productive power than an appropriate chemical condition.

The "rotation of crops" is practiced by farmers. A hoed crop implies surface tillage, several times repeated during the growing season, thus effectually exposing the upper soil to the oxidizing influence of the air. A field put into grass or clover is to some extent under opposite conditions. In the one case organic matters waste rapidly; in the other, they accumulate in the soil. In the first instance the surface soil tends to lose that porosity and attractiveness for moisture due to the presence of humus, which is a quality of the utmost significance in climates subject to drouth. In the second instance the soil gains in these respects. On the other hand, the lower soil, which under hoed crops is yearly broken up by repeated plowing, may settle down to injurious compactness in a

pasture or meadow. Deep-rooted crops affect the soil very differently from those whose radication is confined to near the surface. The reasons for rotation thus become to some extent apparent. Some plants while occupying the soil enrich it, and though yielding the farmer a large and valuable harvest, yet actually manure the land for the subsequent crop. Clover has long been known as a plant of this kind.

The most marked advances in agriculture in recent years are along lines of agricultural education and government aid. (See AGRICULTURAL COLLEGES and EXPERIMENT STATIONS.) Topics which have received special consideration are irrigation, deep drainage, chemical fertilizers, rotation of crops, and meteorological conditions; also the study of diseases of plants and animals, the improvement of breeds of animals and varieties of plant, the distribution of seeds, plants, and cultures, and the enforcement of sanitary laws.

Agriculture, Department of, executive branch of the U. S. Govt. In 1839 it was recognized as a division of the Patent Office and received an appropriation of \$1,000 from the Patent Office fund; organized as an independent department in 1862, and raised to a department of first rank in the executive branch of the government in 1889. Its function is to acquire and diffuse useful information among the people on agricultural subjects, and distribute plants, seeds, etc. It maintains bureaus of statistics, chemistry, soils, entomology, biological survey, plant industry, animal industry, forestry and the weather bureau, transferred from the war department in 1891. It has also several divisions, departments, and offices, and maintains a museum, herbarium, chemical laboratory, propagating gardens, and a library.

Agrippa (ä-grip'ä), King. See HEROD AGRIPPA.

Agrippa, Marcus Vipsanius, 63-12 B.C.; Roman statesman; associated with Mæcenas as the principal minister and adviser of Augustus after he had obtained supreme power; projected a detailed map of the world, which Augustus executed and disseminated.

Agrippina (äg-rip-pi'nä) I, d. 33 A.D.; b. Rome; daughter of M. Vipsanius Agrippa and his wife Julia; married Germanicus; was banished by the Emperor Tiberius, who hated her, to the island of Pandateria, where she died. **AGRIPPINA II**, 18-60 A.D.; daughter of the preceding; b. Cologne; mother of Nero, by Domitius Ahenobarbus, and notorious for her profligacy and crimes. Her second husband was Passienus Crispus; her third was Claudius, whom she poisoned. She was put to death by her son Nero.

Agua (ä'gwä), Vol'can de (volcano of water), mountain of Guatemala, about 25 m. SW. of Gautemala City. It sometimes pours forth torrents of water. The old town of Guatemala has been twice destroyed by it. Its crater is 15,000 ft. above sea level.

Aguas Calientes (ä'gwäs kä-lë-ën'tës), capital of Mexican state of same name; on a plain

6,000 ft. above the sea, and 250 m. NW. of the city of Mexico; has numerous churches and three convents, and is surrounded by gardens and orchards of olives, pears, figs, etc. Hot springs occur in the vicinity. Pop. (1900) 30,052.

Ague (ä'gū). See **MALARIA**.

Aguilar (ä'gē-lār), **Grace**, 1816-47; Jewish authoress of Spanish extraction; b. Hackney, near London; author of "Woman of Israel"; "Home Scenes and Heart Studies"; and "Home Influence, a Tale."

Aguinaldo (ä-gwīn-äl'dō), **Emilio**, 1870-; former Filipino leader; b. Imus, Luzon, Philippine Islands; educated at the College of St. Jean de Lateran and Univ. of St. Tomas, Manila; afterwards was a student in the medical department of the Pontifical Univ. of Manila; went to Hong-kong, 1888, and there studied the English, French, and Chinese languages, and became interested in military affairs. His education and personal magnetism made him such a commanding figure in the outbreak against Spanish authority, 1896, that at the head of the diplomatic commission he made the terms with the Spanish Govt., whereby a large sum of money was paid to the Filipino leaders to lay down their arms. At the beginning of the Spanish-American War. Admiral Dewey sent for Aguinaldo, who, a few days after the battle of Manila Bay, began organizing Filipino troops. No promises were made to him, and the insurgents never were officially recognized by the Americans. On June 12, 1898, he organized his so-called Filipino Republic, proclaiming himself dictator. He protested against the treaty of peace ceding the Philippines to the U. S., and late in the year planned a massacre in Manila, which was discovered and prevented. February 4, 1899, his troops attacked the American lines in the suburbs of Manila. He made a determined resistance to American occupation, and it was not till early in 1900 that the organized insurrection was broken up, and its leader became a fugitive in the mountains. Fighting was continued under his nominal leadership till March 23, 1901, when he was captured at Casiguiran, Isabella province, Luzon, by stratagem executed by Gen. Frederick Funston. He was taken to Manila and April 2d swore allegiance to the U. S.

Agustina (ä-gūs-tē'nä), the "Maid of Saragossa," d. at Ceuta, Spain; for her bravery during the siege of Saragossa by the French in 1809 was made lieutenant in the Spanish army and received numerous decorations. Byron extols her in "Childe Harold."

Agynians (ä-jin'i-äns), Gnostic sect of the seventh century who condemned marriage and the use of certain kinds of meat.

Ahab (ä'häb). 918-896 B.C., seventh king of Israel; dwelt at Jezreel, which he adorned with splendid buildings. His history is in the first book of Kings. Ahab was killed in battle with Benhadad, king of Damascus.

Ahasuerus (ä-häz-ü-ērūs), name of one Median and of two Persian kings mentioned in

Old Testament. The Ahasuerus of Esther was probably Xerxes, who reigned 486-65 B.C.; invaded Greece, 480, and married Esther, 479.

Ahaz (ä'häz), eleventh king of Judah after its secession from Israel. His reign (B.C. 741-25) was greatly disturbed by the attacks of Rezin, king of Damascus, and Pekah, king of Israel, and by the Edomites and Philistines.

Ahaziah (ä-häz-i'äh), eighth king of Israel; succeeded his father Ahab, and ruled under the direction of Jezebel, his mother, B.C. 987-6. Also the fifth king of Judah, B.C. 885-4. A famous error of some transcriber (II Chron. xxii, 2; xxi, 5, 20) makes him older than his father.

Aithophel (ä-hith'ö-fel), Hebrew politician and counselor of David, who took the side of Absalom in his rebellion, but, foreseeing the failure of the enterprise, went home and hanged himself. See II Sam. xvi, xvii.

Ahmadabad (ä-mäd-ä'bäd), city in Bombay presidency, British India; on the Sabarmati River, 160 m. NNW. of Surat; formerly a large and magnificent capital, but now decayed; has several beautiful mosques and other remains of its ancient splendor; founded by Ahmed Shah in 1412. Pop. (1901) 185,889.

Ahmadnagar (ä-mäd-nä'gär), city and fortress in Bombay presidency, British India; on the Seena River, 162 m. E. of Bombay City; founded by Ahmed Nizam Shah, 1493; taken by Gen. Wellesley in 1803. Pop. (1901) 41,700.

Ahmed (ä'med), name of four sultans of Turkey. **AHMED I**, son of Mohammed III, succeeded to the throne, 1603; his reign was disturbed by insurrections and war with the Germans. **AHMED II**, 1643-95; succeeded his brother Solyman, 1691. **AHMED III**, 1673-1739, son of Mohammed IV, succeeded his brother Mustapha II, 1703; he sheltered Charles XII after battle of Pultowa; was engaged in war against Russia, Austria and Venice; was deposed by Janissaries, 1730. **AHMED IV**, 1725-89; succeeded to the throne, 1773; reign notable for disastrous wars with Russia in which Turkey lost the Crimea, part of Circassia and other territories.

Ahmed Khan (kän), 1724-73; founder of the kingdom of the Afghans; proclaimed himself ruler of Afghanistan, 1747; conquered large territories and parts of Persia. His son Timour succeeded him.

Ahn (än), **Johann Franz**, 1796-1865; German philologist; b. Aix-la-Chapelle; author of a new method of learning foreign languages; published a "Practical Course for the Quick and Easy Acquisition of the French Language," and similar works, which had immense circulation.

Ahriman (ä'ri-män), according to the ancient Persians the personification, or principle of evil.

Ai (i), city of Palestine destroyed by Joshua; site not positively known; also a city of Ammon, destroyed by the Babylonians.

Ai'dan, Saint, d. 651; first bishop of Lindisfarne; b. Ireland, and sent as missionary bishop to Northumbria by the bishop of Iona abt. 635 A.D.; established Christianity, aided by the king and nobles.

Aidé (ä-ë-dä'), **Hamilton**, 1830- ; English author; b. Paris; published novels, including "Carr of Carlyon," "Poet and Peer," and "Passages in the Life of a Lady"; also poems: "Eleanore," "The Romance of a Scarlet Leaf," "Songs Without Music."

Aides-de-Camp (ädz' dë käñ), confidential officers selected by general officers to assist them. They are, in the U. S. service, attached to the person of the general, and receive orders only from him. They are employed in representing him, in writing orders, in carrying them in person if necessary, in communicating them verbally upon battlefields. Aides should know the position of the troops, routes, posts, quarters of generals, composition of columns, and orders of corps; and understand the purpose of all orders.

Aidin (i-dën'), or **Guzel-Hissar'**, town of Anatolia, Asiatic Turkey, on the Mender River, 68 m. SE. of Smyrna; has a large trade, several fine mosques and synagogues, and a Protestant mission. The ruins of the ancient Tralles are in the vicinity. Pop. 35,000.

Aigneulle (äg-bel'), small town of Savoy, France, on the Arc River, 15 m. E. of Chambéry. Here the combined French and Spanish armies defeated Duke Charles Emmanuel III of Savoy, 1742.

Aigues-Mortes (äg-mört'), town of France, department of Gard, 19 m. from Nîmes. An interview between Francis I of France and the Emperor Charles V took place here, 1538.

Aiguillon (ä-gë-yön'), **Armand de Vignerot Duplessis Richelieu** (duc d'), 1720-82; French statesman; governor of Alsace and Brittany, and later prime minister.

Aiguillon, Armand de Vignerot Duplessis Richelieu (duc d'), d. 1800; son of the preceding; earnestly supported the popular cause in the states-general of 1789, commanded one of the armies in 1792.

Aiken (ä'kën), capital of Aiken Co., S. C., 120 m. W. by N. of Charleston, 600 ft. above the sea-level; noted as a resort for invalids, especially those suffering from pulmonary complaints. Pop. (1900) 3,414.

Aikin (ä'kin), **John**, 1747-1822; English writer; b. Leicestershire; produced, with his sister, Mrs. Barbauld, "Evenings at Home"; his numerous works include a biographical dictionary, entitled "General Biography."

Aikins, James Cox, 1823-88; Canadian statesman; b. Toronto, Ont.; educated at Victoria College, Coburg; member of Canadian assembly, 1854-61; legislative council, 1862-67; privy council, 1869; Secretary of State, 1869-73 and 1878; Minister of Inland Revenue, 1880-82; member of dominion senate, May, 1867; and lieutenant governor of Manitoba and Keewatin, 1882-88.

Ailan'tus Silk'worm, the *Attacus Cynthia*; so named because it feeds on the leaves of the ailantus tree. Its silk is extensively used in



AILANTUS SILKWORM.

China. The larvæ, after being fed through their first molt with picked leaves, are transferred to the trees and there left. See SILKWORM.

Ail'red, or **Æth'elred**, or **Eal'red**, or **Al'ured**, **Saint**, 1109-66; Cistercian abbot of Rievaulx, Yorkshire; b. Hexham, England; wrote many sermons, histories, and other works.

Ailsa Craig (äl'sä kräg'), rocky islet in estuary of the Clyde, 10 m. from coast of Ayrshire, Scotland; 1,139 ft. high; inhabited only by a rabbit catcher and the lighthouse keeper; gives title to the marquis of Ailsa, its proprietor.

Ailu'rus, a genus of carnivorous animals of the family *Procyonidæ*. The *Ailurus fulgens*, allied to the raccoon, is found in the mountains of Nepal. It is there called *panda*, *chitwa*, and *wah*. It is about the size of a large cat, and has singularly rich and beautiful fur, mostly of a bright chestnut brown, but deepening into



AILURUS FULGENS.

a rich black on the chest and outside of the legs. It has a short head and a thick muzzle. The head is of a whitish fawn color, and the tail is of the same color as the body. The coat of the panda is very thick, fine, and warm in texture. These animals live among rocks and trees at a considerable elevation in the Himalaya Mountains. Their food is chiefly fruit and other vegetable substances.

Ain-müller (in'mül-er), **Maximilian Emanuel**, 1807-70; German painter; b. Munich; restorer of the art of painting on glass. Among his works are the windows of the cathedrals of Ratisbon and Cologne.

Ainos (I'nöz), aboriginal inhabitants of Japan, now found only in Yezo, Saghalin, and Kurile islands, driven there by the advance of the Japanese, who seem to have entered the country from the SW. Though mentioned in Japanese history as barbarians, they are of a mild and amiable disposition. Their chief occupations are hunting and fishing. They have Caucasian features, are low of stature but strongly built, and are in general very hairy. They are fetishists, and are in a low state of civilization.

Ains'worth, William Harrison, 1805-82; English novelist; b. Manchester; published "Rookwood," "The Tower of London," and "Jack Sheppard," which had an extraordinary success; became the proprietor of the *New Monthly Magazine*, 1845.

Aintab (In-täb'), town of Asiatic Turkey; on the S. slope of Mt. Taurus or Alma-Dagh; about 60 m. N. of Aleppo; is well built and has manufactories of leather, woolen cloths, etc. A flourishing mission among the Armenians here has been maintained for years by American Protestants. Pop. est. at 45,000.

Air, the gaseous substance of which our atmosphere consists, being a mechanical mixture of nitrogen and oxygen; it also contains, in small amounts, water vapor, carbon dioxide, nitric acid, ammonia, ozone, argon, neon and organic matter, as well as dust, germs and other solid particles held in suspension. The oxygen is absolutely essential to animal life, while the purpose chiefly served by the nitrogen appears to be to dilute the oxygen. Oxygen is more soluble in water than nitrogen, and hence the air dissolved in water contains about 10 per cent more oxygen than atmospheric air. The oxygen, therefore, available for those animals which breathe by gills is somewhat less diluted with nitrogen, but very much diluted with water. Air has weight which we do not feel, because of the air and other gases within us that exert an equal outward pressure. Upon every square inch of the earth's surface there rests a weight of about 15 lbs. of air, so that upon the body of a medium-sized man the air presses with a force equal to 30,000 lbs. Air is sometimes put to mechanical use as a moving power, or rather as a means for transferring power. Compressed air can be employed in this way with great advantage in mines, tunnels and other confined situations, where the discharge of steam would be attended with inconvenience. This use of compressed air in such situations is also of indirect advantage in serving not only to ventilate the place in which it is worked, but also to cool it. See COMPRESSED AIR; GAS; LIQUID AIR.

Air Blad'der, or **Swim Bladder**, an organ or large air sac in fishes, which enables them to modify their specific gravity by increasing or

diminishing the volume of air in the bladder. This air, largely nitrogen, is secreted by the walls of the bladder, the homologue of the lungs of air-breathing animals. Many fishes have no air bladders. In others the organ has a complex structure.

Air'brake. See BRAKE.

Air Gun, an instrument for projecting missiles by the force of condensed air, which is forced into a strong metal reservoir within the stock. The bullet should fit the barrel very exactly, to leave no windage. On pulling the trigger, the condensed air rushes with violence into the barrel, propelling the bullet before it. The force with which a projectile is propelled from an air gun is commonly much less than that produced in a weapon charged with gunpowder, but it may be sufficient to make a very formidable weapon.

Air Plant. See EPIPHYTE.

Air Pump, machine for the production of a vacuum, or sometimes for the compression of a gas; invented by Otto von Guericke, abt. 1659; essential parts are similar to those of suction pumps for water, but the capacity of the cylinder is relatively larger, and the valves are constructed with special reference to delicacy of action. All air pumps with valves cease working before the vacuum is complete, even where leakage is eliminated. The vacuum attained by mechanical pumps is rarely as good as $\frac{1}{1000}$ of an atmosphere. By the mercurial air pump, however, the pressure has been reduced to less than $\frac{1}{100000}$, and, by extraordinary precautions, to about $\frac{1}{1000000}$ of an atmosphere.

Air'ship. See FLYING MACHINES.

Air'y, **Sir George Biddell**, 1801-92; British astronomer and physicist; b. Alnwick, Northumberland; Lucasian Prof. of Philosophy at Cambridge, 1826, and Plumian Prof. of Astronomy, 1828. In 1835 appointed astronomer royal, in charge of Greenwich Observatory till September, 1881. He attained high rank as an astronomer and physicist; wrote much on weights, measures, coinage, railways, and kindred subjects; made important improvements in astronomical and philosophical instruments.

Aisle, the lateral division of a church on each side of the center portion or nave, to which latter the term aisle is often misapplied.

Aisne (än), river in N. of France; rises in the department of Meuse; flows nearly W., passes by Soissons, and enters the Oise near Compiègne; length, about 85 m.; navigable 44 m. The canal of Ardennes connects it with the Meuse.

Aix (äks), ancient *Aquæ Sextiæ*, city in SE. France; department of Bouches-du-Rhône; 33 m. N. of Marseilles; formerly capital of Provence; a celebrated seat of learning in Middle Ages; is the seat of an archbishopric; has a fine cathedral, museum, Royal College, public library, manufactories of silk and cotton. Has warm mineral springs, from which it derived its ancient name.

Aix-la-Chapelle (äks-lä-shä-pél'), city of Rhenish Prussia; on frontier of Belgium, 44 m. WSW. of Cologne. Once the capital of empire of Charlemagne and his favorite residence. A well-built, handsome city, with a cathedral founded in 796 A.D., a large townhall, elegant theater, public library, and several hospitals. Here are celebrated mineral springs, considered efficacious for the cure of gout, rheumatism, and cutaneous diseases. Has important manufactories of fine broadcloths, needles, and pins. The cathedral contains the tomb of Charlemagne and a collection of relics. The successors of Charlemagne and the emperors of Germany were crowned here from the ninth century till 1531. Pop. (1900) 135,221.

Aix-la-Chapelle, Con'gress of, assembly held 1818 for settling the affairs of Europe after the war of 1815. The king of Prussia and the emperors of Russia and Austria were present in person. The representatives were Metternich, Wellington, Castlereagh, Hardenberg, Bernstorff, Nesselrode, and Capo d'Istrias, with Richelieu on behalf of France. Their deliberations resulted in the withdrawal from French territory of the army of occupation, and prepared the way for what was afterwards known as the Holy Alliance.

Aix-la-Chapelle, Trea'ties of: I, a treaty concluded May 2, 1668, between Louis XIV of France on one side and the Triple Alliance, including England, Sweden, and Holland, on the other, which ended the war between France and Spain for possession of the Spanish Netherlands; **II**, a treaty which ended, 1748, the Austrian war of succession, in which all the great powers of Europe were engaged. Several German princes had disputed the claim of Maria Theresa to the throne of Austria, and from this cause the war arose. It lasted from 1740 to 1748, and the peace left the different states with nearly the same possessions as before.

Aix-les-Bains (äks-lä-bän'), fashionable bathing resort in Savoy, France; in the mountains, about a mile from the picturesque Lake Bourget, 90 ft. above the lake and 823 ft. above the sea. The diseases treated are those of the throat, rheumatism, gout, eczema, neuralgia, catarrh, and scrofula. The waters are administered internally and externally.

Aizani (i-zä'nē), ancient city of Phrygia, Asia Minor, historically unknown. Its numerous remains, including a theater with accommodations for over 20,000 spectators and in a fine state of preservation, were discovered by Ashburnham, 1824, at Tchavdyr, on the Adranas (ancient *Rhyndacus*), 30 m. SW. of Kutaia.

Ajaccio (ä-yä'chö), or **Ajazzo** (ä-yät'sö), seaport and capital of Corsica, on the W. coast; has a good port defended by a citadel; also a cathedral and a library. Wine and olive oil are exported. Napoleon I was born here August 15, 1769. A magnificent monument, representing him, surrounded by his four brothers, was finished in 1865. Pop. (1901) 19,579.

Ajalon (äj'lön), town of Palestine belonging to the Levites, in the land of Dan, on the

spot now occupied by the village of Yalo, 14 m. NE. of Jerusalem. Over the valley in which this town was situated the moon stood still while Joshua pursued the five kings.

Ajax (ä'jäx), name of two Greek chiefs in the Trojan war. One, son of Telamon, king of Salamis, was second only to Achilles, and killed himself because the arms of Achilles on his death were given to Ulysses. The second, called the Lesser Ajax, was son of Oileus, king of the Locrians, whom he led to the war in forty ships.

Ajmere (äj-mēr'), or **Rajputa'na**, town of British India, province of Ajmere-Merwara; 220 m. SW. of Delhi, in a picturesque valley; has several massive temples and mosques, Mayo College, and water works supplied by a subterranean aqueduct. Pop. (1901) 73,839.

Akbar (äk'bër), or **Ak'ber**, **Jelal ed-Din Mohammed**, 1542-1605; Mogul emperor of Hindustan; reigned half a century; made vast annexations and many useful reforms; his history written in Persian, "Akbar Nameh," has been partly translated into English.

Akenside (äk'en-sid), **Mark**, 1721-70; British physician and poet; b. Newcastle-on-Tyne; best known by his didactic poem "The Pleasures of the Imagination."

Akerblad (äk'er-bläd), **Johan David**, 1760-1819; Swedish antiquary and orientalist; visited Jerusalem 1792, and the Troad 1797; gained distinction by deciphering the demotic writing of ancient Egypt, and wrote a "Letter on the Egyptian Inscription of Rosetta."

Akers (äk'kërz), **Benjamin Paul**, 1825-61; American sculptor; b. Sacarappa, Me.; studied in Boston and at Florence (1852). Spent some years of work in Italy, but generally lived and practiced his art in the U. S., most of his work being portrait busts and medallions.

Akhalt'sikh (ä-käl-tsëk'), city of Asiatic Russia; in Georgia; on an affluent of the Kur, 100 m. W. of Tiflis; contains a mosque and several churches, and has some trade in silk and honey. The Russians defeated the Turks near this place 1828, and it was ceded to Russia 1829.

Akhlat (äk-lät'), town of Armenia, Asiatic Turkey; on the NW. shore of Lake Van, 203 m. SE. of Trebizond; formerly the seat of the Armenian kings, now the seat of an Armenian bishop.

Akiba (ä-kë'bä), **Ben Joseph**, d. 135; Jewish rabbi, of great learning and influence; president of the school of Bene Barak in the second century A.D. Having joined the rebellion of Barchochebas, he was flayed and burned by the Romans.

Akka (äk'kä), a dwarf race of central Africa. See PYGMY.

Akerman (äk'er-män), fortified town of Russia in Bessarabia, on the Dniester; about 4 m. from the Black Sea, and 28 m. SW. of Odessa; has a port, several mosques and Greek and Armenian churches, numerous factories,

and an extensive trade in salt, etc. A treaty concluded at Akerman, September 4, 1826, exempted the Danubian provinces from all but a nominal dependence on Turkey. Pop. (1897) 28,303.

Akron (äk-rön), capital of Summit Co., Ohio; on the Ohio canal, 36 m. S. of Cleveland; has a variety of manufactures, including one of the largest printing and publishing plants in the U. S., reporting 1905 aggregate capital \$29,188,351 and value of products \$34,004,243; is the seat of Buchtel College (Universalist); and has an assessed property valuation of nearly \$23,000,000. Pop. (1900) 42,728.

Akshehr (äk-shēr'), white city; city of Asiatic Turkey, in vilayet of Konia, on route from Constantinople to Syria; it is the ancient Philomelion of Strabo.

Aksu (äk-só'), town of E. Turkestan, on a river and in a province of the same name, 250 m. NE. of Yarkand; has manufactures of woolen stuffs and jasper, and is visited by many caravans from all parts of central Asia.

Akyab (äk-yäb'), town of Burma, at the mouth of the Aracan River; 550 m. SE. of Calcutta. Good situation for commerce, with fine harbor; has large export trade, especially in rice. Protestant missionary station. Pop. abt. 40,000.

Al, Arabic definite article, forms a prefix to many oriental names, as Al-Mansur, the victorious; Al-Amin, the faithful, etc., and found in English in many words of Arabic origin: e.g., algebra, alcohol, almanac, etc.

Al'a, wing, a Roman military term, denoting the wing of an army. At first, when the whole legion consisted of citizens, it was applied to the horsemen, but after the admission of *socii* was applied to the allies, both horse and foot, who were stationed on the wings. Still later the *alæ* were composed of foreign troops serving with the Roman armies; while under the empire the term was given to bodies of horsemen raised generally in the provinces, and serving apart from the legion.

Alabama (äl-ä-bü'mä), river of U. S.; formed by the Coosa and Tallapoosa, which unite about 10 m. above Montgomery, Ala. It flows nearly W. to Selma, and afterward SW., uniting with the Tombigbee to form the Mobile; navigable for large steamboats through its whole extent, about 300 m.; traverses a fertile region, of which cotton and maize are the staple products.

Alabama (Creek language, "Here we rest"), popularly called "Land of Flowers"; State flower, golden rod; State in the south-central division of U. S.; bounded by Tennessee, Georgia, Florida, Gulf of Mexico, Mississippi; area 52,250 sq. m.; pop. (1900) 1,828,697. The N. part is broken and hilly; principal rivers Tennessee, Mobile, Tombigbee, Alabama, Coosa, Black Warrior, Tensas, Perdido, and Chatahoochee; principal bay, Mobile. Mineral productions include, gold, silver, copper, iron ores, lead, clay, and building stones; value coal mined, 1906, \$17,514,786; has large tracts of

valuable yellow pine forests; among trees are the oak, hickory, chestnut, cedar, elm, cypress, live oak, magnolia; among fruits raised are the apple, pear, plum, and hardy peach in the N., fig, pomegranate, olive, and orange in the S. Climate in N. Alabama delightful, with no intense heat; central Alabama, greater heat but cool nights; occasional frosts; S. Alabama, protracted heat but cool nights and heavy dews. Crops include cotton, corn, wheat, oats, rye, sweet potatoes, hay, rice, sugar cane, to-



bacco; production of cotton, 1906-7, 642,210,770 pounds. In 1900 there were 223,220 farms. Chief manufactures, iron and steel, lumber products, cotton goods, foundry and machine shop products, railroad cars, coke, flour and feed, cottonseed oil, and fertilizers; value of pig iron produced, 1905, \$22,680,000; number of factories 1905, 1,882, value products, \$109,169,922. National banks, 1905, 67; total resources, \$37,808,543; State banks few in number. Mobile is the chief port. Value exports, fiscal year 1906-7, \$24,468,710, chiefly cotton, flour, corn, and meat products; imports, \$3,950,360. The public schools, 1904-5, included 76 high schools, enrolling 400,000 pupils; higher institutions include Univ. of Alabama, Southern Univ., Howard College, St. Bernard College, Spring Hill College, Alabama Polytechnic Institute, and Tuskegee Institute for negroes. The leading religious bodies are the Baptist, Methodist, Presbyterian, Protestant Episcopal, Disciple, or Christian, and Roman Catholic. There are over 4,000 m. of railroads. The assessed property valuation, 1905, was \$344,224,221; bonded debt, January 1, 1907, \$9,357,600; chief cities, Montgomery, the capital, Mobile, Birmingham, Anniston, Selma, Huntsville, Florence, Bessemer, Tuscaloosa, Eufaula, New Decatur, Gadsden, Opelika, Phenix, Troy, Pratt City, Sheffield. First settlement, 1702, by Bienville; Mobile planted, 1711-13; territory N. of 31° ceded by France to Great Britain, 1763, transferred to U. S., 1783; first attached to Georgia and S. Carolina, but organized as Mississippi Territory, 1802; region S. of 31° belonged to Spain, but seized in the war of 1812 and annexed to Mississippi Territory; this region and Florida purchased from Spain, 1819; Creek war, 1813-14; Mississippi set off as a State, 1817, and Alabama admitted to the Union, 1819, ninth in order of admission; one of the first of the

S. States to declare for secession. 1860-61; convention of all the S. States held at Montgomery, February 4, 1861, to organize a S. confederacy; provisional government organized; Jefferson Davis elected president and Montgomery made capital; capital removed to Richmond, Va., July, 1861. Several severe battles were fought within the State—notably at Mobile, 1864-65. Provisional government appointed by U. S. Govt., June 21, 1865, and State temporarily under military control; State convention met September 25, 1865, and annulled ordinance of secession; State convention called by Gen. Pope to meet November 5, 1867, to form a new constitution and State government; constitution submitted to people February 4, 1868, met with opposition and deemed to have been rejected. Most of its provisions have, however, since been grafted on the existing constitution. State admitted to representation in Congress by act passed over the President's veto, June 25, 1868.

Alabama, The, a wooden steam sloop of 1,040 tons, built for the confederate states at Birkenhead, England, and called "No. 290," from her number in the list constructed by that firm. She was bark rigged, furnished with two engines of 350 horse-power each, and pierced for twelve guns. Strict precautions were taken to keep her destination secret, but before she was finished, the U. S. Minister requested the British Govt. to detain her. But "No. 290" escaped under pretext of a trial trip, July, 1862. She was not then equipped with guns and warlike stores, but received them at Terceira. August, 1862, Capt. Semmes took command, named her the *Alabama*, and began his cruise with a crew of 80. He burned most of the merchant vessels captured, being unable to take them into any confederate port owing to the blockade. The *Alabama* never entered any port possessed by the confederate states. It is believed that she captured 65 vessels, and destroyed property valued at \$6,000,000. Much greater damage was inflicted on ship owners of the U. S. by the heavy insurance for war risks to which they were subjected, and by their difficulty in obtaining freight. After a long cruise in the Pacific, she returned to Europe, and entered Cherbourg to refit and obtain stores, June 11, 1864. There the *Kearsarge*, in command of Capt. Winslow, found her and offered battle. Though hardly in fighting trim, the *Alabama* came boldly out and was speedily sent to the bottom by her antagonist.

Alabama Claims, demand made by the Govt. of the U. S. in favor of certain of its citizens and of itself upon the Govt. of Great Britain, on account of the warlike acts of certain vessels, thirteen in number, with their tenders, in the interest or employ of the confederate states during the Civil War. Some of these vessels were equipped in Great Britain, others in confederate ports, but allowed to ship coal and supplies in British ports in excess of the maximum amount permitted by the queen's proclamation of neutrality, while one was permitted to take captured cargo into one of the Bahamas and there sell and dispose of it with-

out judicial process. Much greater damage was inflicted on ship owners of the U. S. by the heavy insurance for war risks to which they were subjected and by the difficulty of obtaining freight for their vessels. The U. S. Govt. was unable to induce England to prevent the escape of cruisers built and equipped in British ports, the latter insisting that as none of them were actually armed there, its international obligations had not been violated. Diplomatic negotiations between the two countries resulted in the meeting at Washington, 1871, of a joint high commission of five British and five Americans, who signed a treaty, May 8th, referring disputes between the two countries, including the Alabama claims, to arbitrators. These met at Geneva, Switzerland, and September 14th awarded the U. S. for actual losses of ships, cargoes, and interest, the sum of \$15,500,000, but brushed away all claims for indirect and national losses.

Al'abaster, one of two kinds of white mineral substances, similar in appearance, but different in composition. Alabaster proper is a fine-grained variety of gypsum or sulphate of lime; the finest quality of this is found near Volterra, in Tuscany. It is manufactured into various ornamental forms in Florence, Italy, which is the center of the alabaster trade. The other is a translucent carbonate of lime, and is harder than the first. Both are manufactured into ornaments.

Considerable deposits of alabaster of the gypsum variety are found in England. It is used there to form the plaster molds of the potters, and is hence called "potter's stone." The fine blocks are used by the turners.

Alabas'trum, a small jar, vase, or bottle, used for holding unguents and liquids. The vessel mentioned in Matt. xxvi, 7, called "alabaster box" in the Authorized Version, and "alabaster cruse" in the Revised Version, is an alabastrum.

Alain de Lille (ä-län' də läl'), Latin *Alanus ab Insulis*, the *Doctor Universalis*; flourished in the twelfth century; was a Cistercian monk, and wrote a great number of books, theological, philosophical, and poetical.

Alais (ä-lä'), ancient *Alesia*. town of S. France, department of Gard; on the Gardon, at the foot of the Cevennes; 31 m. NW. of Nîmes; is in a productive coal field, and has several manufactories, a college, and school of mines. Alais was a stronghold of the French Protestants in the seventeenth century, and was captured in 1629 by Louis XIII. It has a citadel built by Louis XIV, and a fine Gothic church. Pop. (1901) abt. 18,500.

Alameda (ä-lä-mä'dä), city in Alameda Co., Cal., on San Francisco Bay, 11 m. ESE. of San Francisco; has large borax works, potteries, oil refineries, and shipyards; is the seat of the College of Notre Dame, Roman Catholic, and the residence of many San Francisco business men. Pop. (1900) 16,464.

Alamo (ä'lä-mō). The, celebrated fort at San Antonio, Tex. A band of 140 Texans here bravely resisted a Mexican force of ten times

their number from February 23 to March 6, 1836, and nearly all perished rather than surrender. The six who finally surrendered were murdered by the Mexicans. In consequence of this heroic defense, Alamo is styled the "Thermopylæ of America." "Remember the Alamo!" became the war cry of the Texans in their struggle for independence.

Alani (ä-lä'nī), ancient warlike tribe of unknown origin, who made incursions into the Roman Empire as allies of the Goths and Vandals, invaded Asia Minor in the reign of Aurelian, and cooperated with the Vandals in the invasion of Gaul 406 A.D.

Alarcon (ä-lär-kön'), **Fernando de**, 1466-1540; Spanish army officer; took care of Francis I of France after his capture in the battle of Pavia, and of Pope Clement VII when taken prisoner by the constable of Bourbon.

Alarcon, Hernando de, Spanish navigator of the sixteenth century, who explored and mapped the coast of California, 1540, and discovered that Lower California was a peninsula, not an island.

Alarcon, Pedro Antonio de, 1833-91; Spanish novelist and poet; b. Guadix; took part in the war of 1859 against Morocco, as historiographer, and wrote his "Diario de un testigo de la guerra de Africa." Later wrote successful short sketches, then novels of a more serious character, among them "El sombrero de tres picos," "La Alpujarra," "El Escándalo." The last of these is strongly Catholic in tone, and sharply opposed to the scientific and realistic tendencies in contemporary Spanish literature. The following are recommended for students: "El niño de la bola," "El capitán," "Veneno," "El final de Norma."

Alarcon y Mendoza (-mën-dö'thü), **Don Juan Ruiz de**, abt. 1580-1639; Spanish poet and dramatist; b. Tasco, Mex.; went to Spain, 1622, became reporter of the royal council of the Indies. Among his works, which present a faithful delineation of Spanish manners, are "Walls have Ears," and "Suspicious Truths," which Corneille imitated in his "Menteur."

Alaric (äl'ä-rik), king of the Visigoths, 350-410; invaded Thrace, Macedonia, and other provinces, 395; took Athens and entered the Peloponnesus, from which he was driven out by Stilicho; appointed governor of Illyria, 396; invaded N. Italy, 402, but was defeated by Stilicho at Pollentia and Verona; Alaric renewed the invasion of Italy, which the Emperor Honorius was unable to defend. The army of the Visigoths invested Rome, but were induced to retire by the payment of 5,000 lbs. of gold and 30,000 lbs. of silver. After unsuccessful efforts to negotiate, Honorius rejected the terms of Alaric, who, 410, took Rome, and permitted his soldiers to pillage it for six days. He was marching to Sicily when he died at Cosenza.

Alaric II, eighth king of the Visigoths, began to reign 484 A.D., on the death of his father, Euric, over dominions including parts of Spain and of Gaul; was killed in battle by Clovis, king of the Franks.

A Lasco (ä-läs'kō), or **Alasco, John**, 1490-1560; Polish Protestant theologian; early imbibed the doctrines of Zwingli; became a friend of Erasmus, and, on invitation of Cranmer, removed to London, 1551, and took charge of congregations of foreign exiles who had embraced the reformed faith. Banished on accession of Queen Mary, 1553, he returned to Poland, 1556.

Ala Shehr (ä-lä shēr'), the ancient Philadelphia, founded abt. 200 B.C. by Attalus Philadelphus, walled city of Asia Minor, at the N.E. base of Mt. Tmolus, 93 m. E. of Smyrna. Here are five Christian churches and numerous ruins.

Alaska (ä-läs'kä.) unorganized territory in the W. division of the N. American union, comprising the extreme NW. portion of the N. American continent, adjacent islands, and Aleutian Islands; bounded by the Arctic and Pacific oceans, Bering Sea and Strait, British Columbia and NW. Territory of Canada; extreme length of mainland N. and S., 1,100 m.; greatest width 800 m.; length of shore lines estimated at 25,000 m.; area about 590,800 sq. m., greater than that of the 13 original states; formerly called Russian America; mountains a continuation of Coast, Cascade, and Rocky ranges with outlying spurs; lofty peaks numerous, Mt. St. Elias being 19,500 ft.; there are extensive glaciers; in the Aleutians are periodically active volcanoes; rivers: Yukon, 2,000 m. long, navigable 1,500 m., Kuskokwim, Colville, Copper, Suschitno and several Arctic streams; chief inlets, Prince William Sound, Cook Inlet, Bristol Bay, Morton Sound, and Kotzebue Sound on the Arctic. Gold, silver, copper, iron, coal, marble, graphite, bismuth, kaolin, sulphur, and petroleum are among mineral productions; wild animals include bear, wolf, moose, mountain sheep, walrus, seal; reindeer have been introduced; extensive forests of lofty trees on mainland and larger islands; winter climate of S. Alaska mild; mean annual temperature, Yukon district, about 25° F.; nine months severe winter in some parts; cereal growing successfully away from coast; hardy vegetables can be grown over great portion of territory; chief industries, seal and salmon fishing and gold mining. Since its purchase Alaska has supplied furs, fish, and gold to the amount of \$150,000,000, about equally divided between the three items. When purchased, the est. pop. was 30,000; in 1908 it was about 88,824. The salmon industry began to assume importance in 1885; the annual catch is now valued at \$10,671,648. The gold mines are in three distinct localities. In the SE. part low grades of quartz are found; in the interior on the Yukon River the Klondike region was prospected in 1896 and disclosed some of the richest placer mines in the world; the findings in Tanana and Birch Creek valleys amounting to over \$1,000,000 in 1900. In 1898 the beach sands of Norton Sound and Cape Nome were found rich in gold and attracted greater interest than the Klondike region. Value of gold output, 1907, was \$18,489,400; imports merchandise, 1907-8, \$17,354,877; exports, \$12,825,682; gold shipped to U. S. in 1908, \$11,490,777. Public schools enroll about 2,250

pupils; Roman Catholic and Protestant missions in many places. One railroad, about 112 m.; telegraph communication between towns and U. S. and Canada. Chief towns Sitka, Nome, Skagway, and Juneau, seat of government. Alaska discovered by Bering, 1741; Russian trading posts established about 1770; territory ceded to U. S., 1867, for \$7,200,000 in gold. Alaska is governed directly by Congress at Washington and locally administered by a governor appointed for four years by the President of the U. S.; territorial government established May, 1884; boundary line between U. S. and Canada at the Yukon established 1906.

Alaska-Yu'kon-Pacific Exposition, held at Seattle, Wash., in 1909, and designed to exploit the resources of Alaska and develop the trade of the Pacific. Ground was broken for the buildings on June 1, 1907. On Feb. 6, 1908, a bill appropriating \$100,000 for the exposition was passed by the U. S. Senate. The formal opening of the exposition took place on June 1, 1909, when President Taft gave the signal by pressing a gold telegraph key at the White House.

Alatri (ä-lä'trë), town of Italy; province of Rome; 45 m. ESE. of Rome; occupies the site of the ancient city called Alatrium, or Aletrium, which was one of the principal cities of the Hernician League. Here are some of the finest and best-preserved cyclopean or polygonal walls in Italy; part of the defenses of the ancient city built of immense polygonal blocks of stone, without cement.

Alaudidæ, larks; a family of passerine birds, the best known of which is the skylark (*Alauda arvensis*), after the nightingale the most celebrated song bird of Europe.

Alaux (ä-lö'), **Jean**, 1786-1864; historical and decorative painter; b. Bordeaux; director of the French Academy in Rome, 1845-53; member of the Institute, 1851; Legion of Honor, 1841; notable pictures and decorations at museum of Versailles.

Alb, long white linen vestment worn by those in sacred orders in the Roman Catholic Church at the more solemn functions; symbolizes the purity which the wearer should bring to the discharge of his office.

Al'ba, Duke of. See **ALVA**.

Al'ba Lon'ga, very ancient city of Latium, Italy; founded by Ascanius, son of Æneas, several centuries before the foundation of Rome; situated near Lake Albano, about 16 m. SE. of Rome. Its remains have been discovered.

Al'ban, Saint, one of three Christian martyrs said to have suffered in England about 286 A.D., during the Diocletian persecution. St. Alban was the protomartyr of Britain.

Albanen'ses (from *Alba*, a town of Piedmont), that division of the Catharists who believed in absolute dualism. They taught that the world was created by the evil spirit.

Albani (äl-bä'në), **Francesco**, 1578-1660; Italian painter; b. Bologna; most celebrated productions: "The Sleeping Venus," "Diana in

the Bath," "Danaë Reclining," "Galathea on the Sea," and "Europa on the Bull."

Albani, Marie Emma (LAJEUNESSE), 1852-; Canadian-American dramatic soprano; b. Chambly, near Montreal; sang in the cathedral in Albany, N. Y.; studied in Paris, and made her *début* as an opera singer in Messina, 1870, under the name of Albani out of compliment to the city of Albany; made a great success in "Mignon."

Albania (äl-bä'nī-ä), ancient name of a country bounded on the E. by the Caspian Sea, and comprising the modern Daghestan and Shirvan. Its inhabitants were often defeated, but never conquered, by Rome.

Albania (called **SHKIPERË** by the natives, and **ARNAOUTLIK** by the Turks), SW. part of European Turkey; bounded on W. by the Adriatic and Ionian seas; length N. and S. about 290 m.; width varies from 40 to 90; nearly coincides with the ancient Epirus. Among remarkable features are its subterranean rivers and its beautiful lakes. The Albanians are rude and warlike mountaineers, more addicted to robbery than industry; probably descended from the ancient Illyrians and Epirotes. Their language belongs to the Indo-European family and has several marked dialects. Pop. est. 1,400,000; also many Albanians live in Greece and other parts of the Levant.

Albano (äl-bä'nö), lake and mountain in Italy; about 14 m. SE. of Rome. The lake, 6 m. in circumference, occupies the crater of an extinct volcano, is 1,000 ft. deep, and has no natural outlet, but discharges its waters through an artificial tunnel cut through tuffaceous rock. This tunnel or "emissary," constructed by the Romans in 397 B.C., is one of the most remarkable remains of ancient engineering. It is 6,000 ft. long. Alba Longa stood on the NE. margin. From the E. shore rises Mt. Albano or Monte Cavo, over 3,000 ft. high, on whose summit are the ruins of the temple of Jupiter Latiaris.

Albano (ancient *Albanum*), city of Italy, near Lake Albano, and on the Via Appia, 18 m. SE. of Rome; occupies the site of Pompey's villa, is celebrated for beauty of scenery, and is a favorite summer residence of the wealthy citizens of Rome. Pop. (1901) 8,461.

Albany (äl'bä-nī), **Louisa Maria Caroline**, Countess of, 1753-1824; b. Mons; daughter of Gustavus Adolphus, prince of Stolberg Geder, Germany; married, 1772, the Young Pretender, Charles Edward Stuart, a grandson of James II of England, then fifty-two years old. After eight years she eloped with the poet Vittorio Alfieri, and lived with him till his death, 1803. She was received into the highest society even in England. After Alfieri's death she married a young French artist named Fabre, and to him she bequeathed the curiosities given her by the Young Pretender and by Alfieri, together with other treasures, and these form the foundation of the notable Musée Fabre at Montpellier.

Albany, or **Al'bainn**, ancient name of the Highlands of Scotland. It is supposed that Albany or Albion was the original name given

to the whole island by its Celtic inhabitants, and that it was afterwards restricted to the NW. part of Scotland, when the Celts had retired from the other parts of Britain. The title of Duke of Albany was given to the second son of several kings of Scotland and England.

Albany, capital of the State of New York; on Hudson River, 145 m. N. of New York City; was first occupied by the Dutch, 1614, as a trading post, but an actual settlement was not effected till May, 1624, when a small fort (called Fort Orange, or Aurania) was built of logs and earth. In 1626 a war between the Mohawks on the W. and the Mohicans on the E. broke up the settlement, and the families were transferred to New Amsterdam. Settlement was resumed, 1630, by Dutch families under the patroon system, the settlers renting their lands of the patroon or lord of the manor. The village was called Beverwyck, then Williamstadt, and, 1664, Albany, after the Duke of York and Albany, afterwards James II. It was incorporated as the city of Albany in 1686, and became the capital of New York in 1797. The city, which has a river frontage of 4 m., extends back over an alluvial plain up the sides of the hills to and upon the table-land 150 ft. high, about 5 m. W. The principal streets are Broadway and Pearl, which run parallel with the river, and State, which ascends the hill to the capitol, and thence to the limits of the city proper on the W. The capitol, built of drilled granite, four stories high, 300 ft. wide and 400 long, on an elevation 155 ft. above the Hudson, contains halls for the assembly, senate, court of appeals, State library, and rooms for the State officers; cost, including \$543,179 for the site, \$23,721,903.14; the marble State hall (1842) also contains State departments. Other buildings are: the new city hall, of granite and red sandstone, with a picturesque tower (1882); U. S. custom house and post office (1882); Dudley Astronomical Observatory; State Museum of Natural History (1797); State armory (10th battalion, N. G. N. Y.); Albany is also the see of Roman Catholic and Protestant Episcopal dioceses, with two fine cathedrals. The park system of over 300 acres includes Washington Park, 90 acres, with a lake 1,700 ft. long, and carriage drives of 5½ m.; and Beaver Park, on the S. side, occupying the extensive and picturesque ravines about Martinville, 78 acres. Among the educational institutions are a Medical College, Law School and College of Pharmacy, departments of Union Univ.; State Normal College, Albany Institute, formed in 1791, merged with the Historical and Art Society (1901) as the Albany Institute and Historical and Art Society; Dana Natural History Society (women), organized in 1868; and the State library. In 1905 the city had \$16,676,369 invested in manufacturing, with products valued at \$20,208,715, the chief articles being stoves, shoes, beer, flour, brick, and foundry products; large lumber interests. The assessed property valuation exceeds \$70,600,000. Pop. (1905) 98,374.

Albany Con'gress, convention of representatives of the principal British N. American

colonies called by the British Govt. 1754 to consider the impending French war. A league with the Indians was proposed and carried out. Politically, the strongest feature of the Congress was the presentation by Franklin of a proposal for a union of the colonies, which was rejected.

Albatross, web-footed bird of the subfamily *Diomedinae*, allied to the petrels; remarkable for their great size and powers of flight. The wandering albatross (*Diomedea exulans*) is the



ALBATROSS.

largest of all ocean birds, having wings which measure 12 ft. or more from tip to tip, but are narrow in proportion to their length. They wander over the open oceans, and often follow ships for days without resting.

Albay (ál-bí'), province and its capital in Luzon, Philippine Islands; in the richest hemp-growing region of the islands; province contains the picturesque volcano Mayon, which has had several destructive eruptions, the last 1888. Pop. (1903) province, 240,326; town, 14,049.

Albemarle, George Monk (first duke of), 1608-69; famous English general, chiefly known as the principal agent in the restoration of the Stuarts, 1660; b. Devonshire. After the defeat of the royalist cause Cromwell appointed Monk a lieutenant general and chief of artillery, and after the battle of Dunbar, general in chief of the army in Scotland. In 1652 he took part in the commission which drew up a pact of union between England and Scotland, and went to Scotland as governor, 1654; in which position he had great difficulties in maintaining his rule against the Presbyterians. On January 1, 1660, he crossed the Border with 6,000 men, and, February 3d, marched into London without drawing sword from scabbard. February 21st he recalled the expelled Presbyterian members, thus creating a majority for the king. Charles gave Monk the offices of privy counselor, chamberlain, and lord lieutenant of Devon and Middlesex, besides creating him Duke of Albemarle. In 1666 Monk commanded the naval expedition against Holland, was beaten by De Ruyter in the three days' conflict at Dunkirk, but defeated the Dutch admiral at the N. Foreland.

Albemarle Sound, inlet in the NE. part of N. Carolina, extending from the mouth of the Roanoke River 60 m. E. to a narrow island which separates it from the Atlantic; average width N. and S. about 12 m.; communicates by narrow inlets with Pamlico and Currituck sounds; water nearly fresh.

Alberic (äl'bër-ik) I, 925; ruler of Rome; b. in the beginning of the tenth century; son of a Lombardian noble; became margrave of Camerino, and, through his marriage with the celebrated Marozia, ruler of Rome; banished by John X from Rome, and murdered at Orta. His son, **ALBERIC II**, was a powerful and wise ruler, and d. 954, after a reign of twenty-three years. He was succeeded by his son, Ottaviano, who was elected pope under the name of John XII, 956.

Alberoni (äl-bä-rö'nē), **Giulio**, 1664-1752; Italian cardinal; b. near Piacenza; began his public career as envoy to the court of Madrid, and, having gained the favor of Philip V, became prime minister of Spain 1715, and cardinal 1717. His foreign policy was so audacious and violent that nearly all the powers of Europe combined against Spain. Removed from office 1719, and banished.

Al'bert I, 1828-1902; king of Saxony; b. Dresden; son of King Johann I and Queen Amalie, daughter of King Maximilian I of Bavaria; as crown prince was made lieutenant general, 1853, and general, 1857; commanded the Saxon army against Prussia, 1866; received command of the Twelfth Army Corps after the admission of Saxony into the N. German union, took part in the battles of Rezonville, Gravelotte, and Sedan in the Franco-German war of 1870, and commanded the Fourth Army (of the Meuse). July, 1871, created field marshal of the empire. He succeeded to the throne, at the death of his father, October 29, 1873.

Albert I, 1248-1308; archduke of Austria; son of the Emperor Rudolph of Hapsburg; was elected emperor of Germany, 1298, but his title was contested by Adolphus of Nassau, who had occupied the throne. The rivals fought a battle, in which Adolphus was killed. Albert was assassinated at Windisch by his nephew, John the Parricide.

Albert (OF BRANDENBURG), 1490-1568; first duke of Prussia; b. Ansbach; elected grand master of the Teutonic order, 1511; was the last who held that office; became a Protestant and duke of Prussia, which he held as a fief of the king of Poland, 1525.

Albert Ed'ward. See EDWARD VII.

Albert Francis Augustus Charles Emmanuel (better known as **PRINCE ALBERT**), 1819-61; prince of Saxe-Coburg-Gotha and consort of Queen Victoria; b. Rosenau, near Coburg; son of Duke Ernest I. His marriage with Victoria was celebrated February 10, 1840, soon after which he obtained the rank of field-marshal in the British army. He patronized science and art, was a liberal promoter of benevolent institutions, and acquired great influence in public affairs as the prudent and trusted adviser of the queen. In 1857 he received the title of prince consort. His death was lamented as a national loss.

Albert Fred'erick Ro'dolphe, 1817-95; archduke of Austria; eldest son of Archduke Charles and Princess Henrietta of Nassau; en-

tered the army; served in Hungary, Moldavia, and Silesia, and commanded a division in Italy, 1849; fought with distinction at Mortara and Movara; was military and civil governor of Hungary, 1851-60; commanded the Eighth Army Corps at Vincenza, October, 1860; and on his appointment as field-marshal, April, 1863, was placed in command of the Austrian army. June 24, 1866, he won the victory at Custoza, and, returning to Austria, raised a new army of 200,000 men to repel the Prussian invasion of Bohemia; July 13, 1866, commander-in-chief of the Austrian army.

Albert Ed'ward Nyan'za, African lake; one of the sources of the Nile; discovered by Stanley; latitude 1° S., longitude 30° E.; is about 40 m. across, and lies in a crescent, open to the N., and about 50 m. from point to point; is 100 m. NW. of Victoria Nyanza, on the line between the Kongo Free State and British E. Africa. It drains by the Semliki River into the Albert Nyanza, and between these two lakes lie the Ruwenzori Mountains, which reach an altitude of 18,000 ft., and were ascended by the Duke of Abruzzi, 1906. The lake was named after Albert Edward, Prince of Wales.

Albert Nyanza, lake of central Africa; headwaters of the White Nile; latitude 2° N., longitude 31° E.; about 100 m. long by 25 m. broad; 2,400 ft. above sea-level. It receives the Semliki River from the Albert Edward Nyanza at the S. end and the Somerset River from Victoria Nyanza at the N.; a short distance from the mouth of the Somerset the waters of the lake empty into the White Nile. Discovered in 1864 by Baker, who partially explored it, but erred in confounding its SW. extremity with Albert Edward Nyanza and making it about 300 m. long, an error perpetuated on the maps for a quarter of a century.

Alber'ta, a province of Canada, next to British Columbia the most westerly. It lies to E. of Rocky Mountains, stretching from the U. S. boundary N. to lat. 60° N.; it is bounded S. by Montana, W. by British Columbia, N. by Mackenzie District, and E. by Saskatchewan; area, 253,540 sq. m. Pop. abt. 300,000. The province consists of great plains rising gradually toward the W., and culminating in the Rocky Mountains; these plains, fertile and covered with succulent grasses, have for years been a great grazing country, but the rancher is rapidly giving place to the farmer. The climate is temperate, but vigorous and bracing.

Alberti (äl-bër'tē), **Leon Battista**, 1404-84; Italian architect, poet, and writer on art; b. Venice or Florence; employed as an architect by Pope Nicholas V; completed the Pitti palace at Florence, and built the Church of St. Francis at Rimini, and the larger Church of St. Andrea in Mantua. He was one of the two men who introduced the classical style of design into Italy.

Albertinelli, **Mariotto**, 1474-1515; Italian painter; b. Florence; pupil of Roselli, and a friar and imitator of Fra Bartolommeo, with whom he painted several pictures. Among his

most celebrated paintings are the "Visitation of Mary and Elizabeth," in Florence; "Saint Catherine" and the "Virgin Mary with the Child," in the Louvre.

Albertus Magnus (Albert the Great), also called ALBERT VON BOLLSTÄDT, 1193-1280; German scholastic philosopher; b. Lauingen, Suabia; became a Dominican 1223; lectured for many years at Cologne and Paris, and wrote numerous works on theology, philosophy, etc.; 1254 chosen provincial of Dominicans, and 1260, bishop of Ratisbon. He was reputed one of the most learned men of the Middle Ages; celebrated for introducing the system of Aristotle to the understanding of his age.

Albi (äl'bē), or Al'by, Latin *Albiga*; old city of France; seat of an archbishopric; on the river Tarn; 42 m. NE. of Toulouse; has a museum of natural history, college, normal school, Cathedral of St. Cecilia, public library, and manufactories of coarse linens, tablecloths, and cotton goods. The Albigenses derived their name from this town, which suffered much in the religious wars of France.

Albigenses (äl-bi-jēn'sēz), religious sect that rose in the S. of France in the tenth and eleventh centuries; allied to the Catharists. Their creed was derived from the Paulicians. Their main bond was a determined opposition to the Church of Rome—to the authority of church traditions, the hierarchy, the adoring of saints and images, and the value of pilgrimages.

Albi'no (Latin *albus*, white), person who has congenitally a great deficiency or an absence of pigment in the hair, skin, and eyes. The complexion is very light, the hair often snowy white, the eyes red. Albinism in the human species may be observed in white and black races, and in the negro is sometimes partial, patches of the skin having the normal color. Albinism is frequent among Zuffi Indians and other tribes in Arizona.

Albion (äl'bi-ōn), ancient Celtic name of Great Britain, signifies "white island"; supposed to have been given on account of the chalky cliffs of Kent.

Albistan (äl-bis-tän'), or El Bostan' (the garden), town of Asiatic Turkey, pashalic of Marash; on Sihun River, near base of Mt. Taurus; 32 m. NNW. of Marash. Here the Egyptian Sultan Bibars defeated the united Turks and Mongolians in a great battle, April 16, 1277.

Al'bo, Joseph, d. 1428; Jewish scholar of Spain; took part in the discussion between Jews and Christians held before Benedict XIII, 1412; continued the work of Maimonides. According to him, the fundamental dogmas of Judaism are the existence of God, the law of Moses and the future life.

Alboin (äl'boin), d. 573; founder of the Lombard kingdom in Italy; son of Alduin, whom he succeeded, 543 A.D. He conducted an army of Longobards into Italy, 568, and conquered the N. provinces. He married Rosamund, daughter of Cunimund, king of the

Gepidæ, whom he had killed, and whose skull was made into a drinking cup from which Alboin forced Rosamund to drink. She had him assassinated the same day.

Al Boräk (äl bö-räk'), the lightning, so called on account of its fleetness; the fabulous milk-white creature on which Mohammed made journeys to the celestial regions.

Albrecht (äl'brēkht), name of many German princes and others. See ALBERT.

Albrechtsberger (äl'brēkhts-bērg-ēr), Johann Georg, 1736-1809; Austrian contrapuntist; b. near Vienna; director of the choir of the Carmelites in Vienna; organist to the court in 1772; musical director at St. Stephen's Cathedral, Vienna, 1792, and published "Gründliche Anweisung zur Composition," 1790. He was the instructor of Beethoven and other eminent musicians.

Albret (äl-brä'), Jeanne d', 1528-72; queen of Navarre; b. Pau; daughter of Henry II of Navarre, and Margaret, sister of Francis I; married Antoine de Bourbon (1548); embraced Calvinism and succeeded in retaining her kingdom; declared Protestantism established in her dominions, 1567; joined Coligny at La Rochelle, 1569; was regarded after the assassination of Condé as the only support of the Huguenots.

Albuera, La (äl-bō-ä'rä), village of Spain, in Estremadura, on a river of the same name, 13 m. SE. of Badajoz, where, May 16, 1811, the British under Gen. Beresford defeated the French under Soult, who lost nearly 9,000 men. The allies lost about 7,000.

Albufera (äl-bō-fä'rä), coast lagoon near Valencia, Spain; here Marshal Suchet defeated the Spanish, 1811. The lake and domain were conferred on him by Napoleon, with title of Duc d'Albufera.

Albu'men, or **Albu'min** (Latin *albumen*, the white of an egg, from *albus*, white), in chemistry, an organic compound which, besides being the characteristic ingredient in the white of an egg, abounds in the serum of the blood, in chyle, lymph, the juice of flesh, and forms an important part of the skin, muscles, and brain.

Albu'minoids, or **Pro'teids**, extensive class of organic bodies found in animals and plants. They form the chief constituents of blood, muscles, nerves, glands, and other organs of animals; and though present in plants in much smaller proportions than cellulose, starch, sugar, etc., they still play a most important part in plant life. Their exact constitution has not been determined. Analysis shows them to contain carbon, 50-55 per cent; hydrogen, 6.9-7.5; nitrogen, 15-18; oxygen, 20-24; sulphur, 0.3-2.0.

Albuminu'ria, condition in which albumin occurs in the urine, and an important symptom of disease. This condition was first recognized by one Nicholas Cotunius in 1770, and by him described as "coagulable urine." Later the relation to forms of dropsy and then to Bright's

disease was determined. Albuminuria is recognized by various tests, of which the two following are most useful: (1) On boiling the urine, mildly acidified with nitric or acetic acid if not already acid in reaction, a coagulation of greater or less distinctness is manifest. (2) If strong nitric acid be poured into a test tube, and on the surface of this from a pipette held in an almost horizontal direction, a little of the urine, a ring of coagulated albumin will appear at the junction of the two liquids.

Albuquerque (äl-bö-kär'kä), Affonso de, surnamed THE GREAT and THE PORTUGUESE MARS, 1452-1515; Portuguese commander; b. near Lisbon; related to the royal family; viceroy of the Indies, 1509; took the city of Goa 1510, and conquered Malacca 1511. In 1513 his fleet entered the Red Sea, which had never before been navigated by Europeans. He captured the rich emporium of Ormuz 1515.

Albuquerque, capital of Bernalillo Co., N. M.; on the Rio Grande; 75 m. SW. of Santa Fé; 5,000 ft. above sea level. It is in a gold, silver, iron, and coal mining region; has an extensive trade; and is the seat of the Univ. of New Mexico. Pop. (1900) 6,238.

Albuquerque, town of Spain, province of Badajoz, 26 m. N. of Badajoz, 9 m. from frontier of Portugal, built on high ground, and defended by a strong fortress. The town was taken, 1705, by the allies of Charles, then a claimant of the Spanish throne, but restored to Spain, 1715.

Albur'num (Latin *albus*, white), or Sap'wood, that part of the wood of exogenous trees which is most recently formed and is contiguous to the bark; gradually hardens with age, and is converted into duramen or heart wood, which is more valuable than alburnum.

Alcæus (äl-sé'üs), abt. 600 B.C.; one of the nine lyric poets of the Alexandrian canon; b. Mytilene. He composed in the fiery Æolic dialect, and the alcaic meter, which bears his name, is full of movement.

Alcaide (äl-käd'), or Alcayde, Spanish adaptation of Arabic *algaid*, the captain; jailer, magistrate, or governor among the Spaniards, Portuguese, and Moors.

Alcala de Henares (äl-kä-lä' dä ä-nä-rës), city of Spain; province of Madrid; on the Henares River; 21 m. E. of Madrid; built 1083 near the site of the ancient Complutum; was the seat of a celebrated university founded by Ximenes, since removed to Madrid. Cervantes was born here, and the Complutensian Bible was printed here 1514.

Alcalde (äl-käl'dä), Spanish adaptation of Arabic *algadî*, the judge; title given by the Moors, Spaniards, and Spanish-American nations to a judicial or administrative officer; sometimes erroneously confounded with alcaide, justice of the peace.

Alcámenes (äl-käm'ë-nës), Greek sculptor of the fifth century B.C.; b. Athens; formerly assumed that he was a pupil of Phidias; since

the discovery of the sculptures at Olympia, stated by Pausanias to be his work, is thought rather that he was a contemporary and rival of Phidias. The Olympia sculptures, which were a part of the temple of Zeus, are powerful and vigorous; the W. pediment contained the battle of the Centaurs and Lapithæ, and the metopes are of varied subjects connected with the labors of Hercules.

Alcantara (äl-cän'tä-rä), town of Spain; province of Caceres; on the Tagus, near Portuguese boundary; where are ruins of a grand bridge built by Trajan, 103 A.D., of which a triumphal arch 40 ft. high still remains. The Duke of Alva here defeated the Portuguese August 25, 1580.

Alcantara, Order of, also called the Order of Saint Jul'ian, religious order of Spanish knight-hood, founded 1156 at Alcantara for the defense of the Christians against the Moors. In 1495 the office of grand master of this order was united to the Spanish Crown; 1835 it was changed from an ecclesiastical to a court order.

Alcatraz (äl-cä-trä'z'), or Pel'ican, Is'land, in San Francisco Bay, Cal. 2½ m. N. of San Francisco; 1,650 ft. long, 130 ft. elevation; is a strongly fortified military post and prison, at the entrance of the Golden Gate; has a lighthouse on its summit.

Alcavala (äl-kä-vä'lä), or Alcaba'la, Spanish adaptation of Arabian *algabalah*, the tax; tax formerly imposed in Spain and her colonies on all property sold, and payable as often as it changed hands.

Alcazar Kebir (äl-kä'zär kë-bër'), the great castle; decayed city of Morocco; 83 m. NW. of Fez. Near it is a bridge where Sebastian, king of Portugal, was defeated and killed, August 4, 1578. Pop. in 1864 abt. 25,000; now abt. 6,000.

Alcestis (äl-sës'tis), in classic mythology, a daughter of Pelias and the wife of Admetus, king of Thessaly; prolonged the life of her husband by suffering voluntary death as his substitute, and was rescued from Hades by Hercules. Her devotion is the subject of one of the tragedies of Euripides.

Al'chemy, the occult science or art of transmuting the baser metals into gold; supposed to have originated in Egypt, and introduced into Europe by the Arabs. The origin of alchemy is connected with the notion that all matter has a common basis, and that the properties of bodies are due to formative force separable from this common substratum. Hence if this first matter could be separated from all special formative forces, and the special "form" of gold or other precious substance discovered, this or any body could be produced at will. So the alchemists sought for the "universal solvent" and the special "forms" of things, for the union of the *matteria prima* and the "form" of gold would produce the actual metal. Similarly, if the vital principle or form of bodily organization could be found its tendencies to decay could be resisted. Hence the search after the elixir

of life and the philosopher's stone. It was this search after forms and the *materia prima* which so vitiated the method of the Middle-Age investigators. A reaction against this false analysis of Aristotle led to the opposition to his name and doctrines which marked the rise of modern science in Europe. When belief in the reality of the Aristotelian analysis passed away, alchemy ceased.

Many useful discoveries were the results of these visionary pursuits. The oldest European works on alchemy are those of Roger Bacon. Among other famous alchemists were Basil Valentine, R. Lully, and Paracelsus. As late as the sixteenth century many men of superior intellect devoted their time and money to alchemy. According to Liebig, "The great (Francis) Bacon, Luther, Benedict Spinosa, and Leibnitz believed in the philosopher's stone, and in the possibility of the transmutation of metals." The same writer affirms that alchemy was never at any time anything different from chemistry. It is unjust to confound it with the gold-making of the sixteenth and seventeenth centuries. Among the alchemists there was always a nucleus of genuine philosophers, who were often deceived in their theoretical views; whereas, the gold-makers knowingly deceived both themselves and others. See CHEMISTRY.

Alciades (äl-sē-bī'ā-dēs), 450-04 B.C.; Athenian general and politician; son of Cleinias. In 421 B.C. he began his political career as the leader of the Democratic Party and an opponent of Nicias, who advocated peace with Sparta. Having induced the Athenians to send an expedition against Syracuse, the ally of Sparta, he was chosen with Nicias and Lamachus to command it. As commander of the Athenian fleet, 412 B.C. defeated the Spartans at Abydos, 411, and at Cyzicus, 410 B.C. By these and other victories he restored the naval supremacy of Athens, 407. He was assassinated in Phrygia.

Alciphron (äl'sī-frōn), abt. 180-200 A.D.; Greek epistolary writer, of whom we have 118 fictitious letters representing the manners and opinions of various classes of society.

Alcmæonidæ (älk-mē-ōn'ī-dē), The prominent family of ancient Athens. They expelled, 596 B.C., their chief, Megacles, who had committed sacrilege by allowing Cylon and his partisans to be massacred. The family went to Phocis, but its wealth and connections enabled it to return to Athens after an exile of about thirty years. Then followed the long contest with Pisistratus, in which they were once more driven from Athens. During their second exile they spent much of their wealth in rebuilding the temple of Apollo in Delphi, and the magnificence of this made them so popular that the Spartans restored them to citizenship. Among the members of the family were Clisthenes, Pericles, and Alcibiades.

Alcmene (älk-mē'nē), daughter of Electryon and Anaxo, the daughter of Alcæus; mother of Heracles by Zeus. Hera, jealous of Alcmene, delayed the birth of Heracles for seven days, that Eurystheus might be born first, and thus be entitled to greater rights.

Al'cohol, limpid, colorless liquid which has a hot, pungent taste, and is the essential principle of all spirituous liquors and intoxicating drinks. It is the product of the fermentation of sugar or saccharine substances, and is extracted by distillation from spirituous liquors, such as whisky and brandy, which contain nearly 50 per cent of water. Pure alcohol is very inflammable, has a strong affinity for water, is a powerful solvent, boils at 173° F., and has been congealed at an extremely low temperature (about 200° F. below zero). It is composed of carbon, oxygen, and hydrogen, its composition being expressed by the formula C_2H_6O . In medicine, alcohol is used as a stimulant or excitant, mostly in the form of wine, brandy, or whisky. In pharmacy, alcohol is extensively used as a solvent; its solutions are called tinctures. Intoxicating beverages are divided into fermented liquors and distilled liquors or spirits. Fermented liquors include (1) wine made from saccharine fruits, such as the grape, apple, and pear; and (2) beer made from materials which contain starch, usually barley. Distilled liquors are made from the refuse of the grape—brandy; or from molasses—rum; or from cereals or potatoes—whisky. Gin is alcohol flavored with juniper berries. In 1906 the U. S. Congress passed an act removing the tax of \$2.00 per gallon on methylated alcohol to be used for fuel, light, heat, power, or any industrial purpose. This act took effect January 1, 1907, when a new industry, the manufacture of denatured alcohol, was launched. This form of alcohol contains ingredients prescribed by the government, and cannot be used as a beverage. Proof spirits contain fifty per cent of alcohol by volume, cologne spirits contain ninety-three to ninety-five per cent. Absolute alcohol is that from which water has been entirely removed.

Alcohol, Physiological Effects' of. Acute intoxication is produced in a very short time by drinking a large quantity of liquor. This is followed by sudden coma which may be complete or incomplete, with stertorous breathing, deviation of the pupils, frothing at the mouth, etc. Unless assistance is speedily given, the termination is death in from thirty minutes to six hours. The patient should be aroused, an active emetic or the stomach pump used; diluted ammonia given as an antidote and large draughts of tea should be taken. The sub-acute form is the ordinary intoxication indulged in by persons either voluntarily for the pleasing effect of one of its stages, or involuntarily through a depraved appetite growing out of the former method. Alcohol in this form excites the vascular and nervous systems; all the secretions are at first arrested, and the body temperature is lowered. If so taken by one not accustomed to it, there will be derangement of the stomach, nausea and vomiting. There is a general feeling of increased physical power, and the mental faculties are exhilarated. The patient at first talks rationally, but becomes loquacious and silly, or absurdly dignified. Incoherence follows, then delirium and sopor. The effect on the cerebellum is shown by the impairment of the power of coördination, causing a staggering gait and

later, complete loss of muscular power. This is followed by deep sleep, and an awakening with a feeling of depression which the patient may seek to relieve by a renewed resort to stimulation. If it is important to bring to an end this stage of moderate intoxication it may be done by giving several teaspoonful doses of aromatic spirits of ammonia in water, or a half tumbler of plain vinegar. An emetic may also be used. The alcoholic habit may lead to delirium tremens, which is the expression of a profound impoverishment of the vitality of the nervous system, or to *mania-a-potu*, which is an explosive manifestation of cerebration.

The deaths directly due to alcoholism each year, in the countries named, have been estimated as follows:

France from	5,000 to	6,000
United States	30,000	
Germany	40,000	
United Kingdom	60,000	
Russia	160,000	

Total

But the most widespread evil physical effects of alcoholic excesses are due to the diminution of general vitality. Many cases of fatal pneumonia are the results of a "spree." Habitual alcoholic excesses also produce chronic gastritis and inflammation of various organs, especially the kidneys and liver, followed by degenerative changes, such as Bright's disease and cirrhosis of the liver. See DELIRIUM TREMENS.

Alcohols, compounds with the same general properties as ordinary alcohol (spirits of wine). Water consists of hydrogen and oxygen in the proportion shown in the formula H_2O . If half the hydrogen is replaced by a group consisting of carbon and hydrogen, the product is an alcohol. Thus ordinary or ethyl alcohol is $C_2H_5.OH$, wood spirit or methyl alcohol is $CH_3.OH$, etc. Ordinary glycerin is an alcohol, and fusel oil is a mixture of alcohols all more complex than ordinary alcohol. Some alcohols are liquid, others solid; some intoxicate, others do not.

Alcoran (äl-kör'rän). See KORAN.

Alcorn (äl'körn), James Lusk, 1816-94; American legislator; b. near Golconda, Ill.; practiced law in Mississippi, 1844; served in both branches of the legislature; elected Republican governor, 1869; U. S. senator, 1871-77; founded the Mississippi levee system and for several years president of the levee board of the Mississippi Yazoo Delta.

Alcott (äl'köt), Amos Bronson, 1799-1888; American transcendental philosopher; b. Wolcott, Conn.; settled in Concord, Mass.; an educational reformer, but chiefly distinguished for his conversational powers; held conversations on a wide range of speculative and practical themes in the principal cities of the U. S.

Alcott, Louisa May, 1832-88; American author; daughter of the preceding; b. Germantown, Pa.; in early life was a teacher; during the Civil War a hospital nurse. She published her first book, "Flower Fables," 1855, but it was not till 1868, when her "Little Women"

appeared, that she attracted much attention. In "Little Men," "Joe's Boys," and her later stories of American child life, she achieved great popularity.

Alcuin (äl'kwün), abt. 735-804; English educator; b. York; 766, master of the school of York, the representative of Irish learning on Anglo-Saxon ground; accepted, 782, the invitation of Charlemagne to assume the leadership of the school at Aix-la-Chapelle; exercised a decisive influence on the ecclesiastical affairs of the Frankish Empire; wrote a number of theological works, books for use in schools, poems, letters (of great historical interest), etc.

Alcyone (äl-si'ö-nē), or **Halcy'one**, in classic mythology, a daughter of Æolus and the wife of Ceyx; was so inconsolable for the death of her husband that she threw herself into the sea. Ceyx and Alcyone were changed into kingfishers to reward their mutual devotion.

Aldan (äl-dän'), river of Siberia; largest tributary of the Lena; rises in the Yablonoi Mountains, near the Chinese frontier; flows NE. and NW. and enters the Lena nearly 60 m. below Yakutsk; length about 400 m., in considerable part navigable.

Aldebaran (äl-dēb'ä-rän), from the Arabic *al*, the, and *dabaran*, following, i.e., the Pleiades; star of the first magnitude in the constellation of Taurus; is the brightest star of a group called the Hyades.

Aldehyde (äl'dē'hīd), a compound formed by abstracting hydrogen from alcohol by the action of oxygen; oxygen uniting with a part of the hydrogen of the alcohol to form water, leaves aldehyde. In purifying alcohol it is passed through filters of bone black. The air contained in the pores of these filters oxidizes a part of the alcohol that first passes through, and therefore the "first runnings" contain aldehyde. It is a volatile liquid of a marked and characteristic odor.

Al'den, John, 1599-1689; one of the Pilgrim fathers who came over in the *Mayflower*, 1620; a magistrate of Plymouth colony for over fifty years; Longfellow familiarized his name by "The Courtship of Miles Standish."

Aldenhoven (äl'dēn-hö'n), market town of Prussia; in the Rhine province, where the Austrians defeated the French, March 1, 1793, and the French defeated the Austrians October 2, 1794.

Al'der, a tree or shrub of the genus *Alnus* and family *Betulaceæ* or *Cupuliferaæ*. The



ALDER.

alders are natives of the temperate parts of Europe and N. America. The common alder grows in moist localities, especially on the higher portions of swampy grounds. The wood is in demand by cabinet-makers and turners, and is valuable for mill-wheels, piles of bridges and other work which is mostly under water. Charcoal made from the wood is of excellent quality for the manufacture of gunpowder. The bark, which contains an astringent juice, is used for tanning, and with the addition of other ingredients forms a dye of several colors. The alders found in the E. U. S. are shrubs and small trees but on the W. coast and in Italy it attains a height of 50 or 60 ft. and is considered a very ornamental tree, with abundant foliage of deep green.

Al'derney, or **Aurigny** (ä-rë'fîë), island in the English channel, 7 or 8 m. from Cape la Hogue, France; belongs to Great Britain; is about 4 m. long; area, 3 sq. m. Produces a celebrated breed of small cows.

Al'dine Editions. See MANUTIUS ALDUS.

Aldrich (al'drich), **Thomas Bailey**, 1836-1907; American poet and story writer; b. Portsmouth, N. H. Lived in his youth in Louisiana, then in New York, where he attained eminence as a writer and editor; edited the *Atlantic Monthly*, 1881-92; published several volumes in verse and prose, the best known of which are "The Ballad of Babie Bell" and "The Story of a Bad Boy."

Al'dridge, **Ira**, 1810-67; American; a negro tragedian; b. Maryland; was in his youth a personal attendant of Edmund Kean; performed with success in Great Britain and other countries of Europe; was called the "African Roscius."

Ale, fermented liquor produced from malt; contains more alcohol than common or lager beer. There are three varieties of malt liquor in general use in this country—ale, porter, and lager beer. All are prepared from malt, which is barley that has been allowed to germinate, and has then been dried by artificial heat. Hops are added to give the aromatic bitter flavor. The lower the temperature at which the malt is dried, the lighter will be the color of the malt and the beverage. Ale and lager beer are made from light, porter from dark-colored, malt.

Aleander (ä-lä-än'dër), **Hieronymus** (or, in Italian form, **GIROLAMO ALEANDRO**), 1480-1542; Italian cardinal; b. Motta; was sent by Leo X as papal nuncio to Germany, 1520, to oppose Luther, and to him is mainly due the condemnation of Luther at the Diet of Worms. In 1538 he was made a cardinal by Paul III, when he took the title of St. Chrysostom.

Alecsandri (ä-lëk-sän'drë), **Vasile**, 1821-90; Roumanian poet; b. N. Moldavia; took part in the liberal movement of 1848; minister of foreign affairs for a few months, 1859-60; Roumanian minister at Paris, 1885-90. Among his writings are collections of the popular songs of Roumania, of which a first series appeared 1852, a second 1853.

Alemanni (äl-ë-män'në), all men; German tribes who formed a confederacy against the Romans abt. 200 A.D., and at that time lived on the Main. They invaded Gaul in the reign of Julian the Apostate, who defeated them in 357 A.D. Having been defeated by Clovis in 496, their confederacy was dissolved. From this word is derived the French *Allemand*, signifying German.

Alembert (ä-län'bär), **Jean le Rond d'**, 1717-83; French mathematician; b. Paris; admitted to Academy of Sciences, 1741, and to that of Berlin, 1746; perpetual secretary of the French Academy, 1772; published "Treatise on Dynamics"; "On the Theory of the Winds"; "Preliminary Discourse" to the "Encyclopédie," of which he was an editor; "Researches on some Important Points of the System of the Universe," etc.

Alem'bic, one of the oldest forms of vessels for distillation; consists of a flask with a wide neck, on which is fitted a head connected with a downward running tube, so arranged that vapors condensed against the inside of the head run through a surrounding gutter to the tube and so into a receiver.



ALEMBIC.

Alencar (ä-län-kür'), **Jose Martiniano de**, 1829-77; Brazilian jurist and novelist; b. Ceará; is best known by his romances of Indians and colonial life, which have given him the title of the "Brazilian Cooper."

Alençon (ä-lön-sön'), capital of the department of Orne, France, on the Sarthe; 65 m. WSW. of Paris; is well built and handsome, has a cathedral, a public library, and a church about 1,000 years old; manufactories of various articles, including muslin, leather, and lace called point d'Alençon. Pop. (1901) 14,886.

Aleppo (ä-lëp'pö), called by the Arabs **HALEB** (ancient *Chalybon* and *Beraa*), city of Syria, and one of the chief emporiums of the Ottoman Empire; on the Kowek; about 55 m. E. of Antioch; houses are well built of stone, mostly in the Saracenic style; environs have celebrated gardens about 12 m. in extent. Aleppo has a castle, a Mohammedan college, and many Christian churches. It has an extensive trade and is visited by large caravans from Bagdad, Diarbekir, Mosul, and Armenia. It was a great emporium of trade during or before the Middle Ages. Greatly injured by the earthquake of 1822 which destroyed most of the city and about two thirds of the inhabitants. Pop. (1907) 200,000.

Alesan'drian Co'dex. See **CODEX ALESAN-DRINUS**.

Alesia (ä-lë'shi-ä), modern name, **ALAIS**; fortified capital of the Gallic tribe Mandubii; built, according to a legend, by Hercules. Here the last battle for freedom was fought by the Gauls, under Vercingetorix, against the Romans, under Cæsar, 52 B.C. The Gauls were

defeated and the city destroyed. Alesia was rebuilt, and again destroyed by the Northmen 864.

Alessandria (äl-ës-sän'drë-ä), fortified city of Italy; capital of the province of the same name; on Tanaro; 46 m. ESE. of Turin; was built by the Lombard league 1168 as a bulwark against Frederick Barbarossa. It belonged to the houses of Montferrat and Milan, but by the peace of Utrecht it was ceded to Savoy. Bonaparte enlarged its fortifications, 1800-14. The citadel, regarded as one of the strongest fortresses in Europe, was taken 1849 by the Austrians after the battle of Novara. Two m. SE. of this place is Marengo, where Napoleon defeated the Austrians, 1800. Pop. (1901) 35,956.

Aleutian (ä-lü'shî-än) **Is'lands**, or **Cath'arine Archipel'ago**, group of 150 or more islands extending W. from Alaska toward the S. point of Kamchatka, separating Bering Sea from the N. Pacific; area, 6,391 sq. m.; pop. abt. 2,500; belong to Alaska; discovered by Bering, 1728; explored by Krenitzin, 1760; divided into three groups—Aleutian, nearest to Kamchatka, Andreanof, middle, and Fox, nearest to Alaska. The natives, or Aleuts, resemble N. American Indians. The principal islands are Unalashka and Unimak.

Ale'wife, species of American fish belonging to the *Clupeidæ*, and allied to the herring and the shad. It abounds in Chesapeake Bay, and is found along the Atlantic coast from N. Carolina to Cape Cod.

Alexan'der, surnamed **THE GREAT**, 356-323 B.C.; b. Pella; third Macedonian king of the name, the most famous of all military heroes; son of Philip, king of Macedon, and Olympias, daughter of the king of Epirus, who claimed descent from Achilles. At fifteen he was placed under the instruction of Aristotle, and soon distinguished himself by his rare intellectual powers. Philip left him, although only sixteen, the regent of his kingdom during his expedition against Byzantium. At eighteen he distinguished himself in the battle of Chæronea, and 336 B.C., Alexander, not yet twenty, succeeded to the throne. Several of the states which his father had subjugated revolted, but Alexander defeated all their schemes. He subjugated Thrace and Illyria, conquered and destroyed Thebes and gained control of Greece, 335; entered Asia in the spring, 334; defeated the Persians at the Granicus River; was victor at Issus, 333; took Tyre and Gaza; was welcomed in Egypt and founded Alexandria, 332; conquered E. Persia, 330-27; invaded India, 326; returned to Persia, 324; and as he was forming schemes for the extension and improvement of his empire, died in Babylon in the thirty-third year of his age. His conquests diffused Hellenic culture and influenced for ages the condition of Asia and Egypt.

It would be unjust to regard Alexander merely as a successful military hero. He possessed some moral qualities of a high order, especially generosity and magnanimity. Many of his views of state policy were liberal and enlightened. But all that was excellent and

admirable was impaired and vitiated by mistaken ideas of the dignity and glory which belonged to a great king. As his passions were stronger than his intellect, they gradually acquired, during his career of uninterrupted success, an ascendancy over him. His uniform prosperity was his greatest misfortune. Being a stranger to the "sweet uses of adversity," it was impossible for him to see his own character and conduct in their true light. After successes had turned his brain, regarding himself as little less than a god, he could not brook the slightest freedom of speech, even from his most faithful officers. In a paroxysm of rage he slew his foster-brother Clitus, who had once saved his life; after which a grief, scarcely less violent than his anger had been, took possession of his soul, so that if he had not been restrained he would probably have taken his own life.

Alexander, name of eight popes. **ALEXANDER I**, d. 119; b. Rome; supposed to have died a martyr. **ALEXANDER II** (ANSELMO BAGGIO), d. 1073; b. Milan; carried out the reform of the churches and their emancipation from secular control. **ALEXANDER III** (ROLANDO RANNCI), d. 1181; b. Sienna; successfully opposed Frederick Barbarossa, and increased the ecclesiastical powers and privileges. **ALEXANDER IV** (RINALDO DI ANAGUI), d. 1261; attempted to unite the Greek and Roman Churches; sanctioned the establishment of the inquisition in France. **ALEXANDER V** (PIETRO PHILARGI), d. 1410; b. Candia; forbade the teaching of Wyclif in Bohemia and vainly summoned Huss to trial for heresy. **ALEXANDER VI** (RODRIGO LEUZUOLI BORGIA), 1431-1503; b. Valencia, Spain. Before his election to the papacy, he had several children, among whom were Cesare and Lucretia Borgia. The years of his pontificate were filled with stirring events, and witnessed an enormity of corruption, for protesting against which Savonarola suffered martyrdom. **ALEXANDER VII** (FABIO CHIGI), d. 1667; b. Sienna; published the famous bull against the Jansenists. **ALEXANDER VIII** (PIETRO OTTOBONI), 1610-91; b. Venice; assisted the Venetians in wars against the Turks.

Alexander, the name of three emperors of Russia. **ALEXANDER I** (ALEXANDER PAULOVITCH), 1777-1825; b. St. Petersburg; succeeded his father, who was assassinated 1801; promoted civilization, education, industry, and trade; carried out many reforms; abolished serfdom in the Baltic provinces; and maintained a pacific foreign policy till 1805, when he joined the coalition against Napoleon. He was present at the defeat of the Russian and Austrian armies at Austerlitz; signed the peace of Tilsit, 1807; conquered Finland, 1808; waged war with Turkey, 1806-12; and, after Napoleon had taken Moscow and abdicated, entered Paris, 1814. He became king of Poland, and, with the Emperor of Austria and King of Prussia, formed the Holy Alliance, 1815; and attended the congresses of Aix-la-Chapelle, Troppau, Laibach, and Verona. He d. without issue and was succeeded by his brother Nicholas. **ALEXANDER II** (ALEXANDER NICOLAI-

VITCH), 1818-81; b. St. Petersburg; succeeded his father, Emperor Nicholas, 1855, during the Crimean War; agreed to an armistice and to the treaty of Paris, 1856; issued a serf emancipation proclamation, 1861; crushed a Polish insurrection with extreme cruelty, 1863; after various attempts on his life, was killed by Nihilists in St. Petersburg. **ALEXANDER III** (**ALEXANDER NICOLAIEVITCH**), 1845-94; b. St. Petersburg; second son of Alexander II; became heir apparent on the death of his elder brother Nicholas, 1865; succeeded his father, 1881; was not crowned till 1883 through fear of Nihilist violence; had a conservative reign; greatly desired peace; vigorously supported the Greek Church; extended his empire; died on his Crimean estate; and was succeeded by his son Nicholas.

Alexander I, 1876-1903; king of Serbia; son of King Milan I; was proclaimed king under a regency on his father's abdication, 1889; assumed royal authority when seventeen (1893); with Queen Draga and several court officers was assassinated in a military revolt.

Alexander, Sir James Edward, 1803-85; British army officer and explorer; b. Scotland; served in Burman war 1825, Russian war against Turkey, 1829, under Dom Pedro in Portugal, 1834, in Canada, 1839, Crimean War, 1858, Maori War, 1863; published "Travels from India to England"; "Expedition into the Interior of Africa"; "Incidents of the late Maori War."

Alexander, John White, 1856- ; American portrait painter; b. Allegheny, Pa.; sociétaire of the Beaux Arts, Paris, an American juror on paintings at Paris exposition, 1900; several times gold medalist; member many art societies at home and abroad.

Alexander, William, styled **LOED STIRLING**, 1726-83; American army officer; b. New York; claimed the earldom of Stirling, but did not succeed in obtaining the estate belonging to it; espoused the popular cause in the revolution; served with distinction at Long Island, Germantown, and Monmouth, and obtained the rank of major-general.

Alexander Ba'laa, d. 146 B.C.; usurper of the throne of Syria; was a person of low origin; pretended to be the son of Antiochus Epiphanes, and, with the aid of Rome and several Greek princes, defeated his rival Demetrius Soter in 150 B.C.; after a short reign was defeated by his father-in-law, and murdered.

Alexander Jannæus, king of the Jews, 104-78 B.C.; third son of John Hyrcanus; his reign was a series of revolts and massacres; when once he asked the people what he should do to please them, he was answered, "Kill yourself."

Alexander John I, 1820-73; prince of Roumania; unanimously elected, 1859, first, prince of Moldavia, then, prince of Wallachia, but had to promise to complete the union of the two principalities, and then resign in favor of some European prince; was not recognized by Turkey until December 23, 1861, on which day the union of the two principalities under the name

of Roumania was proclaimed; was forced to resign February 23, 1866.

Alexander Karageorgevitch (kä-rä-jör'jävich), prince of Serbia; son of Czerny George, the first prince of Serbia; b. Topola. After Prince Michael's deposition he was elected prince of Serbia, 1842. Russia protested against his election, but March 27, 1843, he was again elected, and this time unanimously. In consequence of his peace policy toward the foreign powers, he was deposed December 11, 1858. In 1868 he was accused of complicity in the murder of Prince Michael, his successor, and was sentenced to eight years' imprisonment.

Alexander Michaelovitch (mi-kai'lö-vich), 1866- ; Russian grand duke; b. Tiflis; son of Grand Duke Michael, brother of Alexander II; married 1894, Grand Duchess Xenia, sister of Nicholas II; commanding Russian squadron, visited U. S., 1893; made admiral and head of department mercantile marine 1902; relieved 1905.

Alexander Nev'ski, 1219-63; Russian prince and hero; b. Vladimir; son of the Grand Duke Yaroslaf II; gained 1240 a victory over the Swedes on the Neva; hence his surname; on the death of his father, abt. 1246, became grand duke of Vladimir. By the Russians he is regarded as a saint. In his honor Peter the Great built the Alexander Nevski monastery in St. Petersburg, on the spot where the hero and saint gained his great victory.

Alexander of Hales, d. 1245; one of the greatest of the Schoolmen; b. Gloucestershire, England; studied and taught in Paris. His "Summa Theologiae," is based on the sentences of Peter the Lombard.

Alexander Seve'rus, abt. 205-35; Roman emperor; original name Alexianus Bassianus, but when he was created cæsar, pontiff, and consul by his cousin, Elagabalus, he assumed the name Marcus Aurelius Alexander, and added Severus afterward. In 222, on the death of his cousin, was proclaimed emperor; 231-3 waged war against the Persians; 234 he marched into Gaul against the Germans, but was waylaid and murdered by mutinous soldiers near Mayence.

Alexan'dra, Caroline Marie Charlotte Louise Julie, 1844- ; queen of England; daughter of Christian IX, king of Denmark; b. Copenhagen; married March 10, 1863, to Albert Edward, Prince of Wales, and became queen on his accession as Edward VII, 1901.

Alexan'dria, ancient city and seaport of Lower Egypt, named from Alexander the Great, by whom it was founded in 332 B.C.; was situated on a low and narrow tract which separates Lake Mareotis from the Mediterranean, near the W. mouth of the Nile, 117 m. NW. of Cairo. Soon after its foundation it became the capital of the Grecian kings who reigned in Egypt, and one of the most populous and magnificent cities in the world. Here was founded by the Ptolemies, abt. 296 B.C., the celebrated museum, to which was attached the greatest library of antiquity, known as the Alexandrian Library. Among the principal edifices was the

Serapeion, or temple of Serapis. In front of the city stood a famous lighthouse called Pharos, on an island of the same name. During its greatest prosperity Alexandria is said to have had 600,000 inhabitants, a majority of whom were Greeks and Jews. The chief remains of its ancient grandeur are a granite monolith called Pompey's Pillar; the Catacombs; and two obelisks named Cleopatra's Needles. Pop. (1902) 310,587.

The modern city is built near the site of the ancient; is connected with Cairo by a canal and railway, and with Suez by a railway, which is continued from Cairo. Steam navigation made Alexandria again a great emporium of commerce between Europe and India. Its new artificial harbor, with a breakwater 2 m. long, is one of the most important works of the kind in the Mediterranean. In consequence of the Egyptian revolution headed by Arabi Pasha, 1882, culminating in revolting cruelties against the Christians, Alexandria was bombarded by the British, under Admiral Seymour, July 11 and 12, 1882. The forts defending the harbor were dismantled, and on July 13th the greater part of the city was practically a mass of ruins. Pop. (1897 census) 319,766.

Alexandria, port of entry and capital of Alexandria Co., Va.; on the Potomac, 6 m. below Washington. Pop. (1900) 14,528.

Alexandrian Library, largest and most celebrated library of antiquity; founded by Ptolemy Philadelphus, king of Egypt, abt. 275 B.C.; said to have been partially destroyed by fanatical Christians abt. 395 A.D.

Alexandrian Manuscript. See CODEX ALEXANDRINUS.

Alexandrine, poetical line or verse formed of six iambs; so called from a French poem of the twelfth century on Alexander the Great, which was written in that meter.

Alexeiff (ä-lëks-ä'yëf), Eugene Ivanovitch, 1843—; Russian naval officer; b. Tiflis; entered navy, 1867; rear admiral, 1892, and assistant head chief naval station; commanded Pacific squadron, 1899-1901; adjutant-general, 1901; viceroy with control of army and navy in Far East, 1903; his inefficiency resulted in Russian reverses in war with Japan; resigned, 1904; restored to imperial favor, 1907.

Alexis, or **Alexius I**, 1048-1118; emperor of Constantinople. So proclaimed by his soldiers abt. 1080, in place of Nicephorus.

Alexis Alexandrovitch (ä-lëks-än'drö-vich), 1850-1908; grand duke of Russia; younger son of Emperor Alexander II; visited the U. S., 1872; made high admiral but by his maladministration caused many naval disasters during the war with Japan.

Alexis Michaelovitch (mi-kai'lö-vich), 1629-76; emperor of Russia; succeeded his father Michael, 1645; promoted civilization and improved the laws; father of Peter the Great.

Alexis Petrovitch (pä-trö'vich), 1690-1718; Russian prince; son of Peter the Great; condemned to death on the charge of treason or

rebellion against his father; d. in prison. His son Peter became emperor 1727.

Alfal'fa, a prolific forage plant belonging to the clover family, native of W. and central Asia, grows from 1 to 3 ft. high, with triple-parted leaves and small purple flowers. It was introduced into S. America by the Spaniards and into California abt. 1860, since which time it has become one of the most extensively cultivated forage crops in the U. S. Its adaptability to varying conditions of soil and climate gives it an extensive range. It will not flourish in extremely damp or clayey soils. Its roots strike to great depths, so that it withstands droughts better than most of the forage plants. It is cut when coming into bloom from two to six times a year, and yields from 3 to 12 tons of hay to each acre.

Alfieri (äl-fi-ä'rë), Vittorio (Count), 1749-1803; Italian poet; b. Asti, Piedmont; began his literary career by the drama of "Cleopatra," received with applause 1775. His reputation is founded chiefly on his tragedies, among which are "Virginia," "Filippo II," "Orestes," "Abel," "Mary Stuart," "Myrrha," "Octavia," and "Saul."

Alfonsine (äl-fön-së'nä), or **Alphonsine Tables**, astronomical tables prepared by the order of Alfonso X. of Castile and Leon, at a cost of about \$800,000; published 1252.

Alfonso I, abt. 1385-1458; king of Naples and Sicily; son of Fernando I of Aragon, whom he succeeded 1416. On the death of Joanna II, queen of Naples (1435), that kingdom was claimed by Alfonso and René of Anjou. After a long war, Alfonso obtained the throne 1442; succeeded by his son, Ferdinand I.

Alfonso, name of several kings of Portugal and Spain, the most important of whom were: **ALFONSO I**, abt. 1100-85; first king of Portugal; son of Henry of Burgundy; gained a great victory over the Moors, 1139; assumed the title of king; afterward became master of all Portugal. **ALFONSO V**, 1432-81; king of Portugal; successful in wars against the Moors in Africa, and surnamed Africano on that account; but failed to add Castile and Leon to his dominions. **ALFONSO X**, called **EL SABIO**, "The Learned," 1221-84; succeeded to the throne of Castile and Leon, 1252. Elected German emperor by a faction of the German princes, 1257, his extravagance forced him to disastrous financial measures, which prepared the way for the usurpation of his throne by his second son, Sancho, 1282. He died a fugitive in Seville. To his learning and literary activity he owes a position in Spanish history. His interest in natural science is attested by such compilations as the "Astronomical Tables"; his "Book of the Treasure"; in law, by "The Mirror of all Laws," and especially by his well-known code "The Seven Divisions." **ALFONSO XII**, 1857-85; king of Spain; son of Queen Isabel and of the Infante Francisco; educated at the Military Academy, Woolwich, England; on December 31, 1874, proclaimed king; on January 9, 1875, landed at Barce-

lona and took command of the army; January 23, 1878, married Princess Maria de las Mercedes, youngest daughter of the Duke of Montpensier; became a widower 1878, and married, 1879, Archduchess Maria Christina of Austria. ALFONSO XIII, 1886- ; king of Spain; b. Madrid, after the death of his father, Alfonso XII; under regency of his mother; crowned May 17, 1902; married Princess Ena of Battenberg, May 31, 1906.

Alford (al'förd), Henry, 1810-71; English poet and theologian; b. London; fellow of Trinity College, Cambridge, 1834, incumbent of Quebec Street chapel, London, 1853, dean of Canterbury, 1856. His most popular poetical work is "The School of the Heart, and other Poems." He gained reputation as a biblical critic by his edition of the Greek New Testament, 1844-52, and edited the *Contemporary Review*, 1866-70.

Al'fred, surnamed THE GREAT; written also ÆLFRED, ALUBED, or ALVRED, 849-901; king of the W. Saxons in England; b. Berkshire; younger son of Ethelwolf; succeeded his brother Ethelred, 871, when he found the country in a miserable condition; after being conquered by the Danes, Alfred was forced to flee and conceal himself in the hut of a cowherd. Raising a small army, he attacked and routed the Danes at Eddington, 878, after which the Danish king, Guthrum, surrendered, was converted to Christianity, and remained a peaceable subject. His kingdom was invaded, 894, by an army of Northmen under Hastings. Alfred defeated them in several battles, and finally drove them out of the island; founded the British navy, rebuilt cities and forts, established schools, compiled a code of laws, and reformed the administration of justice. He is regarded as the wisest and greatest of all the kings of England.

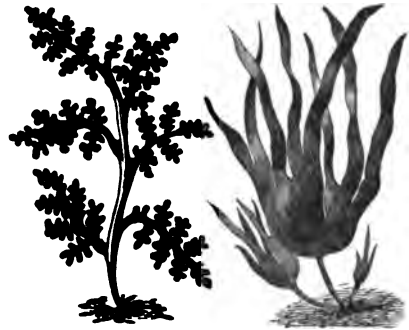
Alfred, Ernest Albert. See EDINBURGH, DUKE OF.

Alfred, or Al'ured (of BEVERLEY), b. abt. 1100; English priest and historian; wrote a history of Britain in Latin.

Al'gæ, general name of seaweeds, etc., comprising many species which grow in salt or

fresh water, of diverse form and structure. Some are microscopic, while the stem of the

giant kelp of the W. coast of America attains from 1,000 to 1,500 ft. According to their color, algæ are classified as red, brown, blue-green, and green. Having no true roots, they adhere to rocks or the sea bottom, and sometimes float on the surface. Navigators



Laurentia pinnatifida. Laminaria digitata.

COMMON TYPES OF ALGÆ.

often meet with masses of gulweed (*Sargassum*) many miles in extent. One such area in the Atlantic is estimated to be as large as the Mississippi Valley. There are several such areas in the ocean, called Sargasso Seas. Algæ are cellular in structure, are useful as manure, and some species, like Irish moss, are used as food. Kelp or barilla, made by burning seaweeds, yields soda and iodine. They are the most primitive form of plants, and from them all other classes have developed.

Algardi (äl-gär'dē), Alessandro, 1600-54; Italian sculptor and architect; b. Bologna. His masterpiece is a colossal work in St. Peter's, Rome, the subject of which is Pope Leo forbidding Attila to enter Rome.

Al-Gazza'li, or Al-Ghazza'li, Abu Hamed Mohammed, 1058-1111; Moslem theologian, philosopher, and writer; b. Tus, Persia; taught in Nishapur and Bagdad.

Al'gebra, important branch of mathematics, sometimes called universal arithmetic, but more properly described as a calculus of symbols. The symbols it employs are of three kinds: (1) those of quantity, known or unknown, which consist of ordinary numbers and letters of the alphabet; (2) those of operation, among which are +, -, ×, ÷, √, etc.; and (3) mere abbreviations for ordinary words. The combination of these symbols according to fixed laws leads to algebraical expressions or formulæ, in which actual computations are indicated rather than performed. The universality of algebra as compared with arithmetic consists in the fact that in the latter, computations being effected as they arise, all traces of the intermediate steps are obliterated, and the result is applicable to a single case only; whereas in algebra the formulæ contain implicitly the answers to an unlimited number of questions. Diophantus of Alexandria, about the fourth century of our era, wrote the first known treatises on the subject, using few symbols, these mere abbreviations for ordinary words. The



Chondrus crispus.

Fucus vesiculosus.

COMMON TYPES OF ALGÆ.

fresh water, of diverse form and structure. Some are microscopic, while the stem of the

Arabians derived their algebra from the Hindus but did little toward its extension. Algebra was introduced into Italy 1202 A.D., and into Germany, France, and England toward the middle of the sixteenth century, by Stifelius, Peletarius, and Robert Recorde, respectively, who contributed much to the progress of the science, while Vieta of France did still more by introducing letters as symbols for both known and unknown quantities.

Algeciras (äl-jë-cëräs), the peninsula, seaport of Spain; province of Cadiz; 6 m. W. of Gibraltar, from which it is separated by the Bay of Gibraltar. Here occurred a naval battle between the English and French in July, 1801, and here was held the international conference on Moroccan affairs, 1906.

Alger (äl'jër), **Cyrus**, 1781-1856; American inventor; established himself in the iron-foundry business, and manufactured ordnance of his own invention, which included the first gun ever rifled in America, first perfect bronze cannon, etc. During the war of 1812 he supplied the U. S. Govt. with cannon balls.

Alger, **Horatio, Jr.**, 1834-99; American Unitarian minister; b. N. Chelsea (now Revere), Mass.; ordained at Brewster, Mass., 1864; settled in New York, 1866; published more than fifty popular books for boys.

Algeria (äl-jër'i-ä), French colony in Africa, bounded N. by the Mediterranean; E. by Tunis and Tripoli; S. by the Sahara; W. by Morocco; area 184,474 sq. m., not including a protectorate claimed over a desert region to the S. with area of 123,500 sq. m.; surface generally mountainous with vast arid plateaus between Atlas and Little Atlas Mountains; no large rivers; climate dry, heat protracted; rainy season, September to April; wheat, barley, tobacco, root crops, alfalfa, and tropical fruits; rich pasturage; horses, cattle, etc., raised; iron, lead, copper, zinc, coal, marble, sulphur, salt, phosphates, and petroleum found; extensive fisheries; railways, 1,940 m.; value total exports, including live stock, cereals, wines, and timber, 1905, \$45,752,600; imports, \$76,776,400, chiefly to and from France. Education well cared for; academy at Algiers, eight commercial colleges, one college for girls, normal and primary schools. Algeria, early inhabited by Numidians and Moors, soon came under control of Carthage; in 146 B.C. became a Roman province; conquered by Vandals in fifth century; by Saracens, two centuries later; pirates of Barbarossa became masters in sixteenth century, and their descendants ruled till 1830, when France, to punish their piracies, captured Algiers. 1815 U. S. squadron had compelled these scourges of commerce to sue for peace. Algiers was under French military control till 1871, when a civil administration under a governor-general was established. Pop. (1906) 5,231,850, including 729,900 Europeans; remainder Arabs, Moors, Kabyles (a mountain tribe), Negroes, and Jews. Pop. of Sahara abt. 62,000; chief city, Algiers.

Algiers (äl-jër'z'), seaport and city of N. Africa; on Mediterranean; formerly capital of

the Dey of Algiers, but since 1830 capital of the French colony of Algeria. It has numerous mosques, several Roman Catholic churches, a fine cathedral and exchange, and a public library; was for three centuries the rendezvous of Algerine pirates, who defied the greatest nations of Europe; bombarded by the English July, 1816, and taken by the French July, 1830. Pop. (1906) 138,240.

Algo'a Bay, in Cape Colony, Africa, about 425 m. E. of Cape of Good Hope. Here are a good harbor and a seaport called Port Elizabeth, at the mouth of Zwartkops River.

Al'gol, star, about as large as our sun, in constellation of Perseus; remarkable for variation in brightness at intervals of a little less than three days, due to an invisible satellite between the earth and the star. Both Algol and its satellite revolve around a third dark body.

Algoma (äl-gö'mä), district of Ontario, Canada; extending to 85° W., and from the N. channel, Lake Huron, to the Albany River on the N. It is well wooded and watered and rich in minerals. Pop. abt. 42,000.

Algon'kian Pe'riod, division of geologic time, between Cambrian and Archæan. Algonkian rocks are not characterized by a fossil fauna, are many thousands of feet thick, and are locally divided into several series, some of which are sedimentary rocks; others exhibit metamorphism in various degrees. The same series may be unaltered in one region and metamorphic in another. Rocks of this period occupy great areas in the Lake Superior region, in Canada, the Hudson Bay region, and in several states of the American Union; also in Great Britain and on the continent of Europe.

Algon'kins, one of the two great families of Indians that formerly occupied the Mississippi Valley and the regions E. of it. The Indians of New England belonged to the same linguistic stock.

Algon'quian In'dians, most widely extended of all the N. American linguistic stocks, stretching along the Atlantic coast from Labrador to Pamlico sound, and W. from Newfoundland to the Rocky Mountains, with one or two tribes in the prairies farther to the S. They had the Esquimauan and Athabascan tribes on their N., the Siouan tribes on their W., the Muscogean and E. Siouan tribes on their S., with the Iroquoian tribes forming a linguistic island in their center. They were divided into a large number of tribes and bands, speaking about forty distinct languages and innumerable dialects. The name is derived from *Agoumek*, "on the other side" (of the river), a term originally used to designate the Indians of the Ottawa River by their neighbors lower down on the St. Lawrence. Another form of the word occurs in Accomack, Va.

Algorith'mic Logic. See SYMBOLIC LOGIC.

Alham'bra, palace and citadel of the Moorish kings of Granada; built 1248-1314 in a suburb of the city of Granada; surrounded by

gardens and groves of aromatic trees. The interior of the palace is gorgeous, and richly decorated. Among the portions now standing are the court of the Lions and the court of the Fish-pond.

Alī, or **Ali-Ibn-Abi-Talib** (ā'lē-ib'n-ā-bō-tā'-līb), surnamed **THE LION OF GOD**, 602-61 A.D.; Arabian caliph; cousin-german of Mohammed; married Fatimah, daughter of Mohammed, whose doctrines he adopted and enforced. Ali became caliph, 656; was assassinated.

Ali-Bey (ā'lē-bā), 1728-73; chief of the Mamelukes; taken to Egypt at an early age; became bey of the Mamelukes, and in 1757 bey of Egypt; attempted to restore the ancient Egyptian Empire, but was defeated and captured, and died a few days after.

Alicante (ā-lē-kān'tā), ancient *Lucentum*; fortified city and seaport of Spain, capital of province on Mediterranean; well built, and contains several hospitals, a college, and theater. Wine, grain, soda, oil, oranges, etc., are exported. Pop. (1900) 50,140.

Al'ien, one born out of the jurisdiction of a country, who has not been naturalized under its laws. But by common law public ministers' children born abroad are citizens, and by U. S. statute children born abroad are citizens of the U. S. if their fathers were such and had resided in the U. S. In the U. S. even after naturalization, alien-born citizens are ineligible to the offices of president and vice-president of the U. S. An alien may acquire real estate by purchase and hold it subject to a proceeding by the state termed "office found," wherein, upon proof of alienage, the land is adjudged to belong to the state. In the U. S. the disability of resident aliens to inherit real estate has been generally modified, and defects of title due to alienage are cured by private act of the Legislature. Aliens have the same rights as to personal property as citizens; and may freely resort to law to protect those rights. A contract with an alien enemy, however, is illegal and cannot be enforced even after peace has been declared. See **CITIZEN**; **NATURALIZATION**.

Alien and Sedit'ion Acts, four statutes enacted in the U. S. in 1798 on account of the expectancy of war with France and bitter attacks upon the Republican administration by immigrant editors and writers. These laws extended the period of residence necessary for naturalization from five to fourteen years, required the registration of all immigrants and permitted the President to order the deportation or detention of foreigners in the event of war. Persons conspiring to oppose the government or to impede the operations of any law, or publishing seditious writings, were also punished. The spirit of these measures, to strengthen the federal authority, met with such opposition, that they contributed greatly to the triumph of the party of Jefferson in 1800.

Aligarh (ā-lī-gār'), district, fortress, and city, Meerut division, NW. province, British India; between the Ganges and Jumna; fortress captured from the Mahrattas, 1806, and

since, much strengthened; contains the Anglo-Oriental College. Pop., city (1901), 70,430.

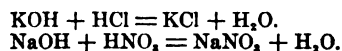
Alimen'tary Canal, the cavity in an animal in which food enters to be digested before it is conveyed by the nutritive vessels into the system. In some animals it is a simple cavity, with one opening; in others it is a proper canal, with an outlet, or anus, distinct from the inlet or mouth, and is a continuous passage of variable size from the mouth to the anus. The principal portions of the alimentary canal of mammalia are the esophagus, a tube leading from the mouth to the stomach; the stomach; the small intestines, which are long and convoluted; and the large intestine. The canal is lined throughout with mucous membrane. Its entire length in man is about 30 ft., and into it are poured the secretions of glands, such as the salivary, peptic, liver, pancreas, etc., which participate in the process of digestion (*q.v.*).

Al'imony, an allowance granted by a court to a wife from the husband's estate, either during a litigation between them, alimony *pendente lite*, or at its termination, permanent alimony. Permanent alimony will not be granted when the suit terminates unfavorably to the wife. The amount varies according to the facts of the case and with the husband's position, from a few dollars a week to one third of his income. A writ of *ne exeat* will prevent the husband from leaving the state without giving proper security for the payment of alimony.

Alison (āl'i-sōn), **Sir Archibald**, 1792-1867; Scottish historian; b. Kenley, England; called to the bar, 1814; in 1832 published "Principles of Criminal Law"; chief work, "History of Europe during the French Revolution."

Alizarin (ā-līz'ā-rīn), the coloring matter of madder obtained by treating madder with strong sulphuric acid. Artificial alizarin is now largely obtained from anthracene. Artificial alizarin has now superseded that made from madder, the production of which formerly exceeded \$10,000,000 in value annually and occupied in its culture large tracts in Holland, Alsace, Italy, and the Levant.

Al'kali, name of bases which combine with acids to form salts, turn vegetable yellows to brown, vegetable blues to green, and act upon oil or fat to form soap. The proper alkalis are potash, soda, lithia, cæsia, rubidia, and ammonia, which are very caustic. Potash is a vegetable alkali, soda a mineral alkali, and ammonia, volatile alkali. Lime, magnesia, baryta, and strontia, having some properties of alkalis, are called "alkaline earths." The alkalis and alkaline earths are metallic oxides, except ammonia. When an alkali and an acid combine, they are said to neutralize each other and produce metallic salts:



These equations show that when potassium hydrate is treated with hydrochloric acid, potassium chloride and water are produced; and

when sodium hydrate is treated with nitric acid the result is sodium nitrate and water. See ACID; SALT.

Alkali Flat. See **PLAYA**.

Alkaloid, any compound of vegetable origin, so called because of its alkali-like (or basic) properties. They all contain carbon, nitrogen, and hydrogen. Some also contain oxygen. They are derived from ammonia which they chemically resemble. They are organic bases and form salts by direct combination with acids. Volatile alkaloids have a disagreeable odor like ammonia. Most alkaloids are insoluble in water, but are soluble in alcohol, while their salts are generally soluble in water and alcohol. Solid alkaloids may be crystallized and most are white and have a bitter taste. The practical importance of alkaloids depends upon their energetic effects when taken as medicines or poisons, thus, $\frac{1}{10}$ grain of strychnine sulphate is an ordinary dose as a tonic, and $\frac{1}{6}$ grain of aconitine nitrate is fatal to an adult within five hours. Alkaloids are obtained from the bark, seeds, etc., containing them, by crushing and then washing with acidified water which dissolves the alkaloids; these are then distilled if volatile, or precipitated by the addition of an alkali. Emetics and the stomach pump should be employed in cases of alkaloidal poisoning, and astringent liquids, such as strong tea, should be given freely, as the tannic acid in the tea forms an insoluble compound with most alkaloids and so prevents their solution and absorption in the body. The small quantities of alkaloids which suffice to produce fatal poisoning, make a post-mortem analysis extremely difficult, and this difficulty is increased by the fact that the "cadaveric alkaloids" (see **PROMAINE**) produce similar analytical reactions to the poisons sought for. Among important alkaloids are: aconitine, atropine, quinine, cinchonine, cocaine, caffeine, nicotine, morphine, strychnine, etc.

Al-Kindi (āl kīn'dī), or **Alchin'dus**, prolific Arabian writer on medicine and philosophy; b. Bassorah; flourished in ninth century. Several of his works, translated into Latin, were much read during the Middle Ages.

Alkmaar (ālk-mār'), town of Holland; 20 m. NNW. of Amsterdam; well built, and traversed by several canals, by which it carries on an active trade; defended with success against Spain in a long siege which began 1573. Pop. (1900) 18,275.

Alkoran (āl'kō-rān). See **KORAN**.

Al'lah, Arabic name of the Supreme Being, the only true God, as distinguished from deities worshiped by idolaters.

Allahabad (āl-lā-hā'bād), city of God, capital of the united province of Agra and Oudh (formerly NW. province), British India, and of a division and district of the same name; at the junction of the Ganges and Jumna; between Benares and Oudh; thousands of pilgrims come to bathe in the sacred rivers; seat of an annual fair, attended by 250,000 per-

sons. Among the notable buildings are the fort founded by Akbar Khan, 1575, now one of the strongest defensive works in British India; the Jumna Musjid mosque; Sultan Khusru's caravansary; and the Muir Central College; city taken by the British, 1765; assigned to the titular emperor of Delhi; transferred to the nawab of Oudh, 1771; restored to the British, 1801, and suffered severely during the Mutiny, 1857. Pop. (1901) 175,750.

Allan, David, 1744-96; painter of domestic and humorous subjects, called the "Scottish Hogarth"; b. Alloa; studied and worked in Rome, whither he went, 1764. Among his works are "The Origin of Painting," which represents a maiden drawing her lover's profile on the wall, and illustrations of Allan Ramsay's "Gentle Shepherd."

Allan, Sir Hugh, 1810-82; Canadian ship-owner; b. Saltcoats, Scotland; went to Canada 1824; served in the rebellion of 1837; and in 1838 became a partner in the firm of Edmonston & Allan, who, 1853, began construction of iron screw steamships. From this the Allan Line developed.

Allan, Sir William, 1782-1850; Scottish portrait and figure painter; b. Edinburgh; R.A., 1835; president of Royal Scottish Academy, 1838-50.

Allan'tois, a thin membranous sac developed in the eggs of birds and reptiles, and in the embryo of viviparous animals.

Alla'tius, Leo (Latin form of *Leone Allacci*), 1586-1669; librarian; b. of Greek parents in the island of Chios; employed, 1622, by Gregory XV to transfer to Rome and incorporate in the Vatican the Heidelberg library, which had been given to the pontiff by the elector of Bavaria; Alexander VII, 1661, made him librarian of the Vatican, which office he held till his death. Leo was a prolific writer; his works were partly editions and elucidations of the classic and ecclesiastic writers and notices of authors, and partly treatises on the history and doctrines of the Roman Church and on the differences between the E. and W. churches.

Allatoona (āl-lā-tō'nā), village of Bartow Co., Ga.; 40 m. NW. of Atlanta. Gen. J. E. Johnston, when pursued by Sherman, made a stand in the strong position of Allatoona Pass, in May, 1864, until his flank was turned. Gen. Corse defended this place against the assault of a superior force on October 5, 1864, while Sherman, from the top of Kenesaw Mountain, signaled that he should hold out to the last. This incident furnished the theme for Sankey's song, "Hold the Fort, for I am Coming."

Allegheny (āl-y-gā'nī). See **PITTSBURG**.

Allegheny, river which rises in Potter Co., Pa., makes short circuit in New York, and returns into the former state. Flowing in a SSW. direction through the hilly oil regions, it unites with the Monongahela at Pittsburg, forming the Ohio. It is navigable for small steamboats 150 m. or more above Pittsburg, is over 400 m. long, and is remarkably clear and pure.

Allegheny Mountains, or **Alleghenies**, the Appalachian system of mountains; in a more limited sense the name is applied to parallel ranges which traverse Pennsylvania, Maryland, and Virginia W. of the great valley. The general direction of these ridges is nearly NE. and SW., and their mean height about 2,500 ft. These ridges are remarkable for the parallelism of their direction and the uniformity of their outline and altitude, and inclose several beautiful and fertile valleys. The rocks of the Alleghenies are shales, sandstones, and limestones of Silurian, Devonian, and Carboniferous age, and include in the upper series the most important store of coal in the E. States.

Alle'giance, in law, the tie or obligation which binds a citizen or subject to a state. The common law distinguishes between natural allegiance which a citizen owes to the state of which he is a member, and local allegiance, due from a person who is a foreigner temporarily residing in a country and subject to its laws. Natural allegiance can only be shaken off by naturalization, a formal act on the part of the citizen. Should he abandon the country to which he belongs, and engage in war against it, he might, if taken prisoner before naturalization, be treated as a traitor. The doctrines of allegiance are of feudal origin, and it has been found difficult to reconcile them with the requirements of modern times. The U. S. in their legislation upon naturalization have proceeded upon the theory that a citizen of a foreign country might, at his will, shake off his allegiance and become a citizen here. The European nations formerly denied that there was any such rule of public law, Great Britain until 1870 even maintaining a right to the indelible allegiance of her subjects. But now, through a series of treaties negotiated about twenty years ago with Great Britain and many of the continental states, a complete transfer of allegiance in favor of the U. S. on the part of these subjects is permitted. Allegiance to one state remains until superseded by the acquisition of a new allegiance to another.

Al'legory, a figurative representation in which the signs (words or forms) signify something besides their literal or direct meaning. Parables and fables are a species of allegory. The most famous of English allegories is Bunyan's "Pilgrim's Progress." In a long-continued allegory not only the allegorical meaning should be appropriate, but the story should have an interest of its own in the direct meaning apart from the allegorical significance. Allegory is used in painting and sculpture as well as literature. See **FABLE**; **PARABLE**.

Allegretto (äl-lä-grät'tō), in music, a movement or time quicker than *andante*, but not so quick as *allegro*.

Allegri (äl-lä'grè), Antonio. See **CORREGGIO**.

Allegri, Gregorio, abt. 1580-1652; Italian composer; b. Rome; masterpiece is the "Miserere," which is annually performed in the Pontifical chapel during Passion week.

Allegro (äl-lä'grō), in music, a term signifying that the piece is to be performed in a brisk manner; sometimes used as a substantive, and a name of an entire musical composition.

Al'len, Charles Grant Blairfindie, 1848-99; British naturalist; b. Kingston, Canada; became a teacher in Spanish Town, Jamaica, studied tropical vegetation and the peculiarities of W. Indian life. Wrote many novels and scientific works, including "Physiological Aesthetics"; "The Color Sense"; "The Evolutionist at Large"; "Vignettes from Nature"; "Colors of Flowers"; "Flowers and their Pedigrees"; "Life of Charles Darwin"; "Postprandial Philosophy"; "The Woman Who Did."

Allen, Elizabeth (AKERS), 1832- ; American poet; best known as FLORENCE PERCY; b. Strong, Me.; first husband, the sculptor Benjamin Paul Akers, afterward E. M. Allen, of New York; published 1866, a volume of poems, and, 1886, "The Silver Bridge and other Poems"; contributed much to periodical literature; most popular poem, the song "Rock Me to Sleep, Mother."

Allen, Ethan, 1737-89; American revolutionary officer; b. Litchfield, Conn.; removed to Vermont, 1766; led the popular resistance to claims of New York; organized and commanded the "Green Mountain Boys"; with 85 men captured Fort Ticonderoga from the British, 1775; attacked Montreal, was captured, and held prisoner, 1775-78; commanded Vermont militia; wrote "Vindication of Vermont" and "Allen's Theology."

Allenstein (äl'en-stin), city in province of E. Prussia; on the Alle River; founded 1353; where Marshal Soutl defeated the rear guard of the Russian and Prussian armies, February 4, 1807. Pop. (1900) 24,207.

Al'lentown, capital of Lehigh Co., Pa.; on the Lehigh River, 60 m. N. by W. of Philadelphia; first incorporated as Northampton 1811; name changed to Allentown 1836; has many blast furnaces, rolling mills, foundries, and machine shops, tanneries, shoe factories, tube works, woolen mills, fire-brick works, etc. It is the seat of Muhlenberg College. Pop. (1900) 35,416.

Al'ler, a river of Germany, an affluent of the Weser, rises near Magdeburg and flows northwestward. It is about 150 m. long.

Alliance, Evangelical. See **EVANGELICAL ALLIANCE**.

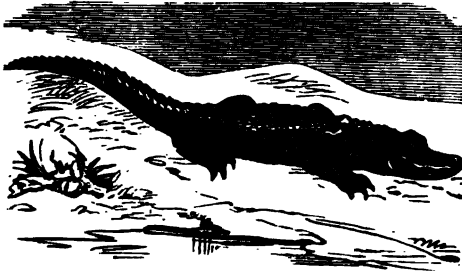
Alliance, Ho'ly. See **HOLY ALLIANCE**.

Alliance Israélite Universelle (äl-yäns' ès-rä-ä-lèt' ün-è-vär-sèl'), league established in Paris, 1860, by distinguished Israelites for the protection of their co-religionists against oppression, and for their social elevation. It has spread all over the world, and has been of great service. By the munificence of Baron Hirsch, who in 1873 put 1,000,000 fr. at its disposal, and by other donations and contributions, the Alliance supports trade schools in Turkey, in Palestine (one for agriculture at Jaffa), and in Africa.

Allibone, Samuel Austin, 1816-89; American author; b. Philadelphia; librarian Lenox Library, New York, 1880-89; principal work, "Critical Dictionary of English Literature and Authors," 1859-70.

Allier (ã-lë-ã'), river of France; most important affluent of the Loire; rises near the source of the Loire, flows nearly N., and enters that river at Nevers; entire length about 260 m.

Alligator, genus of American saurian reptiles (nearly allied to the crocodile) which abounds in the rivers and swamps of the S. U. S. They have broader heads, more numerous teeth, and more obtuse snouts than crocodiles. The alligator is about 12 ft. long, in-



ALLIGATOR.

cluding the tail, which is a powerful weapon for defense. The name alligator is also frequently applied to the muggur of India. The common alligator of the S. States is the *Alligator mississippiensis*. Among the so-called alligators of Florida, a true crocodile (*Crocodilus americanus*) also occurs.

Alligator Pear. See AVOCADO PEAR.

Allingham, William, 1828-89; Anglo-Irish poet, journalist, and playwright; b. Ballyshannon; editor of *Fraser's Magazine*, and published much poetry, original and selected. His poems were illustrated by D. G. Rossetti, Kate Greenaway, and other eminent designers. His most popular pieces are "Mary Donnelly" and "The Fairies."

Alliteration, the repetition of the same letter or sound at the beginning of two or more words which succeed each other, immediately or at short intervals, as "many men of many minds"; "Apt alliteration's artful aid." In ancient German, Scandinavian, and English poetry an alliterated letter or syllable recurs at regular intervals in the line and replaces the terminal rhyme of more modern verse. Although both poetry and prose sometimes gain in music from alliteration, if carried to excess it easily becomes ridiculous. Modern taste does not hold it in high favor.

Allobroges (ã-lëb'rë-gës), dwellers on mountains; people of Gaul whose territory comprehended parts of what is now called Dauphiny and Savoy, chiefly between the Isere and the Rhône. They were brought under the dominion of Rome, 121 B.C., by Fabius Maximus, and

remained faithful to their conquerors, though at times discontented; principal town, Vienna, now Vienne, on left bank of the Rhône.

Allocution, a formal address, as by a general-in-chief to his soldiers; in ecclesiastical usage, a speech which the pope addresses to the college of cardinals on some political or ecclesiastical subject. The pope often resorts to this method to define his position or explain his policy.

Allo'dium, or **Allo'dial Ten'ure**, in feudal law, land held by one in his own absolute right, free from feudal obligations. There is no allodial land or property in England, the laws of which declare that the king is the original proprietor and lord paramount of all the land in the kingdom.

Allopathy, theory of medicine, according to which remedies are used whose effects are opposite to the symptoms of the diseases treated. The term was formed after that of homeopathy, and both were introduced by Hahnemann; the one teaching that medicines must produce a similar affection to the disease, the other a different affection. Allopathy is at least as old as Hippocrates, who used the expression, "opposites are remedies of opposites." See HOMEOPATHY; MEDICINE.

Allori (ãl-lë'rë), **Alessandro**, 1535-1607; Italian painter; b. Florence; excelled in anatomy; masterpieces, "The Last Judgment" and "Christ Disputing with the Doctors."

Allotropy, or **Allot'ropism**, the diversity of form and properties which some elements, as sulphur, oxygen, and carbon, exhibit in certain circumstances, as when exposed to heat or electric discharge. If sulphur be heated and poured into water it ceases to be brittle and becomes elastic. Oxygen, which has no odor, may by an electric discharge be transformed into ozone, which has a peculiar odor and other new properties. The diamond and graphite are allotropic forms of carbon.

Allotta'va, or abbreviation **8va**, in music, a direction to play an octave higher or lower, according as the phrase may be placed above or below the notes.

Alloway Kirk, a ruined church in parish of Ayr, near mouth of the Doon, Scotland; scene of Burns's "Tam o' Shanter." A monument has been erected here to Burns, who was born near the kirk.

Alloy, a mixture or compound of two or more metals fused together; thus applied to a baser metal mixed with gold or silver to make it harder. Brass is an alloy of copper and zinc; bronze, of copper and tin; pewter, of tin and lead. In many cases the metals do not unite in definite or invariable proportions. Most alloys have greater cohesion than either of the metals of which they are composed, so that a bar of an alloy will bear a greater longitudinal strain than a bar of either metal. The proportion of gold in an alloy is expressed in carats: 24 carat is pure gold, 18 carat is 18

parts of gold to 6 of alloy. A compound of mercury with another metal is an amalgam.



ALLSPICE.

All'spice, *pimen'to*, or **Jamaica pepper**, the dried berry of the *Eugenia pimenta*, which is a native of the W. Indies.

All Saints' Day, or **All-Hal'ows**, festival of the Roman Catholic, Anglican, Lutheran, and the various oriental churches, observed on November 1st, in honor of the saints in general. The Greeks keep All Saints' Day on the Sunday after Whitsunday.

All Souls' Day, festival of Roman Catholic Church observed on November 2d, when mass is said for the souls of all the faithful departed. Introduced by Abbot Odilo of Clugny, 998.

Allston (al'stön), **Washington**, 1779-1843; American painter; b. Waccamaw, S. C.; graduated Harvard, 1800; studied art at the Royal Academy, London, in the Louvre, Paris, and in Rome; returned home, 1809; went again to London, where he was elected an Associate of the Royal Academy, later resided in Boston and Cambridge; distinguished as a painter of historical and religious compositions and of portraits.

Allu'vion, soil gradually formed by constant washing of the waters along a river or sea. Distinguished from *avulsion* which is a sudden, not gradual, accretion.

Allu'vium, gravel, sand, etc., washed down by rivers and floods, and spread over land not permanently submerged. Such deposits often accumulate at the mouths of rivers and form deltas.

Al'ma, small river of Russia, in the Crimea, flows W. and enters the sea about 20 m. N. of Sevastopol. On its banks the allied armies of England, France, and Turkey defeated the Russians September 20, 1854.

Almaden (äl-mä-dën'), or **Almaden del Azo'gue** ("the mines of quicksilver"), town of Spain, province of Ciudad Real, 50 m SW. of Ciudad Real. Here are the richest and most ancient mines of quicksilver (cinnabar) in the world, producing annually 2,000,000 lbs.; were worked by the ancient Spaniards and the Romans. Pop. (1900) 7,400.

Al'magest, name given by the Arabs to Ptolemy's work on astronomy, in which the laws of the celestial motions were developed on the supposition that the earth was the center of the universe; the standard work till abt.

A.D. 1500, when Copernicus showed that the earth revolved around the sun.

Almagro (äl-mä'grö), **Diego de**, 1475-1538; Spanish soldier of fortune; one of the conquerors of Peru; a founding named after the city in which he was found 1475; at an early age went to America, where he enriched himself by plunder. Pizarro, Almagro, and Luque united, 1525, and conquered Peru; in 1535 invaded Chile, but his progress was hindered by the enmity of Pizarro. He returned from Chile, 1536, and took Cuzco, which Pizarro claimed. In April, 1538, Almagro was defeated and put to death by Pizarro.

Almagro, Diego de, 1520-42; Spanish soldier; son of preceding; became the leader of a party hostile to Pizarro, whom they assassinated, 1541; then took the title of captain-general of Peru, but was defeated by the royal army under Vaca de Castro, and executed.

Al'ma Ma'ter (Latin, "fostering or propitious mother"), name used to express the relationship of a university to its "foster-children" or alumni.

Al'manac, annual publication respecting times, seasons, the motions and positions of the heavenly bodies, and other celestial phenomena; also, the times of high and low tides are added, especially for use in seaports or on shipboard. Among the most widely known is the "Almanach de Gotha," first published in German in 1763; also published in French. The first American almanac was that of William Pierce, published at Cambridge, Mass., in 1639. In 1733 Franklin first published his celebrated "Poor Richard's Almanac." See CAL-
ENDAR.

Almansa (äl-män'sä), or **Alman'za**, town of Spain; province of Albacete; 52 m. by rail E. of Albacete; has manufactories of linen and cotton fabrics, brandy, leather, and soap. Near Almansa the French defeated the British and Spanish armies, April 25, 1707.

Alma-Tadema (äl'mä-tä'dē-mä), **Sir Lawrence**, 1836-; Dutch-English figure painter, principally of Greek and Roman subjects; b. Dronryp, Friesland; has long resided in London; member R.A., 1879; received many honors at exhibitions on the continent and in Great Britain; officer of the Legion of Honor, 1878; knighted, 1899. Some of his pictures are "Roman Dance"; "Vintage Festival"; "Sculpture Gallery"; "The Four Seasons"; "Antony and Cleopatra"; "The Conversion of Paula."

Al'meh, or **Al'mah**, written also **ALMÉ**, professional female singer of Egypt. The common dancing girls are a different and less respectable class, and are called Ghawazis.

Almeida (äl-mä't-dä), **Don Francisco de**, 1450-1510; Portuguese commander; b. Lisbon; son of the count of Abrantes. Having gained distinction in wars against the Moors, he was appointed viceroy of India, 1505, and extended the dominion of Portugal. He gained a great victory over the Egyptian fleet near Diu, 1508.

Almeida-Garrett (-gär-rēt'), João Baptista de, 1799-1854; Portuguese poet and politician; b. Oporto; minister of public instruction, 1820-23; compelled to leave the country in 1823 and 1828; in 1832 landed in Portugal with Dom Pedro; was minister to Belgium, 1834, and member of the Cortes after the revolution of September, 1836; raised to the peerage, 1852; collected the national ballads and poems; wrote dramas of high rank and epic-lyrical compositions.

Almeida (äl-mä't-dä), fortified town of Portugal; in Beira; on the Coa, 95 m. NE. of Coimbra; is an important stronghold. Here Wellington defeated Massena, August 5, 1811.

Almeria (äl-mä-rē'ä), city and port of Spain; on the Mediterranean; 104 m. E. of Málaga; under the Moorish kings was a rich and important town in Granada; has a safe harbor, defended by two forts, and a fine cathedral; wine, silk, cochineal, and other articles are exported. Pop. (1900) 47,326.

Almodovar (äl-mō-dō'vär), Ildefonso Diaz de Ribera (Count), 1777-1846; Spanish soldier and statesman; b. Granada; fought with distinction against the French; was suspected of liberalism and imprisoned, but liberated by the revolution of 1820; in 1823 fled to France, and did not return until after the death of Ferdinand; one of the leaders of the liberal party; became minister of war, but retired, 1843.

Almohades (äl-mō-hädz), Mohammedan dynasty that reigned in Spain and N. Africa, 1129-1269; were the conquerors and successors of the Almoravides.

Al'mond, a species of the order *Rosacea*, supposed to have given rise to the peach through cultivation; is a native of the Mediterranean basin, but now also cultivated in the U. S.,



ALMOND.

especially in California. There are two varieties, the sweet and the bitter. The fruit is hard, but the kernel of the stone is edible. If bitter, the kernel is used to make flavoring extracts, oil of almonds and prussic acid, the latter being obtained also from almond leaves. According to the consistency of their shells,

almonds are commercially classed as hard, soft, and paper-shell.

Almonde (äl-mön'dē), sometimes **Alemonda**, **Philippus van**, 1646-1711; Dutch admiral; b. Briel; was second in command under De Ruyter when the latter was killed, 1676, and contributed to the victory which Van Tromp gained over the Swedes, 1677; accompanied William of Orange to England, 1688, and commanded the Dutch fleet which, aided by the English, defeated the French at La Hogue, 1692.

Al'monds, Oil of, a fixed oil, light yellow and odorless, obtained by pressure from almonds, both sweet and bitter. It is chiefly olein, soluble in alcohol, and is a mild laxative. The volatile oil of bitter almonds, or benzoic aldehyde, is formed from the glucoside amygdalin and the ferment emulsion, by macerating and distilling bitter almonds with water. It has been used for flavoring confectionery and scenting soaps, but its prussic acid makes it dangerous for the former purpose, while for the latter it has been superseded by artificial oil of bitter almonds (nitrobenzene, or essence of mirhava), which is cheaper and has the same odor.

Al'moner, officer to distribute alms for a king or other person of rank, or for a monastery. The grand almoner of France was usually a cardinal. This office was abolished during the Revolution. In England there is a lord high almoner, who distributes the bounty of the king. In ancient times all bishops were required to keep almoners.

Almonte (äl-mön'tä), Don Juan Nepomuceno, 1804-69; Mexican general and statesman of Indian descent; b. Valladolid; minister of war under Bustamente, and, 1841, minister plenipotentiary at Washington; distinguished himself in the war against the U. S.; was sent to Washington, 1853, and 1857 to Paris; went to Mexico with the French expedition 1862, and was declared president in Juarez's place, but was not able to gain recognition. He entered the capital with the French army, 1863, and was made president of the government Junta; minister extraordinary to France from 1866 till his death.

Almoravides (äl-mō'rä-vīds), a Moslem or Arabian dynasty that reigned in N. Africa and Spain; founded by Abdallah-Ibn-Yaseen abt. 1050, and continued until 1145, when it was succeeded by the Almohades.

Almquist (äl'mkvist), Carl Jonas Ludvig, 1793-1866; Swedish writer; b. at Stockholm; produced poems, plays, school books, tales, and romances; in 1851 fled to America, under suspicion of an attempt at murder; afterward returned to Europe and lived under a false name (C. Westermann) in Bremen, where he died.

Almucan'tar, small circle, immediately around the zenith, or a larger one at any altitude, the largest of all being the great circle of the horizon; also an instrument for accurate measurement of equal altitudes; consists of a telescope mounted on a stand which floats in quicksilver.

Aloadin (ä-lō'ä-dīn), Prince of the Assassins; commonly called the "Old Man of the Mountain"; was sheik of a Syrian tribe professing Mohammedanism, but blindly devoted to their chief; word "assassin" derived from the followers of Aloadin, because when about to commit murder, they intoxicated themselves with hashish.

Al'oes, the inspissated juice from the leaves of the various species of aloe plants, of the *Liliaceæ*, as Socotrine, Barbados or Cape aloes. It is used as a stimulating purgative, but the essential principle, aloin, is preferred to the crude drug, as it is less irritating.

Aloes Wood, or **Ag'ila**, or **Ea'gle Wood**, inner part of trunk of the *Aquilaria ovata* and the *Aquilaria agallochum*, trees of tropical Asia; supposed to be the lign aloes of the Bible; contains a resin, which emits a pleasant odor when burned, and is prized as a medicine by the orientals.

Al'ogi, sect of religionists opposed to the Montanists; formed abt. 160 A.D. The name has a double meaning, i.e., their rejection of writings in which the Logos is mentioned; also that they were without reason.

Aloïdæ (äl-ō-i'dē), sons of Aloeus, in Greek mythology, Otus and Ephialtes, giants of extraordinary strength who attempted to storm Olympus, and were condemned to suffer in Tartarus.

Alost (ä'löst), or **Aalst**, town of Belgium, E. Flanders, on the Dender, midway between Ghent and Brussels; contains the Church of St. Martin, one of the finest in Belgium; cotton mills, foundries, distilleries, and manufactories of lace, leather, etc.; was the capital of Austrian or imperial Flanders. Pop. (1904) 31,660.

Alpa'ca, the *Auchenia pacos*; supposed to be only a domesticated variety of the *guanaco*, a ruminant animal allied to the llama, and belonging to the family *Camelidæ*; occurs in



ALPACA.

large flocks in a domesticated or semidomesticated state on the Andes of Peru and Bolivia. It is valued only for its wool, which is remarkable for its length, fineness, silken texture, and a luster almost metallic.

Alp-Arslan (älp-är-slän'), "strong lion," written also **ALP-ARSELAN**, 1029-72; Persian

sultan of the Seljukian dynasty; b. Turkestan; ascended the throne, 1063; embraced Islamism, and became sole monarch of Persia from the Tigris to the Oxus. Under him Persia enjoyed great prosperity, many colleges were founded, justice was well administered, and learning was promoted.

Alpes, name of three departments in the SE. of France, all more or less covered by the Alps and their offshoots.

THE BASSES-ALPES (bäs-zälp') is bounded N. by Hautes-Alpes, E. by Italy and Alpes-Maritimes, S. by Var, and W. by Vaucluse. The surface is mostly mountainous, with some fertile valleys. It is drained by the river Durance.

THE HAUTES-ALPES (öt-zälp') is formed mostly out of ancient Dauphine, and is drained by the Durance and its tributaries. It is entirely covered by the Alps. The lofty summit, Des Écrines, is situated here, and rises 13,442 ft. above sea-level. The soil is unproductive, but there are heavy forests and mines of lead, copper, iron, and coal. Capital, Gap.

THE ALPES-MARITIMES (älp-mä-rê-tēm') forms the SE. extremity of France, bordering on Italy. It is bounded N. and E. by Italy, S. by the Mediterranean, W. by Var and Basses-Alpes. It is drained by the river Var. The mild climate along the coast makes it a favorite winter resort. It includes the county of Nice, which was ceded by Italy to France in 1860. It is partly covered with forests of valuable timber. The chief towns are Grasse, Antibes, Cannes, and Nice, which is the capital.

Alpha and Omega (äl'fä and ö'më-gä), names of the first and last letters of the Greek alphabet. These words occur in Revelations as a title of Christ. The two letters were used by the early Christians as symbols of faith, and were sometimes marked on coins, tombs, ornaments, etc.

Al'phabet. This term, formed from the names of the first two Greek letters, alpha, beta, after the manner of our a-bee-see, and originally applicable to the series of letters by which the Greek language is written, has been extended in application to any such complete set of symbols for the sounds of a language. The modern European alphabets are all ultimately derived from the Greek. The Russian and those of other Slavic countries where the Greek Orthodox Church is dominant are modifications of the Cyrillic alphabet, which is based upon the Greek writing of the ninth century A.D. Our own alphabet is essentially the Roman form of the Greek. The letter J is a late differentiation of I, and W represents the attempt, in the earlier use of the Latin alphabet among Germanic peoples, to indicate the Germanic consonantal u (= w) by doubling the Roman symbol V, which had assumed, since the third century A.D., the value of a spirant. The symbol &, often appended to our alphabet, is, as well as + (plus), a conventionalized degradation of Latin et (&). "and."

The form of the Greek alphabet from which the Roman is derived is that form of the Eubœan which was introduced into Italy by the colonists from Chalcis. The alphabet which we commonly know as Greek is essentially the Ionic. It had its home in the Ionic cities of the Asiatic coast, and from there gradually spread over all Greece, becoming the standard at Athens in 403 B.C., and in Greece

Phœnician	Earliest Greek	Later Greek	Latin	
𐤀	Α	Α	Α Α	1. aleph
𐤁	Β	Β	Β Β	2. beth
𐤂	Γ	Γ	Γ < C	3. gimel
𐤃	Δ	Δ	Δ > D	4. dalet
𐤄	Ε	Ε	Ε	5. he
𐤅	Ϝ	Ϝ	Ϝ	6. vav
𐤆	Ζ	Ζ	Ζ	7. sayin
𐤇	Η	Η	Η	8. cbeth
𐤈	Θ	Θ		9. teth
𐤉	Ι	Ι	Ι	10. yod
𐤊	Κ	Κ	Κ	11. kaph
𐤋	Λ	Λ	Λ L	12. lamed
𐤌	Μ	Μ	Μ M	13. mem
𐤍	Ν	Ν	Ν N	14. nun
𐤎	Ξ	Ξ		15. samech
𐤏	Ο	Ο	Ο	16. sin
𐤐	Π	Π	Π P	17. pe
𐤑	Ϝ			18. tsade
𐤒	Ϟ		Ϟ Ϟ	19. qoph
𐤓	Ρ	Ρ	Ρ R	20. resh
𐤔	Σ	Σ	Σ S S	21. shin
𐤕	Τ	Τ	Τ T	22. tav

generally during the following century. It differed from the Chalcidian in several points.

All the Greek alphabets are based upon the Phœnician alphabet of twenty-two letters, to which a twenty-third (y) was directly added. From this series of twenty-three letters all the various systems may be derived. The form of the parent alphabet may be regarded as almost identical with the writing of the Moabite stone (abt. 890 B.C.).

The order of the letters is old, and is most rigidly preserved. The original grounds for this arrangement are not entirely clear; it was partly due to likeness of sounds, thus the three sonants b, g, d, and the liquids l, m, n, and partly, doubtless, to the names of the letters; thus Nos. 16, 17, 19, 20 refer to the

head or its parts, ayin, "eye"; pe, "mouth"; q'oph, "back of head"; resh, "head." See LANGUAGE.

Alpheus (äl-fé'ús), in classic mythology, river god and a son of Oceanus. He loved Arethusa, who fled from him to the island of Ortygia, and was transformed into a fountain. Alpheus pursued her under the sea and was united to the fountain.

Alpheus. See RUPHIA.

Alphon'so. See ALFONSO.

Al'pine Plants, plants which grow at great elevations (a mile or so) on mountains. As the distance from the equator increases the flora is alpine in character at lower and lower levels, and finally it occurs upon the surface but little above sea-level. Among the more remarkable alpine plants are the edelweiss, the gentians, the low catchfly, forget-me-not, saxifrage, knot-grass, etc. Woody plants at high altitudes become dwarfed, as the alpine willows, which trail upon the ground, and many trees are reduced to shrubs. Alpine flowers are noted for their bright colors.

Alpi'nus, or **Alpini** (äl-pé'né), Prosper, 1553-1617; Italian physician and botanist; b. Marostica, in the Venetian state; published "The Plants of Egypt," and obtained a chair of botany at Padua.

Alps, European mountains extending from the Mediterranean between Marseilles and Nice irregularly E. to near 18° E. longitude and 45° 30' N. latitude; stretching over a part of France, the greater part of Switzerland, and a considerable portion of N. Italy and Austria; extent from W. to E. about 700 m. They culminate in Mont Blanc. Several important rivers rise in Alpine valleys; the largest are the Rhine and the Rhône. The height of the central chain is 10,000 ft., being in the region of perpetual snow, while several hundred peaks rise above it to 12,000 and 15,000 ft. From these descend destructive avalanches. In the valleys are quantities of snow which form glaciers. There are about sixteen passes over the Alps, the most noteworthy being the Great St. Bernard. The longest tunnel in the world, completed 1905, extends through the Simplon Mountains from Brieg, Switzerland, to Iselle, Italy.

Alpujarras (äl-pó-här'äs), mountain region or range of Spain; in Granada between the Sierra Nevada and the Mediterranean; highest peaks about 7,000 ft.

Alrau'nen, or **Alru'næ**, name given by the ancient Germans to certain prophetic women who were employed in sacrificing victims, and were supposed to have magical or supernatural skill; also applied to small images carved out of mandrake roots, and exhibiting a rude imitation of the human form.

Alsace (äl-säs'), a part of the German Empire, but for centuries a bone of contention between France and Germany; bounded E. by the Rhine, S. by Switzerland, and W. by the Vosges Mountains, which separate it from

France. Area, 3,236 sq. m. It was ceded to France by the emperor of Austria in 1648, and became a province of that country. After the division of France into departments, abt. 1790, it formed the departments of Haut Rhin and Bas Rhin (upper and lower Rhine), which in 1866 contained a pop. of 1,119,255. Chief towns, Strassburg, Colmar, and Mülhausen. After the German armies had defeated and captured Napoleon III in 1870, Bismarck and his king insisted on the annexation of Alsace to Germany as one of the conditions of peace. The French therefore continued to fight for it, but at last they were compelled to cede it (with the exception of the fortress Belfort) by the treaty of May 10, 1871. Pop. (1900) 1,163,335.

Alsace-Lorraine (äl-säs' lör-rän'), German *Elsass Lothringen*, division of Germany formed of those portions of Alsace and Lorraine ceded by France to Germany, 1871; is a Reichsland (imperial land), immediately subject to the emperor; area, 5,600 sq. m.; it is divided into three districts—Ober-Elsass, Unter-Elsass, and Lothringen. The first corresponds to the former French department of Haut Rhin, the second to the former French department of Bas Rhin, while the third contains all the territory which was ceded of the French departments of Moselle, Meurthe, and Vosges. Pop. (1905) 1,814,564; abt. 200,200 are of French origin.

Alsatia (äl-sä'sht-ä), name formerly given to Whitefriars, London, used as a sanctuary by criminals in the seventeenth century.

Al Segno (äl sä'nyö), Italian to the sign; in music, a notice to a performer that he must return and commence again that part of the movement to which the sign *:S:* is prefixed.

Al Sirat (äl sē-rät'), literally the road or passage; a bridge as narrow as the edge of a razor, supposed by the Mohammedans to extend from this world over hell to paradise.

Alsen (äl'sēn), island of Schleswig-Holstein, in the Baltic, near the coast of Schleswig; 18 m. long; remarkably picturesque and very fertile.

Alsop (äl'söp), Richard, 1761-1815; American poet and scholar; b. Middletown, Conn.; with Theodore Dwight and others, edited the *Echo*, a satirical publication; published "Monday on the Death of Washington" and translated Molina's "Natural and Civil History of Chile."

Alströmer (äl'strö-mēr), or **Al'strömer**, **Klaudius** or **Klas**, 1736-96; Swedish naturalist; b. Alingsås; pupil of Linnæus, who named in his honor a genus of plants, *Alstrœmeria*.

Altai (äl-tī'), group of mountains in central Asia; between Jungaria (NW. Mongolia) and W. Siberia, extending from the Tien Shan to the Yenisei, consisting of parallel ranges, running E. and W. The Siberian rivers, Obi, Irtish, and Yenisei, rise on the N. side of these mountains; rich in minerals, especially gold, silver, copper, and iron; area covered by perpetual snow is considerable.

Altamaha (äl-tä-mä-hä'), river of Georgia, formed by the union of the Oconee and Ocmulgee; enters the Atlantic 12 m. below Darien, length about 140 m.; navigable for small vessels.

Altamura (äl-tä-mö'ra), cathedral town of S. Italy; province of Bari; at foot of the Apennines; defended by a castle; is the site of the ancient *Lupatia*. Pop. (1901) 27,730.

Alt'ar, an elevated place or table on which sacrifice is offered. The first altar mentioned in history was built by Noah immediately after the Flood. Altars were sometimes erected as memorials of some great event by the religious personages of sacred history. In the Christian Church the term "altar" is applied to the table-like construction of wood, stone, or marble, upon which the eucharist is offered. In the first prayer book of King Edward VI the altar was called "God's board." The words "holy table" appear in the place of "altar" in the prayer books of the English and American churches. The Lutheran Church retains the altar. An altar was a sanctuary both among the Jews and the heathen for those who fled to it for refuge.

Altdorfer (ält'dör-fēr), **Albrecht**, 1480-1538; German painter and engraver; pupil of Albert Dürer; b. at Altdorf, Bavaria. A painting of the victory of Alexander over Darius, now at Munich, is his masterpiece.

Altenstein (äl'tēn-stīn), castle in Saxe-Meiningen, Germany, near Liebenstein. Near the castle is the beech tree where Luther was captured and taken to the Wartburg.

Al'ter E'go ("my other self"), term used in the former kingdom of Naples to signify the king's deputy, authorized to perform the functions of royalty during the compulsory absence of the king.

Alter'nate Cur'rents, in electricity, currents generated by the electro-motive force in any electric circuit when it undergoes periodic changes of direction and intensity; simplest and most important case, that of the current generated by the uniform revolution of a ring or coil in a uniform magnetic field.

Alterna'tion of Genera'tions, the course of development of certain organisms in which at least two generations of individuals are necessary to complete the life of the species. One animal produces an egg—the sexual product. This develops into an individual unlike the parent, incapable of producing eggs, and reproducing only by division or budding—the asexual method. The progeny thus formed develop again into the sexual generation which produces eggs.

Among the hydroids the egg develops into a polyp—a cup-shaped animal attached by the closed end. A much-repeated process of budding now occurs, the individuals thus produced cohering to form a finely branched colony, moss-like in appearance and often mistaken for a seaweed. Most of the polyps thus asexually formed remain sterile, but some detach themselves, develop into small, free-swimming medusæ which resemble the larger jellyfish, finally

form and distribute the eggs, and thus complete the cycle.

In plants, as the moss-worts (*Bryophyte*), the thallus, or leafy plant, bears sexual organs; after fertilization of the egg-cell, a new plant body is produced, in which are eventually developed the spores; from the latter may be produced the thallus, or leafy plant, again, and so on. This cycle occurs in all plants above the Thallophytes.

Altgeld (ält'gëld), **John Peter**, 1847-1902; American jurist; b. Germany; judge of supreme court of Chicago, 1886-91; governor of Illinois, 1893-97. His pardon, while governor, of the imprisoned anarchists convicted of complicity in the Haymarket riot, caused adverse comment at the time; author of "Our Penal Machinery and Its Victims"; "Live Questions," etc.

Altitude, a synonym for height. In astronomy, it signifies the apparent height of a star or other body above the horizon—that is, the angle which a line from an observer to the star makes with the plane of the horizon. This altitude is expressed in degrees, the greatest possible altitude being 90°. It is measured in observatories by means of a telescope attached to a graduated circle, which is fixed vertically. The altitude of a triangle is measured by a straight line drawn from the vertex perpendicular to the base; that of a cone or pyramid by a straight line drawn from the vertex perpendicular to the plane of the base.

Al'to, in music, the part immediately below the treble, and the deepest musical voice in females and boys.

Alton (äl'tön), city, port of entry, and railroad center, Madison Co., Ill.; on a high bluff on the Mississippi, 21 m. above St. Louis, 5 m. above mouth of Missouri; exports grain, hay, stone, lime, flour, and fruits; has important manufactories; cathedral; limestone quarries; railroad bridge crossing the Mississippi. Upper Alton, 2 m. distant, is the seat of Shurtleff College. Pop. (1900) 14,210.

Altona (äl'tö-nä), most populous and important city of Schleswig-Holstein; on the Elbe; immediately adjoining Hamburg; connected by railroad with Kiel; has extensive trade by the Elbe. Many Hamburg merchants reside in Altona, which contains an observatory, a museum, and a library; important manufactories of tobacco, soap, chemicals, leather, ropes; a free port, accessible to large vessels. Pop. (1900) 161,500.

Altoona, city of Blair Co., Pa.; 117 m. E. of Pittsburg; at E. base of Allegheny Mountains; contains the extensive machine shops of the Pennsylvania Railroad, in which locomotives and cars are manufactured; large individual car works, planing mills, rolling mill, water-works, and library. Pop. (1900) 38,973.

Altorf (ält'örf), or **Alt'dorf** ("old village"), town of Switzerland; capital canton of Uri; near S. extremity of Lake Lucerne, and at foot of the Grunberg. Here is an old tower said to mark the place where William Tell shot the apple off his son's head.

Alto-rilievo (äl'tö-rë-lyä'vö), in sculpture, high relief; that is, figures projecting boldly from the background, having half or more than half their full roundness.

Altranstädt (ält-rän'stët), town of Saxony, in which Charles XII of Sweden concluded a treaty with Augustus, elector of Saxony, 1706. A treaty was also signed here, 1714, between Charles VI of Germany and Louis XIV of France.

Altruism, term applied by Auguste Comte to denote the benevolent instincts of man as distinguished from egoism, or the selfish instincts. In the "Data of Ethics" of Herbert Spencer, altruism is recognized as an essential element of society.

Alum, a name given to a remarkable series of double salts, of which potash alum may be taken as a type. The other two varieties are soda alum and ammonia alum, both similar in properties. It is a crystalline, astringent substance with a sweet taste. Alum is largely manufactured and is used in preparing skins, as a mordant in calico printing, in glazing paper, etc. In medicine it is used as an astringent. It rarely occurs in nature, but in Great Britain it is prepared artificially from alum shale, obtained from coal mines and cliffs along the coast.

Alumin'ium, or **Alu'minum** (symbol Al, atomic weight 27.04), element; a widely distributed constituent of the earth, occurring in a number of forms of combination; most abundant as silicates in the different varieties of clay. The most striking property of aluminium is its lightness. Taking the specific gravity of aluminium as 1, soft steel is nearly 2.95 times, copper 3.6 times, ordinary high brass 3.45 times, silver 4 times, lead 4.8 times, and gold 7.7 times as heavy. Many extravagant and erroneous claims have been based on the lightness of aluminium for its use as a structural material, coupled often with assertions relating to very low cost of production. Aluminium is not, section for section, comparatively a very strong metal. It is only about as strong under tensile strain, section for section, as cast iron, and has less than one half the strength of wrought iron under ordinary conditions. Under compression the metal has a very low elastic limit, although its extreme ductility allows the metal to flow on itself so freely as to make it for special purposes a very safe metal to use in compression. Pure aluminium is white with a decided bluish tint, which becomes much more marked upon exposure, when a thin film of white oxide on its surface prevents further tarnishing from the air, but seems to give by contrast to the metal as a background an enhanced bluish tint. The metal fuses at about 1,300° F., but becomes pasty at a temperature of about 1,000° F. It was first isolated by Wöhler, 1827; first produced by electric decomposition by H. St. Claire Deville, 1854; first made for commercial purposes near Rouen, France, 1855; process for making aluminium alloys by electricity invented by Cowles Brothers, Cleveland, Ohio, 1885; prop-

erties—lightness, malleability, ductility; alloyed with silver gains increased elasticity and hardness; with copper, produces bronzes of great strength, ductility, and resistance to corrosion; used to improve steel and steel castings; production in the U. S., 1907, 17,211,039 lbs.; value, \$4,926,948.

Alum'nus, plural **Alum'ni** (feminine singular *Alumna*, plural *Alumnæ*), Latin "foster child," applied in modern times to graduates of a university or college, to express the relation between them and their Alma Mater. In Germany there were at one time institutions called *alumnat*, founded for the free education of poor boys, termed *alumni*.

Al'va, or **Al'ba**, **Fernando Alvarez de Toledo** (Duke of), 1508-83; Spanish general; fought under Charles V against the Turks; commanded army of Philip II in Italy, 1555-56, defeating French and papal forces; in 1567 sent with large army to suppress revolt of the protestants of the Netherlands; established a "council of blood," and persecuted and put to death many thousands; failed to subdue the patriots and was recalled, 1573; in 1580 conquered Portugal. Distinguished for cool determination and remorseless cruelty.

Alvarado (äl-vä-rä'dö), **Alonzo**, d. 1553; Spanish officer; served under Cortez in Mexico; after its conquest went to Peru, held high command under Pizarro, and became captain-general.

Alvarado, Pedro de, d. 1541; Spanish general; b. Badajos; removed to America, 1518; served under Cortez in Mexico; conducted a successful expedition against Tehuantepec and Guatemala, 1523; appointed governor of Guatemala; led an army across the Andes into Quito, which he found occupied by Pizarro, who induced Alvarado to retire by the payment of money.

Alvarez (äl'vä-réth), **Juan**, 1790-1863; Mexican general; a leader of the insurgents who took arms against Santa Ana and drove him from power, 1854; during the French invasion, 1863-66, a determined opponent of Maximilian.

Alvinczy (äl-vin'tsë), or **Alvin'zy**, **Joseph** (Baron von), 1753-1810; Austrian general; b. Transylvania; served in Seven Years' War; lieutenant-field-marshal, 1789; in 1796 commanded about 55,000 men sent to oppose Bonaparte in Italy; fought an indecisive battle at Bassano, and was defeated at Arcola and Rivoli.

Alwar (äl'vär), capital of semi-independent state of the same name, in Rajputana, British India, 85 m. SW. of Delhi; at the foot of a fortress-crowned hill; most notable building, the palace of the maharajah; copper and iron ore mined near by, and silver, lead, and sulphur exist. Pop. (1901) 56,740.

Alyattes (äl-i-ät'éz), king of Lydia; ascended the throne abt. 618 B.C.; father of Croesus. During a battle between him and Cyaxares of Media an eclipse of the sun occurred, and made such an impression that they ceased fighting and made a treaty of peace.

Alsog (ält'sög), **Johannes Baptist**, 1808-78; German Catholic theologian; b. Ohlau, Silesia; 1853 Prof. of Ecclesiastical History at Freiburg, Germany. His "Manual of Universal Church History" has been translated into many European languages.

Amadeus (äm'ä-dë-us), name of nine counts and dukes of Savoy, the first of whom was a son of Count Humbert, and lived in the eleventh century. The others who have occupied an important place in history are: **AMADEUS V**, the Great, 1249-1323; son of Count Thomas II; succeeded his uncle Philip, 1285; increased his dominions by marriage, and was the first prince of Savoy that made any figure in history. **AMADEUS VI**, 1334-83; b. Chambéry; became count, 1343; was a successful ruler; defeated the French, 1354, and added a part of Piedmont to his dominions. **AMADEUS VIII**, 1383-1451; grandson of preceding; b. Chambéry; succeeded his father, 1391; received title of duke from Emperor Sigismund, 1419; in 1434 resigned his power to his son Louis, and retired to a monastery; was chosen pope by the council of Bale, 1439, and took the name of Felix V. As Eugenius IV, who had been deposed by that council, was still recognized as pope by a strong party, a schism ensued in the church. Felix V resigned the papacy in 1448.

Amadeus, 1845-90; king of Spain; son of Victor Emmanuel, king of Italy; received the title of duke of Aosta; November 16, 1870, the Spanish Cortes elected him king of Spain, the throne of which had been vacant for two years. Amadeus was crowned, 1871, but abdicated, being unable to maintain order, 1873, and a republic was proclaimed.

Amadis (äm'ä-dis) of Gaul, hero of a prose romance of chivalry. The oldest version extant is a Spanish redaction made about 1470, but some form of the romance was popular in Spain as early as 1350. A French version, begun by Nicholas de Herberay (d. abt. 1552), extended the popularity of the story. The romance had several continuations, and its direct influence on the literature of Europe did not die out till the beginning of the nineteenth century.

Amador de los Rios (äm'ä-dör' dä lös rë'os), **José**, 1818-78; Spanish historian; b. Baena; translated into Spanish Sismondi's "Littérature du Midi de l'Europe"; published "Estudios Politicos y Literarios los Judios de España," critical editions of Spanish authors; seven volumes of "History of Spanish Literature," 1861-65, and other works.

Amador, Manuel, b. abt. 1833; first president state of Panama; b. Cartagena, Colombia; early in life in commercial business; settled at Panama City, 1871; for many years chief physician for Panama Railroad Company and Pacific Mail Steamship Company; active in revolt that established new state; first minister of finance under new government, and one of Panama's commissioners to the U. S.; unanimously elected president, February, 1904.

Amalaric (äm-äl'ä-rík), 501-31; king of the Visigoths; son of King Alaric II; succeeded his father, 507, by the aid of his grandfather Theodoric, king of the Ostrogoths, and married, 527, Clotilde, daughter of Clovis, king of the Franks; in order to compel her to embrace Arianism, treated her so cruelly that her brother Childebert came to her rescue with a great army, 531. Amalaric was defeated and slain.

Amala'rius Fortuna'tus, d. 814; archbishop of Treves; sent by Charlemagne, 811, to diffuse Christianity among the Saxons; established the first church at Hamburg.

Amalason'tha, 498-535; daughter of Theodoric the Great, king of the Ostrogoths; wife of Eutharic; mother of Athalaric, who succeeded his grandfather as king of Italy at age of ten; ruled wisely as regent till Athalaric's death, 522; married and made co-regent with her cousin Theodatus, who, desiring full power, had her strangled.

Am'alek, grandson of Esau, and a chieftain of Edom. A remnant of his posterity existed in the time of Hezekiah.

Amalekites (äm-äl'lek-its), nomadic and warlike people, occupying, at the time of the Exodus, the Sinaitic peninsula and the wilderness between Egypt and Palestine. Opposing the march of the Israelites, they were signally defeated at Rephidim. Centuries later they were severely punished by Saul, and finally destroyed by David.

Amalfi (äm-äl'fë), a seaport of S. Italy, on the Gulf of Salerno, 23 m. from Naples. It was founded in the fourth century, and is the seat of an archbishop. During several centuries of the Middle Ages it was of great commercial importance and enjoyed a republican constitution of its own. Here arose the *Amalfian Code* of maritime law, once of great influence in Mediterranean maritime trade. Amalfi is much visited by tourists; there is a magnificent carriage drive partly hewn in the cliffs along the sea, from Amalfi to Salerno and Sorrento. In 1899 a great land slip occurred destroying part of the Capuchin monastery, in use as a hotel, and destroying part of the roadway. Amalfi has manufactories of soap, paper and macaroni. Pop. of commune (1901) 7,308.

Amal'gam, a combination or alloy of mercury with another metal produced by direct contact by subjecting the mixture to an electric current, or the action of the metal on a mercurial salt. Some amalgams are solid, others liquid. The mercury can usually be removed by heat, and this fact is utilized in obtaining gold and silver from their ores. Amalgam of tin is used in making mirrors, copper amalgam in dentistry, gold and silver amalgams for gilding and plating, etc.

Amalgama'tion, the process of extracting gold and silver from the earthy or mineral substances in which they occur in nature, by combining them with mercury. The ores are crushed and then washed through machines in which mercury is placed. The mercury seizes

upon the small particles of the metals that come in contact with it and brings them together into one mass, from which the earthy matters are all washed away.

Amalie (ä-mä'le), **Marie**, 1782-1866; wife of Louis Philippe, king of France; daughter of Ferdinand I, king of the Two Sicilies; married the duke of Orleans, then a political refugee with no prospect of reaching the throne, 1809; queen of France, 1830-48; distinguished for piety and exemplary domestic life.

Amal'rich of Be'na, d. 1209; French scholastic philosopher who taught dialectics and the liberal arts at Paris in the twelfth and thirteenth centuries; b. Bena near Chartres; attempted to reconcile theology with the Averroistic and materialistic interpretation of Aristotle's metaphysics. He and his book "Physion" were condemned by the university and the pope, 1207; and Amalrich, after an enforced recantation, died of grief.

Amalthea (äm-äl-thë'ä), or **Amalthe'ia**, in classic mythology, nurse of Jupiter; supposed to have been a goat, the horn of which, broken off by Jupiter, was endowed by him with magical power, and became the cornucopia, or "horn of plenty."

Amar (ä-mär'), **André J. P.**, 1750-1816; French Jacobin; b. Grenoble; member of the convention, 1792, voted for the death of the king, and, 1793, presented to the convention a report which condemned to death twenty-two Girondists.

Am'aranth, plant of the genus *Amarantus* and family *Amarantaceæ*, bearing small but aggregated flowers that do not wither, and in some species are highly colored; *Amarantus caudatus* is popularly called "prince's feather."

Amarapura (äm-ä-rä-pö'rä), city of the gods, decayed city and former capital of Burma, on the Irawadi, 8 m. N.E. of Ava; founded 1783; destroyed by fire, 1810; nearly destroyed by earthquake, 1839; has remains of temples and pagodas remarkable for rich gildings.

Amar'a-Sing'ha, or **-Sin'ha**, Hindu poet and grammarian, supposed to have lived abt. 50 B.C.; was a Buddhist, whose works were destroyed by the Brahmans, except his "Amara Kosha," a vocabulary of Sanskrit words.

Amaryll'is Fam'ily (*Amaryllidaceæ*), herbaceous, monocotyledonous plants, mostly bulbous, and related to the yams, irises, cannas, bananas, etc. About 650 species are known, mostly in warm climates. *Narcissus Amaryllis*, *Polyanthus*, and *Agave* are important genera.

Amasis (ä-mä'sis), or **Aah'mes, I**, king of Egypt; flourished in the seventeenth century B.C.; conquered the Hyksos or shepherd kings; united the country, and established the eighteenth dynasty. Two stone tablets commemorating the twenty-second year of his reign have been discovered at Turah and Massarah.

Amasis II, king of Egypt; fifth ruler twenty-sixth dynasty; flourished 570-26 B.C.; culti-

vated friendly relations with the Greeks; contributed to the rebuilding of the temple at Delphi; and founded a Greek commercial settlement at Naucratis. Prof. Flinders Petrie says excavations show the Greeks in possession of Naucratis prior to this king, and concludes that his act was a confirmation of the rights of the Greeks to that territory.

Amati (ä-mä'të), **Andrea**, b. abt. 1520; Italian violin maker of Cremona. Few of his instruments, which are superior to any of the present time, are extant.

Amati, Nicolò, 1596-1684; Italian violin maker; grandson of Andrea; excelled the others in the number and quality of his instruments; produced large violins now called "grand Amatis."

Amaury (ä-mö-rë'), or **Amal'ric I**, 1135-73; king of Jerusalem; son of Baldwin II; began to reign at the death of his brother, Baldwin III, 1162 or 1163; invaded Egypt, 1168, from which he was forced to retreat by Saladin, who in turn invaded Amaury's dominions.

Amaury II, called **AMAURY DE LUSIGNAN**, d. 1205; became king of Cyprus; on his marriage with Isabella took the title of king of Jerusalem, 1198. His dominions were occupied by the victorious Saracens, so his reign was only nominal.

Amazi'ah, d. 809 B.C.; king of Judah (II Kings xiv, 1-20), succeeded his father Joash abt. 837 B.C.; waged war with success against the Edomites; killed by conspirators at Lachish.

Am'azon, S. American river, largest on the globe; rises among the Andes in Peru; formed by the union of several large head streams. By S. Americans this river is known, from its mouth to the mouth of the Rio Negro, as the Amazonas or Amazon; from the mouth of the Rio Negro to the borders of Ecuador, as the Solimoens; thence to its source in the Andes, as the Maranon. Its whole length more than 3,000 m.; area of the countries which it drains estimated at 2,500,000 sq. m.; 4 m. wide at mouth of the Japura, more than 1,000 m. from the sea. At a distance of 2,500 m. from its mouth the elevation is only 210 ft.; the descent is therefore about an inch to the mile. Boats can be navigated from the Amazon, through the Rio Negro and the Cassiquiari, into the Orinoco, but are obliged to pass rapids on the Negro, and again on the Orinoco, before they can reach the sea. The Amazon and its affluents open to the ocean 15,000 m. of interior navigation for large vessels; tide ascends it over 400 m. The principal affluents from the right are the Ucayale, Yurua, Purus, Madeira, and Tapajos; from the left the Napo, Putumayo, Japura, and Rio Negro. The mouth of the Amazon was discovered by Yanez Pinzon, 1500, but the first European who explored the river was Orellana, 1539.

Am'azons, female warriors; semi-fabulous nation of martial women celebrated by Greek poets; said to have cut off their right breasts,

so as not to interfere with their aim in shooting; lived in Asia Minor, and fought against the Greeks at the siege of Troy, commanded by their queen, Penthesilea. In modern times the African kingdom of Dahomey has been noted for its army of Amazons.

Ambala (äm-bä'lä), capital of a division and district of the same name in the Punjab, British India; 120 m. NNW. of Delhi. Here a treaty was concluded between Lord Mayo and the Emir Shere Ali of Afghanistan, 1869. Pop. (1901) 78,638.

Ambarvalia (äm-bär-vä'lä), religious festival observed by the ancient Romans in May, to propitiate Ceres and invoke her blessing on the coming harvest.

Ambas'sador, diplomatic officer of the highest rank, sent by a sovereign or nation to the seat of government of another nation to conduct affairs of state. Unlike a minister resident or plenipotentiary, an ambassador represents also the person of the chief of his own nation, and has therefore the privilege of audience with the chief of the nation to which he is sent. In U. S. history, American ambassadors date only from 1902, when Congress authorized the raising of the rank of its missions to embassies in nations willing to return the courtesy, and in 1907 this mutual change had been made with Austria-Hungary, Brazil, France, Germany, Great Britain, Italy, Japan, Mexico, Russia, and Turkey. See **CONSUL**; **EMBASSY**; **DIPLOMATIC AGENT**.

Am'ber, a fossil resinous exudation from several species of extinct coniferous trees. Over 800 species of insects have been found preserved in amber, and leaves or other fragments of 163 species of plants. The largest mass known is in the Cabinet at Berlin; it weighs 18 lbs., and is valued at \$30,000. Amber was formerly obtained from the shores of the Baltic, but now it is systematically mined for in that region. Amber was highly prized by the ancients and was an article of exchange in prehistoric times as evidenced in the lake-dwellings of Switzerland. Amber exhales a fragrant odor when burned, and was formerly in high repute as a medicine. When rubbed it becomes strongly electro-negative and the first exhibition of electric force which received attention was the attraction exerted on light bodies by amber. This force, supposed to reside in amber alone, took its Greek name from amber, *elektron*, from which electricity is derived.

Amberg (äm'bërkh), a walled town, formerly the capital of upper Palatinate of Bavaria; on river Vils; 39 m. E. of Nuremberg; has a royal manufactory of firearms and several breweries and potteries. The French republican army under Jourdan was defeated near Amberg by the archduke Charles, commanding the Austrians, 1796. Pop. (1900) 22,030.

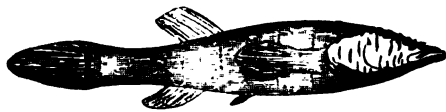
Ambergris (äm'bër-grës), a gray, waxlike concretion formed in the intestines of the sperm whale and found on the surface of the sea or on the shore. In it are often embedded the

horny beaks of the squids, on which the whale feeds. Ambergris was once used in medicine, but is now dissolved in alcohol and used as a base in perfumes, rendering them more lasting. The price of it is about \$5 an ounce.

Ambiorix, famous Gallic chief who ruled over the Belgic tribe of Eburones, and warred against Cæsar.

Ambletuse (äm-b'l-teuz'), decayed seaport of Pas-de-Calais, France, on the English Channel, 6 m. N. of Boulogne, and about 25 m. from the English coast. Here James II of England landed after his abdication in 1689, and here Napoleon I erected a granite column in honor of the Grand Army in 1805.

Amblyop'ia, genus of blind fishes; contains a single species, found in the caves of Kentucky and Indiana. The eyes of this fish,



AMBLYOPSIS SPELEUS.

though seemingly absent, exist in a rudimentary state, hidden beneath the skin. The body is translucent, and partly covered with scales; length about 5 in.

Am'bo, reading desk or pulpit, common in ancient Christian churches; still found in oriental ones.

Amboise (öñ-bwäz'), ancient *Ambacia*; old town of Indre-et-Loire, France, 14 m. ENE. of Tours; has a château of the time of the Renaissance; celebrated as the place of imprisonment of Abd-el-Kader, 1842-52. Here the "Conjuratation d'Amboise," a conspiracy of the Huguenots against the Guises, was formed, 1560. It has been the residence of several of the kings of France. Pop. (1901) 4,538.

Amboise, Georges, Cardinal d', 1460-1510; French statesman; b. Chaumont-sur Loire; archbishop of Rouen, 1493; prime minister under Louis XII, 1498; and cardinal the same year.

Amboyna (äm-boi'nä), most important of the Moluccas or Spice islands, situated E. of Buru; about 30 m. long; area 264 sq. m. The staple product is cloves, the trade in which was once monopolized by the Dutch. The most of the population are Malays, and the inhabitants are mostly Christians or Mohammedans. The Portuguese were the first Europeans that visited Amboina (1512), and they obtained peaceable possession, 1580; taken by the Dutch, 1605; British settlement made here abt. 1615, which was destroyed by the Dutch, 1623; taken by the British, 1796, and restored, 1802; retaken by the British, 1810, and restored again, 1814. Pop. abt. 38,663.

Ambriz (äm'brëz), seaport town, formerly a small native kingdom on the W. coast of Africa, now a part of the Portuguese colony of Angola; name applied also to a race of na-

tives in this part of Africa, and the river is called Brisho or Loge.

Ambros (äm'brös), August Wilhelm, 1816-76; German composer; b. Mauth, Bohemia; Prof. of Music in the Univ. of Prague, 1869; wrote overtures "Genofeva" and "Othello," and a "History of Music."

Am'brose, Saint, 340-97; a Latin father of the church; b. Gaul; son of the Roman prefect of Gaul; governor of Liguria and Æmilia abt. 370; elected bishop, although he had never been a priest, abt. 374. Under his preaching Augustine was converted; favored the Catholics and opposed Arianism. Theodosius the Great having ordered a massacre of the Thesalonians in 390, Ambrose forbade him to enter the church, and extorted from him a public penance of eight months, and the promise that no sentence of death should be executed until thirty days after it was passed. He was the author of a method of singing called the Ambrosian chant, and left numerous religious works and letters.

Ambro'sia, in classic mythology, the food of the gods, supposed to confer immortal youth; also the name of a genus of weeds, one species of which, common in the U. S., is known as hogweed or Roman wormwood.

Am'bulance, covered vehicle by means of which wounded men are removed from the field of battle. Ambulances are also in use as an adjunct to hospital work in many cities.

Amend'ment, in law, is the correction of an error committed in any process, or the alteration of the record or of any pleadings in a civil or criminal cause. The deficiency of means of amendment in pleading at common law led to the statutes of amendments and jeofails.

Amendment, in legislation, is an alteration in the words of any bill, motion, or resolution. Any member may move an amendment to a bill or resolution after it has been read twice, and it is usual to take a vote on the amendment first, and next on the main question. An opponent of a bill has a right to move an amendment to it by a motion to strike out all after the enacting clause, and to substitute a contrary principle. Either House of Parliament or Congress has a right to amend a bill which has been approved by the other, but such amendments must receive the assent of both Houses before the bill can become a law.

The term amendment is also applied to an alteration of the Constitution of the U. S. To render an amendment valid it must be first proposed by two thirds of both Houses of Congress, and must be ratified by the Legislatures of three fourths of the several states. The most recent of these changes in the organic law is the fifteenth amendment, which ordains that no man shall be disfranchised on account of color or race.

Amende' Honora'ble, in French law a penalty inflicted upon offenders against public decency or morality, consisting of a confession in open court made by the criminal, bareheaded and kneeling. The *amende honorable* in *figuris* was

made by a culprit kneeling in his shirt, with a torch in his hand and a rope round his neck. In modern speech the term means a public recantation or apology.

Amenophis (ām-en-ō'fīs), or **Am'enoph**, name of four kings of Egypt. **AMENOPHIS I**, second of the ten kings of the eighteenth dynasty, began to reign abt. 1500 B.C. **AMENOPHIS II**, sixth king of the eighteenth dynasty; regarded by some as identical with Memnon, who fought against the Greeks at the siege of Troy. **AMENOPHIS III**, grandson of the preceding, and eighth king of eighteenth dynasty; ascended the throne abt. 1400 B.C.; supposed to have built the palace of Luxor (El-Ukser) at Thebes. **AMENOPHIS IV**, last important king of the eighteenth dynasty; son of Amenophis III and Queen Ti; left Thebes, the previous royal residence, and built Khut-Aten in middle Egypt, whose ruins are now called Tell el-Amarna; adopted the name of "Khunaten" at the time of his attempt to introduce a solar monotheistic worship in Egypt. The reformation was backed by force and was opposed by various interests, chief of which was that of the priesthood of endowed temples. The innovation was short-lived, in spite of its splendor, and scarcely survived Amenophis himself.

Amerbach (ā'mēr-bākh), 1443-1513; Swiss printer; b. Reutlingen, Swabia; first to use Roman type instead of Gothic and Italian; published first edition of complete works of St. Augustine, of St. Ambrose, and of St. Jerome.

Amercement (ā-mēr's'mēt), or **Amer'ciament**, a pecuniary punishment imposed at the discretion of the judge. Fines grow expressly from some statute; amercements are arbitrarily imposed.

America, one of the great continental divisions of the globe, bounded N. by the Arctic Ocean, E. by the Atlantic, S. by the Antarctic, and W. by the Pacific; separated from Asia on the NW. by Bering Strait; about 10,500 m. long, extending to latitude 56° S.; greatest breadth about 3,000 m.; area, about 16,000,000 sq. m.; of which about 8,500,000 is in N. America. Nearly six sevenths of the area is available for cultivation. It has two grand natural divisions, N. America and S. America, connected by a narrow strip of land lying between the Gulf of Mexico and the Caribbean Sea on the E. and the Pacific on the W., a part of which is called Central America. S. America has numerous political divisions; those of N. America are British America, the U. S., and Mexico. The principal islands adjacent to the American coast are Greenland, which belongs to Denmark, Newfoundland, to Great Britain, and the W. Indies. Little is known about the early inhabitants of America. The extreme N. was peopled by the Eskimos, and the region E. of the Rocky Mountains, now constituting the U. S., by tribes afterwards called Indians. Mexico was occupied by a more civilized people, while in S. America was a seat of civilization known as that of the Incas, and supposed to date from abt. A.D. 1000. It was at its height at the period of the Spanish conquest. The Northmen visited Greenland as early as the

tenth century, and planted a colony there, with which they maintained an almost continuous intercourse. They also sailed for some distance down the Atlantic coast. The historical period of America begins with the discovery of the W. Indian Islands by Columbus, 1492. In 1497 the Cabots discovered Newfoundland and coasted as far down as Florida. The Spaniards took the lead in conquest and partial colonization. Within half a century they took possession of the Islands; Cortez conquered Mexico; Balboa and others Central America, and Pizarro and Almagro overran Peru. They reached New Mexico before 1537. Brazil was formally occupied by the Portuguese, 1549. The French took formal possession of Canada, 1534. The first permanent settlement by the English was at Jamestown, Va., 1607. The natural and political divisions are treated under their appropriate heads.

American, river in California, formed by the union of its N. and S. Forks in the W. part of El Dorado Co.; flows SW., and empties into the Sacramento River a short distance above Sacramento City. Gold is found along the banks of this river and its forks.

American Association for the Advance'ment of Science, most important American scientific society; organized in Philadelphia as the Association of American Geologists, 1840; enlarged and called Association of American Geologists and Naturalists, 1842. In 1847 a new organization was effected, embracing all sciences, and the present name assumed.

American Institute, a New York institution, the object of which is to promote industry in agriculture, commerce, manufactures, and the arts, by bestowing rewards and other benefits on those who shall make improvements therein or excel in any of the said branches. It was organized 1828; chartered 1829. One of the principal means to accomplish its objects was the holding of exhibitions—or, as they were then called, annual fairs—in which inventors, manufacturers, and others could exhibit their various productions. Among the things first shown at these exhibitions were Morse's telegraph, Colt's firearms, the sewing machine, McCormick's reaper, Francis's metallic lifeboats and car, Hoe's printing press, and the telephone.

Americanisms, words or phrases peculiar to the U. S. of America. They include new words; Old-English words in new meanings; words which were provincial in England adopted in general American use; words which have retained in America the meaning they formerly had in England, while in England the meaning has changed; and words preserved in American use which have become obsolete in England. Most so-called Americanisms are mere vulgarisms, never used by Americans of culture. Also a term used in an encyclical letter of Pope Leo XIII, January, 1890, condemning a tendency to tone down doctrinal points, and to omit certain church teachings of lesser importance.

Cases of true Americanisms—i.e., of expressions which are quite universally acceptable in





the U. S., at least among speakers whose usage is not recently and consciously affected by contact or instruction, but which are foreign to the standard usage in Great Britain—are the following: Different words for the same idea: American "bureau," English "dressing-table"; American "elevator," English "lift"; American "sleigh," English "sledge"; American "store," English "shop"; American "fall," English "autumn" (also American); American "candy," English "sweets"; American "cracker," English "biscuit"; American "rare" (of meat), English "under done"; American "straight" (of drinks), English "neat"; American "pants" (regarded as vulgar by cultivated classes in cities), English "trousers"; American "sack-coat," English "jacket"; American "waist," English "body, bodice," etc. Especially instructive is it to note how special activities, particularly those of more modern development, have found themselves in Great Britain and the U. S. separate vocabularies; for instance, the language of railroad travel: American "engineer," English "engine-driver"; American "fireman," English "stoker"; American "conductor," English "guard" (only in general comparable, as functions differ).

American Literature. The literary history of the U. S. may be treated under three distinctly marked periods, *viz.*: a colonial or ante-revolutionary period (1620-1775), during which the literature of the colonies was closely assimilated in form and character to that of England; a first American period (1775-1820), which witnessed the transition from a style for the most part imitative to one in some degree national; and a second American period (from 1820 to the present time), in which the literature of the country assumed a decided character of originality. (1) 1620-1775. The first literary production of any note in the British-American colonies was the version of Ovid's "Metamorphoses," made by George Sandys in Virginia abt. 1620 (London, 1626). The famous John Smith wrote a "General History of Virginia," which is quaintly interesting. The "Bay Psalm Book" (Cambridge, 1640) was the first book printed in the country. Ten years later a volume of poems by Mrs. Anne Bradstreet, of Massachusetts, was published in London. The most remarkable early productions of the colonial press were the Indian Bible of John Eliot, the "Concordance of the Scriptures" by John Newman and the prolific writings of Increase and Cotton Mather, the latter of whom was the author of 382 works. Among theologians Jonathan Edwards was preëminent. He was not essentially a man of letters, but a psychological observer, and a metaphysician and logician whose powers of reasoning were of the first order. In the writings of Benjamin Franklin we have charming specimens of practical philosophy or of simple narrative. His investigations in electricity and other scientific subjects constitute the chief contributions to scientific literature during the colonial period. The historians and annalists are less prominent, but the journals and annals of Winthrop, Winslow, Morton, and others are

worthy of note. William Hubbard wrote a history of New England, and Thomas Prince began a work on the same subject, which was never completed. Among the earlier contributions to American local history are the histories of Virginia, by Robert Beverley (London, 1705) and William Stith, and that of Massachusetts, by Thomas Hutchinson. Of works relating to the Indians, the most noteworthy are the history of King Philip's war by Capt. Benjamin Church, the history of the Five Nations by Cadwallader Colden, and the "Diary" of the missionary, David Brainerd. The drama of "The Prince of Parthia," by Thomas Godfrey, was the first work of the class produced in America.

The second period (1775-1820), was characterized at its beginning by the appearance of many political and patriotic pamphlets. Conspicuous among the early pamphleteers of the revolution were James Otis, Josiah Quincy, Jr., John Dickinson, Joseph Galloway, Richard Henry Lee, Arthur Lee, William Livingston, William Henry Drayton, John Adams, Thomas Jefferson, and Timothy Pickering. For fervid declamation Patrick Henry stands at the head of all the orators of this period. The "Common Sense" of the Englishman, Thomas Paine, was thoroughly American in tone. In it he argued boldly and clearly for independence as the only practical solution of the difficulties in which the colonies were involved. The great state paper of this era was the "Declaration of Independence," by Thomas Jefferson. Jefferson was more subtle and brilliant than Paine, and probably no more influential letter writer can be mentioned among Americans. The writings of George Washington must always hold a distinguished place in American literature. An enduring monument of the political sagacity and literary ability of Alexander Hamilton is the "Federalist." Hamilton was assisted in this work by John Jay and James Madison, the latter a prolific writer on political, constitutional, and historical subjects. John Adams published a "Defense of the American Constitution."

The most accomplished rhetorician and speaker of the period was Fisher Ames. In this period a biography of Washington, written by Chief Justice Marshall, was produced. Of works of travel, the most important are the narrative of Jonathan Carver, the journals of John Ledyard, the reports of Maj. Zebulon Montgomery Pike, and the account of the expedition of Lewis and Clarke, prepared by Nicholas Biddle and Paul Allen. The leading theologians of this period are the second Jonathan Edwards, Samuel Hopkins, Timothy Dwight, and Bishop William White. One of the first laborers in the field of science was David Rittenhouse. Benjamin Rush and James McClurg were conspicuous writers on medical science, and Benjamin Smith Barton produced the first American elementary work on botany, and the first contribution to the ethnographical literature of the country. The most important contribution to natural history was the "Description of the Birds of North America," by Alexander Wilson. The most distinguished poet of this period was Philip Freneau. His

satires against the British and Tories, written while he was a young man, are really vital, as are some of the meditative and descriptive poems published before he was forty. Contemporary with him were John Trumbull, Joel Barlow, Lemuel Hopkins, Timothy Dwight, and John Woolman, a Quaker who is remembered for his "Journal," a sincere record of his unselfish life and spiritual experiences. Charles Brockden Brown, the first American novelist, was also the first author who made a profession of literature. Another well-known figure of this period is Noah Webster, of "Dictionary" and "Spelling Book" fame. Perhaps the most important literary events in this period were the establishment of the *North American Review* (1815), the publication of the inimitable "History of New York" (1809), purporting to come from the pen of one Diedrich Knickerbocker, and the publication (1817) of Bryant's "Thanatopsis." These events foreshadowed the development of a distinctly original American literature.

At the very beginning of the third period we have the publication (1820) of "Precaution," by James Fenimore Cooper, who has written the most typically American novels of the century. In the next year he published "The Spy," followed two years later by "The Pilot" and "The Pioneers," the first novels in his world-famous series, "The Leatherstocking Tales." The works of Washington Irving lap over from the former period. For fifty years from the publication of his "History of New York," he excelled as master of the light essay, history, biography, and travel. He also shares with Hawthorne and Poe the distinction of originating the short story. The greater amount of the work of William Cullen Bryant belongs to this period. He was probably the truest interpreter of Nature in verse that America has produced. Although inclined to dwell upon the solemn aspects of life, much of his verse is far from somber, and he was comparatively free from both morbidness and sentimentality.

The Transcendentalist movement which sprang into being in New England, and lasted approximately from 1820 to 1850, was important in literature. It had its origin in religious skepticism, and was characterized by a recoil upon the inner self. Most of the leaders of the movement were literary men, or else social reformers; notable among them were Bronson Alcott, the Rev. James Freeman Clarke, Ralph Waldo Emerson, Margaret Fuller, and the Rev. George Ripley. They published a magazine of their own, called *The Dial*, of which Margaret Fuller and then Emerson were the editors.

In 1831, William Lloyd Garrison established the *Liberator* at Boston. This publication sounds the keynote of much of the literature written between this time and the Civil War. Many of the works of John Greenleaf Whittier, who published in 1831 his first book, "Legends of New England," were written in the cause of freedom. He is better known, however, by his poems, particularly those descriptive of New England life, and of which the most important is "Snow-Bound" (1866).

The middle of the nineteenth century marks the high water of American literature. It was then (1850) that Hawthorne published "The Scarlet Letter" and "The House of the Seven Gables," his two most important works. With regard to the unique and permanent value of Hawthorne's work as a romancer, there is practically no dissent among critics writing in English. He is not, for various reasons, very widely known outside the English-speaking countries, but within these he is probably regarded by a majority of critics and readers as the greatest American writer of fiction, and as the possessor of a uniquely subtle imagination. The poems and tales of Edgar Allan Poe, which are as well known abroad as at home, belong also to this midcentury period. Poe's reputation has grown steadily since his death. He is almost unique in the grip he secures upon the imagination of his readers, especially in his fiction. His poetry is remarkable for beauty of form and melody. The masterly essays of Ralph Waldo Emerson, the poems and stories of Oliver Wendell Holmes, belong also to this period. The poems, essays, and political writings of James Russell Lowell, probably the most able of American satirists, exercised a great influence upon the thought of the times. His essays are brilliant, but not always thorough and impartial. The sweeter and more lyrical verse of Henry Wadsworth Longfellow has always been popular. He has a rare power of going straight to human hearts by his reflective lyrics and simple narratives. He has been accused by some critics of sentimentality and lack of deep thought. The nature studies of Henry David Thoreau must be mentioned here. Earlier than these we have the historical writers, William H. Prescott, George Bancroft, followed later by Francis Parkman. Other writers in the period preceding the Civil War were H. W. Beecher, H. H. Brownell, G. W. Curtis, Mrs. Julia Ward Howe, Mrs. Helen Hunt Jackson, Bayard Taylor, Donald G. Mitchell, G. W. Curtis, T. B. Read, Charles Eliot Norton, Miss Alcott, and Harriet Beecher Stowe, whose "Uncle Tom's Cabin" was a timely book which achieved world-wide fame. Walt Whitman's work belongs in part chronologically to this period. His "Leaves of Grass" was published in 1855. Later in the century we have the works of Phillips Brooks, H. C. Bunner, Stephen Crane, Eugene Field, R. M. Johnston, Emma Lazarus, Charles Dudley Warner, Theodore Parker, Thomas Bailey Aldrich, Edmund Clarence Stedman, Thomas Wentworth Higginson, Mrs. Louise Chandler Moulton, the Rev. Edward Everett Hale, "Joaquin" Miller, Henry James, James Whitcomb Riley, Rowland Sill, and a host of others. Probably the most important names at the beginning of the twentieth century are those of William Dean Howells, Bret Harte, and Samuel Clemens (Mark Twain) in the field of fiction, and Sidney Lanier in that of poetry.

Much of the literary work produced during the first half of the nineteenth century was valuable only on account of its general educative effects on the people at large, but the advance made in the mid-century period was

almost greater than could have reasonably been expected and covered well the fields of poetry, fiction, oratory, and history. The period since the Civil War has seen a decline in the fields of poetry and oratory, and great changes in those of fiction and history, while it has marked an advance mainly in criticism and specialized scholarship. The same thing, however, may be said of English and other literatures during the period, and it is doubtful whether in any other nation the number of competent writers has so largely increased as in America. A hundred years ago American writers scarcely counted in the eyes of the world; to-day they are holding their own with those of far older nations. And the literature they have produced in a century is exceptionally wholesome in tone, solidly founded on observation and study, fairly—and in the cases of Cooper, Hawthorne, Poe, and Whitman exceptionally—characterized by imaginative power. Above all, through its general level of thought, feeling, and expression, it is excellently adapted to the civic needs of a great democracy. It is not a peculiar literature, differing markedly from every other; but, although many foreign and some native critics have regretted this fact, it is not in the least regrettable or surprising, since the American people in language, laws, religion, manners, and many other particulars do not differ widely from their English and European ancestors.

American Party. See KNOW-NOTHINGS.

American Protec'tive Associa'tion (A. P. A.), secret organization founded 1887, to agitate against "public support of sectarian schools," and "the holding of office in national, state, or municipal government by any subject or supporter of any ecclesiastical power not created and controlled by American citizens, and which claims equal, if not greater, sovereignty than the Govt. of the U. S. of America."

American Sys'tem, in political history, a term applied to Henry Clay's plan of protective duties and internal improvements in the tariff movement of 1824; now denotes the policy of protecting home industries by import duties.

America's Cup, yachting trophy, originally known as the Queen's Cup, offered as prize to yachts of all nations by royal yacht squadron of Great Britain, 1851; first contest held August 22, 1851; cup won by American yacht *America*, whose owners deeded it in trust to New York Yacht Club; numerous contests since by British yachts in hope of recovering it. The last race occurred September 3, 1903, and was won by the American yacht *Reliance*; the English boat *Shamrock III* was lost in fog.

Americus Vespuc'ius. See VESPUCCI.

Ames, Fisher, 1758-1808; American orator; b. Dedham, Mass.; admitted to bar, 1781; member Massachusetts convention that ratified Federal Constitution, 1788; federalist member of Congress, 1789-97, in which he made a powerful speech in support of Jay's treaty with Great Britain; elected president of Harvard, but declined, 1804.

Ames, city of Story Co., Iowa; seat of the Iowa State Agricultural College. Pop. (1905) 3,292.

Am'ethyst, purple variety of rock crystal or quartz, colored by manganese, found in Brazil, Ceylon, India, and many other places. The oriental amethyst is a variety of spinel, and is a more valuable gem than the common amethyst.

Am'herst, Jeffery (Lord), 1717-97; British army officer; b. Riverhead, England; entered army, 1731; commander in chief of all the forces in America, 1758; completed conquest of Canada from the French by the capture of Montreal, 1760; governor of Virginia, 1763; created Baron Amherst of Holmesdale, 1776; commander in chief of the British armies, 1778; suppressed the London riots, 1780; field marshal, 1796.

Amherst, William Pitt (first Earl of), 1773-1857; British diplomatist; nephew of the preceding; b. England; ambassador extraordinary to China, 1816, but failed in his mission; on his return to England, stopped at St. Helena, where he had a number of interviews with Napoleon; governor-general of India, 1823-26; became an earl, 1826.

Amherst College, non-sectarian institute in Amherst, Mass.; founded 1821; has over 40 professors and instructors, over 500 students in all departments, 80,000 volumes in its libraries, grounds and buildings valued at \$1,000,000, productive funds aggregating \$1,700,000, and an average annual income of \$110,000. The Hitchcock Ichneological cabinet, the Adams collection in conchology, the Shepard meteoric collection, and the Mather art collection, are of unsurpassed value. The Pratt gymnasium, with its system of exercise and instruction, is a feature of this institute, and the Pratt field for athletic exercises gives Amherst an excellent equipment for outdoor athletics. The Massachusetts Agricultural College is situated in the same place to secure the advantage of its scientific treasures, but has a separate faculty and board of trustees.

Am'ice, or **Amic'tus,** upper garment worn by Romans over the tunic; also a linen vestment worn over the shoulders of Roman Catholic priests during the celebration of the mass.

Amici (à-mé'chè), Giovanni Battista, 1784-1863; Italian optician; b. Modena; was skillful in the fabrication of mirrors and lenses for telescopes and microscopes; director of the observatory of Florence for many years; wrote on double stars and other topics of astronomy.

Amicis, Edmondo de, 1848-1908; Italian author; b. Oneglia; served in war against Austria, 1866; traveled extensively; settled in Turin; most of his productions have been translated; author of "Military Life," "Spain," "Morocco," "Constantinople," and other records of travel, and many popular novels.

Amiel (à-mè-èl'), Henri Frederic, 1821-81; Swiss poet; b. Geneva; Prof. of Æsthetics and French Literature, Academy of Geneva, 1849,

and of Moral Philosophy, 1854; author of essays and volumes of poems; left a "Journal Intime," extracts from which, published 1882-84, gave him fame.

Amiens (ä'mi-än), ancient *Samarobrivo* and *Ambiani*; capital department of Somme, France; on Somme River, 81 m. N. of Paris; has a citadel, magnificent Gothic cathedral, 415 ft. long by 182 ft. wide, founded 1220; river is here divided into numerous canals, affording power for mills and factories. The "Peace of Amiens" was signed here by the French and British, March, 1802, and the Germans under Gen. Manteuffel gained a victory here over the Army of the Loire, November 27, 1870. Pop. (1901) 90,760.

Amite (ä-mät'), river rising the SW. part of Mississippi; enters Louisiana, and falls into Lake Maurepas; length about 100 m.

Am'leth, or **Ham'leth**, ancient prince of Jutland; considered fabulous by some; said to have lived abt. 150 B.C. His story is related by Saxo Grammaticus, whose narrative was formerly considered the foundation of Shakespeare's "Hamlet."

Amling (äm'ling), **Karl Gustav**, 1650-1751; German designer and engraver; b. Nuremberg, Bavaria; worked at Munich; patronized by Maximilian II, and very successful in portraits; considered the best German engraver of his time.

Amman (äm'an), **Johann Conrad**, 1669-1724; Swiss physician; b. Schaffhausen; practiced at Haarlem and Amsterdam in Holland; acquired distinction by his successful efforts to teach the deaf and dumb to speak.

Am'man, or **Am'mon**, capital of the Ammonites, ruined city of Syria, in pashalic of Damascus; on the Zurka, an affluent of the Jordan, 55 m. ENE. of Jerusalem; an important city in ancient times; originally named Rabbah, besieged and taken by King David; rebuilt by Ptolemy Philadelphus, and called Philadelphia; one of the cities of the Decapolis.

Ammanati (äm-ä-nä'tö), **Ammana'te**, or **Ammana'to**, **Bartolommeo**, 1511-922; Italian sculptor and architect; b. Settignano, near Florence; pupil of Sansovino; employed to adorn the Capitol (in Rome) with sculptures; completed the Pitti palace of Florence. Among his best work is the Ponte della Trinità, Florence.

Am'mergau Mys'tery (German *Ammergauer Passionspiel*), representation of Christ's Passion which since 1634 has taken place every ten years at Ober-Ammergau, Bavaria. The custom originated in a vow made by the inhabitants on their deliverance from the plague.

Am'meter or **Ampère'meter**, instrument for the measurement of heavy electric currents; distinguished from the current meter in that it serves to indicate the amount of current at any given instant, whereas the other sums up total electric quantity for an interval of time; the ammeter indicates the rate of flow in amperes; the current meter records in ampere-

hours, or in other convenient units of electrical quantity. The ammeter is usually a galvanometer, or electro-dynamometer.

Ammianus Marcellinus (äm-i-än'üs mär-cè-lin'üs), d. abt. 395; Roman historian; b. Antioch; of Greek extraction; served in the army, and in the expedition of Julian against Persia; author of "History of the Roman Empire" in thirty-one books, of which the first thirteen are lost.

Ammirato (äm-è-rä'tö), **Scipione**, 1531-1601; Italian historian; b. Lecce, kingdom of Naples; became a resident of Florence, 1569; wrote "Discourse on Cornelius Tacitus" and "History of Florence," etc.

Am'mon (more correctly *Amon*, "the concealed"), Egyptian deity called Zeus or Jupiter Ammon by the Greeks and Romans; sometimes represented as a ram. There was a temple of Ammon in the oasis of Siwah or Ammonium in the Libyan desert, wherein was a famous oracle, and another at Thebes.

Ammo'nia, or **Vol'atile Al'kali**, a transparent, colorless, and pungent gas, consisting of nitrogen and hydrogen (NH₃). It is called hartshorn because sometimes made from the horns and hoofs of animals. It is now obtained as a by-product in the making of gas, and from refuse animal matter in the preparation of bone black. It combines with acids to form ammonium salts. As it supplies nitrogen to plants it is an important ingredient in manures. Water will absorb over 500 times its volume of ammonia, and this solution, called spirits of hartshorn or *liquor ammonia*, is used in medicine. Ammonia can be reduced to a colorless liquid by pressure and cold, when its properties are intensified. It is widely used in making artificial ice. The smelling-salt, or volatile salt of hartshorn, used as a restorative in faintness is a carbonate of ammonia. Ammonic sulphate, made by boiling gas-liquor with lime and passing the liberated ammonia into sulphuric acid, is used in making alum and artificial fertilizers and for preparing other ammonia salts. Ammonic nitrate is used for making laughing gas (N₂O). Ammonic chloride is sal ammoniac, used in soldering, in electric batteries, and in medicine.

Am'monites, ancient Semitic tribe, descendants of Ben-Ammi, son of Lot; inhabited the E. side of the Jordan, between the Arnon and Jabbok rivers, and adjoining the N. part of Moab. Their chief city was Rabbah; frequently waged war against the Israelites.

Ammonites, genus of extinct mollusks belonging to *Cephalopoda*, and to the fauna of the Mesozoic era; they were discoid, chambered, spiral shells, sometimes 4 ft. in diameter. More than 500 species have been described, and they are found in all parts of the world.

Ammo'nium, a hypothetical metal (NH₃), supposed to exist in the salts of ammonia. It has not been obtained in a separate state, but an amalgam of it may be formed by the action

of a galvanic current on a globule of mercury surrounded by a solution of ammonia or by the action of sodium amalgam on ammonium chloride.

Ammonius, surnamed **SACCAS**, d. abt. 241; Greek philosopher; b. Alexandria; founder of the school called Neo-Platonic abt. 193 A.D.; held that the philosophy of Aristotle is substantially the same as that of Plato, a view endorsed later by German philosophers. Though born of Christian parents, he went over to paganism.

Ammunition. See **EXPLOSIVES**; **PROJECTILES**.

Amnesty, an act of oblivion of past misconduct granted by a government to those who have been guilty of some offense. It is usually granted to whole communities or classes of individuals who have taken part, or are supposed to have participated, in some movement against lawful authority; it may be granted either before or after conviction, and its effect is entirely to efface the crime and cause it to be forgotten by the law. An instance is an act of amnesty in England in 20 Geo. II, c. 52, called "an act for the king's most gracious general and free pardon." This subject has excited much interest in the U. S., owing to a provision in the fourteenth amendment to the Constitution creating certain disqualifications as to holding office by persons who have participated in rebellion, and at the same time allowing their removal by a special vote of the Congress. Such a removal is in the nature of an act of amnesty.

Amœba, a genus of microscopical one-celled organisms of the *Protozoa*; consist of naked protoplasm and move by a streaming motion



AMCÆBA, a Typical Unicellular Animal; n, Nucleus; cv, Contractile Vacuole; ps, Pseudopodia; Highly Magnified.

of the protoplasm which often forms projections called pseudopodia. They ingest food by the same motion, possess a nucleus, and usually a contractile vacuole. They are often selected in biological treatises to illustrate the process of nutrition, motion, sensation, reproduction, etc., all performed by a single cell. Amœbæ are found in moist places, ponds, swamps, etc.

Amoor. See **AMUR**.

Amorites (äm'ôr-its), mountaineers; powerful nation of Canaan that occupied the country on both sides of the Jordan in the time of Moses, and resisted the Israelites. Moses defeated their two kings, Sihon and Og. Joshua divided their territory between the tribes of Reuben and Gad. In Solomon's time they were reduced to a tributary condition.

A'mos, one of the minor Hebrew prophets, who was a contemporary of Isaiah; abt. 785 B.C. He was originally a herdsman and a gatherer of sycamore fruit in Tekoa, a town

12 m. SSE. of Jerusalem. He denounced in vigorous and eloquent terms the prevalent corruption and oppression, using many images taken from rural and pastoral life. His prophecies seem to have all been given in one year, and his plain speaking caused the charge of conspiracy against the government because he alienated the people. The prophecies of Amos form one of the books of the Old Testament.

Amoy (â-moi'), local pronunciation of *Hiamun*, the Chinese name; seaport town of China, on island of same name, province of Fui-Kien, on strait of Formosa. It is situated at the mouth of the river on which stands the large city of Chang-Chow-Foo. Amoy is an open or treaty port and one of the chief commercial towns of China; taken by the British in 1841; open to the trade of all nations since 1843; imports cotton, cotton goods, iron, sugar, camphor, and pepper; exports tea, sugar, porcelain, silks, and paper. Pop. (1906) 114,000.

Ampelopsis, genus of creeping, vine-like, woody plants (of the family *Vitaceæ*), to which the Virginia creeper or American woodbine belongs.

Ampère (ân-pâr'), **André Marie**, 1775-1836; French philosopher and mathematician; b. Lyons; became inspector-general of the University (1808), Prof. of Analysis in Polytechnic School in Paris (1809), member of Institute (1814), Prof. of Physics in College of France (1824); having made important discoveries in electro-magnetism, he published, 1822, a "Collection of Observations on Electro-Dynamics." He further explained his discoveries in his "Theory of Electro-Dynamic Phenomena Deduced from Experiments," 1826. Among his other works are treatises on optics and an "Essay on the Philosophy of the Sciences," etc., 1834.

Ampère, in electricity, practical unit of current strength; named, 1881, after André Marie Ampère. It is an exact tenth of the centimeter-gram-second unit of absolute current strength; the amount of current which will be generated in a conductor, the resistance of which is 1 ohm, when the difference of potential between the ends of the conductor is 1 volt. Ampère-turns are the product of the amount of current flowing in a coil or helix, measured in ampères, into the number of turns of wire of which the coil is composed. This product is a factor in the measurement of the magnetic field produced by the coil in question.

Ampèremeter. See **AMMETER**.

Amphib'ia, term originally applied to all animals that live both on land and in water, now limited to a class of vertebrates intermediate between fish and reptiles, including salamanders, frogs, toads, and their allies. They are cold-blooded, having the skin usually without plates or scales, and the young are provided with gills during part or all of their lives. Most amphibians pass through a metamorphosis like that of the frog; but in some, as the mud-puppy and axolotl, the embryonic

condition persists through life. The amphibians had their golden age in the Trias, when Labyrinthodon, with a body as large as an ox



AMPHIBIA.

and teeth 4 in. long, ruled the animal kingdom, but in the Jurassic age the primary passed to the true reptiles. See HERPETOLOGY.

Amphictyon (äm-phic'ty-ön), ancient and perhaps fabulous hero and king of Attica, a son of Deucalion.

Amphictyonic Coun'cil, celebrated congress or politico-religious court of ancient Greece, which met twice every year at Thermopylæ; composed of deputies of twelve tribes, viz.: Thessalians, Bœotians, Dorians (or Spartans), Ionians (or Athenians), Locrians, Dolopians, Magnetes, Mallians, Achæans, Phocians, Ænians, and Perrhæbians, who bound themselves that "they would not destroy any Amphictyonic city nor cut off its streams in war or peace." One object of the council was the protection of the temple of Delphi.

Amphi'on, in Greek mythology, son of Zeus and Antiope and twin brother of Zethus. Antiope was cruelly treated by their uncle Lycus, king of Thebes, and his wife Dirce, and the brothers marched against the city, put Lycus to death, and bound Dirce to a wild bull. Amphion availed himself of his skill in music to build the walls of Thebes; the stones, attracted by the sound of his lyre, moved and arranged themselves in the proper position. He married Niobe.

Amphioxus (äm-fi-öx'üs). See LEPTOCARDII.

Amphip'oda, order of small crustacea, for the most part marine, as the sand fleas and beach fleas. Some European species are very destructive, burrowing in the hulls of ships and in the piles of wharves.

Amphip'olis, ancient city of Thrace or Macedonia; founded by an Athenian colony abt. 437 B.C.; at the mouth of the Strymon, which here enters the modern Gulf of Contessa; in the Middle Ages called Popolia; site now occupied by the Turkish town Yenikeui.

Amphisbæna (äm-fis-bé'nä), family of lizards with an elongated serpentiform body and a blunt tail. Limbs are generally absent, a pair of small front legs being found in the genus



AMPHISBÆNA FULGINOSA.

Chirotæ only. About two dozen species inhabit the warm portions of both hemispheres. They burrow in the earth in search of larvæ, and have rudimentary eyes.

Amphis'sa, town of ancient Greece, in Locris, 7 m. from Delphi, on site of modern Salona; destroyed B.C. 338 by Philip of Macedonia, but was rebuilt. Here was a temple of Athena.

Amphitrite (äm-fi-tri'tè), in Greek mythology, a Nereid, a goddess of the sea, wife of Neptune and mother of Triton; represented in a car of shells drawn by tritons, or on a dolphin.

Amphitryon (äm-phit'ri-ön), in classic mythology, a son of Alceus. Having accidentally killed his uncle Electryon, he was banished from Mycenæ. He married Alcmena, mother of Hercules.

Amphora (äm'fö-rä), vase with two handles, used by the ancient Greeks and Romans to hold



AMPHORA.

wine and oil; also a liquid measure, containing about 8½ gal. among the Greeks and 6 among the Romans.

Am'plitude, in astronomy, is the angular distance of a heavenly body when it rises or sets from the E. or W. points of the horizon. The amplitude of a fixed star remains the same all the year, but that of the sun changes daily, and on a given day varies according to the latitude of the observer.

Ampulla (äm-pül'lä), Roman vessel of glass or earthenware, used for holding oil, wine, etc.; nearly globular in form. In the Roman Catholic Church a vessel which contains wine for the sacrament.

Amputa'tion, the removal, by operation, of any part of the body or limbs; properly resorted to not only after severe injuries, but in such diseases as gangrene, cancer, etc., which are without rational prospect of cure by other means. An amputation in which a bone is cut off is said to be "in the continuity"; at a joint when no bones are divided, "in the contiguity." Amputations are chiefly either "flap" or "circular." The flap operation is probably most often used. One, or even three, flaps are employed, their size and shape varying with circumstances. They ought to be large enough to cover amply the stump but not so as to be redundant. Circular amputation is performed by first dividing the skin and superficial fascia round the limb, dissecting up the skin for 2 or 3 in. so as to form a cuff, and at that part dividing the muscles down to the bone. The flesh is removed from the bone to allow the saw to be applied. The danger attending amputation is generally in proportion to the nearness of the operation to the trunk as well as to the size of the limb. Amputation at joints are usually more serious than in the continuity, but modern aseptic technique has minimized the risk of infection.

Amrita (äm-rë'tä), incorrectly AMREETA, in Hindu mythology, the water of immortality, obtained by the churning of the ocean; term sometimes given to the food as well as the drink of the gods, and likewise to any delicious drink.

Amritsar (äm-rit'sär), i.e., Amrita Saras, fount of immortality; city of N. India; capital of a division and district of the same name; and commercial center of the Punjab; 40 m. E. of Lahore; is the center of the Sikh religion and learning; has a temple, supporting a large body of priests, and a great fortress; carries on an extensive trade with Central Asia, and manufactures imitations of Kashmir shawls and silks. Pop. (1901) 162,450.

Am'rou Ben el As, more correctly AMR IBN-AL 'ASSI, abt. 600-64; Arabian warrior; at first opposed Mohammed, but became a proselyte; aided in the conquest of Syria; conquered Egypt, of which he became emir.

Amsdorf (äms'dörf), **Nikolaus von**, 1483-1565; German reformer; b. Saxony; accompanied Luther to the Diet of Worms, 1521, assisted in translation of the Old Testament; introduced the reformation into Magdeburg, where he was pastor, 1524-42; bishop of Naumburg, 1542, and superintendent of Eisenach,

1548; after Luther's death, was prominent in opposing certain tendencies of Melancthon.

Ams'ler, **Samuel**, 1791-1849; Swiss engraver; b. Schinznach; became Prof. of Engraving in the Academy of Fine Arts, Munich; engraved many of the works of Raphael and Thorwaldsen; and reproduced the former with peculiar fidelity.

Amsterdam', formerly **Amstelredamme'**, or **Amsteldamme'** (dike or dam of the Amstel), commercial city and capital of Holland; at the junction of the Amstel with the Y, near the Zuyder Zee, through which it has access to the ocean; connected with the North Sea by canals; stands on low ground; is divided into 90 islands by canals which occupy the middle of the principal streets; buildings built on piles; many handsome structures; important educational and literary institutions, museums, etc.; shipbuilding and diamond cutting important industries; many and varied manufactories; among exports, dairy products, sugar, coffee, oil, and spices; founded abt. 1250; became a part of the united provinces 1578; and, 1630-1750, was the foremost commercial city in Europe. Pop. (1906) 564,186.

Am'sterdam, city, Montgomery Co., N. Y.; on the Mohawk, 33 m. NW. of Albany; has manufactories of carpets, knit, woolen, and silk goods, steel springs, brooms, paper, etc.; St. Mary's Catholic Institute. Pop. (1905) 23,943.

Amsterdam Treat'y, concluded by France, Russia, and Prussia, August 4, 1717. Russia abandoned the invasion of Mecklenburg, and France agreed not to renew a treaty of subsidies with Sweden.

Amu', or **Amu Dar'ya**. See OXUS.

Amulet, an object worn as a charm to protect against evil spirits, sickness, and other evils. Amulets were widely worn by the ancients, while the Jewish phylacteries embodied the same idea, which survives in the mascot or pocket-piece. Amulets were condemned by the Council of Laodicea abt. 360. An astrological amulet called the talisman was prized by the Arabs. Jewels, metals, herbs, etc., have been used and the circumstances of their selection were the subject of minute precautions which are even now exemplified in the rabbit's foot superstition still current in the U. S.



AMULET.

Amunategui (ä-mö-nä'tä-gwä), **Miguel Luis**, 1828-88; Chilean publicist and *littérateur*. Several of his books remain among the most serious productions of his country. Such are "Biografías de Americanos," and "Los Precursores de la Independencia."

Amuncloen (ä-mön'klön), **Roald**, 1872- ; Norwegian explorer; b. Sarpsburg; early in life a sealer and whaler; accompanied Belgian expeditions to S. pole; studied magnetism in Germany and Norway; fitted out polar expedition 1900, aided financially by Nansen; accomplished NW. passage from Europe to

Alaska 1906; first to make passage from E. to W.; also definitely fixed position of N. magnetic pole, on King William Land.

Amur (ä-mör'), province of Russia; E. Siberia, N. of the river of same name; area, 172,826 sq. m.; pop. (1906) 148,700; capital, Khabarovka; ceded by China, 1858. In broadest sense includes all territory from Lake Baikal to Okhotsk Sea, S. of Stanovoi Mountains and takes in the provinces of Transbaikal, Amur, the coast province, and the half of Sakhalin left to Russia after the war with Japan, an area of 1,150,000 sq. m., with a pop. of 700,000.

Amur, river of E. Asia, formed by union of the Shilka and the Argoon; flows alternately E. and SE., forming the boundary between China and Siberia, till it arrives at about latitude 48° N.; then pursues NE. direction through the Littoral province of Siberia, and enters the Sea of Okhotsk; chief tributaries the Seya, Bureya, and Amgun; length, 2,800 m.

Amurath (ä-mö-rät'), or **Murad** (mö'räd), name of several sultans of Turkey. **AMURATH I**, 1319-89; succeeded Orkhan, his father, 1359; took Adrianople 1361; and waged long and bloody wars, chiefly with the Christians, in what is now European Turkey; was assassinated. **AMURATH II**, d. 1451; succeeded his father, Mohammed I, 1421; attacked Constantinople, 1423; contended for many years against the Hungarians under Hunyady, and against Scanderbeg; gained a victory at Kosovo 1448. **AMURATH III**, 1545-95; one of the most cruel of the sultans; came to the sultanate 1574; waged long wars with Austria and Persia, and with the janizaries at home. **AMURATH IV**, 1610-40; succeeded his uncle Mustafa 1623. The most important event in his reign was the capture of Bagdad by his army, 1638.

Amyclæ (ä-mi'klë), ancient town of Laconia, on the Eurotas, 20 stadia SE. of Sparta; famous as the abode of Tyndarus and Leda and Castor and Pollux.

Amygdalus (ä-mig'dä-lüs), genus of plants of the order *Rosaceæ*, consists of trees whose fruit is a drupe; comprises the almond and the peach.

Am'yl (C₂H₁₁), compound radical of the alcohol series, exists in amylic alcohol, C₂H₁₁.O.H, or fusel oil; forms a series of compound ethers, some of which are used as substitutes for the essences of natural fruits. The nitrite of amyl is a liquid which has a marked stimulating action on the circulation when inhaled.

Amyntas (ä-mn'täs), name of three Macedonian kings. I, son and successor of Alcetas, reigned 537-498 B.C.; tendered abject submission to Darius I. II, nephew of Perdiccas II, d. 369 B.C.; inherited upper Macedonia from his father Philip, and became king of all Macedonia, 393, after contests with his brother and the usurper Pausanias. III, grandson of the preceding, succeeded his father Perdiccas III, 360 B.C., but was deposed, 359, by Philip II, and put to death by Alexander, 336.

Amyot (ä-më-ö'), **Jacques**, 1513-93; French writer; b. Melun; tutor to the sons of Henry

II; grand almoner under Charles IX, and finally bishop of Auxerre; published many translations of Greek authors, which are highly esteemed for the excellent French in which they are written. The translation of "Plutarch's Lives" made him one of the most noted writers of France.

Amyot, Joseph, 1718-94; French Jesuit missionary; b. Toulon; sailed to China 1750; invited to Peking by the emperor, and passed the rest of his life there; learned the language, from which he translated several works into French, and compiled a "Mantchoo-Tartar-French Dictionary"; wrote a large portion of the "Memoirs Concerning the History, Sciences, Arts, and Customs of the Chinese."

Anabantidæ (än-ä-bän'ti-dë), family of spiny-rayed fishes, with more or less spines in the dorsal and anal fins. Species are found in SE. Asia and Africa. One, the *Anabas scandens*, found in India, etc., remarkable for a limited power of climbing; takes journeys over hard, dry roads, and up steep ascents.



ANABAS SCANDENS.

Anabapt'ists, name derived from two Greek words meaning "again" and "baptize"; applied during the sixteenth century to various bodies of Swiss and German Christians, who, while differing widely in personal character, in social and political opinions, and religious faith, agreed in discarding infant baptism, and in rebaptizing those who personally accepted Christianity. While in this respect the German Anabaptists held a position similar to that of the Baptists, they did not insist that immersion only is valid baptism. Indeed, they practiced pouring or affusion. Many of the early Anabaptists were men of irreproachable character and true Christian devotion. They were greatly persecuted and often put to torture. Churches still exist in many parts of Europe and there are some in the U. S. and Canada.

Anabara (än-nä-bä-rä'), river of Siberia, on the boundary between Yeniseisk and Irkutsk; enters the Arctic Ocean; length about 300 m.

Anab'asia, Greek signifying "ascension," a march from a lower into a higher region. The title of two Greek works: (1) Xenophon's account of the expedition of Cyrus the Younger against his brother Artaxerxes Mnemon, king of Persia, 401 B.C., and of the retreat of the 10,000 Greeks who had served in the army of Cyrus. (2) Arrian's "Anabasis," recording the expeditions of Alexander the Great into Persia and India.

Anacharsis (än-ä-chär'sis), Scythian philosopher, lived abt. 600 B.C.; a friend of Solon; the only barbarian admitted to the privilege of a citizen of Athens, and by some reckoned among the seven wise men of Greece;

on his return to Scythia put to death, because he practiced some Greek religious rites.

Anachronism, error in chronology; inversion or disturbance of order of time. The use of cannon in Shakespeare's "King John" is an anachronism, as cannon were not then employed in England. To represent ancient patriarchs in modern costumes is to commit an anachronism.

Anacletus (än-ä-klë'tüs), d. 1138; antipope, elected by a party of cardinals, 1130, as a rival to Innocent II, who was recognized by the majority of European powers. Anacletus was supported by the Romans.

Anaconda, capital of Deer Lodge Co., Mont.; 27 m. NW. of Butte; seat of copper smelting and refining works of the Anaconda Mining Company, one of the largest in the world; founded 1884, when the smelting works were erected. Pop. (1900) 9,453.

Anaconda, a nonvenomous serpent allied to the *Boa constrictor*; a native of tropical America, especially of Brazil and Guiana. It sometimes grows to the length of 30 ft., and is the largest serpent of America. It passes much of the time in the water, preferring the



shallow parts of a lake or stream. Among the generic characters that distinguish it from the boa are the small size and position of its nostrils, which open at the upper part of the end of the muzzle, and are directed upward. It is not venomous. Its food consists of lizards and other small animals. The natives make use of its skin for shoes and its flesh for food.

Anac'reon, 560-476 B.C.; Greek lyric poet; b. Teos, Ionia; emigrated when that town was taken by the Persians, abt. 540, and passed many years at the court of Polycrates of Samos; then became a resident of Athens. Love and wine were his favorite themes; but he was capable of vigorous and biting satire. Some fragments of his poems are extant.

Anadir (än-ä-dër'), or **Anadyr'**, river of Siberia; in extreme NE. of Asia; rises near Arctic circle, and by a winding course enters gulf of Anadir; length about 450 m. The gulf of Anadir is an inlet of Bering Sea; separated from the Arctic Ocean by a peninsula about 150 m. wide.

Anadyomene (än-ä-dy-öm'ä-në), Greek "coming up," surname given to Venus; also the

name of a masterpiece of Apelles representing Venus rising from the sea and wringing her flowing hair with her fingers.

Anæmia (ä-në'mi-ä), morbid condition in which the blood is lessened in quantity or impoverished in quality. Secondary or symptomatic anæmias arise in the course of a disease in which there is systemic weakening from discharges or from interference with the action of important organs. (See BLOOD.) The treatment consists of nourishing diet, means to secure proper assimilation of food, fresh air, and exercise. Of medicines, iron is in many cases of anæmia almost a specific, and in others arsenic is useful.

Anæsthesia (än-ës-thë'si-ä), diminution or loss of feeling, either general or local. Local anæsthesia is produced by the rapid evaporation of some highly volatile substance, like ether or rhigolene, and consequent chilling of the part. Certain drugs, such as aconitine, and notably cocaine, produce local anæsthesia. General anæsthesia is, however, by far the most common result of this kind to which the physician directs his efforts. The Chinese have used preparations of hemp for this purpose for many centuries. The anæsthetics generally in use are common or ethylic ether, chloroform, and nitrous-oxide gas, each of which is administered by inhalation.

Sir Humphry Davy in 1800 observed the anæsthetic effect of nitrous oxide, and proposed its use in surgery, but it was not till 1844 that Horace Wells, a dentist of Hartford, Conn., successfully employed this gas for the prevention of pain in removing teeth. Between 1816 and 1846 several American physicians proposed the use of ether as an anæsthetic. In October of the latter year Dr. W. T. G. Morton, of Boston (who had successfully used ether in dentistry), administered it to a patient in the Massachusetts General Hospital during a surgical operation by the late Dr. Warren. In November, 1847, Sir J. Y. Simpson, of Edinburgh, first announced chloroform as an anæsthetic, it having been used for the relief of difficult breathing by Ives, of New Haven, Conn., in 1832, and its anæsthetic effect upon the lower animals having been shown by Flourens ten months before Simpson's experiments. The use of both ether and chloroform has spread rapidly since the above discoveries. Various other agents (amylene, amyl hydride, carbon bichloride, Dutch liquid, methylene bichloride, ethyl bromide, etc.) have been proposed, but for the most part they have turned out to be more dangerous than the older and better known anæsthetics.

It is claimed by some that ether is much safer than chloroform, while other practitioners of eminence assert that chloroform is pleasanter, cheaper, and more speedy in its effect, and equally safe if the requisite skill is employed in administration. Experiments tend to show that ether produces anæsthesia by causing carbon-dioxide poisoning, while chloroform appears to act by producing anæmia of the brain. See ANODYNES.

Anagni (ä-nän'yë), ancient *Anagnia*, episcopal town of Italy, 37 m. SE. of Rome; birth-

place of several popes; Anagnia was nearly as old as Rome, and an important place during the whole period of the ancient Roman history.

Anahuac (ä-nä-wäk'), Mexican word applied to the central plateau of Mexico, which comprises more than half of the Mexican republic, and lies between latitude 15° and 30° N., and longitude 95° and 110° W. From it rise several high volcanoes, including Popocatepetl.

An'akim, race of giants in S. of Palestine at the time of the exodus of the Israelites, who called them "the children of Anak."

Anal (ä'näl) **Glands**, organs situated near the termination of the intestine and secreting substances, generally repulsive, used by animals for defense. The aphides and bombardier beetles have such glands, and the inky fluid secreted by the cuttlefish to cover its retreat is of similar origin. The secretion of these glands gives the skunk its distinctive quality, while similar secretions from the civet and the beaver are used in perfumery and medicine.

Analem'ma, in geometry, the projection of a sphere upon the plane of a meridian, the eye being supposed to be placed at an infinitely distant point of the radius perpendicular to that plane; orthographically made by straight lines, small circles, and ellipses.

Anal'ogy, in language, all those changes in outer form which arise from association. Thus *belfry* should be *berfry* (Old French *berfroi*) but was changed from a supposed connection with bell. German *beispiel* (example) had nothing to do with *spiel* (play), but should be *beispiel* (*spel*, story, cf. gospel). Such changes are called folk-etymologies. Orthographical analogies are mostly due to pedantry, as the sc of scissors (Middle English *sisoures*) by comparison with Latin *scindere*; debt and doubt have adopted their b as a mere decoration from Latin *debere* and *dubitare*; victuals borrowed its spelling from *victus*, but the old form *vitailles* is continued in its pronunciation.

Analogy and Homol'ogy, in biology, analogy refers to similarity of function; homology to similarity of structure. Thus spores and seeds are analogous, being functionally reproductive bodies; while leaves and stamens are homologous, both being structurally phylomes.

Anal'ysis, the resolution of a whole into its parts. The term analysis is applied to that branch of mathematics which treats of continuously variable quantities by the symbolic notation of algebra. It includes both the higher algebra and the differential and integral calculus. The distinction between algebra and analysis is, however, not sharply defined. Sometimes the former term is confined to quantities growing out of the fundamental operations of addition, subtraction, multiplication, division, and the extraction of roots; while under analysis is included the relations of quantities which cannot be expressed by any finite number of algebraic operations, and in which infinitesimals or limits have to be used. From this application of the word anal-

ysis come the expressions "analytic geometry," "analytic mechanics," etc., which mean geometry, mechanics, etc., treated by algebraic symbols and methods.

The identification and separation of the elements of chemical compounds or mixtures of any sort is called *chemical analysis*. When conducted simply with reference to determining what elements exist in any substance it is termed *qualitative analysis*. When the absolute or relative quantities of the elements are ascertained it is *quantitative analysis*. The theory of qualitative chemical analysis is to put the substance to be analyzed under such conditions and associations as shall cause all its various elements to present certain characteristic phenomena or to enter into certain recognizable combinations, and is based on the truth that each chemical element has constant and absolute peculiarities which it carries into its compounds. The substances which are employed to bring about those chemical changes which serve the purposes of chemical analysis are called reagents, and the chemical processes themselves are termed reactions, for the reason that at least two substances must always be involved in chemical transformations, and that both act and are reacted upon.

In quantitative chemical analysis it is needful to convert each element of a substance into some form or compound which will admit of complete separation from all the others, and also of accurate weighing or measuring. To certain branches or general modes of analysis technical names are applied. Thus "blowpipe analysis" designates a system of operations carried on mainly by aid of the blowpipe, which serves for identifying a large share of the elements, and even for quantitatively estimating the precious metals, as well as lead, copper, nickel, and some others. "Spectral analysis," which furnishes the most sensitive tests for the presence of the alkali metals, is based on the fact that the light proceeding from a flame in which the vapor of any substance is intensely heated, manifests, when viewed there by a prism, lines or bands of color whose position and number are characteristic. "Volumetric analysis" is a branch of quantitative analysis, in which measured volumes of solutions of determined strength are employed in reactions whose completion is indicated by some change of color or other marked phenomenon. "Organic analysis" is either ultimate or proximate. The former signifies the estimation of carbon, hydrogen, nitrogen, and the other elements of organic compounds. Proximate organic analysis is the separation of organic compounds from each other, as is done, for example, in determining the proportions of water, oil, starch, etc., in seeds. "Assaying" is the term usually applied to the estimation of the valuable metals, or ingredients of an ore or other commercial article. See CHEMISTRY.

Anapestic Meter, originally a marching measure. The anapest consists of two short syllables followed by a long syllable, as in Latin *dē-i-tās*, and in English *in-tēr-vēne'*.

An'archist, one who believes that political evil is to be remedied by the abolition of government. Proudhon is the writer who is to be regarded as the founder of modern anarchism; but it was taken up most actively by the Russian Nihilists (see **NIHILISM**), and made the basis of the most vigorous practical agitation. The International Workingmen's Association, founded 1864, was a combination of anarchists and socialists, who worked together in agitation, though their theories were diametrically opposed; the socialists wishing to avoid inequality by increasing state interference, the anarchists by abolishing it. The combination was broken up in 1872; the socialists proper ("Centralist Democratic Socialists"), headed by Marx, holding that you cannot have equality or coöperative production without a state to enforce it; while the anarchists, or anarchic socialists, headed by the Russian Bakunin, believing that this would involve tyranny, wished to have property held by communistic associations of workmen, formed freely without political compulsion. As to the means by which this result is to be secured, different groups of anarchists are not agreed. Some disclaim violence, and believe in the power of moral principles, like those of the early Christian Church. Others seek revolution for its own sake, and hold that after this is accomplished it will be time enough to consider what to do next. The best-known leader of the American anarchists was Johann Most. The anarchists of the U. S. are almost entirely foreign born. In Spain and France the anarchists have shown considerable strength of late years, and the use of dynamite seems to be a most serious danger to the police authority in each of these countries. See **COMMUNISM**; **SOCIALISM**.

Anastasia (än-äs-tä'zhë-ä), name of several female saints of Greek and Roman churches. (1) **ANASTASIA** the Elder became a Christian from the teaching of Peter and Paul, and suffered martyrdom in the time of Nero. Her day is April 15th. (2) **ANASTASIA** the Younger, whose martyrdom by burning at Aquileia, 303, brought to an end the persecutions of her heathen husband Publius. Her day is December 25th in the Latin Church, December 22d in the Greek. (3) **ANASTASIA** the Patrician, a maiden of good family and great beauty, who had attracted the attention of Justinian; to resist his proposals she retired to Alexandria, where for twenty-eight years, till her death, 567, she lived as a monk, no one suspecting her sex. Her day is March 18th.

Anasta'sius I, abt. 430-518; emperor of Constantinople; b. Durazzo; succeeded Emperor Zeno, 491. The orthodox, who considered him a heretic, revolted and defeated his army, 514.

Anas'trophe, in rhetoric, a species of inversion or departure from the usual order of succession in words, as when Scott, in the "Lady of the Lake," says, "Clattered a hundred steeds along," for "A hundred steeds clattered along."

Anath'ema, Greek word, meaning something "placed" or "hung up" in the temples of the

gods, and hence "consecrated" or "devoted." Among the Jews and Christians it is a curse or denunciation uttered by ecclesiastical authority, and a form of excommunication of heretics and other offenders.

An'athoth, or **A'nata**, ancient Jewish city of refuge, about 4 m. NE. of Jerusalem; supposed to have been the native place of the prophet Jeremiah.

Anatolia (än-ä-tö'li-ä), modern name of Asia Minor, a large peninsula, bounded on the N. by the Black Sea and the Sea of Marmora, on the S. by the Mediterranean, and on the W. by the Grecian archipelago. The Euphrates forms part of its ill-defined boundary. It lies between latitude 36° and 42° N., and between longitude 26° and 41° E.; length from E. to W. about 700 m.; area estimated at 204,434 sq. m. Anatolia, which forms a part of the dominions of the sultan of Turkey, comprises the pashalics of Anatolia, Itchelee, Karamania, Adana, Marash, Sivas (or Room), Trebizond. The pop., estimated at 10,970,000, not including Armenia, consists of Ottoman Turks, Turkomans, Greeks, nomadic Koords, and Armenians. The chief cities are Smyrna, Brusa (or Bursa), Sinope, Angora, Konieh, Kutaieh, and Trebizond. In ancient times this peninsula was occupied by many powerful kingdoms and famous cities.

Anat'omy, that division of biology which deals with the structure or morphology of organized bodies. In its relation to plants it is called phytotomy; as to animals, zoötomý. The comparison of the structure of different animals, including man, is comparative anatomy. The description of the constituents of the entire body makes up descriptive or systematic anatomy, the discussion of the mutual relations of parts is topographical or regional anatomy, and also surgical or applied anatomy when those relations are considered from the point of view of the surgeon and physician. General anatomy or histology is the study of the structural elements of organisms, and is called also microscopical or minute anatomy as distinguished from macroscopic or gross anatomy which deals with organs as they appear to the naked eye.

The main divisions of descriptive anatomy are: osteology, the anatomy of bones; syndermology, of joints; myology, of muscles; angiology, of vessels and circulation; neurology, of nerves; splanchnology, of viscera or organs; adenology, of glands; dermatology, of the skin; embryology, of development, etc.

Historical anatomy as a science is of comparatively recent origin, though the first anatomical work is credited to Alcæmon of Croton (500 B.C.). Hippocrates had some correct ideas upon osteology, though it is doubtful if he ever practiced dissection. Aristotle is the founder of comparative anatomy; he dissected many of the lower animals, pointed out the main divisions of the intestines, recognized that the blood vessels are derived from the heart, and named the main stem the aorta, though he supposed it contained air.

Hierophilus (310 B.C.) and Erasistratus (300

B.C.), both of Alexandria, first practiced human dissection. The former is said to have dissected 700 subjects. Besides other important discoveries, they demonstrated that the nerves issue from the brain. Claudius Galenus (130-200 A.D.) was the foremost anatomist of his time, and his writings were authoritative till the advent of Vesalius (1514-64), who first questioned their accuracy. William Harvey (1578-1657) first demonstrated the circulation of the blood (1619), and Leenwenhoek (1632-1723) developed microscopical anatomy. In the eighteenth century the most prominent anatomists were John Hunter (1728-93), Haller (1708-77), and Bichat (1771-1802), the father of histology. Since the beginning of the nineteenth century the increased facilities for exact investigation into the life history of animals have yielded brilliant results in the broadening and the increased accuracy of our conceptions of the relations of anatomical data. In addition to the advances in these fields, improvements in anatomical technique, as in preservation, injecting, etc., have rendered the demonstration of the various parts of the body far more perfect and instructive; topographical anatomy, likewise, has gained by the introduction of frozen sections, as supplementing the usual dissections.

Early in the nineteenth century, there being no regular means of obtaining anatomical material, medical colleges were too often supplied by body-snatchers who robbed graveyards, or even, as the infamous Burke (whose name has become a synonym for throttling), committed murder so that they might sell their victims' bodies. Ample material is now provided by law from among the unclaimed dead of hospitals and the morgue destined for Potter's field. See **PHYSIOLOGY**.

Anatomy, Comparative, science of the structural constitution of animals; divided into primary elements, tissues, organs, and systems—nervous, muscular, muco-dermal, digestive, circulatory, respiratory, and urogenital. A simpler division is skeleton, form, nervous system, organs of special sense, organs of alimentation and digestion, and external covering.

Anaxagoras (än-äks-äg'ö-räs), abt. 500-428 B.C.; Greek philosopher of Ionic school; b. near Smyrna; passed nearly thirty years at Athens, to which he removed abt. 480; friend of Pericles; wrote a "Treatise on Nature," of which fragments are extant; 450 B.C. accused of impiety, and, though defended by Pericles, was condemned to death or banishment, and retired to Lampsacus, where he died. He ascribed the origin of the world and the order of nature to an eternal self-existent and infinitely powerful principle, *Nous* (Mind); taught that generation and destruction are only the union and separation of elements which can neither be created nor annihilated; demonstrated that air is a substance; explained the theory of eclipses; and refuted the doctrine that things may be produced by chance.

Anaximander (än-äks-i-mändér), abt. 610-456 B.C.; Greek philosopher; b. Miletus; disciple of Thales; is said to have discovered the

obliquity of the ecliptic, and to have invented the sun dial; taught that the earth is a cylinder, that the sun is a globe of fire as large as, or larger than, the earth, and that infinity is the beginning and end of all things.

Anaximenes (än'äks-im'ë-nës) of Lampsacus, Greek historian and preceptor of Alexander the Great, abt. 340 B.C.; wrote a history of Philip and of Alexander, neither of which is extant. To him is attributed the "Ara rhetorica ad Alexandrum" found among the writings of Aristotle.

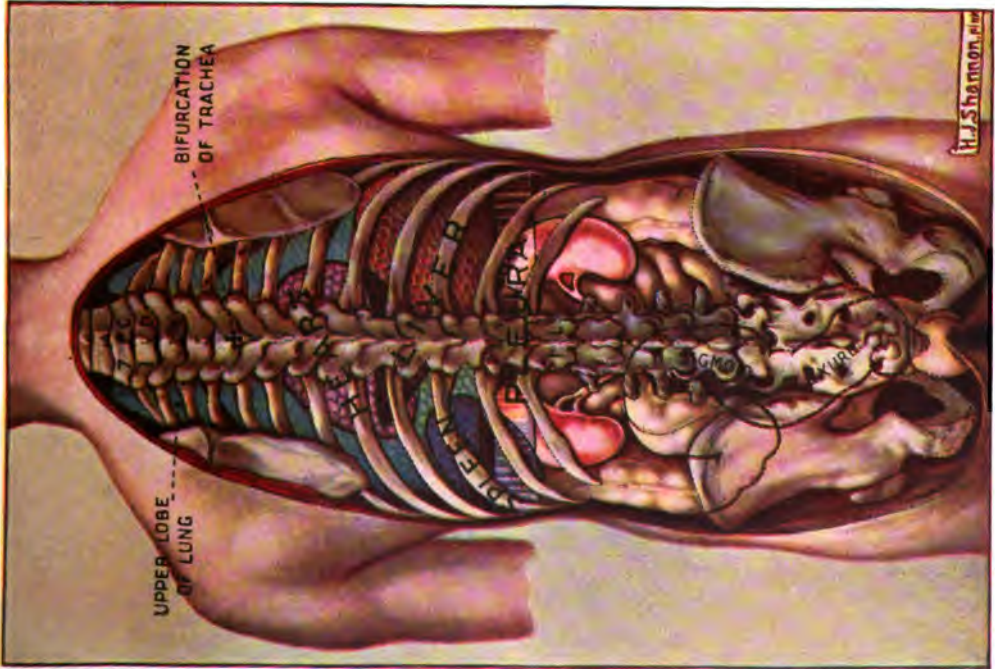
Ancestor-worship, has been especially developed among the Japanese (Shintoism), Chinese, Hindus, Romans (manes-worship), Greeks, and Bantu tribes of Africa. While most spirits are malignant, those of ancestors are kindly disposed; but even on this basis there is no sharp distinction from spiritism, for as the father continues to care for his family, so does the chief for his tribe, or the Chinese god of gambling (himself a deified gambler) for the art he practiced on earth. The ancestral spirits are not more powerful than others, but they will listen to us and help us, or punish us for neglecting them and doing wrong. Among the Chinese ancestor-worship pervades and shapes all social, political, and religious life. Honors are sought largely for the sake of one's ancestors, and all change from their customs is resisted. See **ANIMISM**.

Anchisaurus (än-ki-sä'rüs), genus of small, carnivorous dinosaurs from the Triassic; of interest, because they are supposed to be the animals that made many of the "bird tracks" found in the Connecticut Valley.

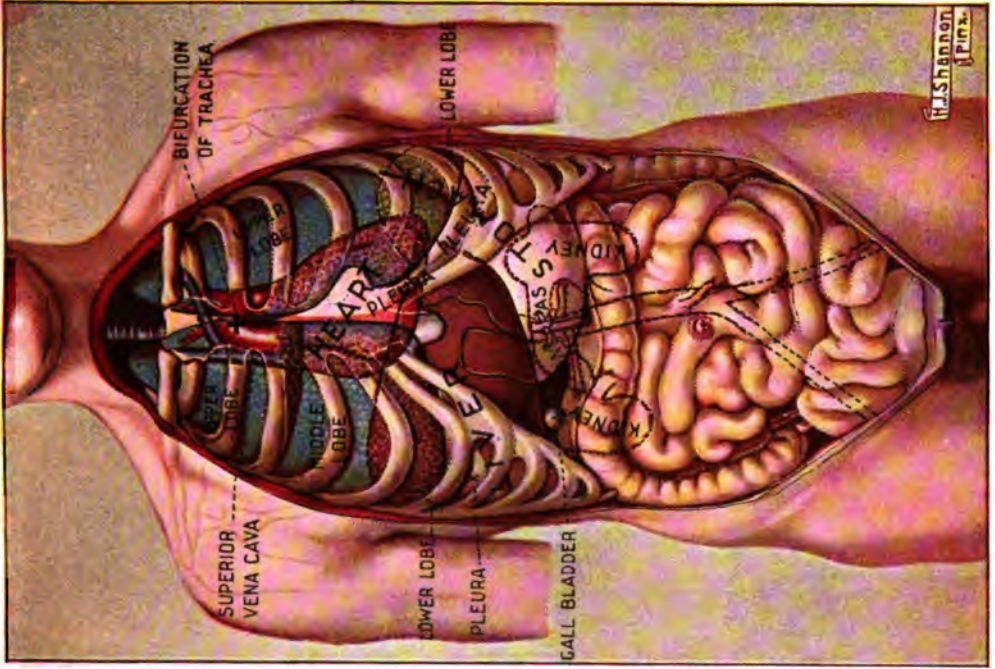
Anchises (än-ki'sëz), Trojan prince related to Priam; was a lover of Venus, and the father of Æneas, with whom he escaped from Troy.

An'chor, an iron implement used to hold a vessel in place in comparatively shallow water. The common anchor consists of a round, straight bar called the shank, at the upper end of which is a transverse piece called the stock, and of two curved arms at the lower end of the shank, each of which arms terminates in a triangular plate called a fluke or palm. The junction of the two arms is the crown. The stock is at right angles to the plane of the flukes. The cable is fastened to a ring in the upper end of the shank. When the anchor is let go, the crown first strikes the ground. The anchor then falls over, so that one end of the stock rests upon the ground, and the movement of the ship causes the anchor to tip up, and one of the flukes to enter the ground, and to penetrate deeper in proportion as the strain or traction on the cable increases. In one form of anchor the arms are pivoted to the shank, instead of being rigidly fixed. There are several other forms of patent anchors made to catch better and to eliminate the liability of fouling. Men-of-war and large merchantmen carry two large anchors of equal size at the bows, thence called bower anchors, and two of smaller size, called the sheet anchor and spare anchor. When the anchor is dragged out of the ground by the movement of the vessel, it is said to come

THE SHAPE AND RELATIONS OF THE THORACIC AND ABDOMINAL VISCERA



POSTERIOR ASPECT.

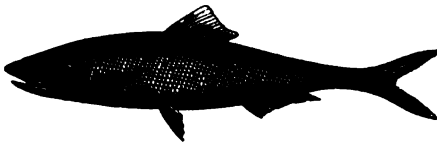


ANTERIOR ASPECT.

home, and when the cable becomes twisted around the anchor it is said to be foul. To *weigh anchor* signifies to heave up or raise the anchor out of the ground to the bow.

An'chorite, or **An'choret**, a hermit or person who has retired from the world and devoted himself to ascetic religion in solitude. The term was first applied to Christians of the third century who retired to caves and solitary places in the deserts of Palestine, Egypt, and Syria, to which, in some cases, they were driven by persecution. They often subjected themselves to painful privations and various forms of penance. The first of these anchorites was Paul of Thebes, who d. in 340, aged one hundred and four years. The so-called "father of monachism" was Antony of Coma, in Upper Egypt, who was b. in 251 and d. in 356, aged one hundred and five years. One anchorite, Simeon Stylites, is said to have lived many years on the top of a pillar in Syria, abt. 420-450 A.D. The chief difference between an anchorite and a monk is that the former lived alone, and the latter associated with other monks. The first monastery was founded by Pachomius, on the island of Tabenna in the Nile, about the year 340; the first nunnery, some eight years later.

Ancho'vy, fish, from 5 to 7 in. long, abounds in Mediterranean Sea and Atlantic shores of Europe; belongs to the *Stolephoridae*, a family related to the herrings, and is distinguished by



ANCHOVY.

a sharp-pointed head, the upper jaw longer than the lower, and the deeply cleft mouth extending behind the eyes. It is salted and packed in small barrels for exportation, and used for sauces, pastes, etc.

Anchyl'osis (än-kí-ló'sís). See ANKYLOSIS.

An'cients, Coun'cil of, in French history, one of the two assemblies composing the legislative body, 1795-99; had 250 members, who had to be at least forty years old; dissolved by the revolution of the eighteenth Brumaire.

Ancile (än-sí'lë), plural **Ancil'ia**, shield of Mars, which fell from heaven in the reign of Numa, when an oracle declared that Rome could never be taken while this shield remained in that city. Numa committed it to the custody of the Salii or priests of Mars, and had eleven other shields made precisely like it in order to prevent the genuine shield from being stolen.

Ancillon (än-së-yón'), Johann Peter Friedrich, 1767-1837; German historian of French extraction; b. Berlin; principal historical work, "View of the Revolutions of the Political System of Europe since the Fifteenth Century," 1803-5.

Ancona (än-kõ'nä), **Alessandro d'**, 1835-; Italian critic and Romance philologist; b. Pisa, 1835; became Prof. of Italian Literature in the Univ. of Pisa, 1861. Here he soon became a power in furthering the new science of Italian, and Romance philology in general, and his pupils have, in their turn, become leaders.

Ancona, seaport of central Italy; on the Adriatic; 132 m. NE. of Rome; capital of province of Ancona; founded abt. 400 B.C. Has a cathedral, government palace, town house, and a triumphal Corinthian arch of white marble, built by Trajan. It has a college, many churches, and several convents. Ancona was taken, 1832, by the French, who occupied it till 1838. Pop. (1901) 34,159.

An'crum Moor, place in Roxburghshire, Scotland, near Jedburgh, where, 1544, a Scottish force under the Earl of Angus and Scott of Buccleuch defeated an English force of 5,000 under Sir Ralph Evers and Sir Brian Latoun.

An'cus Mar'tius, d. abt. 616 B.C.; fourth king of Rome; grandson of Numa; succeeded Tullus Hostilius abt. 640 B.C.; promoted the religious institutions of Numa, and is considered the founder of the plebeian order; waged war against the Latins, whom he subdued, founded Ostia, and built the Pons Sublicius (Bridge of Piles).

Ancy'ra. See ANGORA.

Andalu'sia, S. portion of Spain; bounded N. by Estremadura and La Mancha, E. by Murcia and the Mediterranean, S. by the Mediterranean, W. by Portugal and the Atlantic; is supposed to correspond to *Tarshish* of the Bible and *Bætica* of the Romans; divided into eight provinces—viz., Almeria, Granada, Jaen, Cadiz, Cordova, Malaga, Huelva, and Sevilla, and corresponds to the Moorish kingdoms of Seville, Jaen, Cordova, and Granada. Area, 33,802 sq. m. Pop. (1900) 3,562,606.

Andaman (än-dä-män') **Is'lands**, group of small, densely wooded islands, in the Bay of Bengal, British India; area about 2,508 sq. m.; pop. (1901) 24,499, including 6,000 natives of Nicobar; 120 m. SW. of Cape Negrais, Burma; used as a penal colony for Hindus by Great Britain. The Earl of Mayo, governor-general of India, was murdered here by a convict, February 8, 1872. The chief settlement is Port Blair. The two groups, Andaman and Nicobar, have been united under a commissioner.

Andante (än-dän'tä), Italian musical term indicating a movement that is moderate, rather slow and sedate, but distinct and flowing.

An'dersen, Carl, 1828-83; Danish lyric poet; b. Copenhagen; resided in Iceland, 1837. Wrote the words for Gade's musical compositions, "The Crusaders" and "Kolanus." His "Over Sherry and Beaker" contains sketches of life in Iceland.

Andersen, Hans Christian, 1805-75; Danish poet and novelist; b. Odense; son of a poor shoemaker, who died when Hans was nine years old; 1819 went to Copenhagen, made

various unsuccessful efforts to obtain employment, and passed several years in adversity till he found friends, who, 1828, placed him in the university, where he was educated at the public's expense. His friends procured for him a royal stipend, and, 1833, he visited Italy. He recorded his impressions in "The Improvisatore," which is unrivaled as a picture of scenery and manners. He afterwards traveled extensively in Europe and the East. Of all his works the most popular is his "Tales," translated into many languages, and enjoyed by all for their humor, imagination, and simplicity.

An'derson, James, d. 1809; physician general of the army of the E. India Company at Madras in the eighteenth century; famous for his persistent efforts to introduce the cochineal, silkworm, mulberry tree, etc., into Hindustan.

Anderson, James, 1662-1728; Scottish antiquary; best known by his "Collections Relating to the History of Mary, Queen of Scotland."

Anderson, John, 1726-96; Scottish naturalist; b. Roseneath; Prof. of Oriental Languages, Univ. of Glasgow, 1756, and of Natural Philosophy, 1760; published "Institutes of Physics," 1786; bequeathed all his property to found the Andersonian Univ., Glasgow, for poor students.

Anderson, Mary (MRS. A. F. DE NAVARRO), 1859-; American actress; b. Sacramento; made debut as *Juliet* at Sacramento, 1875; played in principal U. S. and British cities; retired since her marriage in 1890.

Anderson, Robert, 1805-71; U. S. army officer; b. near Louisville, Ky.; graduated at West Point, 1825; served in Black Hawk, Florida, and Mexican wars; as major of artillery in command of defenses of Charleston (S. C.) harbor, November 20, 1860; removed his garrison from Fort Moultrie to Fort Sumter, December 26th; was bombarded by the confederates till April 13, 1861, when his helplessness forced him to evacuate; breveted major-general for his signal gallantry, and retired, 1863.

Anderson, capital of Madison Co., Ind., on the W. fork of White River; 36 m. NE. of Indianapolis; is a manufacturing city, having a hydraulic canal with 44 ft. fall. It has a number of natural gas wells. Pop. (1900) 20,178.

An'dersonville, village of Sumter Co., Ga.; 11 m. NE. of Americus; during Civil War the site of a confederate prison for federal soldiers. Henry Wirtz was superintendent, and after the war was tried and convicted by a military commission on charges of cruelty to prisoners, and executed November 10, 1865. The prison records show total number of prisoners received 49,485; largest number at one time 33,006; total deaths 12,462; now the site of a national cemetery, in which union soldiers are buried.

Andes (än'dēz), S. American range of mountains, one of the most prominent features of the globe; extends along the W. border of the entire continent, parallel to Pacific coast, from the strait of Magellan to the isth-

mus of Darien, about 4,500 m. In length far exceeds every other mountain chain; general direction nearly N. and S.. The S. part, for about 1,000 m., consists of a single range or ridge, extending through Patagonia. N. of that is a basal mass with capping ridges called *cordilleras*. The Patagonian Andes rise to 8,000 ft. The Chilean Andes, S. from 27° S., have an average width of about 130 m., and in some places are not more than 100 m. from the Pacific. The highest summit of the Chilean Andes, probably of the whole chain, is the porphyritic Nevado of Aconcagua, which rises 22,900 ft., 100 m. NE. of Valparaiso. In Chile also occur the volcanic peaks of Tupungato, 20,270, and Maypu, 17,764 ft. high. The line of perpetual snow in N. Chile is about 14,000 ft. Many passes cross the Andes, but all at a great elevation, and mostly dangerous as well as arduous. Several passes among the Peruvian and Bolivian Andes are about 15,000 ft. above the sea, and the lower passes are not less than 12,000 ft. The geological structure of the Andes is as yet but imperfectly known. Like all great mountain systems, the Andes have been produced by elevatory forces acting at different and in some instances widely separated periods. Carboniferous, Triassic, Jurassic, and Tertiary rocks have been recognized on their flanks; and the older Paleozoic will undoubtedly be found to make up a part of their mass. Large quantities of gold and silver are found, also platinum, mercury, copper, tin, and iron. The most productive gold mines are in Peru and New Granada; the silver mines of Potosi are among the richest in the world. Few parts of the globe are subject to so frequent and destructive earthquakes as the countries adjacent to the Andes and inclosed between its different ranges.

Andijan (än-dī-jän'), city of Ferghana, Turkestan, Asiatic Russia; capital of the region in Baber's time (fifteenth century); is in the valley of the upper Syr Darya; and a station on one of the most important caravan routes of central Asia; was visited by a destructive earthquake, 1902. Pop. abt. 42,000.

Andorra (än-dör'rä), small republic under the joint suzerainty of France and the Spanish bishop of Urgel; among the Pyrenees, between the French department of Ariège and the Spanish province of Lérida; area, 175 sq. m.; pop. (1907) 5,231; capital, Andorra; became autonomous in 790, and is governed by a council of twenty-four, elected for four years. The inhabitants are mostly farmers, cattle raisers, and miners.

Andrada (än-drä'dä), **Antonio de**, 1580-1633; Portuguese missionary; b. Villa de Oleiros; entered order of the Jesuits, 1596; to India as a missionary, 1601; became superior of the missions of Mongolia; made two journeys to Tibet; and published "New Discovery of the Grand Cathay, or Kingdom of Tibet" (1627).

Andrada, Fernão Perez de, Portuguese naval officer; commanded a vessel in the fleet of Albuquerque, who made him admiral of a fleet

of ten ships at Malacca, 1511; defeated the Sultan of Java in a naval engagement, 1513; commanded first European fleet on the coast of China (1518); and opened commercial intercourse with that country.

Andral (än-dräl'), Gabriel, 1797-1876; French physician; b. Paris; in 1839 succeeded Broussais as Prof. of Pathology and Therapeutics in Paris, and, 1842, became a member of the Institute. Among his works is a "Summary of Pathological Anatomy" (3 vols., 1829).

Andrassy (än-drä-shè), Julius (Count), 1823-90; Hungarian statesman; b. Zemplin; prominent adherent of the popular cause in the revolution of 1848; condemned to death, 1850, but escaped and went into exile. When self-government was restored, 1867, he was appointed premier of a new Hungarian ministry by the emperor; succeeded Von Beust, 1871-79, as minister of foreign affairs in the common ministry of the whole empire.

André (än-drä'), John, 1751-80; British army officer; b. London; acting for Sir Henry Clinton, British commander, arranged with Benedict Arnold, of the American army, for the surrender of West Point to the British, September 21, 1780; was captured at Tarrytown two days later; condemned as a spy; and executed at Tappan. A monument was erected to his memory in Westminster Abbey, London; one erected by Cyrus W. Field on the scene of his execution was destroyed by the neighbors.

Andre'a del Sar'to. See SARTO.

Andrea Pisano (än-drä'ä pè-sä'nò), or **Andrea da Pi'sa**, 1217-1348; Italian sculptor; b. near Pisa; was a pupil of Giovanni Pisano, and continued the work of that master in its semi-Gothic character. His most important remaining works are the bronze doors in the S. doorway of the baptistry at Florence of extraordinary beauty and delicacy of finish.

Andreas (än-drä'ä), Jacob, 1528-90; German Protestant theologian; b. Waiblingen, Württemberg; chancellor Univ. of Tübingen 1562; active in efforts for the more complete organization of the Lutheran Church in Germany; went to Paris to confer with King Antony of Navarre concerning Lutheran faith 1561. He is the principal author of the "Formula of Concord."

Andreas, Johann Valentin, 1586-1654; German writer; b. Herrenberg, Württemberg; court preacher at Stuttgart, 1639; wrote attacking the corruptions and formalism of the religious life of his time; regarded as the founder of the Rosicrucians, but without sufficient evidence.

Andrée (än-drä'), Solomon Auguste, 1854-; Swedish aeronaut; accompanied a meteorological expedition to Spitzbergen 1892; received aid from Swedish Academy of Sciences for undertaking aerial navigation 1892; made his first ascent at Stockholm 1893; planned a polar expedition by means of a balloon; started from Dane's Island, Spitzbergen, July 11, 1897; and, excepting a pigeon message two days later, nothing has been heard from him since.

Andreini (än-drä-ä-nè), Giovanni Battista, 1578-1650; Italian poet; b. Florence; from his drama "Adam" Milton is said to have obtained the idea of "Paradise Lost."

Andréossy (än-drä-ä-sè'), Antoine François (Count), 1761-1828; French military engineer; b. Castelnaudary; served in Egypt as general of brigade, 1798; member of the Institute of Egypt; chief of Bonaparte's staff on the eighteenth Brumaire, 1799; ambassador to England, 1802; represented France at Vienna and Constantinople, 1804-14; member of the Academy of Sciences, 1826.

Andrew, St., one of the twelve apostles; was, like his brother Simon Peter, a fisherman of Galilee; supposed to have been the first disciple of Christ; preached in Greece and Scythia, and suffered martyrdom in Patrae, in Achaia; the patron saint of Scotland. A cross formed by oblique beams is called St. Andrew's cross, because he is said to have been crucified on one so shaped. St. Andrew's day is November 30th.

Andrew, name of three kings of Hungary; **ANDREW** (or **ANDRAS**) I, d. 1058; began to reign, 1046; waged war against Emperor Henry III.—**ANDREW** II, abt. 1176-1236; conducted an unsuccessful crusade against the Mohammedans, 1217; convoked a diet, to which he granted the Golden Bull, called the Magna Charta of Hungary, 1222.—**ANDREW** III, d. 1301; grandson of the preceding; b. Venice; succeeded Ladislas III, 1290, and was the last king of the dynasty of Arpad. His claim to the throne was opposed by the pope, who supported Charles Martel; defeated Martel in battle, 1291.

Andrew, James Osgood, 1794-1871; bishop Methodist Episcopal Church South; b. Wilkes Co., Ga.; consecrated bishop, 1832. By his second marriage, 1844, he became owner of a few slaves. The general conference of the same year requested him to resign his office of bishop. Thirteen of the S. conferences protested and withdrew, forming the Methodist Episcopal Church South. He presided over this organization till his death.

Andrew, Order of St., Scottish order of knighthood (called also The Order of the Thistle), named in honor of St. Andrew, the patron saint of Scotland.

Andrew, Order of St., Russian order founded by Peter the Great, 1698; the highest in the empire; bestowed only on the imperial family, princes, generals-in-chief, and persons of high rank.

Andrews, or **An'drewes**, Lancelot, 1555-1626; English theologian; b. London; dean of Westminster, bishop of Chichester, Ely, and Winchester, chaplain of Queen Elizabeth, one of the translators of the Bible under James I, and author of several religious works. He adopted the doctrine of St. Augustine as modified by Aquinas.

Andrews, Lorrin, 1827-68; American missionary; b. E. Windsor, Conn.; went to Hawaii, 1827; founded the Lahainaluna Seminary,

which became the Hawaii Univ., in which he was a professor; a judge and privy counselor under the government; published parts of the Bible in the native tongue; wrote a Hawaiian dictionary, and various works on the history of the Sandwich Islands.

Andria (än'drë-ä), town of S. Italy; in Bari, 14 m. E. of Canosa; is the seat of a bishop, and has a fine cathedral, built 1046; also a college. In the vicinity are numerous caverns (Latin *antra*), from which the name is said to be derived. Pop. (1901) 49,569.

Andro (än'drö), or **An'dros**, island of Greece; in the archipelago, about 10 m. SE. of Eubœa; is the most N. of the Cyclades; length, 21 m.; width, 8 m.; area, 156 sq. m. Andros is also the name of a port on the E. coast.

Androcles (än'drö-clës), or **An'droclus**, Roman slave, whose adventures and friendship with a lion are told by Aulus Gellius. He ran away from his master into Africa, and there entered a cave in which he met a lion that was lame. The lion presented to him a paw, from which Androcles extracted a thorn. To recompense him for this service the lion afterwards supplied the man with food as long as he remained in that region. Androcles finally was captured and condemned to fight with a lion in the amphitheater of Rome. This lion proved to be the same that he had met in the cave, and, though purposely kept from food to increase his ferocity, he instantly recognized his benefactor. The man was then pardoned, and both the man and the lion were liberated.

Andromache (än-dröm'ä-ki), celebrated Trojan; wife of Hector; and one of the most admired characters of the "Iliad." After the destruction of Troy she became the captive of Pyrrhus, and finally the wife of Helenus, son of Priam. The subject of a tragedy of Euripides.

Andromeda (än-dröm'ä-dä), in classic mythology, a daughter of Cepheus, king of Ethiopia, and of Cassiopeia. She boasted that she was more beautiful than the Nereids. Neptune, to avenge this affront, sent a sea monster to plague the Ethiopians. The oracle of Ammon having declared that the sacrifice of Andromeda would appease Neptune, she was chained to a rock, but was rescued by Perseus, and after death was transformed into a constellation. The constellation Andromeda may be seen during the autumn and early winter, and recognized by three stars of the second magnitude extending in a row from the NE. corner of the square of Pegasus toward Perseus.

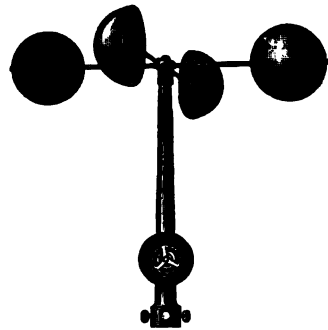
Andronicus (än-drö-n'küs) I, **Comnenus**, d. 1185; Byzantine emperor; grandson of Alexis I, Comnenus; had superior talents, but was profligate and cruel. Having been appointed regent during the minority of Alexis II, murdered that prince and usurped the throne 1183. His subjects revolted and tortured him to death.

Andronicus Rho'dius, Greek peripatetic philosopher who lived abt. 60 B.C. He collected and arranged the works of Aristotle.

An'dros, **Sir Edmund**, 1637-1714; British colonial governor; b. London; governor of New York, 1674-82, New England, 1686-89, Virginia, 1692-98, island of Jersey, 1704-6; deposed by people of Boston for oppressive conduct and sent to England for trial 1689; never tried; private character excellent; unpopularity based on his execution of duke of York's orders.

Androscoggin, river which rises in Umbagog Lake, and flows S. through Coos Co., N. H., to W. boundary of Maine, which it crosses; thence SE. through Oxford and Androscoggin counties in Maine, and enters the Kennebec 4 m. above Bath; length, 145 m.

Anemom'eter, instrument for measuring the velocity of wind; most usual form four hollow cups, on equal horizontal arms, turning on a



ANEMOMETER.

vertical axis. The rotation of the cup bears a fixed relation to the velocity of the wind, and a dial indicates the miles of wind on this principle.

Anem'one, genus of herbaceous plants of the *Ranunculaceæ*, natives of Europe, Asia, and N. and S. America. The *Anemone hortensis* is extensively cultivated in Holland. Among other species are the *A. coronaria*, called poppyanemone; the *A. japonica*, a native of Japan; the *A. pratensis*, which has blue flowers; the *A. pulsatilla* (pasque flower), which grows wild in England, and has purple flowers; and the *A. nemorosa* (wood anemone), which has white flowers. In N. America are found several species peculiar to this hemisphere,



ANEMONE HORTENSIS.

besides some which are common also in the old world. *Pulsatilla*, a favorite remedy with homeopaths, is produced by a plant of this genus.

Anem'one, properly **Sea Anemone**, a marine radiated animal belonging to the class *Actinozoa*. See *ACTINIIDAÆ*.

Aneurism (än'ü-rizm), tumor filled with blood, and communicating more or less directly with an artery. A "true" aneurism has one or more arterial coats in its wall. A "false" aneurism has a wall of condensed areolar tissue, the arterial coat having disappeared. A "traumatic" aneurism originates in a wound or other accidental injury. A "varicose" aneurism communicates with both an artery and a vein. When such dilatations occur in groups or knots, it is a "cirroid" aneurism. When the blood gets between the coats of an artery, and thus forms a tumor, it is a "dissecting" aneurism. Treatment consists in endeavoring to promote the formation of a clot which will fill the aneurism.

Angara (än-gä-rä'), or **Up'per Tungus'ka**, river of Siberia; divided into the upper and lower. The upper falls into lake Baikal; the lower flows from the lake about 30 m. S. of Irkutsk. Passing Irkutsk, it flows first N., and then W., and enters the Yenisei, of which it is the principal tributary; length, about 1,000 m.

An'gel, ministering spirit; a spiritual, intelligent being employed by God to carry commands, to announce glad tidings, and administer comfort to men. The Scriptures record many instances in which angels became visible to men. The Hebrews believed in the existence of several orders of angels, as the seraphim and cherubim, and archangels. The only angels mentioned by name in the Bible are Michael and Gabriel. Raphael also is mentioned in *Tobit*, a book of the Apocrypha.

An'gel, ancient English gold coin, so called from the figure of the archangel Michael piercing the dragon, which was on its obverse. The value of the angel (which continued to be coined till 1650) varied from 6s. 8d. to 10s.

An'gela Mer'ici, or **Angela of Bres'cia**, 1470-1540; founder of the order of Ursulines; b. Desenzano, Lake Garda, Italy; entered a Franciscan convent, but returned to the world and began to teach young children; was called for that occupation to Brescia, where she spent the rest of her life. With other maidens she organized, 1537, at Brescia, an association under the patronage of St. Ursula for teaching small children, nursing the sick, and helping the poor, and became its superior, 1537. It was at first not strictly a religious order, but soon became so. She was canonized 1807.

An'gel-fish, or **Monk'fish**, a shark with the flattened body of a ray, found on the coasts of Europe and on both shores of N. America. Its expanded pectorals suggest the conven-

tional wings of angels. It is sluggish and inoffensive. The name *angel-fish* is also applied



ANGEL-FISH.

to other chætodont fishes of the tropics distinguished by bright coloration.

Angelico (än-jël'ë-kö), **Fra**, common appellation of **FRA GIOVANNI DA FIESOLE**, 1387-1455; early Italian painter; b. Vicchio; entered the Dominican order, 1407. He had studied painting before he entered the order, but was appointed to the work he was so well fitted for as that in which he could best serve the Church. Fra Angelico stands as the type of the purely religious painter, not merely in his devotion to sacred subjects, but in the devotional manner of approaching his subject. The best of his work is that at Rome in the chapel of St. Nicholas of the Vatican, the vault of the Duomo at Orvieto, and the frescoes at St. Mark's in Florence, but all the galleries of art in Europe have examples of it. His works were considered unrivalled in finish and in sweetness and harmony of color, and were made the models for religious painters of his own and succeeding generations.

Angell (än'jël), **James Burrill**, 1827- ; American educator and diplomatist; b. Scituate, R. I.; president Univ. of Vermont, 1866, and Univ. of Michigan, 1871; U. S. minister to China, 1880-81, and Turkey, 1897-98; resumed presidency Univ. of Michigan, 1900; negotiated important treaties in China; member international commission on Canadian fisheries; chairman American-Canadian commission on deep waterways from the lakes to the sea, etc.

Angeln (äng'eln), district in Schleswig, bounded N. by the bay of Fleusburg, S. by the Schlei, E. by the Baltic; area, about 300 sq. m.; the only continental territory retaining the name of the Angles.

An'gelo. See MICHELANGELO.

An'gelus, or **Angelus Domini** ("angel of the Lord"), in Roman Catholic Church, a devotion in memory of the annunciation, consisting of three scriptural texts alternating with the salutation "Hail Mary" (*Ave Maria*), followed by a versicle and response with prayer. Hence the bell tolled in the morning, noon, and evening to indicate the hour for the devotion.

Angermann (öng'ér-män), navigable river of Sweden; rises between Sweden and Norway, collects the water of several lakes, and flowing S. enters the Gulf of Bothnia near Hernösand; length, about 250 m.

Angers (än'zhä), formerly **Angiers** (ancient *Juliomagus*), city of France; capital of the department of Maine-et-Loire, once the capital of Anjou; on the Mayenne River, 60 m. SW. of Le Mans. The old walls are converted into boulevards lined with handsome houses. It has a cathedral, college, library, museum, and a school of arts and trades; also manufactories of linen and wool, hosiery, silk twist, leather, etc. Here are the ruins of a castle of the dukes of Anjou, and the hospice of St. Jean, founded by Henry II of England. Pop. (1901) 74,421.

An'gilbert, or **Engilbert**, St., d. 814; Frankish statesman and poet; b. NW. Gaul; married Bertha, daughter of Charlemagne, and became a confidential minister of that monarch; wrote several short poems; called the Homer of his time.

Angi'na Pec'toris (angina of the breast); called also **BREAST PANG** and **HEART STROKE**, intense pain occurring in paroxysms, and usually commencing in the region of the heart or at the lower end of the breast bone, and extending along the left arm, more rarely going toward the right side. It is characterized by a sense of suffocation, faintness, and by the apprehension of approaching death. Men over fifty years of age are most frequently attacked. Morphia, nitrite of sodium, nitrite of amyl, and other sedatives are useful in the attack. Amyl-nitrite pearls may be broken on a handkerchief and inhaled. A quiet, tranquil life should be led to avoid paroxysms.

Angiology, that part of anatomy which treats of the blood vessels and lymphatics. See **BLOOD**, **CIRCULATION**.

Angiosperm (än'ji-ö-spèrm), flowering plant whose seeds are inclosed in a pod of some kind—always, however, composed of one or more carpels. All ordinary flowering plants are angiosperms. Pines, spruces, cedars, etc., having naked seeds, are gymnosperms.

Angle, the figure formed by two straight lines going out from the same point. The term, however, is extended to the case when the lines are curved, and to distinguish angles formed by straight from those formed by curve lines the former are sometimes called **rectilinear**, and the latter **curvilinear**. The lines which form an angle are called its sides, and the point where they meet is called its vertex. When a straight line, standing upon another straight line, forms two equal angles,

each of them is called a **right angle**. The usual unit of measure of angles is the degree, which is defined as the ninetieth part of a right angle. The word angle is also extended to the case of planes meeting either in a line or a point; when two planes meet they are said to form a **dihedral angle**; when three or more meet, the angle is called **solid** or **polyhedral**.

Angle Iron, wrought iron or steel bar rolled with a section shaped like an L; extensively used in the construction of buildings and bridges, being riveted to plates so as to form beams and columns.

Ang'ler, a fish found on the coasts of N. America and Europe, and called the all-mouth, fishing-frog, or goose-fish. It belongs to a family of the spiny-rayed fishes called *Lophiidae*. It is from 3 to 5 ft. long, has an enormous head and a very large mouth, furnished with a fringe of barbels. With these, and the first three spines of the dorsal fin, which rise from the top of its head, it is supposed to attract its prey.



ANGLER.

Angles (Latin *Angli*), ancient Low-German tribe, from which England derives its name (Angle-land, England). They occupied a narrow district in the S. of Schleswig, between the Schlei and Flensburg, whence some of them passed over in the fifth century with other Saxon tribes into Britain, which they conquered. See **ANGELN**.

Anglesey (än'gl-sè), **Henry William Paget**, first marquis of, 1768-1854; British army officer; major general, 1808; served in the Low Countries and Spain; inherited his father's title, earl of Uxbridge, 1812; commanded the British cavalry at Waterloo; Lord Lieutenant of Ireland, 1828-29 and 1831-33; field marshal, 1846.

Anglesey, or **An'glesea**, ancient *Mona*, once important seat of the Druids; island and county of N. Wales; in the Irish Sea; about 1 m. from Caernarvon, from which it is separated by the Menai Strait; has rich mines of copper and lead.

Anglesite, sulphate of lead produced by the decomposition of galena; so named because first observed in Anglesey.

An'glia, **East**, kingdom in E. part of central England, comprising the present counties of Norfolk and Suffolk; founded by the Angles in the sixth century; was successively dependent on Kent, Mercia, and Wessex till formed into a Danish kingdom under Guthrum (878); was forced by Edward, the son and successor of Alfred, to acknowledge his authority (921), and henceforth a part of the kingdom of England.

An'glican Church, established Church of England; sometimes called the Anglo-Catholic Church; and, with its colonial and missionary churches, and the Scottish, Irish, and American (Episcopal) Churches, often spoken of as the Anglican Communion. Its creeds are "The Apostles," "The Nicene," and "The Athanasian." The last is not included in the liturgy of the American Episcopal Church. See ENGLAND, CHURCH OF.

An'gling, the taking of fish with an "angle," as a hook was called in Old English and practiced by prehistoric man, as can be seen by the hooks of bronze found among the remains of lake-dwellers of Switzerland. A simpler form of taking fish with a line was practiced by this prehistoric people, and also by the tribes of Greenland and Alaska; a double-pointed piece of wood, horn, or bone being used, with the line tied in the middle, so that when swallowed it would set crosswise in the throat. Angling as a sport originated in Great Britain, and it is in the English-speaking countries that it has taken rank with such sports as shooting and fox-hunting. Angling is practiced by market fishermen for salt-water fish, and for lake trout, pike, etc., but by them it is called line- or trawl-fishing, to distinguish it from net-fishing.

The fresh-water fish, in the sportsman's order of value, are the salmon, brook and brown trout, black bass of two species, muscalonge and the pikes, lake trout, white and yellow perch, and then the smaller and less gamy species. The fish are taken with hand-lines or with a rod. Natural baits, such as angleworms, minnows, frogs, etc., are used, with their imitations, and also spinning metal plates, called "spoons." Angling for sport may be divided into classes, as fly-fishing, bait-fishing, trolling, skittering, and still-fishing. In fly-fishing a pliant rod is used, a reel and line, terminating in a leader or casting-line, of silkworm gut, of proportionate length, and hooks, which are variously dressed with feathers, tinsel, and other substances. The casting upon the surface requires skill. In bait-fishing a rod may be used or the line cast and hauled by hand. Trolling implies towing either bait or a spinning metal spoon behind a boat. In skittering, which requires a long, stiff rod, bait or a metal spoon is cast from boat or shore, and made to ricochet upon the surface as the rod is moved from one side to the other. Still-fishing is done from boat or bank with bait, and the fisher waits for a fish to find his bait and take it. From a boat in salt water this is called "drop-line" fishing. Reels are first mentioned in Baker's "Art of Angling," London, 1651, having been in use less than three centuries.

In salt water flies are not used, the lures or some bright, moving object being natural baits. Angling for striped bass is the highest form of the sport in salt water, and its devotees rank it with fly-fishing for salmon. Off the coast of Massachusetts and on the E. end of Long Island are clubs of anglers who fish for the striped bass in the surf. Angling for the tarpon in Florida waters has attracted at-

tention, and fish of 160 lbs. weight have been caught; but in the opinion of scientific anglers this fish, while fighting gamely, has not the surroundings which give zest to the capture of a striped bass of less weight, or the tuna weighing over 400 lbs., caught off the coast of S. California. The bluefish of the S. coast is another gamy fish much sought for.

Ang'lo-American Commission, appointed jointly by the U. S. and Great Britain, 1898, to adjust controversies between the former and Canada. The American commissioners were U. S. Senators Fairbanks and Gray, Reciprocity Commissioner Kasson, and former Secretary of State Foster; and the British, Lord Herschell, Sir Wilfrid Laurier, Sir Richard Cartwright, Sir Lewis H. Davies, and John Charlton. The following subjects of discussion were prearranged: Bering Sea sealing question, reciprocal mining regulations, preservation of the fisheries of the Great Lakes, boundary questions, alien labor laws, and reciprocity of trade. After sessions in Quebec and Washington, the commission adjourned without completing its work. Under a special treaty a new commission was appointed, 1902, to consider the boundary question solely, and granted all the American claims excepting that for the Portland canal at its session in London, October 17, 1903. The American commissioners were Secretary Root, U. S. Senator Lodge, and former U. S. Senator Turner, and the British, Lord C. J. Alverstone, A. B. Aylesworth (Toronto), and Sir Louis Jette (Quebec).

Anglo-Sax'on Lan'guage. See ENGLISH LANGUAGE.

Anglo-Saxon Literature. The pagan Anglo-Saxons had their poets and orators, and after their conversion to Christianity there were good scholars in England. Most of their writings are, however, in Latin. The story of their learning and literature is not one of development. There were schools with bright beginnings, but decay followed soon, or quick destruction from pagan or other foes. Most of the books remaining in Anglo-Saxon are translations from Christian Latin. "The Oldest English Texts" (H. Sweet, 1885) contains all the Anglo-Saxon prior to 900, except the "Chronicle" and Alfred's works. It is mostly glossaries, inscriptions, and lists of names, but has some charters, a psalter, and two or three pages of poetry. The Gospels were read in the native tongue as part of the church service, and several manuscripts are preserved. There are many homilies. Ælfric, an eminent scholar, compiled or translated a series of eighty of them abt. A.D. 990.

King Alfred translated Boethius', "De Consolatione Philosophiæ." It is freely rendered, with large additions and omissions by the royal author. The most illustrious of the Anglo-Saxon scholars, "the Venerable Bede," wrote in Latin an "Ecclesiastical History of the Angles and Saxons," translated by King Alfred into Anglo-Saxon. It abounds in picturesque details of the heroic adventures and characters of his time.

"The Anglo-Saxon Chronicle" gives an out-

line of the history of Britain from the earliest times to Henry II A.D. 1154. Copies were kept at the monasteries as early as the time of Alfred. As far as Bede's history extends, the "Chronicle" has been drawn from it or a common source. It is in general a meager affair. The general "History of the World," by Orosius, was translated by Alfred, with additions of some value.

Many brief biographies are found in Bede and the "Homilies," and some separate lives. That of St. Neot contains the story of Alfred's letting the cakes burn. There is a considerable body of laws, beginning with those of Æthelbirht, who was king of Kent at its conversion. Those of Alfred have an introduction on the history of law, the laws of Moses, and their relations to Christ and Christian nations. The laws are full of valuable knowledge. The rules relating to confession, penance, and the like are suggestive.

Anglo-Saxon poetry is very different in metrical structure from the English. It is like the old Icelandic, the old Saxon, and the earliest German. It is marked off into verses by alliteration, the recurrence of the same initial sound in the first accented syllables of words. A perfect verse of the common narrative kind has three alliterating syllables—two in the first section and one in the second; but in many verses the first section has but one. Each section has two principal beats or metrical accents, marking time for its two nearly equal divisions or feet.

The following literal translation of several verses will illustrate these principles:

There was lordly laughter;
words were winsome.
queen of Hrothgar,
greeted gold-arrayed
and then the cup of grace
first to the sovereign
blithe she bade him be

there the lute resounded,
Forth yode Wealhtheow,
of courtesies mindful,
the guests in the hall,
gave the gentle wife
Lord of the East-Danes,
at the beer-drinking.

Knowledge of the popular poetry was universal. It was disgraceful not to be able to chant in turn at the feasts. Bede, Aldhelm, Alfred learned and loved the old ballads, and made verses. Most of the poetry has perished. The early Christians condemned whatever was mixed with the old superstitions, and the Normans despised or neglected all Anglo-Saxon literature. The old ballads were brought together, beautified and fused into a long poem, "Beowulf," the "liad" of the Anglo-Saxons. The exploits celebrated in it are for the most part combats with monsters after the manner of Hercules, but it has the usual epic variety—the wrath of the monster, the rousing of the hero, the fitting out of the ship, the voyage, the banquet, the wordy war of rivals, woman's graceful presence, the arming for fight. Only one manuscript of it remains.

"The Bible Epic" is a treatment of the Bible narrative similar to that of the ballad epic. The great master in this sphere is Cædmon, the Anglo-Saxon Milton. Bede, who lived in the same region, tells that he was an unlearned man, who could not sing the common secular ballads, and that a vision appeared to him and directed him to sing the Creation, and

that his success was esteemed inspiration. See ENGLISH LITERATURE.

Anglo-Saxons, the people which resulted from the consolidation of the tribes which in the fifth century overran S. Britain. There were seven distinct invasions beginning 449, including parties of Jutes, Frisians, Saxons, and Angles. On the ground of linguistic affinity the Frisians would seem to have been most prominent. As soon as the invaders had subjugated the Celtic inhabitants they began to contend among themselves, until the kingdoms forming the Heptarchy were in 827 reduced by Egbert, King of Wessex, to a single monarchy, which attained its highest glory under Alfred the Great, 871-901. The Saxon power was completely overthrown by William the Conqueror at Hastings, 1066.

Next to the Anglo-Saxon king and queen, in rank, came the æthelings or nobility, then the ealdermen or governors of provinces. The thanes, like the barons of later times, depended upon their landed property for their title, though merchants who had made three voyages could rank as thanes. Lower were the common freemen or churls, usually retainers of some nobleman, and lowest were the theowas or slaves, including prisoners of war, descendants of Roman slaves, and criminals made servile as a punishment.

The country was divided into shires made up of hundreds—districts choosing 100 men for the defense of the shire. A tithing was an association of freemen who became surety for one another in case of misbehavior, and to aid in bringing to trial any of their number who should commit a crime. Every freeman, by law, had to enroll himself in a tithing. A meeting of the hundred was held monthly, while the folcmote seems to have corresponded to the modern assembly for free debate and counsel on public measures.

Ango'la, Portuguese territory on W. coast of S. Africa; bounded N. by Kongo River and Free State, E. by Kongo Free State and British central Africa, S. by German W. Africa; area, 484,400 sq. m.; coast line over 1,000 m.; divided into six districts; capital, San Paulo de Loando; gold, iron, copper, petroleum, and salt are found; chief exports, coffee and rubber; railroads 230 m.; cable from the capital to the Cape. Pop. (1907) abt. 4,119,000.

Ango'ra (ancient *Ancyra*), town of Asiatic Turkey, 217 m. ESE. of Constantinople; celebrated for its goats having long silky hair which is manufactured into shawls and a stuff called mohair. Pop. abt. 30,000, one third Armenians. The ancient city, called *Ancyra*, is said to have been built by Midas, and under the Roman Empire it was capital of Galatia. It had the famous temple of Augustus in which was the *Monumentum Ancyranum*. Two councils of the church were held here in 314 and 358 A.D.

Angostu'ra. See CIUDAD BOLIVAR.

Angoulême (ân-gô-lâm'), Charles de Valois (Duc d'), 1573-1650; natural son of Charles IX of France; plotted against Henry IV, and

was imprisoned, 1604-16; had chief command of royal army at the siege of Rochelle, 1628.

Angoulême, Louis Antoine de Bourbon (Duc d'), 1775-1844; b. Versailles; eldest son of Comte d'Artois; afterwards Charles X of France; emigrated with his father, 1789, and, 1799, married his cousin, Marie Thérèse Charlotte, daughter of Louis XVI; in exile till 1814; commanded the French army against the Spanish liberals, 1823, and restored Ferdinand VII to power.

Angoulême, Marie Thérèse Charlotte (Duchess d'), 1778-1851; wife of preceding; b. Versailles; daughter of Louis XVI. In 1792 she was confined in the Temple with the king and her mother, Marie Antoinette; released, 1795, and exchanged for Camus and others who had been captured by the Austrians, then passed many years in exile.

Angoulême, ancient Inculisma or Iculisma, city of France, capital department of Charente, on Charente River, 83 m. NE. of Bordeaux; has a cathedral, college, theater, public library, and paper, linen, and woolen manufactories. Pop. (1901) 37,650.

Angra Pequena (än'grä pä-kän'yä), or Lüderitz Bay, bay and harbor of German SW. Africa, between Wolfisch Bay and the mouth of the Orange River; settled by Germans, 1883; came under German protection, 1884.

An'gus, Earl of. See DOUGLAS.

Anhalt (än'hält), duchy of Germany, almost completely surrounded by Saxony; area, 906 sq. m.; traversed by the Saale, the Elbe, and the Selke; soil generally fertile; cattle raising extensively carried on; mines of silver, copper, iron, and lead. Pop. (1900) 316,000. Capital, Dessau.

Anhalt-Bernburg (-bèrn'börg), Christian (Prince of), 1568-1630; German general; chief promoter of a league of Protestant princes against the emperor, 1608; commanded the army of Frederick Elector Palatine, which was defeated at Prague, 1620.

Anhalt-Des'sau, Leopold (Prince of), 1676-1747; German general; commanded the Prussian troops under Prince Eugène in Italy and Flanders, 1706-12; second in command of the Prussian army which opposed Charles XII of Sweden, 1715.

Anhin'ga, snake bird, darter, or water turkey; swift, wary water bird, allied to the cormorants; found in tropical rivers and ranging N. to the mouth of the Ohio.

Aniline (än'ī-līn, or lēn), **Phenylamine** (fē-nīl'ā-mīn, or mēn), or **Amido-benzol** (ā-mī'dō bēn-zōl'), liquid discovered, 1826, by Unverdorben as a product of the distillation of indigo, and called by him crystalline, on account of the ready crystallization of its salts. It did not acquire any commercial importance till 1856, when Perkin prepared from it the beautiful purple dye mauve, whose brilliancy and intensity attracted the attention of chemists and dyers, and in a short time an entirely new series of colors was discovered, by which dyeing

was almost revolutionized. Aniline is found among the products of the distillation of bituminous coal; is colorless, mobile, oily with a faint vinous odor and aromatic burning taste. Its specific gravity is 1.002; boiling point, 182° C. It is very poisonous, dissolves slightly in water, in all proportions in ether, alcohol, wood naphtha, bisulphide of carbon, and in oils, fixed and volatile. Aniline is now manufactured in enormous quantities for the preparation of the different colors.

An'imal Char'coal. See BONE BLACK.

Animal Heat, the temperature which each animal possesses during life. In invertebrates and in reptiles, batrachians, and fishes, the body heat varies slightly above the surroundings, these cold-blooded animals being unable to produce heat for themselves. They withstand wide variations of temperature, but become more or less inactive in the lower temperatures. Warm-blooded animals, producing heat, maintain the temperature best suited to their activities, but are less able to withstand wide variations. Some warm-blooded animals hibernate, when they are not much warmer than their surroundings. Body temperature varies with the species. That of man is 98.6° F., horse 98.6°, rat 101.8°, dog 102°, mouse 106°, goose 107°, turkey 108°, swallow 111°. The source of animal heat is the combustion or oxidation going on in the body, especially in the muscles and the liver. Its production is supposed to be controlled by the thermogenetic, thermotaxic, and thermolytic centers in the corpus striatum at the base of the brain. Loss of heat is mainly through the skin by radiation and by evaporation of sweat; the greater the amount of blood flowing through the skin, the greater the loss of heat by radiation. See FEVER; TEMPERATURE OF THE BODY.

Animal Mag'netism. See HYPNOTISM.

Animals, Wor'ship of, prevalent in many ancient lands, as once in Egypt and Persia, and even now in India, where the likeness of the Deity is sought in the forms of animated nature. The historical fact is sketched by Paul in Rom. i, 21-23.

An'ima Mun'di, Latin signifying "soul of the world"; used by ancient philosophers, who supposed that nature or all matter was pervaded by an ethereal essence and vital force, which organized and actuated created beings, but was inferior to the Divine Spirit.

An'imism, belief in spirits, good or bad, having power over nature and men; the predominating philosophy and religion of all savage races and of many nations well advanced in civilization, e.g., Greeks, Romans, Aztecs, Hindus, Chinese, Japanese, etc.; origin of sorcery, fetishism, ancestor worship, spiritism, use of charms, belief in signs, etc.

Modern survivals of animism are: of spiritism,—belief in ghosts and haunted houses, feelings aroused in the dark after a ghost story, fear of darkness, spiritualism entire; of fetishism,—charms, veneration of sacred relics, holy water, lucky coins; of magic,—signs, such as dropping shears and spilling salt, incantations

and charms against warts, omens on All-Hallowe'en, the notion that a priest or ordained minister has peculiar religious authority and power, throwing rice at weddings, lucky and unlucky days and numbers, spiritualistic séances; of Ancestor Worship (*q.v.*),—regard for the curse or blessing of parents or of the aged as possessed of supernatural potency, the thought that perhaps a sainted mother's presence is still with one; of polydemonism and polytheism,—the worship of saints, haunted woods, streams, and wells, and personification in poetry and under the influence of strong emotion. In view of such survivals it must be insisted that our own civilized human nature does not altogether differ from that of the savage, that his so-called superstitions are neither wholly foreign to us nor altogether to be despised. See also FETISHISM.

An'ion. See ANODE.

An'iseed, fruit of *Pimpinella anisum*, annual herbaceous umbelliferous plant; native of



ANISEED.

Egypt; is cultivated in Syria, Malta, Spain, and Germany; used as a stimulant and carminative; also to flavor liqueurs and as a condiment; contains a volatile oil employed for similar purposes.

An'ise-tree, either of two small trees or large shrubs of the order *Magnoliaceæ*, growing in the Gulf States—the *Illicium floridanum* and the *Illicium parviflorum*; evergreen.

Aniuy (än-yó'ë), **Great'er**, river of NE. Siberia; rises latitude 67° N., and, after a course of 270 m., enters the Kolyma near latitude 68° N. Lesser Aniuy rises in latitude 66° 30' N., and falls in the Kolyma near the mouth of the Greater Aniuy; length, 250 m.

Anjou (än'zhô), former province and duchy of France, intersected by the Loire; inhabited in ancient times by the Andegavi, who were conquered by Cæsar; now forms the department of Maine-et-Loire and part of Sarthe, Mayenne, and Indre-et-Loire; old capital Angers; annexed to the Crown of France abt. 1204; erected into a duchy abt. 1360; annexed to the Crown, 1480.

Anklam (än'kläm), town of Prussia; in Pomerania; on the Peene; 109 m. N. of Berlin; has manufactories of linen and woolen goods; belonged to Hanseatic League. Pop. (1900) 14,602.

Ankobär (än-kó'bér), town of Abyssinia; former capital of Shoa; 8,200 ft. above sea-level, and about 265 m. SE. of Gondar; con-

tains a royal palace, and was a favorite residence of the monarch.

Ankylo'sis, or **Anchyl'o'sis**, in surgery, a stiffened and more or less fixed and immovable joint; may result from suppurative inflammation, as in "white swelling" of the knee, and is to be regarded as a favorable termination of such disease.

An'na, St., the supposed mother of the Virgin Mary, but not mentioned in the Bible; annual festival in her honor celebrated by Roman Catholic Church July 26th; by the Greek Church, December 9th.

Anna Carlov'na, 1718-46; regent of Russia; b. Rostock; daughter of the duke of Mecklenburg, and niece of Anna Ivanovna; married, 1739, to Anton Ulrich, duke of Brunswick-Wolfenbüttel, and had a son, Ivan, whom Anna Ivanovna designated as her successor; assumed the office of regent, 1740; was deprived of power by a conspiracy which raised Elizabeth to the throne, 1741; d. in exile.

Anna Comnena (köm-në'nä), b. 1083; Byzantine princess and writer; daughter of Alexis I; famous for her beauty and talents; married Nicephorus Bryennius; on the death of her father, 1118, conspired against her brother John, and attempted to usurp the crown or to place it on the head of her husband, but failed; afterwards engaged in literary pursuits, and wrote in Greek a life of her father, entitled the "Alexiad."

Anna Ivanovna (ë-vän-öv'nä), 1693-1740; Empress of Russia; b. Moscow; daughter of Ivan, a brother of Peter the Great; married, 1710, the Duke of Courland; succeeded Peter II, 1730, and allowed her favorite Biren to control the empire.

An'als, in Roman history, official chronicles kept by the *pontifex maximus* down to 131 B.C.; destroyed except a few fragments when the Gauls sacked Rome; similar "anals" as far back as 3000 B.C. are claimed by the Chinese.

An'nam (literally "peaceful south"), empire in SE. Asia on Indo-Chinese peninsula, under French protectorate; bounded N. by Tonking; E. by China Sea; S. by lower Cochin China; W. boundary not well defined; area about 52,100 sq. m.; pop. (1901) 6,124,000; divided into five states; capital Hué; inhabitants chiefly Annamese, Malays, and Tais; iron, gold, copper, zinc, and coal found; rice, maize, tobacco, cinnamon, sugar, raw silk among productions; language allied to Chinese; people subject to other nations, chiefly the Chinese till abt. 900; first cession of territory to France 1787; war with France 1858; French protectorate 1886. On account of native atrocities the French government deposed the king and established a regency 1907.

An'andale, **Thomas**, 1838- ; English surgeon; b. Newcastle-on-Tyne; assistant and lecturer in Univ. of Edinburgh till 1877, when he was appointed Regius Prof. of Clinical Surgery in the same; author of "Abstracts of

Surgical Principles"; "On the Pathology and Operative Treatment of Hip Disease," etc.

An'na Peren'na, in Roman mythology, goddess; according to Vergil and Ovid daughter of Belus and sister of Dido; went to Italy, and was received kindly by Æneas; Romans invoked her favor to obtain health and long life.

Anna Petrovna (pā-trōv'nā), 1708-28; eldest daughter of Peter the Great of Russia and the Empress Catharine; married to Frederick Charles, Duke of Holstein, 1725; mother of Peter III of Russia.

Annapolis, city, capital of Maryland, and county seat of Anne Arundel Co.; port of entry on the Severn River; 20 m. S. by E. of Baltimore, 22 m. E. by N. of Washington; on several railroads; contains a State house, governor's mansion, court house, land office, comptroller's and treasurer's buildings; seat of St. John's College, U. S. Naval Academy, and court of appeals; chief industry, oyster packing. The harbor, or Annapolis Roads, is one of the finest in the country, there being a depth of 60 ft. in the channel up to Round Bay in the river, 7 m. from the city. Pop. (1900) 8,402.

Annapolis, or **Annapolis Roy'al**, seaport of Nova Scotia; at mouth of river Annapolis; one of the oldest settlements in N. America, founded, 1604, by the French, who called it Port Royal; harbor good, but difficult of access; was the capital of province till 1750. Pop. (1901) 1,019.

Annapolis Convent'ion, in American history, a meeting, 1786, to consider certain changes in the articles of confederation with reference to intercolonial commerce, which led to the Constitutional Convention of 1787.

Ann Ar'bor, capital of Washtenaw Co., Mich.; on Huron River; 38 m. W. of Detroit; the situation elevated and pleasant; has the State university and varied and important manufacturing. Pop. (1900) 14,509.

An-Nasir (ān-nā'sīr), or **Al Nas'sir**, **Ledini'l-lah** ("defender of the religion of God"), d. 1225; an Abassid caliph; began to reign at Bagdad, 1180; liberal patron of learning; defended his dominions against aggressive enemies.

Annates (ān'āts), tax of first-fruits imposed by the popes on all bishops on their accession, equal to one year's revenue of the benefice; first levied in England, 1213; made payable to King Henry VIII instead of the pope, 1534; restored to the church by Queen Anne to be appropriated to increase of poor livings.

Anne, 1665-1714, queen of Great Britain and Ireland; b. Twickenham, near London; second daughter of James II and Anne Hyde; married, 1683, Prince George of Denmark; had seventeen children, all of whom d. before she became queen; supported prince of Orange in revolution of 1688; succeeded her father, 1702; pursued his foreign policy, involving England in war of the Spanish succession; strongly influenced by Duchess of Marlborough and later

by Mrs. Abigail Masham; among important events of reign, victories of Marlborough and union of England and Scotland.

Anne of Au'stria, 1601-66; daughter of Philip III of Spain; married Louis XIII of France, 1615; mother of Louis XIV and Philip, founder of the house of Orleans; made regent after the death of her husband, 1643; put the government in the hands of Mazarin; after his death (1661) retired to convent of Val de Grâce.

Anne Bol'eyn. See **BOLEYN, ANNE**.

Anne of Brit'tany, 1476-1514; queen of France; b. Nantes; daughter and heiress of Francis II, duke of Brittany; married Charles VIII of France, 1491; Brittany, her dowry, then becoming united to France; after his death (1499) married his successor, Louis XII, whom she ably assisted.

Anne of Cleves, 1515-57; daughter of John, duke of Cleves; fourth queen of Henry VIII of England, who, on Thomas Cromwell's advice, married her to please the German Protestants, 1540; divorced the same year, and retired on a pension of £3,000 per annum; buried in Westminster Abbey.

Anne of Den'mark, 1574-1612; wife of James I of England; b. at Skanderborg, Jutland; married, 1589; d. at Hampton Court; rather frivolous, fond of pageants and masquerades, given to expensive building.

Anneal'ing, a process of tempering glass and certain metals by heating and then cooling them slowly, in order to render them less brittle and more tenacious. Glass vessels are annealed in a long oven, one end hotter than the other, and the trays in which the vessels are placed are slowly drawn into cooler and cooler parts. The operation of annealing large vessels requires several days. Iron, steel, brass, and other metals which are hammered into plates or drawn into wire become brittle during the process, and require to be annealed by cooling them slowly in water or air. Steel is tempered and hardened by a process of annealing, being placed in an oil-bath or surrounded by a metallic compound which has a low fusing point. The soft metals are annealed by immersion in water, which is boiled and then cooled slowly.

Annecy (ān-sē), town of E. France; upper Savoy; at NW. extremity of Anneck Lake, 22 m. S. of Geneva; has a cathedral, a bishop's palace, a church in which are relics of St. Francis de Sales, an old castle, glass works, cotton mills, etc.; once the capital of the counts of Geneva. Pop. (1901) 10,896.

Annecy, Lake of, upper Savoy, 22 m. S. of Geneva, and 1,426 ft. above the sea; 9 m. long and from 1 to 2 wide; discharges through the Fieran into the Rhône.

Annel'ida, a class of animals in which the long cylindrical body is divided into a series of rings or segments, each like its fellows. These segments each contain a portion of the internal organs, but they lack jointed append-

ages. (See ARTHROPODA.) There is usually a well-developed circulatory system consisting of dorsal and ventral vessels and communicating transverse branches. The nervous system consists of an anterior brain connected with a series of ventral ganglia (a pair in each segment) by two nerve-cords, one passing on either side of the throat. The mouth is ventral, the alimentary canal usually straight. Respiration takes place either by the general body-surface or by gills which may be developed upon the head or upon the segments of the body. In some there are also paired outgrowths from the body, strengthened by bristles, which serve as locomotor organs. The reproduction is usually by eggs, a few forms dividing spontaneously into two new individuals. Most of the Annelids are marine, but some occur in fresh water and a few (see EARTHWORMS) in moist earth. The Annelids include (1) the *Hirudineæ*, (2) the *Chaetopoda*, and (3) the *Mycostomata*, a group of peculiar forms parasitic on the crinoids.

An'nenkoff, Michel, 1838-99; Russian civil engineer and officer; b. St. Petersburg; a colonel at twenty-eight; military *attaché* with the German army in Franco-Prussian War; served as general under Skobelev in Meru campaign; built Trans-Caspian Railroad, the first constructed through a desert; identified with building of Trans-Siberian Railroad.

Annexa'tion, act of uniting or joining a territory, province, state, or country to a larger geographical division, either by force or by peaceable agreement; chief annexations by U. S., Louisiana purchase, 1803; E. and W. Florida, 1819; Texas, 1845; territory including the present California and Utah and parts of New Mexico, Nevada, Arizona, Wyoming, and Colorado, 1848; Alaska, 1867; Hawaii, or Sandwich Islands, 1898; Philippine Islands and Porto Rico, 1890. See IMPERIALISM.

Annihila'tionists, those who deny the existence of the soul after death, some believing that annihilation is the final doom of the incorrigibly wicked, others that immortality is specially conferred by God on those who through faith and obedience become partakers of the divine nature.

An'nus of Viter'bo, whose proper name was GIOVANNI NANNI; abt. 1432-1502; Italian Dominican monk; b. Viterbo; wrote a "Treatise on the Empire of the Turks"; published at Rome, 1498, "Seventeen Volumes of Various Antiquities with Commentaries," containing extracts from the lost works of ancient historians, which proved to be forgeries.

Anniver'sary, annual return of a memorable day; day on which some remarkable event is annually celebrated—chief one among the Jews, the Passover; principal religious anniversaries of Christians, Christmas, Epiphany, Easter; anniversary days in Roman Catholic Church, those on which an office is annually performed for the souls of the deceased.

Annonay (än-nō-nā'), town of France; department of Ardèche; 37 m. SSW. of Lyons, at junction of rivers Cance and Déaume; has

manufactories of glove leather and paper. Pop. (1901) 16,822.

Annot'to, or **Annat'to**, red coloring matter; pulp of the seeds of the *Bixa orellana*, an exogenous shrub which grows in S. America and the W. Indies; used to color cheese, as an ingredient in some varnishes, and to color ointments and plasters.

An'nual, a plant which within a year passes from a seed into a perfect plant, bears its fruit, and perishes. The duration of annuals is generally much less than a year. Some plants which are annuals in one climate are perennials in another, as the castor-oil plant. See BIENNIAL; PERENNIAL.

Annual Lay'ers of Wood. In ordinary trees there is one period of growth each year, and this produces one layer of wood on the stem. When there are two periods of growth in a year, there are two wood layers. In cool climates, as there is rarely more than one growth period, the rings of wood are about as many as the years during which the stem has lived, but in warmer climates there is greater irregularity.

Annu'ity, a rent or sum of money which one is entitled to receive every year. If the payment is to be continued through a period of uncertain length, it is a contingent annuity; if for a definite number of years, it is an annuity certain. A person who has unemployed capital may find it advantageous to convert it into an annual income, which he is entitled to receive as long as he lives, and which is called a life annuity. The person who receives an annuity is called an annuitant. An annual income which is not to be paid until a number of years have elapsed is a deferred annuity. The determination of the present value of annuities is a complex question based upon the tables of vital statistics and the rate of interest. See INSURANCE.

An'nulus (Latin, a ring), a botanical term used in several senses. In mosses it denotes a rim external with respect to the peristome; in ferns it is an elastic rib which girds the theca or spore-case, and by its contraction disperses the spores; the collar which surrounds the stipes of some fungi just below the hymenium is also called an annulus.

Annuncia'da (Order of Knights of the Annunciation), founded by Amadeus VI of Savoy, 1362; originally called the Order of the Collar; grand master of the order the reigning king of Italy.

Annuncia'tion, Feast of, church festival, observed March 25th, which is called Lady Day; a commemoration of the announcement of the conception of Jesus to Mary by the angel Gabriel.

Annunzio (än-nōn'tsè-ō), **Gabriele d'**, real name GAETANO RAPAGNETTO, 1864- ; Italian author; b. at sea; married Princess Maria di Gallese; educated as a lawyer; took up literature, 1885; elected as a moderate to Italian Chamber of Deputies, 1898, but joined the socialists, 1900; author of morbid and sensuous

works, including poems; novels, "The Triumph of Death," "The Maidens of the Rocks," "The Flame of Life," etc.; plays, "The Dead City," "The Daughter of Jorio," "Giaconda," etc.

An'ode, in electrolysis, the positive pole, or that surface by which the galvanic current enters the body (electrolyte) undergoing decomposition; negative pole, or surface by which the current goes out, called *cathode*; elements of electrolytes called *ions*, and those which go to the anode named *anions*.

An'odynes, medicines which diminish pain, such as opium, morphine, the anæsthetics, *can-nabis indica*. See ANÆSTHESIA.

Anoint'ing, oriental custom of pouring aromatic oil on the head as a mark of honor; practiced at the coronation of kings and the consecration of high priests and prophets; spikenard, myrrh, and olive oil sometimes used for this purpose.

An'olis, genus of lizards of the family *Iguanidæ*, natives of the warm parts of America, remarkable for their power of inflating the skin of the throat; about 100 species known; one of them (*Anolis carolinensis*) is common in the forests of the S. States.

Anomalis'tic Year, interval of time in which the earth completes a revolution with respect to any point in its orbit, or the interval which elapses between two successive passages of the earth through its perihelion; 4 minutes and 39 seconds longer than a sidereal year; length 365 days, 6 hours, 13 minutes, and 45 seconds.

Anquetil du Perron (änk-tël' dü pär-rön'), **Abraham Hyacinthe**, 1731-1805; French oriental scholar; b. Paris; spent seven years in India, learned the language of the religious books of the Parsees, and returned 1762; most important work, "Zend-Avesta, ouvrage de Zoroastre," 1771, the first translation of the sacred books of the Parsees in any European language. See AVESTA.

Anselm (än'selm), 1033-1109; archbishop of Canterbury and father of scholastic theology; b. at or near Aosta, Piedmont; studied in monastery of Bec, Normandy; elected abbot of Bec, 1078; archbishop of Canterbury, 1093, but braved exile (1097) rather than submit to the demands of the king; principal works: tract "De Veritate," containing the groundwork of his theory of knowledge, and the "Monologion" and "Proslogion," all written at Bec.

An'sgar, or **An'shar**, 801-85; Frankish missionary, the "Apostle of the North"; b. near Amiens; reputed to have undertaken the first successful attempt to propagate Christianity in the North; missionary to Denmark, 827, Sweden, 828-31; then N. Germany, becoming first bishop of Hamburg, 831.

An'son, **George** (Lord), 1697-1762; British naval officer; b. Staffordshire; commander of an expedition to the S. Sea, 1740; circumnavigated the globe and made important discoveries, £500,000, 1744; defeated a French fleet, 1747,

£500,000, 1744; defeated a French fleet 1747, rewarded with the title of Baron Anson of Soberton; first lord of the admiralty, 1751-56; admiral of the fleet, 1761.

Anspach (äns'päk), **Elizabeth Berkeley** (Margravine of), 1750-1828; daughter of Augustus, earl of Berkeley; remarkable for versatility; in 1767 married Mr. Craven, who became earl of Craven; separated from him, 1780; married the margrave of Anspach; wrote and performed dramas, and published entertaining autobiographic memoirs.

An'ster, **John**, 1798-1867; Irish educator and author; b. Cork Co.; Regius Prof. of Civil Law in Univ. of Dublin; published "Poems and Translations from the German" and a translation of "Faust."

An'stey, **Christopher**, 1724-1805; English humorist; held a fellowship at King's College, Cambridge, 1745-54; translated Gray's "Elegy" into Latin; principal work the "New Bath Guide," 1766, letters in verse satirizing that fashionable watering place.

Ant, or **Em'met**, insect, allied to bees and wasps; remarkable for industry, ingenuity, and muscular strength. They live in societies composed of males, females, and neuters, the last being sterile females and destitute of wings. The neuters do the work, building and repairing the nests, nursing the young, etc. Some have their jaws greatly enlarged, and serve as soldiers. The males and females have wings, and are larger than the neuters, but less numerous. After the pairing season, the females lose their wings, and are waited on by the workers until the eggs are laid. In winter most species remain dormant. They are mostly carnivorous, and will attack a living animal larger than themselves. Another favorite food is the honey-dew, the sweet excretion of aphides, or plant-lice. They often confine these aphides, and obtain from them, by a process like milking, a supply of honey-dew. Perhaps the most remarkable are the "honey-ants" of Mexico, New Mexico, and Arizona. They live in colonies. Certain members of the community, however, during the summer season store up honey in their abdomen, and become incapable of locomotion. They are then placed in subterranean galleries, and are systematically fed by the others. In time the distention of the abdomen becomes so great that the victim ants resemble spherical, pellucid grapes. When food is scarce, these ants are devoured by the other members of the colony. They display great ingenuity in the construction of their habitations. The large ants of S. America raise their ant-hills to the height of 15 ft. or more. Some species perforate galleries in the clay, and support by pillars and arches the roof of their house. Others excavate cells and labyrinthine galleries in the trunks of living trees. Ants are supposed to have a faculty of conversing or communicating with each other by rubbing their antennæ together. These insects are generally very pugnacious, and often fight pitched battles with other ants. The Swiss

naturalist Huber has given a detailed account of their battles, martial exploits, and predatory expeditions. Still more marvelous and paradoxical is the well-attested fact that some species reduce other ants to slavery, and that the principal motive of their wars and piratical excursions is to capture larvæ and pupæ or nymphs, which they carry home for slaves. The workers and females are provided with stings which owe their virulence to the presence of *formic acid*, secreted by a gland in connection with the sting. The fact that ants work all through the night, and seem never to sleep, was noticed more than one hundred and fifty years ago.

Antæus, Libyan giant; son of Neptune and Terra; famous as a wrestler; invincible as long as he was in contact with the earth (Terra). He was conquered by Hercules, who raised him into the air and strangled him to death.

Antag'onism of Drugs, that relation of the actions of different drugs on the animal economy which is shown when the usual effects of the action of one are prevented or suppressed by the action of another, brought about by the opposed actions of the different drugs, and not by any change in the chemical composition of either. The latter process is called "antidotal" action. Antagonism becomes effective by a physiological process. Strychnia increases the excitability of the respiratory centers, while chloral lessens their excitability; and a fatal dose of strychnia may be counteracted by a suitable dose of chloral. Conversely the administration of strychnia may prevent death from chloral poisoning. One of the effects of opium is to strongly contract the pupil of the eye, while belladonna as strongly dilates the pupil. Again, the function of perspiration is markedly increased by pilocarpine and diminished by atropine. The administration of strong coffee to persons poisoned with opium is an example of the utilization of antagonism. The most important practical examples of antagonism of drugs are those of aconite and digitalis, of belladonna and opium, of chloral and strychnia, of chloroform and amyl nitrite, and of physostigma and atropine. See ANTIDOTE.

Antag'onist Mus'cle, any muscle in the human body; so called because always opposed in its action either by some other muscle, or by some elastic ligament.

Antal'cidas, Spartan diplomatist sent to Persia when Sparta was in a critical position; negotiated the "Peace of Antalcidas," 387 B.C., which enabled the Spartans to gratify their enmity to Athens and Thebes, and made the Greek cities of Asia Minor subject to Persia.

Antar (En'târ), **An'tara**, or **An'tarah-Ibn-Sheddad'**, lived abt. 550 A.D.; Arabian prince, poet, and warrior; author of one of the seven poems called Mo'allakat (suspended), because they were suspended in the Kaaba Mecca.

Antarc'tic, opposite to Arctic; Antarctic circle, one of the small circles of the sphere parallel to the equator, and distant 23° 27½' from the S. pole.

Antarc'tica, continent and islands at the S. pole; lying within the Antarctic circle; includes Victoria, Graham, Wilkes, Alexander, and Enderby lands and S. Shetland Islands; estimated area, 3,000,000 sq. m.; interior ice-covered; lofty mountains, including Langstaffe, 15,000 ft. high, and active volcanoes, including Erebus; great glaciers; summers short and cold; fossil plants and vertebrates found; marine and animal life abundant; a little fertile soil; vegetation scanty, chiefly lichens; land here first discovered by Capt. Gerritz of Rotterdam, 1599; first organized expedition under Capt. Cook, 1773-74; many European and American expeditions since; Ross, 1839-43, first to land; Borchgrevink reached farthest S. point, 800 m. from pole, 1902.

Antarctic Cur'ent, drift current which commences on the shores of Victoria Land; carries vast quantities of ice and cold water toward the NE. and E.; and as a coast current, washes and cools the shores of S. America.

Antarctic Explor'ations. See POLAR REGIONS; POLAR RESEARCH.

Antarctic O'cean, or **South'ern Ocean**, large body of water around the S. pole included within the Antarctic circle; also general term designating that vast area S. of the Atlantic, Pacific, and Indian oceans; has not been explored so thoroughly as the Arctic Ocean; contains the great continent Antarctica and its islands; area about 7,900,000 sq. m.; soundings obtained of 3,950 fathoms; marine life abundant; first expedition thither under Alvaro Medana of Peru, 1567.

Anta'res, ruddy double star, the most conspicuous in the constellation Scorpio.

Ant'-bird, large family of S. American passerine birds; living in thorny thickets, and feeding chiefly upon ants.

Ant'-catcher. See ANT-THRUSH.

An'te, Latin preposition, meaning before, in either space or time; now used in English as a prefix (ante-), with the same signification; used to form nouns (accented on the prefix) and adjectives (accented on the radical); as, an'techamber, an'teroom, antenupt'ial, antediluvian.



GREAT ANT-EATER.

Ant'-eater, S. American mammal, order *Edentata*; has no teeth, and feeds on ants and other insects, which it catches by thrusting among them its long viscid tongue; tail, cov-

ered with long hair, about as long as body; claws, large and strong, adapted to tearing open ant-hills. The great ant-eater (*Myrmecophaga jubata*) is about four and a half feet long, exclusive of the tail.

Antedilu'vian, a term applied to any person or thing that existed before the Flood—i.e., the Noachian Deluge. According to the chronology of the Hebrew text of the Bible, this flood occurred 1,656 years after the creation of man; according to the Septuagint version, several centuries later. Geologists do not recognize that the earth was ever inundated by a simultaneous universal deluge since it was inhabited by man.

An'telope, any member of a group of hollow-horned ruminants of the family *Bovidae*. The group comprises numerous genera and species, the genus *Antelope* being the typical one, natives of Europe, Asia, Africa, and America. They are mostly gregarious, inoffensive, and timid animals, remarkable for their elegant figure and extreme agility, and vary greatly in size and form. The greater number are found in S. and central Africa. Among the various



AMERICAN ANTELOPE.

species are the gazelle (*Gazella dorcas*), the beauty of whose eye is proverbial; the addax or Nubian antelope; the steinbok, eland, and springbok of S. Africa; and the chamois of Europe. The antelopes are probably the fleetest of all quadrupeds. Their flesh is a favorite article of food. The Rocky Mountain goat is another antelope (*Mazama montana*).

The common antelope or black buck (*Antelope cervicapra*) is found in India and S. Asia. It is a beautiful animal, distinguished for its timidity and swiftness. The horns of the antelope differ in structure from those of the deer; in the latter the horns or antlers are deciduous, but in the antelopes they consist of a horny sheath surrounding a conical support of bone. Their growth is gradual, and they are retained during the life of the animal. In some groups of antelopes both sexes have horns; in others, only the male. The prong-buck or prong-horned antelope of America (*Antilocapra americana*) is not a true antelope, having deciduous branched horns.

An'te Na'ti (Latin "born before"), term applied to the Scotch born before the accession

of James I to the throne of England, and so considered as aliens by the English.

Antenor (än-tē'nör), in Greek legends, a Trojan noted for his wisdom and his advice to the people to restore Helen to her husband; said to have founded Patavium, now Padua.

Antenupt'ial Settlement. See MARRIAGE SETTLEMENT.

Antequera (än-tä-kä'rä), ancient *Antiquaria*, city of Spain; province of Malaga; 22 m. NNW. of Malaga; on the Guadalhorce; has many monasteries and convents, and factories of flannel, paper, silk, and soap. Pop. (1900) 31,609.

Anteros (än'tē-rös), in Greek mythology a being opposed to Eros or Cupid, the god of Love, and fighting against him; also the deity who punishes those who do not return the love of others.

Anthelmin'tics, drugs to destroy or drive out intestinal parasites, in the former case called vermicides, in the latter vermifuges; such are santonin, mild purgatives, injections of quassia, turpentine, aloes, or repeated injections of salt and water.

An'them, a musical composition in free form; a mixture of motett and cantata, with instrumental accompaniment, adapted to scriptural words. It may contain solos, duets, etc., but the main composition is generally understood to be for chorus.

Anthe'mius, surnamed TRALLIANUS, from his native place, Tralles, Lydia; d. abt. 534; Greek architect and mathematician; brother of Alexander Trallianus; patronized by Justinian at Constantinople; designed the celebrated church of St. Sophia.

Anthemius, or **Anthemius Proco'pius**, d. 472; Roman emperor, who began to reign 467 A.D., before which he was a favorite general of Leo, emperor of the East; father-in-law of Ricimer, who became his enemy, defeated him in battle, and put him to death.

Anthol'ogy, Greek, collection of flowers, collection of short pieces of poetry, or selection of beautiful thoughts and sentences, by different authors; name first given to a collection made by Meleager, Syrian poet abt. 80-60 B.C. See CHRESTOMATHY.

Antho'n (än'thön), **Charles**, 1797-1867; American classical scholar; b. New York City; admitted to the bar in 1819, but never practiced; in 1820 Adjunct Prof. of Ancient Languages in Columbia College, and in 1835 Principal Prof. of the Classics; published an edition of Horace with notes (1830), and of the classical works usually read in schools; also a "Classical Dictionary," 1841.

Anthony (än'tō-nī), **Susan Brownell**, 1820-1906; American reformer; b. of Quaker parents, S. Adams, Mass.; fifteen years a teacher in New York; organized first woman's temperance convention, 1852; active in antislavery movement; leading member of women's loyal league during Civil War; originated many laws

for woman's betterment; president American National Woman Suffrage Association, 1892-99; indicted for voting at State and Congressional elections, Rochester, N. Y., 1872; author with E. C. Stanton of "History of Woman Suffrage."

Anthony, St. See ANTONY, ST.

Anthony's Nose, mountain in the Highlands E. of the Hudson River; partly in Philipstown township, Putnam Co., partly in Cortlandt township, Westchester Co., N. Y.; rises 1,228 ft. above the river.

An'thracene, or **Paranaph'thalene** (C₁₄H₁₀), a hydrocarbon extracted from the "green oil" or last portions of the distillate of coal-tar. It is obtained as white, crystalline laminae, insoluble in water, soluble in alcohol, benzine and carbon bisulphide. The preparation of anthracene by the action of zinc dust on *Alizarin* led to the preparation of alizarin from anthracene, and revolutionized the madder-growing industry.

An'thracite, important fuel, the hardest variety of stone coal, consisting almost exclusively of pure carbon; has a conchoidal fracture, a black color, and an imperfectly metallic luster, from which it is sometimes called *glaucous coal*; burns slowly, with intense heat, without smoke, and with little flame; like all coal, is of vegetable origin, formed from bituminous coals by subterranean heat, which has driven off most of their volatile matter; composition the same as that of coke formed artificially from bituminous coal; more dense than coke only because it has been heated under great pressure; has no definite composition, but shades into graphite on one hand, and bituminous coal on the other; occurs in many parts of the world; mined extensively in Europe and the U. S., especially in Pennsylvania, Colorado, and New Mexico; output of Pennsylvania fields, 1905, 69,339,152 long tons; value \$141,879,000. See COAL.

An'thrax (splenic fever, malignant pustule, charbon, rag-pickers' or wool-sorters' disease, Siberian plague, etc.), infection caused by anthrax bacillus. This bacillus produces spores which retain their vitality for many years. Anthrax is widespread among animals, especially sheep and cattle fed in infected pastures. Anthrax is rare in man. It is caused by inoculation by infected meat or by inhaling the spores, which last may cause death in twenty-four hours. External anthrax begins with a hard red papule which itches. The patient feels no pain, though his condition may be grave. Anthrax should be prevented by disinfecting the hides, etc., conveying it, and by cremating animals that have died of it. The malignant pustule should be cauterized, and corrosive sublimate sprinkled about it. Stimulants are the only internal treatment indicated, though purgatives may remove the infecting material. A vaccine has been employed to render animals immune to anthrax.

Anthropol'atry, the worship of man. a word always applied in reproach; applied by the

Apollinarians, who denied Christ's perfect humanity, toward orthodox Christians.

Anthropol'ogy, science of man; divided into: **Somatology**, or the biology of man; **Psychology**, or the science of the mind; and **Ethnology**, the science of the races of men and of their character, history, customs and institutions. See BIOLOGY; MAN; ETHNOLOGY.

Anthropom'etry, measurement of the human body. See BERTILLOIN SYSTEM.

Anthropomor'phiam, the representation of the Deity under a human form or with human affections; the figurative application to God of terms which properly relate to human beings. Also the herey of the Anthropomor'phites.

Anthropomor'phites, or **Anthropomor'phists**, persons who imagine, as did the ancient Greeks, that the Deity has a human form. This idea has been entertained by some Christians, especially the Audæans or Audians, a Syrian sect formed abt. 350 A.D.

Antibes (än-tèb'), ancient *Antipolis*, a fortified seaport of France; department of Alpes Maritimes; on the Mediterranean, 17 m. SW. of Nice. It has a college, and considerable trade in olives, fruits, oil, salt fish, etc. It was founded by a Greek colony abt. 340 B.C. Its Provençal name, *Antiboul*, recalls the Greek appellation. Its coins, the remains of its theater, and certain Roman constructions are of interest to antiquaries, but its early history is obscure. Pop. (1901) 8,935.

An'tichrist, a name applied by Christian writers to a supposed powerful individual or institution destined to arise in opposition to Christianity. This idea has been traced beyond the Christian era by some writers, who cite the prophecy of Ezekiel concerning Gog and Magog. The word Antichrist occurs in the Bible only in the First and Second Epistles of John. The "Man of Sin" and "Adversary" of Paul's Thessalonians II are commonly identified with the Antichrist of John. Many writers, both Catholic and Protestant, have suggested one or another of the persecuting emperors, as Nero or Diocletian, as Antichrist.

Anticleia (än-ti-kl'ëä), daughter of Autolycus; married Laertes, and became the mother of Odysseus; died of grief at the long absence of her son.

Anticleides (än-ti-kl'ëdéz), Greek historian; lived shortly after the time of Alexander the Great, of whom he wrote a history, and an account of the return of the Greeks from their ancient expeditions.

Anticli'max, a marked descent from lofty to mean, or from great to little thoughts or language; the reverse of climax, as in this line of Pope: "Die, and endow a college or a cat"; the term bathos is used in the same sense.

Anticos'ti, a large island of the province of Quebec, Canada; in the Gulf of St. Lawrence; area, more than 2,000 sq. m.; length, 135 m.; greatest width, 40 m. The island has never been colonized, though its soil is fertile. It contains

the most extensive peat deposits in Canada. It was purchased, 1896, by M. Menier, of Paris, for a private park and game preserve.

Anticyclone, an atmospheric or weather condition covering a large territory, and characterized by a high barometer, gently outflowing winds, clear skies, and dryness; meteorologically, it is an area over which wind is gently descending at the center, and flowing out at the sides.

Anticyra (än-tis'i-rä), an ancient city of Thessaly, on the Sperchius River; another, a city of Phocis, with a harbor on the Corinthian gulf; still another, in Locris, at the entrance to the Corinthian gulf; all were noted for the production of hellebore.

Antidiph'theretic Serum. See **SEBUM THERAPEUTICS.**

Antidote, a medicine given to prevent injurious effects of poisons. Chemical antidotes neutralize the poison by converting it into an insoluble or harmless substance. Thus common salt, by combining with nitrate of silver, forms an insoluble silver chloride. Physiological antidotes produce action within the body which enables it to resist the effects of the poison. Thus belladonna and opium, both poisonous, are physiological antidotes or counter poisons to each other. See **ANTAGONISM OF DRUGS; POISONS.**

Antietam (än-të'täm), or **Sharpsburg, Battle of**, engagement near Sharpsburg, Md., September, 16, 17, 1862, between 87,164 union soldiers under McClellan and about 35,000 confederates under Lee; action begun by Hooker (union), who crossed Antietam Creek to attack Lee; result of battle was Lee's retreat across the Potomac; union loss 12,469, including 2,010 killed; confederate loss about 12,000; the engagement was called **Battle of Sharpsburg** by confederates.

Antifeb'rin (*Acetanilide Phenylacetamide*), a white crystalline substance, slightly soluble in cold water, much more so in hot; used in medicine to reduce temperature and relieve pain. Its general action is similar to that of antipyrin, but it is believed to be less apt to cause collapse than antipyrin.

Anti-Federalists, former party in the U. S. opposed to centralizing tendencies in the administration of government and interpretation of the Federal Constitution; its first great leader was Jefferson. It first opposed the Constitution, but when the Constitution was adopted favored the strictest construction. The name went out of use soon after 1793, and the party it represented has been successively called Republican, Democratic Republican, and Democratic.

Antigone (än-tig'ö-ni), daughter of Oedipus, king of Thebes, and his own mother, Jocasta; attended her father in his exile into Colonos, Attica; on his death she returned to Thebes; she buried her brother Polynices in defiance of the edict of the tyrant Creon, who, for her disobedience, immured her alive. Her story was a subject of the Greek poets, particu-

larly Sophocles, whose plays of "Antigone" and "Oedipus at Colonos" are extant, and Euripides, whose "Antigone," though not extant, is known from extracts by later writers, and in his "Phoenissæ."

Antigonus, abt. 80-30 B.C.; king of the Jews; son of Aristobulus II; after the death of his father he was expelled from Judea by Antipater and Herod; restored to the throne by the Parthians abt. 39 B.C., but the Roman senate refused to recognize him as king. Mark Antony took Jerusalem and put Antigonus to death abt. 36 B.C.

Antigonus, surnamed **CYCLOPS** ("one-eyed"), abt. 382-301 B.C.; Macedonian general; took part in Alexander's campaign against Persia; became satrap of Phrygia, 333; on death of Alexander ruled Greater Phrygia, Lycia, and Pamphylia; waged war in Asia Minor; conquered several provinces in Asia; in 315 Ptolemy, Cassander, Seleucus, and Lysimachus formed a league against him to restrain his immoderate ambition; he encountered their allied armies at Ipsus where he was defeated and killed.

Antigonus Do'son, d. 221 B.C.; regent of Macedon; descendant of Antigonus surnamed Cyclops, and nephew of Antigonus Gonatas; became regent, 229 B.C., during the minority of Philip V, heir to the throne; was an ally of the Achaean League in a war against Sparta, and defeated the Spartan Cleomenes, 221 B.C.

Antigonus Gona'tas, abt. 320-240 B.C.; son of Demetrius Poliorcetes; b. Gona, or Gonni, Thessaly. Having defeated the Gauls, who under Brennus had invaded Macedonia, he became King of Macedonia, 277 B.C.; was expelled by Pyrrhus, King of Epirus, 273, but recovered the throne after the death of Pyrrhus, 271.

Antigorite (än-tig'ö-rit), a species of serpentine in which a portion of the silica is replaced by alumina. It has a weak luster, and feels smooth but not greasy; is found in the Antigorio Valley, Piedmont.

Antigua (än-të'gä), British W. India island, Leeward group; 22 m. S. of Barbuda; first settled in 1632; capital St. John's; climate dry and healthful, soil of the interior fertile; sugar, molasses, and rum, chief exports. Pop. (1901) 34,971, including Barbuda and Redonda. Combined area, 108 sq. m.

Antilegomena (än-ti-lë-göm'ë-nä), literally, "spoken against," a theological term applied in ancient times to certain books of the New Testament, namely, the Second Epistle of Peter, those of James and Jude, the Epistle to the Hebrews, the Second and Third of St. John, and the Apocalypse, the authority of which was questioned by some biblical critics.

Antilles (än-til'ëz), all the W. India Islands except the Bahamas. They lie between the Atlantic Ocean and the Caribbean Sea, and extend from the Gulf of Mexico nearly to the Gulf of Paria. They are divided into three groups—the Greater Antilles, the Virgin Islands, and the Lesser Antilles, or Caribbean

Islands, which are the most E. The Greater Antilles comprise the four largest islands of the archipelago, i.e., Cuba, Hayti (or Santo Domingo), Jamaica, and Porto Rico, with the small islands along their coasts. They are situated in the torrid zone, and are subject to frequent hurricanes and earthquakes. In the central parts of these islands rise high mountains of granitic formation. The staple products are sugar, rum, tobacco, cotton, and coffee.

The Lesser Antilles are small in size, but very numerous, and are arranged in a long curved line or row like a crescent, the convex side of which is toward the E. They are divided into two groups—*viz.*, the Windward, or South Caribbee Islands, and the Leeward, or North Caribbee Islands. The Windward Islands are Barbadoes, Grenada, the Grenadines, Martinique, St. Lucia, St. Vincent, Trinidad, and Tobago. All these belong to Great Britain, except Martinique, which is a French colony. The Leeward Islands are Anguilla, Antigua, Barbuda, Deseada (French), Dominica, Guadeloupe (French), Marie Galante (French), Montserrat, Nevis, Saba, St. Bartholomew (French), St. Christopher, St. Eustatius, St. Martin (French and Dutch), Santa Cruz. For Virgin Islands, see under that heading. The Leeward Islands are British, except those otherwise designated, and three of the Virgin Islands. Many of the Lesser Antilles are of volcanic origin, and some are of coral formation. The staple productions are similar to those of the Greater Antilles. A large portion of the population of the Antilles are negroes and mulattoes, who are free.

Anti-Lib'anus, or **Anti-Leb'anon**, a mountain-range of Palestine and Syria, extending about 90 m. in a N.E. and S.W. direction nearly parallel with Lebanon, from which it is separated by the valley of Cœle-Syria; highest summit is Mt. Hermon, about 10,000 ft. The valley of Cœle-Syria, between the two ranges, now called *Buk'a'a*, is from 4 to 6 m. wide.

Antilocapra (än-ti-lö-kä-prä), "antelope-goat," generic name of prong-horned antelope (*Antilocapra americana*), inhabits the drier portions of N. America W. of the Mississippi; except the so-called Rocky Mountain goat (*Mazama*), is the only antelope found in America; differs from the Old World antelopes in that the sheaths of its horns are shed annually.

Antim'achus, poet and scholar of Colophon; lived abt. 400 B.C.; a forerunner of the Alexandrian period.

Anti-Mason'ic Par'ty, in American politics, an organization opposed to Freemasonry, founded on the allegation that William Morgan, of Batavia, had been abducted or drowned for revealing Masonic secrets; nominated State ticket in New York, 1828, 1829, 1830, and 1832; national ticket, 1832; and State tickets, Vermont, 1832, and Pennsylvania, 1832, 1835.

Anti-Mis'sion Bap'tists, call themselves OLD-SCHOOL BAPTISTS; a denomination of hyper-Calvinistic Baptists of the U. S. who have no

Sunday-schools, missions, colleges, or theological schools, holding that these things make the salvation of men depend on human effort and not on divine grace.

Antimo'nial Wine, a solution of tartar emetic in sherry or other wine.

Antimo'nians, in ecclesiastical history, those who maintain that the law is of no use or obligation under the gospel dispensation. They took their rise from John Agricola, originally a disciple of Luther, who contended that his views were legitimate deductions from the teachings of Luther.

An'timony, a brilliant brittle metal, either silver-white or bluish-white in color, of a peculiar taste and highly crystalline or laminated structure; atomic weight 120; chemical symbol Sb. It occurs in nature native, combined with other metals, as nickel, silver, etc., with oxygen and with sulphur. The sulphide, "stibnite" or "gray antimony," is the source of all the antimony of commerce. The most abundant supplies of this ore are obtained from Borneo. It also occurs in considerable quantities in Hungary, Cornwall, New Brunswick, California, and Nevada. The extraction of antimony from its ores is mainly carried on at Linz, Germany, where the sulphide of antimony is found extensively, and in Great Britain, which receives ore from Singapore and Borneo, commonly as ballast.

Antimony may be easily pulverized in a mortar. Heated in the open air, it burns with a bluish-white flame, and forms copious fumes of antimonous oxide (Sb_2O_3), or "flowers of antimony." The metal does not rust when exposed to the air, and when alloyed with other metals it hardens them. In bells it renders the sound more clear; it renders tin more white and harder and gives to printing types firmness and smoothness.

Alloys of antimony are *Type-metal*, composed of antimony 1, lead 4 parts, and when used for stereotype plates receives an addition of one-eighth to one-fiftieth of tin; *Britannia*, composed of antimony 1, tin 9 parts, and Antimony also enters into the composition of *Pewter*, another alloy of antimony and tin. Antimony also enters into the composition of some of the anti-friction alloys. Tartar emetic is the most important preparation of antimony used in medicine; in large doses it is very poisonous.

Antinous (än-tin'ö-üs), a beautiful youth, native of Bithynia, a favorite of Hadrian; accompanied that emperor to Egypt, and was drowned in the Nile, near Besa, 122 A.D. As a monument to him, Hadrian built the city of Antinópolis, Upper Egypt. Many statues were erected to perpetuate his memory and form; some are still extant.

Antioch (än'ti-ök), ancient city and former capital of Syria; on a fertile plain, on the Orontes River, 57 m. W. of Aleppo. It was founded, 301 B.C., by Seleucus Nicator, and named in honor of his father, Antiochus; the favorite residence of the Seleucid kings of Syria; called "Antioch the Beautiful"; and in

its greatest prosperity is supposed to have had a pop. of 400,000. The disciples of Christ were first called Christians in Antioch (Acts xi, 26), which occupies a prominent position in the primitive church as the scene of the labors of Paul, and the starting point of his journeys. The crusaders took Antioch from the Saracens, 1098, after which it was the capital of a Christian principality until 1269. Among the remains of its former grandeur are the ruined walls and aqueduct. On the bank of the Orontes, about 5 m. SW. of Antioch, is the site of the grove of Daphne and temple of Apollo. The modern town, Antakia, has manufactories of pottery and cotton stuffs, and is a center of missionary labors. Pop. abt. 28,000.

Antioch, Bay of, part of the Mediterranean, at mouth of the Orontes between high mountains on the N. and S., by which it is well sheltered. Some ruins on the N. side are described as those of Seleucia Peiria, ancient port of Antioch.

Antiochian (än-ti-õ'ki-än) School, a school which held doctrinal views in opposition to the Alexandrian school; flourished in Antioch during the fourth and fifth centuries, rejected allegorizing, maintained freedom of the will, the conjunction rather than the union of the two natures in Christ, and in general practical rather than speculative views.

Anti'ochus, the name of several Greco-Syrian kings of the dynasty of the Seleucids. The most famous were: **ANTIOCHUS I**, abt. 324-261 B.C.; surnamed **SOTER**, i.e., saviour; a son of Seleucus I, Nicator. He commanded the cavalry which fought Antigonus at Ipsus, in 301. Having succeeded his father in 280 B.C., he gained a victory over the Gauls, who had invaded his dominions, from which victory he derived his surname. He was killed in battle. **ANTIOCHUS II**, **THEOS**, d. 246 B.C., son of the preceding; began to reign in 261 B.C. The people of Miletus gave him the title of *Theos*, "god." In his reign the Parthians revolted with success, and Arsaces became king of Parthia, which had previously been subject to the king of Syria. A war which he waged against Ptolemy of Egypt was ended in 252 B.C. by a treaty, in accordance with which he married Berenice, a daughter of Ptolemy, and repudiated his first wife, Laodice. After the death of Ptolemy he reinstated Laodice, who poisoned him in 246 B.C. **ANTIOCHUS, III** abt. 238-187 B.C.; surnamed **THE GREAT**; was a grandson of the preceding, and a son of Seleucus Callinicus. He succeeded his brother, Seleucus Ceraunus, 223 B.C. His kingdom comprised Syria Proper, Babylonia, Media, and part of Asia Minor. For the possession of Palestine he waged war against Ptolemy of Egypt, by whom he was defeated at Raphia, 217 B.C. He took Palestine from the king of Egypt in 198 B.C., and invaded Thrace in 196. By this movement he provoked the hostility of the Roman senate. He was defeated at Thermopylae in 191 by Acilius Glabria, and retreated into Asia Minor. The Roman army, commanded by L. Cornelius Scipio, passed over

into Asia, 190 B.C., and gained a decisive victory over Antiochus at Magnesia. The war was then ended by a treaty dictated by the Romans, who required him to cede all the provinces W. of Mt. Taurus, and to pay about 15,000 talents. To raise this sum he plundered a temple in Elymais, for which act the populace killed him, 187 B.C. He left the throne to his son, Seleucus Philopator. **ANTIOCHUS IV**, d. 164 B.C., surnamed **EPIPHANES** (the illustrious), was son of the preceding. He passed about twelve years in captivity in Rome, whither he was sent as a hostage in 188 B.C. He became king on the death of his brother, Seleucus Philopator, in 175 B.C. He invaded Egypt in 170, and captured the king, Ptolemy Philometor, but was constrained by the Roman senate to retire from that country in 168 B.C. About this date he endeavored to supplant Jewish institutions and usages by Hellenic arts and culture; he plundered the temple of Jerusalem and persecuted the Jews, who, led by Judas Maccabæus, rose in arms and defeated the Syrians.

Antip'aros, Oli'aros, or Ole'aros, Grecian island in Ægean Sea, about 1 m. W. of Paros; one of the Cyclades; 8 m. long and 2 or 3 m. wide; has a stalactitic cavern, called the Grotto of Antiparos, about 300 ft. long and 80 ft. high; roof and sides of which are adorned with incrustations of great splendor and beauty. It was discovered by M. de Nointel, 1673.

Ant'ipas. See **HEROD ANTIPAS**.

Antip'ater, d. 319 or 318 B.C.; a Macedonian general; a pupil of Aristotle; held a responsible position under Philip of Macedon. Was appointed regent of that kingdom by Alexander the Great in 334 B.C., when he departed to invade Persia. He defeated Agis, King of Sparta, in a battle near Megalopolis in 330. After the death of Alexander, his generals agreed that Antipater should govern Macedonia and Greece. The Athenians, in alliance with other Greek states, made an effort to regain their independence in 322, and defeated Antipater near Lamia, but, having been reinforced by Craterus, he gained a decisive victory in the same year. The Lamian War was then ended by a treaty dictated by Antipater, who required the Athenians to deliver Demosthenes to him. He joined Antigonus in a league against Perdiccas, and on the death of the latter, 321, succeeded him as regent of the empire.

Antipater, d. 1 B.C.; son of Herod the Great and Doris; notorious for his wickedness; procured the death of his half-brothers Aristobulus and Alexander; conspired against his father, and was put to death.

Antipater of Tar'sus, Stoic philosopher who lived abt. 140 B.C.; wrote on philosophy and morality; opposed the skepticism of Carneades.

Antipater the Idumean (Id-ü-më'an), d. 43 B.C.; son of Antipas, and father of Herod the Great; governor of Idumea; assisted Cæsar against the Egyptians; rewarded with the office of governor of Judea, abt. 46 B.C.

Antiphanes (än-tif'ä-nēs'), Greek poet of the Middle Comedy; flourished abt. 368 B.C., was a prolific playwright; specimens of 130 comedies are extant.

Antiphlogistic (än-ti-flō-giä'tik), adapted to subdue inflammation and its effects; applied to such remedies as purgatives and blood-letting, which deplete the body fluids.

Antiphon (än'ti-fōn), abt. 480-411 B.C.; one of the ten Attic orators; b. Rhamnus, Attica; gained repute as a teacher of rhetoric, and composer of orations for politicians and for those accused of capital offenses; took an active part in the oligarchical reaction of the Four Hundred; was convicted of treason, and executed.

Antipope, one who assumes or usurps the office of pope, but is not regularly elected or generally recognized as such. The emperors of Germany in several instances, having quarreled with the pope, appointed another person to the office. Emperor Henry IV, 1080, appointed the antipope Clement III in opposition to Pope Gregory VII. In some cases two rival popes have been elected by different parties of cardinals. The great Western schism began, 1378, when the Italian party chose Urban VI, and the French cardinals voted for Clement VII, who held his court at Avignon, and was recognized by France and Spain. This schism was continued after their death by another double election, but in 1415 the Council of Constance deposed both of the popes, and elected Martin V. The last antipope was Felix V (originally Amadeus VIII of Savoy), elected, 1439, and abdicated, 1449.

Antipyrine (än-ti-pi'rīn), compound much used in medicine for reducing temperature in fever and for relief of pain. Pains dependent on inflammations are not relieved by antipyrine, but nerve-pains, such as headaches and neuralgias, are greatly affected by it; is a useful remedy in epilepsy, especially in combination with bromides.

Anti-rent'ers, inhabitants of several counties in E. New York who refused to pay rents and feudal services required of them by the, so-called, lord-patrons, the owners of the land; disturbance was at length ended by the triumph of the Anti-rent Party in the constitutional convention of 1846, in which a clause was inserted abolishing all feudal tenures.

Anti-Semitic Move'ment, movement against Jews as Jews, based on prejudice and fomented by the success of Jews in those branches of business in which they compete with Christians. The hatred of Jews has been a glaring inconsistency in the Christian world for many centuries. Of late, in Russia, Germany and France, there has been a more or less organized effort to put the Jews back into political bondage. See Jews.

Antiseptics, substances which prevent or check the decay of organic matter. This may be accomplished by the exclusion of air, moisture and heat, as in preserving fruit in airtight cans or keeping food in cold storage.

Chemical antiseptics, as alcohol, formalin, creosote, carbolic acid, etc., form compounds with the organic matter which are not liable to become putrescent. The part played by germs often necessitates the use of germicides and disinfection to prevent decay. See DISINFECTIOIN; PRESERVATION OF FOOD; PRESERVATION OF TIMBER.

Antiseptic Treat'ment, a method of procedure introduced by Sir Joseph Lister, 1867, which has revolutionized surgery, and made possible many operations which, without it, would be almost invariably fatal. It consists in purifying the skin of the region to be operated upon and the hands and instruments of the operator, and so guarding the part as to prevent the entrance and growth of septic organisms. If the part is already infected it must be thoroughly treated with germicides (i.e., antiseptics) till rendered "aseptic" (i.e., free from septic or infecting material).

Antispasmod'ics, medicines which alleviate spasm; often applied specifically to a class of drugs of strong odor, some of which act as stimulants, as valerian, asafoetida, musk, ether, etc. Others are sedatives, as hydrocyanic acid.

Antisthenes (än-tis'thē-nēs), Greek Cynic philosopher; b. Athens; flourished abt. 400 B.C.; pupil of Socrates, after whose death he opened a school at Athens; maintained that virtue is all-sufficient for happiness and directed his attention chiefly to practical morality.

Antitox'in, substance having power to combat the poison of microorganisms. It has been found that infection of the animal body with bacteria gives rise to the production of certain toxins which occasion most of the symptoms of infectious diseases. Later other substances having antagonistic powers, and these are produced in the body, and are called antitoxins. Both toxins and antitoxins are found in the blood, and antitoxins now used are obtained from the blood of animals which have been gradually placed under the influence of increasing doses of toxins of the various bacteria. Antitoxins have been successfully employed only for diphtheria and tetanus, although experiments with other microorganisms have been partially successful. See SERUM THERAPEUTICS.

Anti-Trinita'rians. See UNITARIANISM.

Antium (än'shi-üm), ancient city of Latium, now Porto d'Auzio, on seacoast, 34 m. SSE. of Rome; favorite resort of citizens of Rome, in whose villas famous works of art have been discovered, among them the "Apollo Belvedere" and the Borghese "Gladiator."

Antivari (än-tē'vä-rē), only seaport of Montenegro, on the Adriatic; 14 m. NW. of Scutari; acquired as a result of the Russo-Turkish war of 1877-78; shallow harbor.

Anti-vivisection. See VIVISECTION.

Ant'-lion, larva of several species of *Myrmelion*, and other cognate genera, insects of the order *Neuroptera*, found in sandy tracts in different parts of the world. The perfect insect

is similar in appearance to the dragon-fly. The larva is remarkable for the insidious mode



ANT-LION.

in which it catches ants and other insects on which it feeds.

Antofagasta (än-tō-fä-gäs'tä), largest inhabited province of Chile, extending from Tarapaca on the N. to Atacama on the S.; area, 46,597 sq. m.; pop. (1895) 44,085; comprises territory ceded by Bolivia after the war of 1879-82. Bolivia has the right to free transport of goods over the province to her own custom-houses. Capital is Antofagasta, a seaport on the Bay of Morena. It ships much silver bullion, ore and nitrate of soda. Pop. (1900) 19,482.

Antonelli (än-tō-nē'lē), **Giacomo**, 1806-76; Italian cardinal and statesman; b. Sonnino; grand treasurer of apostolic chambers 1845, minister of finance 1846, cardinal deacon 1847, and papal secretary of foreign affairs 1849; opposed the Liberal movement of 1848 and the cause of Italian unity; had great influence with Pius IX.

Antonello, or **Antonelli**, **Antonio**, surnamed **DA MESSINA**, 1414-93; Italian painter; b. Messina. He is reputed to be the first Italian who painted in oil, having visited Bruges and obtained the secret from J. van Eyck.

Antonia, **Ma'jor**, or the **Eld'er**, b. 39 B.C.; daughter of Mark Antony, the Triumvir, and Octavia, sister of Augustus Cæsar. She was the grandmother of Nero. Her sister, **Antonia Minor**, b. 36 B.C., was the wife of Claudius Drusus Nero, and mother of Germanicus and of Claudius I.

Antoni'des van der Goes. See **GOES**, **JAN ANTONISZ**.

Antoninus (än-tō-nī'nūs), **Marcus Aurelius**, usually called **MARCUS AURELIUS**, and sometimes surnamed **THE PHILOSOPHER**, 121-180; Roman emperor distinguished for wisdom and virtue; b. Rome; son of Annus Verus and Domitia Calvilla; original name was Marcus Annus Verus; having been adopted as a son by Emperor Antoninus Pius, 138, assumed the name of M. Ælius Aurelius Verus Cæsar. He became a disciple of the Stoic philosophy, with the principles of which his habitual conduct was consistent. Although his temper was pacific, he was involved in frequent wars by

the aggressions of northern barbarians and the revolts of his subjects. He conducted in person a successful expedition against the Marcomanni, 168; drove them out of Pannonia and gained over the Quadi a victory, 174, which was reputed miraculous. In 176 he visited Syria and Egypt, and on his homeward journey passed through Athens, where he founded a chair of philosophy for each of the four sects, Platonic, Stoic, Peripatetic, and Epicurean. His ardent love of learning continued unabated in advanced age, and he cherished, amid the turmoil of war and the distractions of public life, his philosophic and philanthropic aspirations which are embodied in his "Meditations." His persecution of the Christians is explicable on the ground that he considered them atheists and fomenters of political dissension.

Antoninus Pius, or, more fully, **Ti'tus Aurelius Fulvius Boio'nus Ar'rius Antonin'us**, 86-161; Roman emperor; b. Lanuvium; son of Aurelius Fulvius; was chosen consul in 120, and having, as proconsul in Asia, distinguished himself by wisdom and equity, he was adopted by Hadrian, 138; ascended the throne in July of that year; and adopted as his successor Marcus Aurelius. His reign was so peaceful and prosperous that it furnishes scant history.

Antoninus, **Column of**, pillar in Piazza Colonna, Rome; combination of the Corinthian and Doric orders, and adorned with bas-reliefs of the victories Marcus Aurelius gained over the Marcomanni, in memory of which it was erected by the Roman senate.

Antoninus, **Wall of**, rampart or intrenchment raised in Scotland by the Romans under Lollius Urbicus, 139; extended from the Clyde to the Frith of Forth, 36 m. long and 20 ft. high, built of earth and stone. Its remains are called "Græm's dyke."

Anto'nus, **Caius Hybrida**, d. 44 B.C.; Roman consul; son of M. Antoninus, the orator, and uncle of Mark Antony, the triumvir; chosen consul as colleague of Cicero, 63 B.C.; did not earnestly coöperate with him in opposing the conspiracy of Catiline.

Antonius, **Marcus**, called **THE ORATOR**, 143-87 B.C.; Roman lawyer; grandfather of Mark Antony; became prætor, 104, and consul, 90 B.C.; attached to the aristocratic party; was assassinated by order of Marius; was perhaps the most eloquent Roman orator of his time. Eulogized by Cicero in his treatise "De Oratore" and in his "Brutus."

Antonius, **Marcus**, in English **MARK ANTONY**, surnamed **THE TRIUMVIR**, 83-30 B.C.; Roman general and politician; son of M. Antonius Creticus, and Julia, daughter of L. Julius Cæsar; obtained, abt. 57 B.C., command of the cavalry of Cabinius, in Syria and Egypt, and elected questor, 53 or 52; served in Gaul as legate, and displayed talent in several campaigns. Through Cæsar he was elected augur and tribune, 50 B.C. After the Civil War be-

gan, and Cæsar passed into Spain, he appointed Antony commander in chief of his forces in Italy. His eloquent funeral oration over the body of Cæsar excited such popular indignation against the conspirators that they were compelled to retreat from Rome. In 43 B.C. Antony was defeated in battle by the consuls Hirtius and Pansa at Mutina (now Modena). About this time he was denounced by Cicero in a series of orations, called "Philippics." Before the end of 43, Antony, Octavius, and Lepidus united to form a league (triumvirate) against the senate and the republicans, many of whom were put to death by the myrmidons of the triumvirs. At the instigation of Antony, Cicero was proscribed and killed. It was the military skill of Antony which defeated Brutus and Cassius at Philippi (42 B.C.), which rendered the triumvirs masters of the Roman world. Antony, who received for his share the Asiatic provinces and Egypt, now gave himself up to pleasure and luxury. He was so captivated by Cleopatra, queen of Egypt, that he neglected public affairs, while Octavius was marching with stealthy steps toward undivided power. Antony and Octavius were involved in a quarrel in 41, but they were formally reconciled in 40 B.C., and Antony married Octavia, the sister of his rival or colleague. He soon divorced Octavia and returned to his dalliance with Cleopatra. The conflict which had been postponed now became inevitable, and Antony was defeated at the naval battle of Actium, 31 B.C. He then retreated to Alexandria in Egypt; was deserted by his fleet; and reduced to desperate extremity, killed himself, 30 B.C.

An'tony, or An'thony, Saint, surnamed **AB-BAS**, 250-356; founder of monachism; b. Coma, Upper Egypt; reduced to poverty; passed many years in ascetic devotion and solitude in a desert; and founded a monastery near Fayoum (or Phaiûm) abt. 305. He opposed Arrianism; during the persecution of Christians, 311, he went to Alexandria to obtain the crown of martyrdom, but disappointed, he returned to the desert. Some of the letters of St. Antony are extant.

Antony, or Anthony, Saint, of Padua, 1195-1231; patron saint of animals; b. Lisbon; became a Franciscan monk, and preached at Toulouse, Bologna, and Padua, where he d. June 13, 1231. According to a legend, he once preached an eloquent sermon to the fish in the sea, because men would not listen to him. This sermon is extant. An abstract of it may be seen in Addison's "Remarks on Italy."

Antony of Bourbon, 1518-62; Duke of Vendôme and King of Navarre; b. Picardy; brother of Prince of Condé; married, 1548, Jeanne d'Albert, only child of the King of Navarre; lieutenant general of France, 1560; commanded the royal army in the civil war and was mortally wounded at Rouen; was father of Henry IV of France.

Ant'-thrush, or Ant'-catcher, bird of tropical and subtropical countries belonging to the family *Pittida*; feeds upon ants, and is nearly

allied to the fly-catchers. The name ant-thrush is also given to the members of the family *Formicariidæ*, a group of small, sober-colored birds comprising some 250 species, characteristic of the forests of tropical S. America; they feed largely on ants, and the approach of a band of foraging ants, *Eciton*, is usually announced by the calls and movements of small flocks of these birds.

Ant'werp, chief commercial city of Belgium and capital of the province of same name; on the Scheldt; 26½ m. N. of Brussels; is strongly fortified, and has a citadel built by the duke of Alva, 1567. Magnificent public buildings, numerous churches, stately and antique houses, and the profusion of ornamental trees, render the general appearance of the city very picturesque. Foremost among the public buildings is the cathedral, one of the largest and most beautiful specimens of late and florid Gothic architecture in Europe; has a tower and spire of extraordinary beauty, and contains the principal masterpieces of Rubens. The principal institutions are the Academy of Sciences, the Academy of Painting and Sculpture, a rich gallery of pictures, public library, and zoölogical and botanic gardens; has a good harbor, which will admit the largest vessels, has excellent railway connections with all parts of Europe, an extensive trade, and manufactories of black silk stuffs, cotton, linen, lace, carpets, sewing-silk, and printer's ink; was a city as early as the eighth century, and in the fifteenth and sixteenth was the center of European commerce. It was besieged and taken by the prince of Parma, 1835, soon after which, much of its commerce was transferred to Amsterdam. Pop. (1906) 304,032.

Anubis (ä-nū'bis), or **Ano'pu**, Egyptian god; represented as a son of Osiris, and in the form of a jackal, a dog, or a man with a jackal's head. His worship as god of funeral rites commenced in early Egypt, and continued till superseded by Christianity. The Greeks confounded him with Hermes, and called him **Hermanubis**.

Anvari (än'wä-rë), or **An'wari, Auhad ud-Din**, d. abt. 1200; Persian poet; b. Khorassan; is classed with Firdausi, Hafiz, and Saadi; wrote numerous lyrical poems, also some longer panegyrics.

Ao'nia, district of ancient Greece; in Bœotia; contained Mt. Helicon (the Aonian mount) and the fountain Aganippe; celebrated as favorite resort of the Muses, who were called *Aonides*.

A'orist, the name given to one of the tenses of the verb in some languages (as in the Greek) which expresses indefinite past time. It is



ANUBIS.

peculiarly adapted to the narrative style of writing.

Aor'ta, the large arterial trunk arising from the left ventricle of the heart, and giving origin directly or indirectly to all arteries except the pulmonary and its ramifications. The curve that it makes in the upper part of its course is called the arch of the aorta. The thoracic aorta extends from the arch to the diaphragm, where it takes the name of abdominal aorta, which in the lower part of the abdomen divides into the two iliac arteries, to supply the lower extremities. The thoracic aorta gives off the bronchial arteries to supply the tissue of the lungs. The abdominal aorta gives off a number of branches to the abdominal organs.

Aosta (ä-ös'tä), ancient *Augusta Prætoria*; town of Italy, province of Turin; on Dora River, 50 m. NNW. of Turin; has a Gothic cathedral, the remains of a Roman amphitheater and a triumphal arch. The valley of Aosta produces large forests of pine, and has mines of copper, silver, iron, and lead.

Apaches (ä-pä'chäz), tribe of N. American Indians, belonging to the Athabascan family; formerly very fierce; long resisted civilizing influences; now on reservations in Arizona, New Mexico, and Oklahoma; number about 7,000.

Apalach'ee Bay, large open bay near the N. part of Florida; part of the Gulf of Mexico, and 30 m. S. of Tallahassee; extends inland about 50 m.

Apalach'ees, tribe of N. American Indians, belonging to the Muskogean family; lived on the Florida bay bearing their name; formerly very numerous; disappeared as a tribe after 1722, probably absorbed in the Choctaw nation.

Apalachicola (äp-pä-läch-i-kō'lä), a river, formed by the union of the Chattahoochee and Flint, at the SW. extremity of Georgia; flows southward through Florida to Apalachicola Bay, a part of the Gulf of Mexico; length 100 m.; navigable for steamboats. The city of the same name is a port of entry and capital of Franklin Co., Fla.; 85 m. SW. of Tallahassee; has trade in timber and fish.

Ap'anage, or **Ap'panage**, in feudal law, an allowance to the younger sons of a sovereign or prince out of the revenues of the country, generally joined with a grant of the public domain. In England the duchy of Cornwall is an ap'panage of the prince of Wales, but the younger sons of the sovereign are dependent upon the liberality of Parliament.

Apcheron (äp-shä-rön'). See **APSHERON**.

Ape, any of the *Primates*, excepting the lemurs and man; in a more restricted sense, any of the old world tailless *Simiidae*, which includes the chimpanzee, orang-utan, gorilla, and gibbons. These apes are the most highly organized of the *Quadrumana*, and approach in structure nearest to man, from whom they differ principally in the smaller size of brain and brain-case, the larger canine teeth, the

relatively greater length of the arms, and the shorter great toe, which is opposable to the other toes. See **BABOON**; **MONKEY**.

Apega (äp-ä'ga), wife of Nabis, tyrant of Sparta, who made a machine outwardly resembling his wife but full of spikes within, which pierced every part of her body when her husband shut her in it; supposed to have suggested the "iron virgin," an instrument of torture used by the inquisition.

Apelles (ä-pél'éz), a Greek painter of the second half of the fourth century B.C.; probably a native of Colophon; studied art at Ephesus, but at Pella, Macedonia, formed an acquaintance with Alexander the Great. He is noted especially as the painter of an "Aphrodite Anadyomene" and an "Artemis in the Chase." His portrait of Alexander was put in the temple at Ephesus. All his works have perished, but many anecdotes are recorded of his power of rebuke and repartee. Once a shoemaker criticised a painting as showing a slipper with less ties than it ought to have had. Apelles accepted the correction, but when the man, emboldened by the success of his previous criticism, began to find fault with a leg, Apelles indignantly replied: "*Ne sutor ultra crepidam*" (Let not the cobbler go beyond his last).

Ap'ennines, chain of mountains extending the length of the Italian peninsula, and forming the watershed between the Adriatic and the Mediterranean seas; belongs to the system of the Alps, from which it branches off near the Col de Tenda; length, about 800 m.; general direction nearly SE.; no summits reach perpetual snow line; highest is Monte Corno, which has an altitude of 9,546 ft., but Mt. Etna, regarded by some as belonging to the Apennine system, is 10,935 ft. high; average height of the chain is about 4,000 ft. The geological formations of the Apennines are either metamorphic or secondary, and limestone is the predominant rock. They are remarkable for the celebrated marbles of Carrara, Seravezza, and Siena.

Ape'rients, remedies to act upon the bowels in constipation. They may be divided into saline and vegetable aperients. Of the salines, the mineral waters, such as Hunyadi, depend for their action upon the sulphates of sodium, magnesium, or lime, either alone or combined. Glauber's salts, Epsom salts, or Rochelle salts may be substituted for the more costly mineral waters. Salines should be taken when the stomach is empty, and are usually preferred on rising, about an hour before breakfast. There are many vegetable aperients, the best probably being cascara sagrada. An excellent combination is $\frac{1}{2}$ gr. aloin, $\frac{1}{2}$ gr. extract of belladonna, $\frac{1}{2}$ gr. strychnine, one to three of these pills being a dose. A vegetable laxative acts slowly and should be taken preferably at bedtime. When habitually used, aperients lose their power over the individual, so they should be changed from time to time. Their use in chronic constipation should be avoided as long as possible, the constipation being overcome by proper

food and habits of life. Food with a large proportion of non-nutritious material acts as a laxative, by its bulk stimulating the intestines. Thus bran bread, oatmeal, whole-wheat flour are laxative, while milk and meat are constipating. Water has laxative power, and a pint of hot water taken at bedtime or on rising often acts satisfactorily. Enemata of water may also be used, but regular habits, exercise, and proper food are to be preferred to any medicines. See CATHARTICS; PURGATIVES.

Apha'sia, a defect of the power of speech due to brain disease, as distinguished from aphonia, the loss of phonation through external disease, as of the vocal cords or larynx. Aphasia results when the portion of the left side of the brain, especially devoted to the function of speech, becomes diseased, as by apoplectic hemorrhage. There are many grades of aphasia, from speechlessness to the slightest hesitation. There may be a confusion or misplacing of words, or ability to speak may be limited to the repetition of memorized sentences. Aphasia is not a disease, but a symptom of many diseases. In some cases, by re-education other parts of the brain assume the function, and power of speech is partially regained.

Aphelion (ä-fë'lî-ôn), that part of a planet's orbit which is the most distant from the sun, and is opposite to the perihelion, or the point nearest the sun.

Aphides (ä-fî-dëz), singular *aphis*, a plant-louse, hemipterous insects of the family *Aphididae*; inhabit trees and plants, on the juices of which they feed; remarkable for their saccharine secretion, known as honey-dew, produced by a pair of small tubes near the hinder end of the body. Ants have a special fondness for this substance, and often may be seen milking the aphides — that is, stroking the sugar tubes with their antennæ to induce them to furnish the fluid more abundantly.

Apho'nia, more or less complete loss of the power to utter sounds. This may arise from disease or paralysis of the larynx, or from functional disease, as hysteria or chorea. As a general rule, aphonia is tem-

porary, unless there is a serious organic change in the tissues of the larynx.

Aphrodite (äf-rö-dî'të). See VENUS.

Aphtharto-Docetæ (ä-thä'r'tö-dö-së'të), literally, "believers in (that which is) incorruptible"; the followers of Julian of Halicarnassus, abt. 520, who taught that the body of Christ was divine and incorruptible.

Apia (ä'pë-ä), chief town of Samoan island of Upolu, belonging to Germany under treaty of 1899 with the U. S. and Great Britain, following native tribal outbreak forcibly suppressed by two last nations; has small, and usually safe, harbor, but where several German and American warships were wrecked in hurricane, 1889.

Apian (ä'pë-än), or **Ap'pian** (properly, BIENEWITZ), Peter, 1495-1552; German astronomer and mathematician; b. Leisnig, Saxony; became Prof. of Mathematics at Ingolstadt abt. 1527; gained distinction by his work on cosmography; and first proposed the method of ascertaining longitude by lunar observations.

Apicius (ä-pîsh'ûs), Marcus Gabius, Roman epicure; name proverbial for gluttony; according to Seneca, he expended more than \$3,600,000 for rare dishes, and then discovering that his fortune was reduced to about \$360,000, poisoned himself, because he could not continue his expensive style of living.

Apiculture (äp'î-kül-tür). See BEE.

A'pis, bull of Memphis, the favorite object of worship of the ancient Egyptians, as early as the second dynasty; he was a symbol of Osiris, and was not permitted to live more than twenty-five years, when he was secretly put to death by the priests. During his life he was kept in the temple of Ptah in Memphis, and served by a retinue of priests.

Apo (ä'pö), a noted volcano in Mindanáo, Philippine Islands, though active, has not been in eruption for some time.

Apocalypse (ä-pök'ä-lîps), literally, revelation; usually the last book of the New Testament, which contains discoveries or predictions respecting the future of Christianity.

Apocalyp'tic Num'ber, mystical number 666 spoken of in the book of Revelation: "Let him that hath understanding count the number of the beast: for it is the number of a man" (xiii, 18). Some critics interpret this to be an enigmatical expression of the word *Latinus*, the Greek characters of which, taken as numerals, amount to 666. The connection between *Latinus* and the Roman power has given Protestants a reason, or pretext, to apply this passage to the Roman Church, and Catholics retort by making the same number stand for Luther, Calvin, and other Protestants. Interpreted, according to its value in Hebrew characters, as meaning Nero.

Apocrypha (ä-pök'ri-fä), collection of writings which have been regarded as an appendage to the Old Testament, and sometimes as a part of it; valuable as historical records,



APHIDES

and for the light they throw on the religious condition of the Jews from the close of the Old Testament to the Christian era; divided into three classes: (1) those which originated in Palestine, such as the Book of Jesus, son of Sirach, Maccabees I, and Book of Judith; (2) those of Egypto-Alexandrian origin—the Book of Wisdom, Maccabees II, and the addition to Esther; (3) those which show traces of Chaldaic or Persian influence, as Esdras, Tobias, Baruch, and the additions to Daniel. See BIBLE.

Apocynaceæ (ä-pös-I-nä'shë-ä), a family of dicotyledonous plants, including herbs, shrubs, and trees, generally with a milky juice. A drastic, purgative, or poisonous principle is common, and the milky juice of some species yields caoutchouc. Common representatives are the dogbanes (*Apocynum*), oleander (*Nerium*), and periwinkle (*Vinca*). In the tropics, where most of the species occur, some of the trees have considerable value as building material.

Ap'ogee, the point of the moon's orbit most remote from the earth (253,000 m.); the point which is opposite to the perigee (222,000 m.). The apogee of the lunar orbit advances eastward among the stars, and completes a revolution in nine years.

Apollina'ria, or **Apollina'rius**, the Young'er, d. 390 A.D.; bishop and philosopher; son of a grammarian of the same name; became bishop of Laodicea, 362, and gained distinction as an orator and writer. Among his works were "Thirty Books against Porphyry," and commentaries on the Bible. He was an opponent of Arianism, and, 375, founded the sect of Apollinarians. His heresy was the denial of the human soul in Christ, the place of which, he taught, was supplied by the Logos.

Apollinaris Sido'nus, **Saint Gaius Sollius**, abt. 430-480 A.D.; Latin poet and ecclesiastic; b. Lugdunum (Lyons), Gaul; was a son-in-law of Avitus, Emperor of Rome (455-58); appointed prefect of Rome, 468; elected bishop of Clermont abt. 470; wrote "Carmina" and "Epistole," which are extant and have some historical value.

Apollinaris Spring, source of true Apollinaris water; in the valley of the Ahr, near Remagen, Rhenish Prussia. The water is drawn from a deep rocky source at a depth of 50 ft., and the carbonic acid it contains is that contained by water at that depth.

Apol'lo, or **Phœ'bus**, in Grecian mythology, a god, son of Jupiter and Latona, and twin brother of Diana; represented as an archer who inflicts vengeance with his arrows, as a god of song and stringed instruments, as a revealer of the future, and as a god of flocks. In the later poets he is the same as the god Helios, or the sun, and a patron of the healing art. The most celebrated places of his worship were Delphi and Abœ in Phocis, Ismeniam near Thebes, Delos, and Patara in Cilicia.

Apollodo'rus, surnamed **THE SHADOWER**; celebrated Greek painter; b. Athens abt. 440 B.C.;

rival of Zeuxis, and reputed inventor of chiaro-scuro; Pliny says he was the first to paint objects as they really appear.

Apollodorus of Ath'ens, grammarian and historian of the second century B.C.; was pupil of Aristarchus; only fragments of his works remain; to him is attributed a manual of mythology entitled "Bibliotheca," a large part of which is extant.

Apollodorus of Damas'cus, lived abt. 100 A.D.; architect; b. Damascus; was patronized by Trajan, and erected in Rome numerous works, including the Basilica Ulpia, the Forum of Trajan, and the Column of Trajan. His capital work was a bridge over the Danube; he was put to death by Hadrian, for criticising a temple which that emperor had designed.

Apollo'nus, Athenian sculptor; son of Nestor; nothing is known about him except that he executed the marble statue of Hercules, of which a large fragment, called the "Torso of the Belvedere," is now in Rome. It is one of the most important pieces of ancient sculpture.

Apollonius, surnamed **PERGÆUS**, Greek geometer; b. Perga, Pamphylia, abt. 250 B.C.; wrote a "Treatise on Conic Sections," in eight books; also distinguished as an astronomer.

Apollonius of Rhodes, 280-203 B.C.; Alexandrian epic poet; b. Alexandria or Naucratis; pupil and afterward the enemy of Callimachus; betook himself to Rhodes, whence his surname; after the death of his rival, returned to Alexandria. His "Argonautica" (Story of the Argonauts) shows learning, ingenuity, and command of epic diction.

Apollonius of Tya'na, abt. 30-70 A.D.; Pythagorean philosopher; b. Tyana, Cappadocia; went to India to learn the doctrines of the Brahmans, and after his return gained a high reputation as a sage, oracle, and worker of miracles; is considered by some authors as an impostor, and by others as a prophet or magician of extraordinary powers.

Apollyon (ä-pöl'yün), destroyer; name answers to the Hebrew *Abaddon*, and to the *Asmodeus* of Tobit. See BEELZEBUB; DEVIL; SATAN.

Apologet'ica, the formal defense of a person, a doctrine or a religion which has been attacked. It does not, as in popular use, imply an acknowledgment of error. It is used principally to designate the literary defense of Christianity.

Apologue (äp'ö-lög), a story or relation of fictitious events intended to convey some useful truths. It differs from a parable in that the latter is drawn from events that pass among mankind, whereas the apologue may be founded on supposed actions of brutes or inanimate things. Æsop's fables are good examples of apologues. See FABLE; PARABLE.

Apol'ogy of the Augs'burg Confes'sion, one of the symbolical books of the Lutheran Church, written by Melancthon in answer to the

"Confutation of the Augsburg Confession," by the Roman Catholic theologians Eck, Faber, Wimpina, and Cochlaeus; published 1531.

Apoplexy, sudden failure of volition, sensation, motion and mental action due to pressure upon the brain or disturbance of the circulation originating within the cranium. In the common form there is hemorrhage into the substance of the brain, commonly by rupture of the lenticulo-striate artery (hence called the "artery of hemorrhage"), the rupture being usually due to fatty degeneration caused by bad nutrition, etc., or a brittle condition resulting from inflammation. The apoplectic stroke may end in speedy death or partial recovery with paralysis often on the side opposite that in which the hemorrhage has occurred. The symptoms of apoplexy are usually unheralded, the patient falls suddenly, his breathing becomes long and slow, and one or both of his pupils is small. Such cases are often mistaken for the coma due to alcoholic excess. The patient should be kept absolutely still to prevent further bleeding into the brain, an ice bag should be applied to the head, and the blood pressure quickly decreased by drastic purges, such as croton oil, unless the heart is weak and the face pale, when stimulants should be given. The popular idea that apoplexy occurs in a series of three attacks or strokes, the last of which is invariably fatal, is not founded upon any clinical or scientific evidence, although of course each succeeding attack makes the patient less able to recuperate.

A Posteriori (ā-pōs-tē-ri-ō'ri) and **A Priori** (ā-prī-ō'ri); before time of Kant the former of these terms denoted a reasoning from effect to cause, and the latter a reasoning from cause to effect. Since Kant's time, they are generally used more in relation to the doctrine of knowledge; a *posteriori* knowledge being empirical knowledge, or knowledge through experience, and a *priori* knowledge being rational knowledge, or a knowledge through the reason, of that which is prior to experience.

Apos'tle, literally, "one sent," especially, a "delegate." In the New Testament the term is applied (1) to men divinely sent before Christ (Luke xi, 49); (2) to Christ himself (Heb. iii, 1); and (3) to church delegates—very much in the Philonian sense (Rom. xvi, 7; II Cor. vii, 23; Phil. ii, 25). The common application is (4) to the twelve whom Jesus chose (Luke vi, 13), *viz.*: Simon Peter, Andrew, James, John, Philip, Bartholomew (Nathanael), Thomas, Matthew, James the son of Alphaeus, Thaddeus, Simon the Canaanite, and Judas Iscariot.

Apostles, Acts of the, fifth book of the New Testament, written by Luke, containing the history of the period from the ascension of Christ to the first captivity of Paul in Rome; probably from 30 to 63 A.D.

Apostles' Creed, called also the Creed or Confession of Faith; the most used creed of the Christian Church. According to a tradition prevailing in the fourth century, but now generally discredited, this creed was composed by

the apostles themselves, each contributing one of the articles.

Apostles' Islands, group of twenty-seven islands in Lake Superior, 70 m. W. of Ononagon, belonging to Wisconsin; principal ones, Ile au Chêne, Madeline, Bear, Stockton, and Outer; area, 200 sq. m.; brown sandstone largely quarried and exported; Jesuit missions early established and French settlements made, 1680. Lapoint, on Madeline Island, is the only town of importance.

Apostol'ic, or **Apostol'ical**, derived from, or bearing the character of, the apostles. The Roman Catholic Church styles itself the Apostolic Church, and calls the papal chair, the Apostolic chair, recognizing the pope as the lineal successor of Peter, the head of the apostles. The Church of England claims to be apostolic in virtue of regular succession from the apostles through the Church of Rome. The Protestant Episcopal churches of Scotland and the United States base their titles to be apostolic on their original connection with the Church of England.

Apostolic Can'ons and Constitu'tions, notes of ecclesiastical customs regarded as apostolical. The Constitutions contain a comprehensive rule for a Christian life and are supposed to have been written about the end of the third century. The Canons were composed later. The Constitutions have been ascribed to Clement of Rome. In them, "the apostles are represented as communicating to Clement their ordinances and directions for the future administration of the church." The Canons "may be regarded as a corollary to the Constitutions."

Apostolic Fa'thers, disciples and fellow-laborers of the apostles, especially those who have left writings. They are Barnabas; Clement of Rome; Ignatius, bishop of Antioch; Polycarp, bishop of Smyrna; Hermas; and Papias of Hierapolis. Some also include the author of the epistle to Diognetus.

Apostolic Maj'esty, title of the kings of Hungary; first conferred on the duke of Hungary by Pope Sylvester II, 100 A.D. The title was renewed, 1758, by Pope Clement XIII in favor of Maria Theresa.

Apostolic Par'ty, party of Spanish Catholics, formed abt. 1820 for the promotion of an absolutist political policy; absorbed by the Carlists, 1830.

Apostolic Succes'sion, uninterrupted succession of bishops, priests, and deacons (the apostolic orders) from the first apostles down to the present day. See **POPE**.

Apostol'ici, or **Apostolic Breth'ren**, a sect of religious reformers who originated in Italy in the latter part of the thirteenth century, led by Gherardo Segarelli, of Parma; renounced worldly ties, property, etc. Segarelli was burned as a heretic, 1300; Dolcino succeeded him, but also perished at the stake, 1307.

Apostool (ā-pos-tōl'), **Samuel**, 1638-1700; Dutch Mennonite theologian; became minister of a Waterlandian congregation in Amsterdam,

1662; engaged in a doctrinal dispute with Galenus which divided the church into two sects, Apostoolians and Galenists.

Apos'trophe, in rhetoric, digressive address; figure of speech by which the orator suddenly changes the course of his oration, and addresses with emotional emphasis a person present or absent, or some inanimate object.

Apoth'ecary, one who compounds and sells medicines, and makes up medical prescriptions. In the U. S. the vocation of the apothecary is usually distinct from that of the medical practitioner. Among physicians it is generally regarded as contrary to professional ethics for a practitioner to be directly interested in the retailing of medicines. The education of pharmacists has greatly advanced of late years. Most of them are now graduates of colleges of pharmacy wherein excellent scientific and practical training is obtained. There is also a well-organized national pharmaceutical association. To limit the danger connected with the unskillful dispensing of drugs, a law has been put in force in nearly all states requiring all apothecaries to pass a rigid examination.

Apotheosis (ăp-ô-thĕ'ô-sis), Greek word meaning deification, or the practice of raising a human being to a place among the gods; common among the ancient Greeks.

Apotheosis of Augustus, name of the largest cameo in the world, carved on a sardonyx nearly a foot wide, and containing twenty-six figures, including Augustus, Æneas, Cæsar, Tiberius, and Caligula; made in Rome; now in Cabinet of Medals, Paris.

Appalachian (ăp-ă-lă'chĭ-ăn) **Moun'tains**, chain of mountains traversing the E. part of the U. S. from Maine to Alabama; composed for the most part of a large number of ridges or small ranges, parallel with one another, with the Atlantic coast, and with the axis of the chain; general trend is SW.; prominent members of the chain are the White Mountains of New Hampshire, Green Mountains of Vermont, Adirondack and Catskill mountains, the Highlands of New York, and Allegheny Mountains of Pennsylvania and W. Virginia. In part of Pennsylvania and in Virginia the most easterly range is called the Blue Ridge, and in N. Carolina this region adjoins a broad mountain mass, the Great Smoky range, including the highest peaks of the chain. The culminating points are Mt. Mitchell, N. C., 6,688 ft., and Mt. Washington, N. H., 6,293 ft. S. of New York the subordinate ridges are remarkably uniform in outline and height, and in general long and closely parallel; and they are separated by valleys equally long, parallel, and simple in configuration. One valley, broader than the others, extends from Alabama to Pennsylvania. It is known as the Coosa Valley, the Great Valley of Tennessee, the Great Valley of Virginia, and the Cumberland Valley, and is sometimes called collectively the Great Appalachian Valley. If we date the Appalachians from the folding of their strata, they are among the older of the mountain systems of the earth; if we date them from the

time of their relieving and final sculpture, they are comparable in age with the Sierra Nevada, the Alps, and the Rockies.

Ap'panage. See APANAGE.

Appar'itor, among the ancient Romans one of the officers or public servants who attended the magistrates and judges; included heralds, lictors, scribes, etc., in England an officer of an ecclesiastical court whose duty it is to summon persons to appear before the judge; also applied to the beadle of a university, who carries the mace, as well as to a messenger of a spiritual court, who serves its process.

Appeal, word meaning the removal of a cause from an inferior to a superior court for the purpose of obtaining a review and retrial of the case. It differs from a *writ of error* and a *certiorari*, inasmuch as they merely bring up for review the questions of law involved in the proceedings in the lower court, while by an appeal the questions both of law and fact may be reëxamined. In a popular sense, the word signifies the removal of a cause, or of a proceeding in a cause, from an inferior to a superior court for the purposes of review, by whatever means effected. Codes of procedure in a number of states abolish writs of error in civil cases, and establish a review by appeal in all actions, whether of a common-law or equity nature. The word "appeal" is used in parliamentary law to indicate the mode of questioning the decision of the presiding officer as to a parliamentary rule.

Appendicitis (ăp-pĕnd-i-sĭ'tis), inflammation of the vermiform appendix; the exciting cause being usually the colon bacillus. Foreign bodies, such as grape seeds, though found in the appendix are not now believed to be important causes of appendicitis. It may be brought on by lifting heavy weights or by a fall or a blow, or by indiscretions of diet, aided by any cause which lowers the general vitality. The appendix becomes swollen and filled with pus, and if it ruptures general peritonitis results unless the process is limited by inflammatory exudates. The onset is usually abrupt, with tension of the abdominal muscles, and pain in the right side which the patient tries to alleviate by drawing up the right knee. There may be vomiting, with chills and fever, while a sudden collapse shows that the appendix has ruptured. Recovery is the rule, but there is a constant tendency to relapses, so that the removal of the appendix is justified if the pain has continued forty-eight hours. There is no medicinal treatment for appendicitis, and the aseptic precautions of modern surgery render the risk in an early operation extremely small. About 2 per cent of all deaths are caused by appendicitis, which is a disease of young people, for 60 per cent of cases occur between the ages of sixteen and sixty. See VERMIFORM APPENDIX.

Appercep'tion, as used by Leibnitz, knowledge that brings with it a reflection of the mind upon itself by which we know such objects as the ego, the soul, self-existence, true

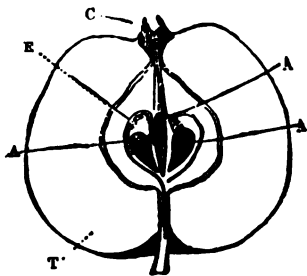
substances, spiritual being, immaterial things and truths. Apperception stands for what we understand and perception for what we only see. It is not what we perceive but what we apperceive that educates us. See PERCEPTION.

Appian (ăp'pî-ăn) of **Alexan'dria**, Greek historian of the second century; b. **Alexan-dria**; procurator and imperial treasurer at Rome; wrote a Roman history in twenty-four books, eleven of which are extant.

Appiani (ă-pĕ-ă'nĕ), **Andrea**, 1754-1817; Italian painter; b. **Bosizio**; imitated the style of **Correggio**; excelled in fresco-painting; became court painter to **Napoleon** abt. 1805; masterpieces include frescoes in royal palace and the cupola of **Santa Maria**, **Milan**.

Ap'pian Way, one of the great highways leading from ancient Rome, and the most famous of all because probably the first that was well and thoroughly constructed, and because it was lined with tombs and monuments for several miles outside of the walls. It was laid out by **Appius Claudius Cæcus**, 312-07 B.C.; and extended originally from Rome to **Capua**, 125 m., but was eventually continued to **Brundisium**. It was built in a very thorough manner, and was paved with large polygonal blocks of the hardest stone, accurately fitted to each other, so as to appear like a solid mass. The substructure was solidified by cement. The road has been partially restored by excavation, and is found to be in a remarkable state of preservation.

Ap'ple, the fruit of a tree, *Pyrus malus*; belongs to the rose family; supposed to be a



SECTION OF A FULLY FORMED APPLE. A, seeds in seed-box or core, E, C, the calyx end; T, the pulp.

native of SW. Asia and of a large part of Europe; has been cultivated from time imme-



SECTION OF AN APPLE BLOSSOM, SHOWING HOW THE APPLE BEGINS TO FORM.

morial. There are many species of wild apple in America, two of which (*Pyrus cor-*

onaria and *P. Ioensis*) appear to possess some value as possible fruit-plants. Another type of native apple, which has already gained some prominence, is that represented by the **Soulard crab**, which has been recently described under the name of *Pyrus Soulardi*, but which may be a hybrid between the common apple, and *Pyrus Ioensis*. The apple is the most important fruit of temperate climates, and adapted to a large area of N. America, where it occupies a larger acreage than any other fruit. In 1900 the U. S. census reported a total of 201,794,764 bearing trees, and a production of 175,397,626 bushels. The leading apple districts of N. America are those comprising the middle and S. New England States, New York, and Michigan, the **Annapolis Valley** of Nova Scotia, a large area of the Prov. of Ontario, the middle altitudes the Alleghenies in Virginia and southward in the Carolinas, the central area comprising Missouri, Kansas, and NW. Arkansas, and a large area in the Pacific Northwest, including the states of Oregon and Washington.

Apples of Sod'om, fruit mentioned by **Josephus** and other ancient writers as growing near the **Dead Sea**; fair in appearance, but when grasped in the hand-collapsing into dust and ashes.

Appleton, capital of **Outagamie Co.**, Wis.; on the lower **Fox River**, which here has a fall of 49 ft., affording water-power; seat of **Lawrence Univ.** (Methodist Episcopal); manufactures machinery, flour, pulp, and woolen goods. Pop. (1900) 17,000.

Appleton, **Daniel**, 1785-1849; founder of publishing house of **D. Appleton & Co.**; b. **Haverhill**, Mass.; engaged in dry goods business there and later in Boston; removed to New York, 1825, and established what became one of the largest publishing houses in the world; carried on by his sons and grandsons till 1897, when it became a corporation.

Appoggiatura (ă-pöd-jă-tô'ră), Italian musical term indicating insertion of one or two "passing notes" in a melody. These notes are printed in a smaller character than the notes of the melody itself.

Appomat'tox, river of SE. Virginia; rises in **Appomattox Co.**; enters the **James River** at **City Point**; length, estimated 150 m.; navigable to **Petersburg**. There is also a village of that name which was the former capital of **Appomattox Co.**, Va.; 20 m. E. of **Lynchburg**; here **Lee**, with the Confederate army of N. Virginia, surrendered to **Grant**, April 9, 1865. Of this army only 27,805 remained. The rest had been killed and taken prisoners, or had deserted, during the battles around **Richmond**, and after its evacuation on the 2d. There were delivered 350 wagons, about 10,000 muskets, and 30 pieces of artillery.

Apponyi (ăp-pön'yî), **Albert George** (Count), 1846- ; Hungarian statesman; son of **Count George Apponyi**; entered political life as a member of the extreme clerical conservative party; subsequently became a leader of the

nationalists; president Hungarian chamber, 1902; resigned and joined the opposition, 1903; worked against Count Tisza's plan for dealing with obstruction; joined the independents, 1904; and with Francis Kossuth and Julius Andrássy led the opposition in the contest with the emperor-king on the relations of the two parts of the Austro-Hungarian monarchy, 1905-06; minister of public worship and education, 1906.

Apportionment, determination, by an act of Congress, of the total number of members to be sent by all the states of the Union, and also the number that each state shall send, to the House of Representatives. A new apportionment is made after each decennial census. The same term is applied to the act by which a state legislature distributes among the counties their respective portions of representation. A populous county often forms a district by itself, and elects several members, while another district is formed by the union of two or three thinly populated counties. Those of the dominant party of the state sometimes so contrive the apportionment that they gain an advantage in the election, by forming districts in each of which a county that gives a majority against them is joined to one that gives a larger majority for their side. This is called gerrymandering.

Appren'tice, a person, ordinarily a minor, bound in due form of law to another to learn some art or trade, usually, if male, till the age of twenty-one; if female, till eighteen. The master in many respects stands in the relation of a parent; he must teach the apprentice the art, give him reasonable support, provide for him in case of sickness, and may administer reasonable corporal punishment. The apprentice must render faithful service and obedience. This relation may be dissolved by magistrates, where the object of the apprenticeship has failed, and in some cases the apprentice may be punished for willful neglect. At present the term apprentice does not generally imply the close personal relation to the master that it did in old days, but means one learning a trade under certain terms and conditions.

Approach'es, in military usage, the system of works employed in the approach by siege, of a fortification; consists of enveloping trenches called parallels, and trenches of communication called *boyaux* or zigzags.

Apraxin (ä-präx'in), Feodor Matveievitch, 1671-1728; Russian admiral; the creator of the Russian navy; built several ships of war, became an admiral and president of the admiralty, 1707; took Viborg from the Swedes, 1710; commanded a fleet in the war against Sweden.

Apricot, fruit (*Prunus Armeniaca*) intermediate between the peach and the plum, having a small, thin, slightly furrowed stone, a firm, sweet flesh, and a pubescent exterior; has been cultivated from the earliest times, is probably a native of China; is considered one of the most delicious fruits of temperate climates.

It is grown throughout temperate Europe, and in the U. S. its culture has assumed great im-



APRICOT—FRUIT, FLOWER, AND PIT.

portance in California and portions of the country adapted to it.

Apries (ä'prī-ēs), king of Egypt of the twenty-sixth dynasty, called in the Bible Pharaoh-Hophra; son of Psammetichus II; reigned 588-69 B.C. His subjects revolted and killed him, and Amasis then obtained the throne.

April, the fourth month of the year; derived from the Romans; in the early age of the Roman republic, it was the second month.

April Fool's Day, name given to the first of April, from the custom of playing tricks upon people or sending them upon bootless errands on that day.

A Prio'ri. See A POSTERIORI.

Apsheron (äp-shä-rön'), **Apcheron'**, or **Abcheron'**, peninsula which extends into the Caspian Sea at the S. extremity of Daghestan; forms the E. termination of the Caucasus; famous as the place of the sacred flame. Large quantities of naphtha are procured here.

Apsides (äp'si-dēz), plural of **Ap'sis**, two points in the orbit of a primary planet which are at the greatest and the least distance from the sun, corresponding to the aphelion and perihelion; also applied to the extreme points in the orbit of a satellite, which in the case of our moon are the same as the apogee and perigee. The straight line connecting them is called the line of the apsides.



APTERYX.

Ap'teryx, genus of flightless birds, peculiar to New Zealand; term used as a common name as much as the native name, kiwi-

kiwi; birds of this genus represent also the family *Apterygidae* and order *Apteryges*.

Apuleius (ăp-ŭ-lĕ'yŭs), **Lucius**, b. abt. 130; Latin Platonic philosopher and satirical writer; b. Madaura, Africa; chief work, "Metamorphoses, or the Golden Ass," a fantastic and satirical romance, which is of importance for the history of manners.

A'qua (plural **Aquæ**), in pharmacy, spring-water, or natural water in its purest attainable state; compound of oxygen and hydrogen.

Aqua For'tis, name given to nitric acid by the alchemists; is still its commercial name.

Aqua Ma'rine, sea-green or blue-tinted beryl.

Aqua Re'gia, mixture of nitric and hydrochloric acids; dissolves gold; product is auric trichloride.

Aqua Regi'næ, mixture of concentrated sulphuric and nitric acids, or of sulphuric acid and niter; used as a disinfectant.

Aqua Tofa'na, a secret poison, ascribed to a Sicilian woman, Tofana, who lived abt. 1650-1730; supposed to have been a solution of arsenic.

Aqua'rians, sect of Christian ascetics founded in the second century by Tatian, who consecrated water for sacramental purposes.

Aqua'rium (plural **Aquaria**), glass tank or vessel containing water, in which living aquatic animals and plants are kept for study. It



FRESH-WATER AQUARIUM.

must contain both animals and plants in something like a due proportion, as the animals depend for breath on the oxygen which is given out by the plants, and the latter are nourished by the carbonic-acid gas which the animals exhale.

Aqua'rius (water-bearer), eleventh sign of the zodiac, into which the sun enters abt. January 20th; is also the name of a constellation which coincided with that sign at the time when the signs were named, but in consequence of the precession of the equinoxes is now in juxtaposition with Pisces.



AQUARIUS.

A'quatint. See ENGRAVING.

Aqueduct, artificial construction for bringing water from a distance for the supply of cities or to convey the water of canals of nav-

igation and of irrigation, and of mill-races, at an elevation across deep valleys or streams. There are remains in Persia and Syria of structures which are supposed to have been intended for aqueducts. Recent discoveries of wells and conduits cut in the rock about Jerusalem appear to establish the fact of their having been a system of water-supply for that city from Bethlehem and Hebron. The Romans appear to have been the first to construct extensive and durable aqueducts, for the supply of Rome, beginning abt. 500 B.C. and continuing until the fall of the Roman Empire. The Appian aqueduct, attributed to Appius Claudius Cæcus, is said to have been completed, 311 B.C., after the building of the Appian Way. The Aqua Augusta was later added to this; the Anio Vetus, built 272 B.C. by Manius Curius Dentatus, brought its supply from near Augusta, 43 m. from Rome; and was almost entirely subterranean; the Aqua Marcia, 145 B.C., built by the prætor Quintus Martius Rex. was 37 m. long, of which 6 m. were on arches still visible, crossing the Campagna by the Frascati and Albano roads; Aqua Tepula (126 B.C.), by Cneius Servilius Cæpio and Cassius Longinus, is 10 m. long; its channel can still be seen in connection with the channels of the Aqua Marcia and Aqua Julia; Aqua Virgo, built by Augustus; course mostly subterranean, about half a mile only being on arches; Aqua Alsietina, 30 m. in length, built by Augustus; now supplies the fountains of the Piazza of St. Peter's and the Paolina fountain; Aqua Claudia, built by Caligula and Claudius (36-50 A.D.); sources were near Agosta, about 38 m. from Rome; course over 46 m. in length, of which 36 were below the surface and 10 were on arches, which now brings to Rome the Aqua Felice from the springs near the Osteria dei Pantani; supplies the Fontana dei Termini, near the railroad depot in the Baths of Diocletian; the fountain of the Triton, that of Monte Cavallo, and some others; Anio Novus, also by Claudius, the longest of the ancient aqueducts, having a course of 62 m., 48 of which were underground.

In the U. S. the first important aqueduct was that for supplying water to New York City from the Croton River, a distance of about 40 m. The first aqueduct, built 1837-41, is still in use, and an additional one was constructed between the same points 1885-90. The first Croton aqueduct is carried across the Harlem on a bridge 1,460 ft. long, supported by fifteen arches. There is under construction at present an aqueduct from the Catskill Mountains to New York City which, when completed, will be capable of supplying the city daily with 700,000,000 gallons of pure mountain water. In the case of Chicago and other cities on the Great Lakes pure water is obtained by means of tunnels built out under the lakes. The Chicago tunnels extend 4 m. under Lake Michigan. See WATER WORKS.

A'queous Hu'mor. See EYE.

Aquila, constellation in Milky Way near the equator, and on its N. side; seen on the meridian during the evenings of August and September.

Aquila, Kaspar, 1488-1560, German Protestant theologian; b. Bavaria; assisted Luther in the translation of the Old Testament and was outlawed by Charles V.

Aquila of Pontus, author of an extremely literal Greek translation of the Hebrew scriptures (abt. A.D. 130). His version was embodied by Origen in his "Hexapla."

Aquila ("eagle"), principal ensign of the Roman legion made of silver or bronze, and with expanded wings. It was a sacred object by which the soldiers swore allegiance to their commanders. In camp it was kept in a shrine



AQUILIFER.

or sanctuary at headquarters; in battle it was under the special care of the first centurion; its loss was regarded as a dire calamity and disgrace. The bearer of the eagle, *aquilifer*, was always chosen for strength and courage.

Aquilaria (äk-wī-lä-rī-ä'cē), family of exogenous plants, all of which are trees and natives of the tropical parts of Asia; order comprises only ten known species, one of which produces the fragrant aloes-wood.

Aquileja (ä-kwi-lä'yä). **Aquile'ia**, or **Ag'lar**, village of the Austrian coastland, near the Adriatic, 16 m. SW. of Gorz; occupies part of the site of ancient Aquileia, founded abt. 182 B.C. by the Romans; an important emporium of trade and a military post at the E. extremity of Cisalpine Gaul. Maximin, who besieged it, was slain here; Attila razed it; Narses retook and partly rebuilt it. It was a patriarchate from the sixth century till 1751.

Aquinas (ä-kwi'näs), **Thomas**, surnamed the "ANGELIC DOCTOR"; 1127-74; saint of the Latin Church, of noble Italian family; became

a Dominican; a pupil of Albertus Magnus at Cologne; taught theology in Paris. His school was thronged with students, and crowds waited upon his preaching; recalled by Urban IV to Italy 1261; taught in Naples, Rome, Bologna, and Pisa; ranked with the four great doctors of the Western church. His "Summa Theologiae" and other works are largely used in Roman Catholic theological schools.

Aquitaine (äk-wē-tän'), SW. division of ancient Gaul, between the Garonne, the Pyrenees, and the Bay of Biscay; formerly an independent Frankish duchy; united with the French Crown by the marriage of Eleanor of Aquitaine with Louis VII, 1137; transferred to England by her subsequent remarriage with Henry Plantagenet; after long conflicts recovered by France, 1453; name became corrupted into Guienne in the thirteenth or fourteenth century. The ancient inhabitants were Iberian tribes.

Arabesque (är-ä-bësk'), in the Arabian style or manner; the fantastic decoration which was employed in the architecture of the Arabs and of the Moors in Spain.

Arabgir (är-äb-gür'), or **Arabkir'**, city of Asia Minor, on the Arabgir-Su, and on the road from Aleppo to Trebizond, 100 m. ESE. of Siwas; has considerable trade, and a large community of Protestant Armenians. Pop. 25,000 to 30,000.

Arabia (ä-rä'biä), peninsula forming the extreme SW. part of Asia; encompassed by the sea on all sides except the N.; bounded N. by Asiatic Turkey, NE. by the Persian Gulf and Sea of Oman, SE. by the Indian Ocean, and SW. by the Red Sea; extends from latitude 12° 35' to 34° N., and from longitude 32° 10' to 59° 40' E.; area est. at 1,230,000 sq. m.; connected with Africa by the Isthmus of Suez at the NW. corner. Ancient and foreign geographers divided this country into three parts—Arabia Felix, the happy; Arabia Petraea, the stony; and Arabia Deserta, the desert. The first comprises the SE. part, bordering on the Persian Gulf, the Indian Ocean, and part of the Red Sea; Arabia Petraea includes the NW. part, bordering on the Red Sea; and Arabia Deserta, the interior and N. portions. The climate is hot and extremely dry; Muscat and Mocha, on the seacoast, are among the hottest inhabited spots on earth. The temperature of the plains is often 100° in the shade. In many parts of Arabia, rain never falls, and the sun is rarely obscured by a cloud. The soil, where irrigated, produces cotton, coffee, indigo, tobacco, tamarinds, the date-palm, barley, rice, sugar, and many aromatic plants. The flora comprises the characteristic plants of its neighboring countries. The fauna includes the camel, the antelope, the ibex, hyena, wolf, jackal, wild ass, wild boar, the jerboa, monkey, ostrich, eagle, etc. The Arabian horse is celebrated for docility, endurance, beauty, and speed. Among the mineral resources are copper, iron, lead, coal, emeralds, carnelians, agate, onyx, alabaster, marble, sulphur, and saltpeter. The population, formerly estimated at from

10,000,000 to 15,000,000, amounts, according to recent calculations, to little over 5,000,000, and is divided into two classes—the nomadic Bedouins, and agricultural and mercantile Arabs. The chief towns are Mecca, Medina, Loheia, Mocha, Aden, Muscat, Yembo (or Yambo), and Rostak. Owing to the sterility of its soil, Arabia was never touched by any of the great conquerors of ancient times. After the death of Alexander, the Arabians conquered a part of Chaldæa, and founded the empire of Hira. Another tribe founded the empire of the Ghasanides, on the river Ghassan. Trajan was the first to penetrate to the interior, 107 A.D. With the advent of Mohammed the tribes began to act in concert, and, leaving their peninsula, founded powerful empires in three continents. The most important event of recent times in the internal history of Arabia is the advent of the Wahabees, 1770, and their defeat of Mehemet Ali, 1811. At present the only European power having possessions in Arabia is Great Britain, which has taken possession of Aden.

Arabian Architecture, style which followed the Mohammedan religion into Europe, Spain and Africa; founded on the remains of the Greek school, blended with the oriental elements of the Byzantine; most marked feature, the horseshoe arch; finest example of development of this style the Alhambra. See ARCHITECTURE.

Arabian Gulf. See RED SEA.

Arabian Nights, or *The Thousand and One Nights*, a collection of wild and fanciful Oriental tales, first brought to the notice of Europe in the early part of the eighteenth century by Antoine Gallan, a French orientalist. These fascinating fictions are probably more widely diffused and read than almost any other production of the human mind. The origin and author of this collection are still unknown.

Arabian Sea, NW. part of the Indian Ocean, lying between India, Arabia, Persia, and E. Africa, by the ancients called *Mare Erythraum*; has considerable commerce, mainly by virtue of being connected by the Red Sea and the Suez Canal with the Mediterranean.

Arab'ici, heretical sect in Arabia in the third century, founded by Beryllus, Bishop of Bostra. They denied Christ's divinity, immortality and the resurrection.

Arabi Pasha (ä-rä'bē pä-shä'), **Ahmed-el-Uraby**, abt. 1839- ; leader of Egyptian rebellion of 1882; b. Tautah, Lower Egypt; entered Egyptian army as a private; but was rapidly advanced to lieutenant colonel, minister of war, and then pasha. The Khedive had pledged all of Egypt and every possible source of revenue to the bondholders, and when the taxpayers refused to pay, Great Britain and France semiofficially interfered; the Khedive was compelled to allow all high positions of trust to be filled by men sent from the British and French foreign offices; the natives were excluded, and thousands of them rose in rebellion under Arabi. The massacre by his forces

at Alexandria soon followed; the British intervened; the forces at that place were bombarded and dismantled by their fleet July 11 and 12, 1882; the war lasted but a few months, and Arabi's army was defeated at Tel-el-Kebir, September 13, 1882, by the British under Wolseley. Arabi soon after surrendered, and was sentenced to death December 3, 1882; but his sentence was commuted by the Khedive to exile for life in Ceylon; was permitted to return 1901.

Araçari (ä-rä-sä'ri), or **Arica'ri**, bird of the genus *Pteroglossus*; a native of tropical S. America, and allied to the toucan, but smaller,



ARAÇARI.

with longer tail. One of the most remarkable is the curl-crested araçari, which has the feathers upon its head beautifully curled.

Araceæ (ä-rä'sä'), family of endogenous herbaceous plants, natives of tropical and sometimes of temperate countries, so named from *Arum*, one of its genera, which is characterized by an acrid juice and a nutritious starchy substance used for food.

Arach'nida. See SPIDER.

Ar'adus (the ARVAD or ARPAD of the Bible), a city of ancient Phœnicia; built upon the island now called Ruad; 35 m. N. of Tripoli.

Arafat', Mount, or **Jeb'el-er-Rham'** ("the mountain of mercy"), granite hill of Arabia, 15 m. E. of Mecca; visited annually by Mohammedan pilgrims, who believe it the place

where Adam and Eve first met after they had been expelled from Paradise.

Arafura (ä-rä-fü'rä), Portuguese "foreigners," aboriginal or non-Malay race of the Spice Islands, Celebes, Papua, etc., according to some ethnologists embracing the native race of Australia, and all the Melanesian tribes, including the extinct Tasmanians and the black forest tribes (Negrillos) of Malacca and the Philippines.

Arago', Dominique François, 1786-1853; French astronomer and savant; b. Estogel, near Perpignan; secretary to Bureau of Longitudes; employed with Biot in geodetic work 1806-8; Prof. Analysis in Polytechnic School, Paris; devoted much attention to optics, astronomy, and magnetism; advocated undulatory theory of light; made discoveries in electromagnetism; received Copley medal, 1825; promoted revolution of 1830; member Chamber Deputies, 1831; of provisional government, 1848; elected to national assembly, 1848.

Aragon, former kingdom of Spain; bounded N. by France, E. by Catalonia, S. by Valencia, and W. by Navarre and the Castiles; length from N. to S., about 200 m.; area, 17,976 sq. m.; now divided into the provinces of Huesca, Saragossa, and Teruel; was conquered by the Moors in the eighth century; Christian kingdom of Aragon, founded 1035, became a powerful state, which was united with Castile by the marriage of Ferdinand of Aragon and Isabella of Castile 1469; chief towns Saragossa and Huesca.

Arag'omite, variety of carbonate of lime, first found in Aragon; crystallizes in hexagonal prisms; resembles calcareous spar or calcite.

Araguay (ä-rä-gwi'), or **Araguay'a**, river of Brazil; rising in the mountains about latitude 18° 10' S., and longitude 51° 30' W.; flows N., and after a course of 1,300 m. joins the Tocantins at São João; navigable 1,100 m.; about midway from its source to its mouth incloses the island of Santa Anna, or Bananal, 210 m. long.

Ar'al, Sea of, large inland sea in Asiatic Russia, about 150 m. E. of the Caspian Sea; length, est. at 262 m.; breadth, about 184 m.; area, 26,000 sq. m.; next to the Caspian, the largest inland sea of Asia; has no outlet; is saline or brackish; SW. part, called Lake Landau, shallow, and not more than 5 ft. deep; fed by the Oxus or Amu, and the Sihon or Sir-Daria; latest measurements make it 157 ft. above the sea-level.

A'ram, Eugene, 1704-59; English felon; b. Ramsgill, York; became a schoolmaster at Knaresborough; tried for fraud but acquitted; again tried 1759, for murder of Daniel Clarke, a shoemaker; made an elaborate and erudite defense, but was convicted and hanged; subject of a novel by Bulwer, a poem by Hood, and a play by Wills.

Aramæa (är-ä-mé'ä), ancient name of a region of Asia, the boundaries of which are

not well defined; extended from Mt. Taurus on the N. to Arabia on the S., and coincided nearly with the countries called by the Greeks Syria, Babylonia, and Mesopotamia.

Arama'ic, branch of the Semitic group of languages; divided into two forms—West, or Palestinian, and East, or Mesopotamian; the former introduced into Palestine after the exile; third century B.C. used together with the Hebrew as the common speech of the people. The earliest E. Aramaic, Syriac, first came into prominence at Edessa. After the Arabic conquest, Syriac remained for some centuries the spoken language of N. Mesopotamia. Was practically dead by the eighth century.

Aranda (är-än'dä), **Don Pedro Pablo Abarca de Bolea** (Count of), 1716-99; Spanish statesman; b. Saragossa; rose to the rank of general; in 1765 President of the Council of Castile and Prime Minister; used his power to promote reform and a liberal policy, and procured the expulsion of the Jesuits from Spain, 1767; in 1773 removed from power by the intrigues of the clergy; ambassador to France, 1773-87; again Prime Minister for a short time, 1792.

Arany (ör'öñ), **János**, 1817-82; Hungarian poet; in 1851 professor at Nagy-Körös; member of the Hungarian Academy 1859, and, 1860, director of the Kisfaludy society at Pesth; first work a humorous poem, "The Lost Constitution of the Past," 1843; his "Buda Halála" was crowned by the Hungarian Academy.

Arapahos (ä-räp'ä-hös), tribe of N. American Indians, belonging to the Algonquin family; also known as Fall Indians, and called by the French the *Gros Ventres* of the South; lived principally in Nebraska and Indian Territory; a county in Kansas and one in Colorado named from them; now divided between the Arapaho reservation, I. T., and the Shoshone, Wyo.

Arapai'ma, a genus of fresh-water fishes found in the rivers of S. America, and highly esteemed for food. They are the largest fresh-water fishes in the world, and are allied to the *Clupeidae* or herring family. Some of them measure about 15 ft. long, and weigh 400 lbs. or more. The body is covered with strong, bony, compound scales.

Arapiles (ä-rä-pé'lés), village of Spain, 4 m. SE. of Salamanca; scene of the battle of Salamanca, between the allies under Wellington and the French under Marmont, July 22, 1812, in which the latter were defeated.

Ar'arat, mountain of W. Asia; rises from the plain of the Aras (or Araxes) about 33 m. SW. of Erivan; called by the Persians, "Koh-i-Nooh" ("Mountain of Noah"); on the boundary between Persia, Asiatic Turkey, and the Russian possessions; highest peak is covered with perpetual snow, has an altitude of 17,212 ft. above the sea-level; is a volcano, the last eruption of which occurred, 1840. Little Ararat is a peak SE. of the preceding; rises in the form of a cone to the height of 12,840 ft. above sea level; summits of the two mountains

7 m. apart in a direct line, but their bases are nearly in contact; according to Genesis, the ark rested upon the mountains of Ararat.

Ar'as, river of Armenia, rising in Erzurum; flows E. into the Caspian Sea; length about 500 m.

Aratus (ä-rä'tūs), flourished abt. 290-260 B.C.; Greek poet and astronomer; b. Soli, Cilicia; physician at the court of Antigonus Gonatas, at whose instance he composed "Phænomena, or Aspects of the Heavens," an astronomical poem, in 1,154 verses; the concluding portion, "Signs of Weather," called by Cicero "Prognostica."

Aratus of Sicyon (sish'ön), 271-213 B.C.; Greek general and statesman; b. Sicyon; aided in liberating Sicyon from the tyrant Nicocles and uniting it with the Achæan League, of which he was chosen general, 245; many times reelected; defeated in several battls by Cleomenes, King of Sparta; formed an alliance with Antigonus of Macedon against the Spartan; left thirty books of memoirs.

Araucania (ä-rä-kä'nē-ä), or **Arauca'na**, once an independent Indian state in the S. of Chile, bounded E. by the Andes and W. by the Pacific; extended from the river Bio-Bio on the N. to Valdivia, or to latitude 40° S., being about 190 m. long; inhabitants remarkable for their independent spirit and their long resistance to foreign domination; authority of Chile recognized by them.

Araujo Porto Alegre (ä-rou'zhö pör'tö ä-lä-grè), **Manoel de**, 1806-79; Brazilian poet; b. Rio Pardo; an accomplished painter, but his fame rests on his poems and plays, especially the latter, as they brought into being the modern Brazilian drama; most noteworthy poems, "Brazilianas," lyrics on national themes, and "Colombo," a lengthy epic.

Arava'li, or **Araval'i**, mountain range of Hindustan; traverses Ajmer, and is about 300 m. long; forms the watershed between the Arabian Sea and the system of the Ganges.

Arbaces (är'bä-cèz), Median general who revolted against Sardanapalus, captured Nineveh, and on the ruins of the Assyrian Empire founded the kingdom of Media.

Arbil (är-bèl'), or **Erbil'**, town of Asiatic Turkey, in Kurdistan, about 40 m. E. of Mosul; has large mosques and bazaars; gave its name to the battle really fought at Gaugamela, in which Darius was finally defeated by Alexander 331 B.C. Pop. abt. 6,000, mostly Kurds.

Arbitra'tion, submission of some matter in dispute to the judgment and decision of a person called an arbitrator; may be either oral or written; is voluntary in its nature, but sometimes made compulsory by statute; result of arbitration termed an award; as a means of settling international difficulties accomplished by submitting points in dispute either to an individual, a number of individuals forming a court, or simply the representative of a friendly power; first general arbitration treaty proposed, 1883, by Switzerland to the U. S.

and other American republics; first general arbitration treaty between U. S. and Great Britain signed, 1897, but rejected by Senate; permanent international court established at The Hague, 1899, by International Peace Convention. A treaty of arbitration and conciliation between France and Great Britain was signed in 1903 providing for the reference of all differences of a judicial order to the Hague Court. Similar treaties holding good for a certain number of years have since been signed by many of the European Powers among themselves. The Netherlands and Denmark in 1904, and Italy and Denmark in 1905, concluded unlimited treaties of arbitration, and the former treaty contained a clause leaving it open for other Powers to join. A general treaty of arbitration between Italy and the Argentine Republic was signed in 1907. Arbitration treaties are in force between the United States and most of the other Powers, including Denmark, France, Great Britain, Italy, Japan, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland. There are also treaties with Guatemala, San Salvador, Peru, Honduras, and others providing for the submission to the Hague Court of claims of individuals for pecuniary loss and damage which cannot be amicably adjusted through diplomatic channels. See ALABAMA CLAIMS; HAGUE TRIBUNAL; PAN-AMERICAN CONGRESS.

Ar'bor Day, day set apart in most states and territories of the U. S. for the voluntary planting of trees by the people; object is to encourage the planting of trees, and to stimulate public interest in forestry; made a school holiday with special programmes of exercises; inaugurated by the Nebraska State Board of Agriculture, 1874.

Arbor Vi'tæ, a plant of the genus *Thuya*, family *Coniferae*. *Thuya* consists of evergreen trees or shrubs, with compressed or flattened branchlets, and small, scalelike, and imbricated leaves. The *Thuya occidentalis* is a native of the U. S., and is often planted as an ornamental tree in the parks of America and Europe. It is one of the trees known as white cedar. The Chinese arbor vitæ (*Thuya orientalis*), a native of China, has larger cones and more upright branches than the preceding. It is cultivated in Europe and the U. S. as an ornamental tree, and produces a resin which has been supposed to possess medicinal virtues. The genus comprises several other species.



AMERICAN ARBOR VITÆ.

Arbroath (är'bröth), seaport town of Scotland; in Forfar; at mouth of the Brothock; 16 m. NE. of Dundee; manufactures linens,

canvas, leather, etc. Here are ruins of an abbey, founded by William the Lion, 1178. Robert Bruce and the Scottish nobles met in this abbey, 1320, to organize a resistance to Edward II. Pop. (1901) 22,372.

Arbuthnot, John, 1667-1735; Scottish physician and author; b. near Montrose; settled in London; physician to the queen, 1705; published humorous political allegory, "History of John Bull"; chief author of another humorous and ironical work, "The First Book of the Memoirs of Martinus Scriblerus."

Arbutus, a genus of plants of the family *Ericaceae*, mostly natives of America and S. Europe. They are evergreen shrubs bearing a fleshy fruit which has five cells and many seeds. The Arbutus mentioned by Vergil was the *Arbutus unedo*, or strawberry-tree, which bears bright red and yellow berries, with beautiful foliage, and is cultivated as an ornamental evergreen. The fruit has narcotic properties, and is used for making wine in Corsica. Another species, the *Arbutus andrachne*, a native of the Levant, is admired as an ornamental plant, and bears an esculent fruit. The



TRAILING ARBUTUS.

madroña of California is a species of this genus; but the *manzanita*, and also the bear-berry (or *Uva ursi*, a trailing shrub of the N. hemisphere, the leaves used as an astringent tonic in medicine) belong to the related genus *Arctostaphylos*, although formerly included in *Arbutus* so called. "Trailing arbutus" is *Epigaea repens*.

Arc, a portion of a curved line, as the arc of a circle or an ellipse. Its magnitude is stated in degrees, minutes and seconds, equal to those of the angle which it subtends. The straight line uniting the two extremities of an arc is called the chord of the arc.

Arc Light. See ELECTRIC LIGHTING.

Arcadia (är-cä'di-ä), a state of ancient Greece; the central part of the Peloponnesus (now called the Morea); bounded N. by Achaia, E. by Argolis, S. by Laconia and Messina, W. by Elis; area about 1,600 sq. m.; inclosed on nearly all sides by mountains; principal river, the Alpheus; people, simple and pastoral; chief towns, Mautinea, Tegca, Orchomenos, and Megalopolis; ancient pastoral poets praised the peaceful and happy life of the Arcadian shepherds; Arcadia now a nomarchy of Greece; area, 2,020 sq. m.; pop. 167,092.

Arca'dius, 377-408; emperor of the East; b. Spain; eldest son of Theodosius the Great, whose kingdom at his death, 395, was divided between his sons Arcadius and Honorius, mi-

nors; Eastern Empire, under Arcadius, included Thrace, Asia Minor and Syria; capital Byzantium.

Arca'ni Discipli'na ("instruction in the mystery"), term for the first time used by the Protestant theologian Dallæus, 1666, for the secrecy observed in the early church with respect to certain doctrines, as those of baptism, the eucharist, and some others, which were withheld from candidates until they had been received into full communion; they were only alluded to in public by some such phrase as "the initiated know"; after the sermon, and before the eucharist, the uninitiated were shown out by the deacons, and the doors closed.

Arca'num (plural Arca'na), a secret, a mystery; a medicine the composition of which is a secret; term used by the alchemists, whose object was to discover the grand arcanum, the philosopher's stone.

Arcesilaus (är-sës-i-lä'üs), 315-241 B.C.; Greek philosopher; b. Pitane, Æolis; founder of the New (or, as it is sometimes called, the Middle) Academy; pupil of Theophrastus, and an admirer of Plato, but taught a modified form of Platonism; revived the Socratic method and recommended abstinence from dogmatism.

Arch, curved structure of stone or brick supported by the mutual pressure of its component parts, intended to cover the space between two piers or two columns, and to support a superincumbent weight; wedge-shaped



ARCH OF TITUS.

pieces of which the arch is composed are called *voussoirs*; middle stone of the arch is the *key-stone*; lowest stone on either side, the *springer*; highest part, the *crown*; the sides are termed *haunches*; inner curve, the *intrados*; exterior or upper curve, the *extrados*; while the base which supports the lowest *voussoir* or *springer* on each side is the *impost*; arches are of various shapes, but the principal distinction is into round and pointed; arch known

to the Egyptians, the Ethiopians, the Assyrians, the Greeks and the Etruscans, though no one of these peoples used it extensively. Its first considerable use was by the Romans, who employed exclusively the round form, in doors and windows, aqueducts, bridges, and triumphal arches, and developed from it a system of vaulting; pointed arch came into use later; word also applied to curved structures of timber, iron, or steel, used for roofs or bridges.

Arches are designated from their shape as circular, elliptic, etc., from the resemblance of the whole contour of the curve to some familiar object as, lancet arch, basket-handled arch, or horseshoe arch; from the method used in describing the curve, as equilateral, three-centered, segmental, etc.; or from the style of architecture to which they belong, as Roman, Saracenic, etc.

Triumphal arch is a structure erected in honor of a victorious general or in commemoration of some important event or victory, usually placed at the entrance of a city or over a grand avenue; numerous triumphal arches were erected by the ancient Romans, of which the largest still extant are the arches of Titus, Septimius Severus, and Constantine; of modern triumphal arches the finest is the *Arco de l'Étoile*, erected in Paris, by Napoleon I. Several structures of this sort have been erected in the U. S. as gateways to parks and cemeteries or as memorials. New York City has a marble arch, commemorating the centennial of Washington's inauguration.

Archæan Era, or **Archæan Pe'riod**, earliest division of geologic time, or that occupied in the formation of the oldest-known rocks; precedes the Algonkian period; rocks, largely of igneous origin, but probably also in part sedimentary; occur in many parts of N. America and Europe, and in India, Australia and New Zealand.

Archæology (ärk-ë-öl'ë-jî), literally the science of antiquities; in its widest sense includes the knowledge of origins, language, religion, laws, institutions, literature, science, arts, manners, customs—everything, in fact, that can be learned of the ancient life and being of mankind. Archæology thus comprehends a part of many branches of knowledge which are recognized as distinct or independent pursuits; in a narrower and popular signification it is understood to have reference to the materials, written, monumental, and traditional, from which a knowledge of the ancient condition of a country is to be attained. Written archæology includes both the science of ancient writings and the knowledge of printed books; monumental archæology admits of almost endless subdivisions, according to the character of the remains to be studied, which may be works of art, such as buildings, sculptures, paintings, inscriptions, coins, armorial bearings, furniture, enamels, glass, porcelain, etc.; works of engineering, such as roads, canals, aqueducts, mines, etc.; articles of dress, armor, or personal ornament; tools, weapons, utensils, habitations, etc.; forms of sepulture; vestiges of man and animals, such as bones, etc.; tra-

ditional archæology includes the oral literature of a people, their dialects, legends, proverbs, ballads, as well as their sports, customs, and superstitions.

The study of archæology was long almost exclusively confined to the antiquities of the Greek and Roman, but about the middle of the sixteenth century attention was turned to the antiquities of other ancient nations and of the Middle Ages. Since the discovery of the Rosetta Stone, which gave a key to its hieroglyphics, the archæology of Egypt has made astonishing progress; while the discoveries of Layard, Rawlinson, and others have far advanced that of Assyria. Of late years the archæology of India and China has been successfully prosecuted. The rude and scanty remains of aboriginal inhabitants of N. America have occupied the attention of men of letters in this country; while the monuments of Central and S. America have fully rewarded the investigations of antiquaries. Prehistoric archæology, or the study of the relics of man as he existed before the dawn of history, is now attracting much attention. The Royal Society of Antiquaries at Copenhagen has given this branch of the subject especial attention, N. Europe being particularly rich in remains of the prehistoric ages. The quite modern science of "folk-lore," which examines and compares the traditions, legends, superstitions, and immemorial customs of existing peoples, links itself inseparably with some departments of archæology.

The foundership of archæological research has lately been claimed in behalf of Rienzi, the Roman tribune, who was an enthusiastic antiquarian (1313-54). But classical archæology appears to have worn the aspect of a collector's hobby until a vitalizing spirit was infused into the science by Winckelmann. France and Germany were the first to establish schools of archæology in Rome and Athens; their example has since been followed in Athens by the U. S. and Great Britain, and by the Italians themselves in Italy. There is also a French school of archæology on Egyptian soil, while the science is systematically taught at most of the continental and some of the British and American universities.

The science of archæology has been greatly promoted by the publication of chronicles, records, catalogues, etc., by the formation of clubs and societies, and by the establishment of museums for the collection and classification of antiquities. Among the societies formed for this purpose are, the Society of Antiquaries of London, founded 1572, incorporated 1751; the Society of Antiquaries of Scotland, 1780; and the Royal Irish Academy, 1786. The last two have good museums. Among the most celebrated antiquarian collections are those of the British Museum in London; the museums of the Louvre and the Hôtel de Cluny in Paris, and the Royal Museum at Naples.

Among recent archæological investigations are those of Mariette Bey, Lepsius, Brugsch Bey, Maspero, and Flinders Petrie in Egypt, extending from the delta of the Nile up to the Sudan; the excavations at Carthage and

Cyrene (Greek Africa); at Ephesus, Pergamon, and Assos in Asia Minor; on the island of Delos, on the Acropolis of Athens; at Eleusis, Epidaurus, Olympia, and Delphi in Greece; and chiefly at Rome and Pompeii, and among the Etruscan cemeteries, in Italy.

Archæopteryx (är-kē-öp'tē-riks), fossil bird found in the lithographic limestones (Jurassic) of Solenhofen, Bavaria; the oldest bird of which there is record; in many points of structure, intermediate between bird and reptile; had feathers, and jaws furnished with teeth.

Archangel (ärk-än'jël), seaport of Russia; capital of province of that name; on the Dwina, about 20 m. from its entrance into the White Sea; harbor closed by ice except from July to September; chief exports, fish, furs, lumber, tallow, flax, linseed, tar, iron, and bristles. Pop. (1897) 20,950.

Archbish'op, chief bishop of an ecclesiastical province containing several dioceses, who has also a diocese of his own; title came into use in the fourth century, and is said to have been first employed by Athanasius; hardly known in the Latin Church before the seventh century.

Archdea'con, ecclesiastic whose jurisdiction is immediately subordinate to that of a bishop; originally an assistant of the bishop, and an overseer of the deacons and younger clergy; called the *oculus Episcopi* ("the eye of the bishop.")

Archduke' and **Archduch'ess**, titles assumed by the children of the emperor of Austria, and inherited by their descendants through the male line; title first taken by the dukes of Austria in the fourteenth century or earlier.

Archegosau'rus, a fossil animal, because supposed to have been the beginning of reptilian life. It is found in the Bavarian coal-measures. Professor Owen considered it a connecting link between reptiles and fishes. Agassiz and Dana regard it as a ganoid fish, while others class it with salamandroid batrachians.

Archelaus (är-kē-lä'üs), the name of several personages in ancient history, the most famous of whom were **ARCHELAUS**, surnamed **PHYSICUS**, because he studied chiefly physical science; flourished abt. 450 B.C.; native of Miletus, or of Athens, and was a pupil of Anaxagoras. Archelaus taught that there were two principles of generation—heat, which moves, and cold, which remains at rest. **ARCHELAUS**, general of Mithridates; was a native of Cappadocia; opposed the Romans in Greece, 87 B.C.; occupied Athens, where he was besieged by Sulla; forced to evacuate Athens, retired to Thessaly, 86 B.C., and was defeated by Sulla at Chæronea and Orchomenus; signed a treaty of peace with Sulla, in 85; deserted to the Romans in 81, and commanded on their side in the second Mithridatic war; last heard of, 74 B.C. **ARCHELAUS**, son of Herod the Great by Malthace, a Samaritan woman; on the death of his father (4 B.C.) became ethnarch of Judea, Samaria, and Idu-

mea; his full brother Antipas and his half-brother Philip receiving the rest of the kingdom; fear of him sent the parents of Jesus into Galilee; in 7 A.D. deposed by Augustus, and banished to Vienne, Gaul.

Archencephala (är-kën-sëf'ä-lä), highest division of the mammalia, to which the order *Bimana*, composed of the solitary genus *Homo*, man, belongs.

Arch'er, John, M.D., 1741–1810; American soldier and legislator; b. Hartford Co., Md.; the first person who received the degree of M.D. in America. This degree was given by the Philadelphia Medical College in 1768. He served as an officer in the Revolutionary War, and member of Congress, 1801–7.

Archer, one who shoots with a bow; in olden times archers formed an important portion of the armies; the ancient Cretans, Parthians, and Thracians, and in the Middle Ages the English, were distinguished for the efficiency of their archers. The use of the bow and arrow in war was probably first introduced into Britain by the Romans; English archers became superior to those of all other nations, and decided the battles of Crécy, Poitiers, and Agincourt. Among the Asiatic Turks, the Persians, and other nations of the East, as well as certain native African tribes and some American Indians, the bow and arrow are still used as weapons.

Arch'er-fish, small E. Indian fish of the family of *Toxotidæ*. The archer-fishes project



ARCHER-FISH.

drops of water at insects, which they thus cause to fall from the air into the water, and then devour them.

Ar'ches, Court of, former court of ecclesiastical law in England; the chief court of appeal from the courts of the several bishops or ordinaries within the province of Canterbury, which included nearly all England; so called because held in the church of St. Mary-le-Bow (*de Arcubus*); abolished by act of Parliament, 1874.

Archetype (är'kē-tīp), original pattern or model of a work; the original on which others are formed; among Platonic philosophers term applied to the original patterns or ideas existing in the Divine mind before the creation.

Archias (är'ki-ās) Aulus Licinius, b. abt. 120 B.C.; Greek poet; b. Antioch; became a resident of Rome, 102 B.C.; accused of assuming citizenship illegally, was defended by Cicero in his "Pro Archia."

Archiater (är'ki-ä-tër), or **Archia'tor**, title given by the Roman emperors to some of their medical attendants; also to officials paid by the state or city, to give gratuitous medical treatment to the poor.

Arch'ibald, Sir **Adams George**, 1814-92; Canadian statesman; b. Truro, Nova Scotia; admitted to the bar, 1838; represented Colchester in Nova Scotia Assembly, 1851-67; in Dominion Parliament, 1869-70 and 1888; member executive council of Nova Scotia; delegate to Great Britain on the subject of mines and the union of the provinces, 1857; to the Quebec union conference, 1864; and to the final conference in London to complete the terms of union, 1866-67; secretary of state for the provinces, 1867-68; lieutenant-governor of Manitoba and NW. Territories, 1870-73; lieutenant-governor of Nova Scotia, 1873-83.

Archidamus (är-ki-dä'müs), the name of several kings of Sparta the most famous of whom was ARCHIDAMUS II, who became king abt. 470 B.C.; died 427 B.C.; waged war against the Messenians, and commanded the army which invaded Attica, 431 B.C.

Archil (är'kil), **Or'chil**, or **Orseille** (or-sä'y), reddish purple dye obtained from various lichens, gathered from rocks near shores in Europe, lower California, and elsewhere. The lichens do not contain the coloring matter ready formed, but by the action of air and ammonia the colorless orcin changes to purple orcein, which is the coloring principle of archil. Cudbear is a variety of archil made at Glasgow. Archil produces beautiful shades of purple, violet, mauve, red, etc., but they are not, as generally employed, permanent.

Archilochus (är-kill'ō-küs), of Pa'ros, Greek poet, ranked by ancient critics as second only to Homer; flourished abt. 650 B.C.; he was often in battles, and met a soldier's death in a war between Paros and Naxos. A pioneer in poetical art, he is said to have invented or perfected the elegiac verse and the iambic; and other lyric measures still bear his name.

Archimagus (är-ki-mä'güs), chief of the ancient Persian magi; title and office belonged to the reigning king of Persia; also the name of a magician in Spenser's "Faerie Queene."

Archiman'drite, ecclesiastic who presides over monasteries of the Greek Church. The Russian bishops are chosen from the archimandrites; the title is retained in the Greek rite of the Roman Catholic Church.

Archimedes (är-ki-mē'dēs), greatest of ancient geometers; abt. 287-272 B.C.; b. Syracuse, of Greek extraction; said to have been a pupil of Conon and a kinsman of Hiero II, King of Syracuse. He enriched geometry, mathematics, and mechanics with important discoveries, and invented several useful and powerful machines. King Hiero suspecting that a goldsmith had mixed alloy with a golden crown which he had made for him, applied to Archimedes to detect the fraud. The solution of this problem suggested itself to him as he entered a full bathing-tub, and perceived that his body must displace a volume of water equal to its own bulk. Running out of the bath, without having dressed (as the story goes), he exclaimed "Euréka!" ("I have found it!"); discovered the proportion which a sphere bears to a cylinder by which it is enclosed; was the author of a celebrated saying, "Give me where I may stand and I will move the world" (or "universe"). When Syracuse was besieged by Marcellus, Archimedes invented powerful machines or engines for its defense. He was killed at the capture of Syracuse. He wrote numerous works, of which eight are extant: "On the Sphere and Cylinder"; "The Measurement of a Circle"; "On the Equilibrium and Centre of Gravity of Planes"; "On Conoids and Spheroids"; "On Spirals"; "The Quadrature of the Parabola"; "The Arenius"; and "On Floating Bodies."

Archimedes, the Prin'ciple of, discovery ascribed to Archimedes that a body immersed in a fluid loses exactly as much of its weight as is equal to the weight of the fluid which it displaces.

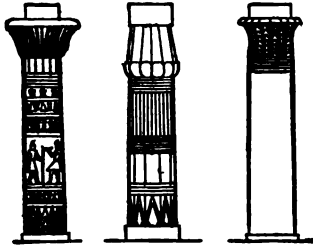
Archimedes' Screw, an engineering appliance, said to have been invented by Archimedes, for the purpose of lifting water. A tube is wound like a screw around a cylinder, the ends of which are fixed on pivots. The cylinder is placed in an inclined position, with its lower end beneath the surface of the water to be raised, and is then rotated by means of a handle at its upper end. As the cylinder turns round the water in the lower part of the tube rises above the water, and continues to rise from bend to bend as a fresh charge is taken in at the lower mouth, until it reaches the upper mouth and flows out. It is sometimes called *spiral pump* and *water-screw*.

Archipelago (är-ki-pē'lä-gō), originally applied to a part of the Mediterranean called the Aegean Sea, between Greece and Asia Minor, which incloses numerous islands. They are mostly arranged in two groups, the Cyclades and Sporades. The principal Cyclades are Melos or Milo, Naxos, Paros, Andros, Tenos, Delos, Seriphos, Syria, Cythnos, and Thera, which, with Negropont, the largest island in the Archipelago, belong to Greece. Among the Sporades, which belong to Turkey, are Rhodes, Samos, Scio (Chios), Lemnos, Metelin, or Mity-

lene, Imbro, Samothraki, and Thasos. These islands are generally calcareous, have a fertile soil, beautiful scenery, and a pleasant climate. The term is now applied to any expanse of water which contains many islands, or to a group of islands, as the Malay Archipelago.

Arch'itecture, in a limited but very common sense, that branch of the fine arts which has for its object the production of edifices, not only convenient for their purposes, but characterized by unity, beauty, and often grandeur.

The Egyptians are the most ancient nation known to us among whom architecture attained the character of a fine art. Of their



EGYPTIAN COLUMNS.

architecture we possess ample remains in the shape of pyramids, temples, sepulchers, and obelisks. The greatest of the architectural monuments of this country, the pyramids, date from 2800 or 2700 B.C. The Egyptian temples had walls of great thickness, sloping on the outside from bottom to top; the roofs were flat and composed of blocks of stone reaching from one wall or column to another. The

innumerable hieroglyphics are the decorative objects which belong to this style.

Other ancient people among whom architecture made great progress were the Babylonians, whose most celebrated buildings were temples, palaces and hanging gardens; the Assyrians, whose capital, Nineveh, was rich in splendid buildings; the Phœnicians, whose cities, Sidon and Tyre, were adorned with equal magnificence; and the Israelites, whose temple was a wonder of architecture

In historic times the Greeks developed an architecture of noble simplicity and dignity. It is considered to have attained its greatest perfection in the age of Pericles, abt. 460-430 B.C. This style is characterized by beauty, harmony and simplicity. Distinctive of it are what are called the orders of architecture, by which term are understood certain modes of proportioning and decorating the column and its superimposed entablature. The Greeks had three orders: Doric, the oldest and simplest column, noted for its avoidance of harsh angles and disagreeable combination of lines, and for the beauty of its sculpture; Ionic, the graceful and elegant column, not so pure and severe as the Doric, but trusting rather to ornamental carvings for its effects; Corinthian, to some extent a combination of the Doric and Ionic, extremely ornate, florid, rich and splendid—popular with the Romans. Lowness of roofs and absence of arches were distinctive features of Greek architecture, in which, as in Egyptian, horizontality of line was another characteristic mark. The temples, of which the Parthenon at Athens is the most famous, were the most remarkable of public edifices. The theaters were semicircular on one side, and



TUSCAN. DORIC. IONIC. CORINTHIAN. COMPOSITE.

TYPICAL COLUMNS.

columns were numerous, close and very stout, generally without bases. The principle of the arch though known, was not employed. Enormous statues, sphinxes carved in stone, sculptures in outline, of deities and animals, with

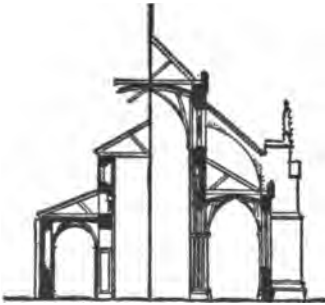
square on the other. The semicircular part, the auditorium, was filled with concentric seats, and could hold 20,000 spectators.

Among the Romans there was no original development of architecture as among the

Greeks, though they early took the foremost place in the construction of such works as aqueducts, as the arch was in early and extensive use among this people. As a fine art, however, Roman architecture had its origin in copies of the Greek model, all the Grecian orders being introduced into Rome and variously modified. Their number was augmented by two new orders, the Tuscan and the Composite. Under Augustus the architecture of Rome attained its greatest perfection. Among the works erected were temples, aqueducts, amphitheatres, magnificent villas, triumphal arches and monumental pillars. The amphitheatre differed from the theatre in being an elliptical building filled on all sides with ascending seats for spectators, and leaving only the central space, called the arena, for the combatants and public shows. The Coliseum is a stupendous structure of this kind. The *thermæ* or baths, were vast structures in which multitudes of people could bathe at once. Magnificent tombs were often built by the wealthy. The emperors who succeeded Augustus embellished Rome, erected palaces and temples and adorned, like Hadrian (117-138), even conquered countries.

In Constantinople, after its separation from the Western Empire, arose a style of art and architecture which was practised by the Greek Church during the Middle Ages. This is called the Byzantine style. The church of St. Sophia at Constantinople, built by Justinian, offers the most typical specimen of this style, of which the fundamental principle was an application of the Roman arch, the dome being the most striking feature of the building.

After the dismemberment of the Roman Empire, a new style of architecture arose, two forms of which form important phases of art. The Lombard Romanesque prevailed in N. Italy and S. Germany from the eighth or ninth



ROMANESQUE CONTRASTED WITH GOTHIC.

to the thirteenth century; with this style were combined Byzantine features, and buildings in the pure Byzantine style were also erected in Italy as the church of St. Mark at Venice. The Norman Romanesque flourished, especially in Normandy and England, from the eleventh to the middle of the thirteenth century. The semicircular arch is the most characteristic feature of this style.

The conquest of the Moors introduced a fresh style of architecture into Europe after the eighth century—the Moorish or Saracenic.

The edifices erected in this style were distinguished by a peculiar form of the arch, which forms a curve constituting more than half of a circle or ellipse. A peculiar flowery decoration called arabesque is a common ornament of this style, of which the building called the Alhambra is perhaps the chief glory.

The German architecture began with Charlemagne (742-814). He introduced the Byzantine and Romanesque styles into his empire. Later the Moorish or Arabian style had some influence upon that of the Western nations,



RENAISSANCE CAPITAL.

and thus originated the mixed style which maintained itself until the middle of the thirteenth century. Then began the modern Gothic style, which grew up in France, England, and Germany. Its striking characteristics are, its pointed arches, pinnacles and spires, large buttresses, clustered pillars, vaulted roofs, profusion of ornament and its lofty, bold character. The Gothic style is divided into four principal epochs: the early Pointed or general style of the thirteenth century, the Decorated, or style of the fourteenth century, the Perpendicular, practiced during the fifteenth and early part of the sixteenth century, and the Tudor or general style of the sixteenth century. This style lasted until the seventeenth century, being gradually replaced by that branch of the Renaissance which is known as the Elizabethan. This was a mixed style, characterized by the vast dimensions of the apartments, the extreme length of the galleries, and the enormous square windows. The effect was rich and gorgeous, rather than graceful and comfortable.

The Renaissance, which was a revival of the classic style, based on the study of ancient models, had its rise in Italy and spread rapidly over the greater part of Europe. In Italy and England, it was mostly used in building churches; in France many palaces were erected in this style. See ARABIAN ARCHITECTURE; ELIZABETHAN ARCHITECTURE; GOTHIC ARCHITECTURE; RENAISSANCE.

Archon (är'kōn), the highest magistrate or ruler of Athens. On the death of Codrus, king of Athens, 1068 B.C., the title of king was abolished, and Medon, his son, became the first archon, with limited power. The office was hereditary and held for life, until 752 B.C., when the term was limited to ten years, and in 714 it ceased to be hereditary and became open to all patricians. In 683, the number was



DORIC.—THE PARTHENON.



CORINTHIAN.—THE PANTHEON.



SARACENIC.—THE TAJ MAHAL, AGRA.



BYZANTINE.—THE BASILICA OF ST. MARKS, VENICE.



ROMANESQUE.—THE CATHEDRAL, PISA.



GOTHIC.—THE CATHEDRAL OF NOTRE DAME, PARIS.



RENAISSANCE.—THE CHURCH OF THE CERTOSA, PAVIA.



ELIZABETHAN.—TRINITY COLLEGE, CAMBRIDGE.



increased to nine, elected annually. In the latter period of Athenian history all citizens were eligible to the office. Among the Gnostics the word is the designation of two beings who ruled the several heavens. A sect of Gnostics bore the title Archontic. It arose in the fourth century, rejected baptism and the Lord's Supper, and identified the God of the Old Testament with the devil.

Archytas (ār-kī'tās), Greek philosopher of the fourth century B.C.; b. at Tarentum; reputed the first that applied geometry to practical mechanics, and the first to solve the problem of the doubling of the cube.

Arcis-sur-Aube (ār-sē'-sūr-ōb'), town of Aube, France; 16 m. N. by E. of Troyes; has manufactories of cotton hosiery; noted for an engagement between Napoleon and Prince Schwartzburg, March 20, 21, 1814.

Arco'la, village of northern Italy; on the Alpone, near its entrance into the Adige; 15 m. ESE. of Verona. Here Napoleon gained a victory over the Austrian general Alvinzy, November 15-17, 1796.

Arcos de la Frontera (ār-kōs dā lā frōn-tā'rā), town in Andalusia, Spain, 30 m. NE. of Cadiz; called Arcos, because built in the form of a bow; chief manufactory tanned leather; is the Colonia Arcensium of the Romans. In 1519 Magellan started from here for the first circumnavigation of the globe.

Arcot (ār-kōt'). I, district of the Carnatic, British India, bordering on the Bay of Bengal, divided into the collectorates of N. and S. Arcot; pop. (both), 4,500,000; principal rivers, Palar, Punnair, and Coleroon; climate, hot and dry; soil, productive where irrigated; after many vicissitudes was ceded to the British by its nawaub, Azim ud-Dowlah, 1801. II, chief town of N. Arcot, also called *Arcuaty*, on the Palar, 65 m. W. by S. of Madras; comparatively modern. In 1751 Clive here withstood a siege of 50 days.

Arc'tic, northern, or, rather, far to the north, near the north pole.

Arctic Circle, imaginary line encircling the north pole of the earth, 23° 27' from the pole and 66° 32' from the equator; the boundary between the N. temperate and the N. frigid zones; within it the sun does not set at the summer solstice nor rise at the winter solstice.

Arctic Current, supposed to originate in the ice of the Arctic seas, whence it runs along the E. shore of Greenland and round Cape Farewell to the W. shore of Greenland, in N. lat. 66°, where it turns S., forming the Hudson Bay Current; thence it passes near the Bank of Newfoundland, and, meeting the Gulf Stream, passes beneath it. Other portions follow the E. coast of N. America for various distances, cooling the land, and eventually pass beneath the Gulf Stream. Both at the surface and after descending, the Arctic is a return current, compensating in part for the N. transfer of water by the Gulf Stream.

Arctic Explorations. See POLAR REGIONS; POLAR RESEARCH.

Arctic Ocean, the ocean which surrounds the north pole, washes the shores of Europe, Asia, and America, and is nearly coextensive with the Arctic circle; communicates with the Pacific by Bering Strait, and with the Atlantic by a wide passage between Greenland and Norway; navigation is obstructed by ice, but it has been supposed that a portion N. of 80° is an open polar sea. The Arctic incloses many large islands, and comprises large bays and gulfs, which indent the adjacent continents, as Baffin Bay, the White Sea, and the Gulf of Obi. The water is extremely pure and clear, and the ice is remarkable for the beauty and variety of its tints. Those parts of this sea which have been explored are occupied by large fields of floating ice and icebergs in almost perpetual motion. For further details, and for account of explorations, see POLAR RESEARCH.

Arctu'rus, a fixed star of the first magnitude in the constellation Bootes; situated behind the Great Bear, and may readily be found by continuing the curve of the tail of the Bear.

Ar'cus se'nilis (Latin "bow of old age"), the hazy zone seen around the outer zone of the cornea with advancing years. It is rarely a complete circle, but may become so in extreme cases. Usually coexists with degeneration of the heart and arteries.

Ar'den, forest in which Shakespeare places the scene of "As You Like It." There was formerly a forest of this name on the borders of Warwickshire, believed to have occupied a great part of the midland counties; it is the maiden name of Shakespeare's mother.

Ardennes (ār-dēn'), or **Arden'**, Forest of (ancient *Arduenna Sylva*), hilly and densely wooded tract which includes a part of Belgium and of France, on both sides of the Meuse; in Cæsar's time was more extensive, and occupied nearly all the space between the Sambre, Moselle, and Rhine; predominant rocks, clay-slate, grauwacke, and limestone. The channel of the Meuse presents rugged and precipitous rocks about 600 ft. high. Many important military events have occurred among the Ardennes, at Rocroi, Sedan, Mézières, etc.

Ardoch (ār'dök), small village of Perth, Scotland, 8 m. SSW. of Crieff. Here is an ancient Roman camp, the most entire now in Britain.

Ardshir (ārd-shēr'), or **Ardsheer'**, Babegan, d. abt. 260 A.D.; King of Persia; founder of the Sassanide dynasty; revolted against Artabanus, King of Persia, whom he defeated and killed; extended the boundaries of Persia by conquests, and reigned in peace for many years; called Artaxerxes by the Greeks; succeeded by his son Shapur (or Sapor).

Are (ār). See METRIC SYSTEM.

A're Fro'de, Thorgilsson. See ARI THE WISE.

Arecibo (ē-rā-sē'bō), seaport, commercial town, and capital of province of Arecibo, on

the N. coast of Porto Rico; at the mouth of the Arecibo, 40 m. W. of San Juan; was damaged by a hurricane, 1899.

A'remberg, or **A'renberg**, name of a noble family of Germany, which adhered to the Roman Catholic Church and to Philip II of Spain. They own large estates in Hanover and Prussia.

Aremberg, **Leopold Philipp Karl Joseph von Ligne** (Duke of), 1690-1754; b. Mons, Belgium; field-marshal in the Austrian army and commander-in-chief in Flanders, 1737; distinguished at Malplaquet, 1709, and at Belgrade, 1717.

Are'na (Latin "sand"), in ancient times, ground strewed with sand on which athletes contended, and to the open central part of the amphitheater usually covered with sand where gladiators fought. Now, arena signifies any scene of contest, any public place in which men display their talents or contend in debate.

Arendal (ä-rën-däl), city of Norway; 41 m. NE. of Christiansand; on the Cattegat; partly built on the mainland and partly on islands, giving it the name of "Little Venice"; has considerable trade in iron and timber. Pop. (1900) 11,130.

Areopagus (är-ë-öp'ä-gūs), called the hill of Mars, hill in Athens W. of the Acropolis; also a court of justice which held its sessions on the same spot in ancient times, remarkable for its high character and antiquity, having been organized before the first Messenian war, 740 B.C.

Arequipa (är-ä-kë'pä), capital of Arequipa, Peru; about 40 m. from the Pacific, on the River Chile and on the plain of Quilca, 7,850 ft. above the sea-level; is reputed one of the best built and most beautiful towns of S. America; is the seat of a bishop, and has a cathedral, a college, and several convents; gold and silver found in the vicinity. Here occurred a great earthquake, August 13 and 14, 1868. Harvard observatory has a station near this place. Pop. (1901) abt. 35,000.

Arequipa, Volca'no of, a peak of the Peruvian Andes; about 14 m. E. of the city of Arequipa. It rises 20,300 ft. above the sea-level, and has the form of a regular truncated cone, with a deep crater, from which ashes and vapor continually issue.

Ares (ä-rës), god of war in Greek mythology, corresponding to the Roman Mars (*q.v.*).

Are'tæus (är-ä-të'üs); abt. 100 A.D.; Greek medical writer of Cappadocia; ranked next to Hippocrates; wrote a work on diseases, which is still extant and highly esteemed.

Arethusa (är-ë-thü'sä), in classic mythology, one of the Nereids, of which Alpheus was enamored; also the name of a fountain near Syracuse, into which she was transformed. Arethusa was invoked by Vergil in his tenth eclogue.

Arethusa, name of two ancient cities, one on the Orontes River in Syria, the other, in Mace-

donia. The Syrian city (now called Restan) was rebuilt by Seleucus Nicator, the first king of Syria. Its inhabitants persecuted Marcus, a Christian bishop, now honored as a martyr by the Greek Church. The Macedonian city was the site of the tomb of Euripides.

Aretin'ian Syl'lables, the syllables *ut, re, mi, fa, sol, la*, which Guido d'Arezzo used to designate his notes in his musical system of hexachords.

Aretino (är-ä-të'nö), **Pietro**, 1492-1556; satirical and licentious Italian writer; b. Arezzo; works include comedies, dialogues, sonnets, and letters. His satires, which were personal and bitter, procured for him the surname of "the Scourge of Princes."

Aretino, Spinello. See SPINELLO DI LUCA SPINELLI.

Arezzo (ä-rët'sö), ancient *Arretium*, capital of Arezzo, Italy; on the Chiana; 55 m. SE. of Florence; founded by the Etruscans several centuries B.C. Was famous for its manufactures of terra-cotta; is noted for the great number of eminent men born there. Pop. (1901) 16,886.

Argæus (är-jë'üs), **Mount**, in Turkish *Arjish-Dagh*, highest mountain in Asia Minor; in the pashalic of Karamania, about 12 m. S. of Kaisariyeh, and connected with a branch of Mt. Taurus; height, 13,100 ft.

Argali (är'gä-ll), large wild sheep of central Asia and Siberia. A closely related species is the bighorn of the Rockies.

Argand Lamp, a lamp invented in 1782 by A. Argand; intended for burning oil. He used a wick in the form of a hollow cylinder, through which a current of air ascends, so that the supply of oxygen is increased, preventing the waste of carbon (which in the old lamps escaped in the form of smoke), thus increasing the amount of light; and added the glass chimney, by which a draft is created and the flame rendered steady.

Argelander (är'gä-lln-dër), **Friedrich Wilhelm August**, 1799-1875; German astronomer; b. Memel; director of the observatory at Abo, Finland, 1823; professor at Helsingfors, 1832; and Prof. of Astronomy at Bonn, 1837; published a celestial atlas, "Uranometria Nova"; and raised the study of variable stars to a science. His greatest work was a catalogue of over 300,000 stars.

Argensola (är-hën-sö'llä), **Bartolomé Leonardo de**, 1562-1631; Spanish poet; b. Barbastro, Aragon; became a canon of Saragossa, and historiographer of Aragon; published poems and a "History of the Conquest of the Moluccas." He and his brother were called the Horaces of Spain.



ARGALI.

Argensola, Lupercio Leonardo de, 1559-1631; Spanish poet; b. Barbastro, brother of the preceding; appointed historiographer of Aragon by Philip III, and secretary of state by the viceroy of Naples, 1610; produced tragedies, entitled "Filis," "Isabella," and "Alejandra"; also successful lyric poems.

Argenson (är-zhôn-sôn') d', French family which has produced many men eminent in letters and in public affairs.—**MARC RENÉ DE VOVER** (1652-1721), prominent academician and public officer.—His son **RENÉ LOUIS, Marquis d'Argenson, 1694-1757**, foreign minister and author of distinction.—**MARC PIERRE, Comte d'Argenson, 1696-1764**, a brother of the foregoing, was an able statesman and a patron of letters.—**MARC ANTOINE RENÉ DE PAULMY, 1722-87**, son of René Louis, was an academician and the collector of a famous library.—**MARC RENÉ, 1771-1842**; b. Paris, served as the adjutant of Gen. La Fayette, and fought afterwards for the republic. Throughout his life he was a prominent leader of the ultra-republicans.

Argenteuil (är-zhôn-tèy'), town of France; department of Seine-et-Oise; on the Seine; 11½ m. SW. of Paris; here was a convent, now in ruins, to which Héloïse retired abt. 1120.

Argen'teus Co'dex, old uncial manuscript of fragments of the four gospels, written in the Mæso-Gothic dialect on vellum; so called because the letters are in silver, except the initials; supposed to have been written in the sixth century. It is a copy of the translation made by Ulphilas, bishop of the Mæso-Goths, was found in the abbey of Werden, Westphalia, 1597, and is now preserved in the Univ. of Upsala, Sweden.

Argentina, short for ARGENTINE REPUBLIC.

Argentine, variety of carbonate of lime, having a silvery-white luster.

Argentine Republic, S. American federal republic; bounded N. by Bolivia and Paraguay, E. by Brazil, Paraguay, Uruguay, and the Atlantic, S. by the Atlantic and W. by the Andes, which separate it from Chile; extends from lat. 22° to 56° S., and lon. 53° 30' to 72° W.; area, 1,135,840 sq. m.; pop. (1905) 5,410,028; divided into fourteen provinces and ten territories. The chief cities with populations (1906) are: Buenos Ayres, the capital, 1,057,000; Rosario, 150,000; La Plata, 85,000; Tucuman, 55,000; Cordoba, 53,000; Santa Fé, 32,200; Mendoza, 32,000; Parana, 27,000; Salta, 18,000; Corrientes, 18,000; San Juan, 11,500; and San Luis, 10,500. The country is divided into four regions, *viz.*, 1, the regions of the Andes, the W. boundary; 2, the Argentine Mesopotamia, situated between the Uruguay and the Parana; 3, the pampas or S. plains; 4, the N. or interior plains which extend far into Bolivia. The characteristic feature of the country, excepting the region of the Andes, is the plain. Almost all the rivers which come down from the Andes, the S. slope of the central Brazilian ranges, and the heights forming the watershed of Buenos Ayres, unite to form the Rio de la Plata, which has a wider

mouth than any other river. Between the capes San Antonio and St. Mary it has a width of 170 m.; 50 m. farther upstream, at Montevideo, it has narrowed down to 75 m., and the water becomes fresh. At Buenos Ayres, 150 m. farther up, the low shores cannot be seen from the middle of the river. The characteristic of the climate is extreme dryness. Although the territory W. of the Parana has plenty of rain, the plains in the interior suffer from drought because the SW. winds, being stopped by the Andes, discharge their rain in Chile, and the equatorial winds have already exhausted their rain at the tropic. In general the climate is healthful, partly due to the pampero, a strong SW. wind coming from the Andes. Also the nights, which are cool throughout the year, and which tend to make the heat of the day less felt, contribute much toward this end. With few exceptions, the animals of the present day have the same characteristics as the gigantic fossils found in the country, except that they are considerably smaller. The animal peculiar to the plains is the llama. The vicuña, related to the llama, is hunted in the west. The puma, the tapir, the capibara, and the ounce are found. Birds of prey, as the condor and the Caracara vulture, are especially numerous. The American ostrich and different kinds of humming birds and parrots are also found. In the Andes, where the ground is easily irrigated, much wheat, wine, and fruits of all kinds have been produced for a long time. At present wheat, corn, oats, and other grain and vegetables are largely cultivated as well as sugar cane, tobacco (especially in Corrientes and Tucuman, but also in Salta and Catamarca), cotton, peanuts, and flax. Cattle and sheep breeding, the old national occupation, is much more important than agriculture. The natives had at the time of the discovery no other domestic animal than the llama or guanaco. Mendoza introduced the horse, 1536; goats and sheep were brought from Peru, 1550; the ox was brought from the coast of Brazil, 1553. From these importations have descended the millions of cattle which now roam over the plains.

The commerce with the interior is unimportant; that with Chile and Bolivia is of more consequence. To these countries many oxen, mules, and asses are exported. The commerce by sea is about twenty times as large as that by land. It is limited almost entirely to Buenos Ayres and Rosario. The exports are, besides those obtained from cattle, horses, and sheep, chiefly ostrich feathers, Patagonian and artificial guano, furs, honey, copper, gold and silver bars. Exports in 1906 had value of \$292,254,000; imports, \$269,971,000; revenue in 1907, \$60,243,055 gold; expenditure, \$26,863,209 gold; total external debt, \$406,069,101; internal debt, \$3,701,540. The extent of railway construction is growing rapidly. In 1906 the total length of railway open for traffic was 12,600 m. and 3,400 m. more were under construction. There were, in 1906, 30,000 m. of telegraph lines, including those of the national and provincial companies.

The native tribes are divided into three groups: 1, the Araucanians, found as far N. as

the Rio Salado; 2, the Quichuas, formerly subject to the Incas of Peru, and spread E. of the Cordilleras as far as Santiago; 3, the Guaranis, who formerly ruled the Rio de la Plata region. These races were among the most civilized of the aborigines when first found, and have blended somewhat (the Guaranis especially) with the Spaniards, this mixed race constituting the larger part of the indigenous population of the republic.

The constitution adopted May 11, 1853, and revised 1860 and 1862, is nearly identical with that of the U. S. At the head of the republic is a president, elected for a term of six years by representatives of the fourteen provinces. Congress consists of a house of deputies with 120 members, and a senate of 30 members. The Roman Catholic religion is recognized in the constitution as that of the state, but all creeds are tolerated. The settlement of Buenos Ayres was begun 1535. The country formed part of the viceroyalty of Peru till 1776, when the viceroyalty of Buenos Ayres was created. The struggle for independence was begun about 1810. The independence of the united provinces of La Plata was declared July 9, 1816. In 1825 an aristocratic constitution was framed by the party of the *unitarios*. In 1829-52, when he was overthrown in the battle of Monte Caseros, Rosas was practically the sole ruler of the country. In 1865-70 the republic, in alliance with Brazil and Uruguay, was at war with Paraguay, which resulted in the overthrow and death of the dictator Lopez. In 1870-73 a rebellion in Entre-Rios, under Lopez Jordan, was with difficulty quelled. A severe financial crisis afflicted the country in 1882. Disputes with Bolivia, Chile, and Brazil over the question of boundaries occupied the attention of the country for some time. In 1902, King Edward VII of England, as arbitrator, settled the question of the boundary between Chile and the Argentine Republic.

Argives (är'jivz), or **Argi'vi**, inhabitants of Argos and of Argolis, a state of ancient Greece; name also used by Homer and other authors as generic appellation for all Grecians.

Argo, extensive southern constellation named after the ship of the Argonautæ; usually divided into four parts: Argo, Argo in Carina (in the keel), Argo in Puppi (in the stern), and Argo in Velis (in the sails).

Argol, crude tartar; a salt deposited by wine in crystalline crusts on the interior of vats, barrels, and bottles; consists of potassic bitartrate, with some calcic tartrate, coloring, and mucilaginous matter; and is used for the preparation of tartaric acid, Rochelle salt, and potassic carbonate, or salt of tartar.

Argolis (är'-gō-lis), state of ancient Greece, in the NE. of the Peloponnesus (Morea), bordering on the sea; consisted partly of a peninsula between the gulfs of Ægina and Nauplia; was bounded on the S. by Laconia and on the W. by Arcadia. Here Hercules was born, and the descendants of Pelops reigned. The inhabitants were called Argives. The chief towns

were Argos, Mycenæ, Epidaurus, Hermione, Sicyon, and Træzene, each of which was a separate kingdom. Since 1899 Argolis has formed a nomarchy of Greece.

Argon, gas, somewhat heavier than nitrogen, found in the air, 1894, to the extent of less than one per cent, by Lord Rayleigh and Professor Ramsay. Its most marked property is its inactivity, to which it owes its name.

Argonaut, mollusk of the class *Cephalopoda*; commonly called "paper nautilus," from the fragile nature of the boatlike shell in which it floats on tranquil seas. There is no organic connection between the body of the animal and its shell, which is formed in the female



ARGONAUT WITH THE SHELL.

only, for the purpose of protecting the eggs. They have eight arms, two of which are expanded into broad membranes. The latter were formerly believed to be sails, and the other arms were regarded as oars; but, though the fable is perpetuated by the poets, it has long been known that the animal really propels itself by ejecting water from its funnel.

Argonautæ (är-gō-nāt'ä), "the sailors of the Argo"; in English **ARGONAUTS**; Greek heroes who lived before the Trojan war, and were famous for adventurous navigation of unknown seas; derived their name from the ship *Argo*, in which, under Jason, they performed the expedition to Colchis, on the Euxine, to recover the Golden Fleece, which was guarded by a dragon. Among the argonauts were Hercules, Theseus, Castor, Pollux, and Orpheus. Among the obstacles which they encountered were the enmity and treachery of Ætes, King of Colchis, but they were aided by his daughter Medea, a sorceress, and finally carried off the Golden Fleece. In U. S. history, those who prospected for gold in California in 1849 were called argonauts.

Argos, city of ancient Greece; in Argolis, abt. 3 m. from the Gulf of Nauplia; was considered the oldest city of Greece, and to have been founded by Inachus, the father of Io, abt. 1500 B.C.; was famous in the Heroic Age, and at the time of Trojan was the capital of Diomedes; the head of a league of Doric cities before Sparta acquired supremacy. Its site is occupied by a small modern town of the same name, 6 m. NWN. of Nauplia.

Argot (är'gō), a word applied in France to a peculiar language, or gibberish, invented for purposes of concealment by those whose pur-

suits make them dread the arm of the law. In all the countries of Europe a language of this kind prevails, and has prevailed perhaps to some extent from immemorial time. Nodier remarks that "argot, a language invented by thieves, often sparkles with imagination and wit."

Argus (ăr-gŭs), fabulous personage who, in Greek legend, had 100 eyes, some of which were always awake. Having been employed by Juno to guard the heifer into which Io was transformed, he was killed by Hermes. Juno transferred his eyes to the tail of her favorite bird, the peacock. Another Argus was king of Argos, and a son of Jupiter and Niobe.

Argyle (ăr-gil'), Archibald Campbell, Marquis of, 1598-1661; Scottish peer; son of the seventh earl of Argyle; fought against Charles I, and was a leader of the Scottish covenanters; defeated by Montrose, 1644. An adherent of Charles II, he took arms against Cromwell, 1651. After the restoration of 1660 he was convicted of submission to the usurpation of Cromwell, and beheaded in Edinburgh.

Argyle, Archibald Campbell, ninth earl of, d. 1685; eldest son of the preceding; noted for his loyalty to the royal family, notwithstanding the fact that his father was a leader of the covenanters; fought for Charles II at Dunbar, 1650, and when the Commonwealth was established was imprisoned and carefully watched till the Restoration. When he took the test oath, which was exacted, 1681, he added the phrase: "So far as consistent with the Protestant faith." For this he was imprisoned, tried for high treason, and condemned to death. His execution being suspended, he escaped, and, after remaining concealed for a while in London, fled to Holland, where he remained until the close of the reign of Charles II. He returned with a small body of armed men to Scotland on the accession of James II, to aid in the rising of the Duke of Monmouth; was captured, and beheaded.

Argyle, or **Argyll**, George Douglas Campbell, eighth duke of, 1823-1900; b. Dumbarton; succeeded his father, the seventh duke, 1847; published, 1848, "Presbytery Examined," in which he defends the Presbyterian system against prelacy; entered the house of lords; supported the liberal party; became lord privy seal, 1852, and postmaster-general, 1855; reappointed, 1860; was secretary for India, 1868-74; again lord privy seal under Gladstone, 1880.

Argyll, John Douglas Sutherland Campbell (second Duke in peerage of United Kingdom, ninth Duke of, in peerage of Scotland), 1845-; son of the preceding; member of Parliament, 1868-78; governor general of Canada, 1878-83; governor and constable of Windsor Castle since 1892; author of "The Book of Psalms," "Memoirs of Canada and Scotland," "Life of Palmerston," etc.

Ari (ăr-rē) the Wise, 1067-1148; the father of Icelandic history; b. Iceland; was a *godi* (chief), and was also in holy orders. Three

works of his are mentioned: "The Book of Kings," the "Book of Settlements," and the "Book of the Icelanders." The "Book of Settlements," a record of the settlers of Iceland and their descendants, is, in its present condition, the work of several hands; but the essential part of it is the work of Ari. It is a monument of genealogical labor.

A'ria, in music, a rhythmical song, a tune, a measured lyrical piece for one or several voices; commonly applied to a song introduced into a cantata, opera, or oratorio, and intended for one voice supported by instruments.

Ariadne (ă-ri-ăd'nē), daughter of Minos, King of Crete; became the lover of Theseus, to whom she gave a clew of thread by which he was enabled to find his way out of the Cretan labyrinth. According to one account, she was abandoned by Theseus at Naxos, and subsequently became the wife of Bacchus; others say that Diana slew her at Naxos with her arrows. She bore twin sons to Theseus.

Aria'na, ancient name of a region in the W. central part of Asia, inhabited by the Aryan or Arian race. It probably comprised ancient Persia and Bactriana.

A'rianism, doctrinal system of the Early Church, named after Arius. Its fundamental principle was a denial of the coeternal existence of the Son with the Father, and hence of his Deity; was condemned at the council of Nice, 325, and the orthodox view embodied in the Nicene creed. The doctrine spread rapidly, especially in the East, giving rise to controversies and persecutions. The influence of Constantius at the synods of Arles, 353, and Milan, 355, secured the condemnation of Athanasius, the leading defender of the Nicene creed, and the adoption of Arian decrees. Arianism was now dominant throughout the Roman Empire, and the orthodox were relentlessly persecuted. The sect itself became divided into strict Arians and Homoiousians or Semi-Arians, forming hostile parties, and alternately persecuting each other. Through the influence of Pope Liberius the Nicene creed again became predominant in the West, and on the death of the Emperor Valens, 378, Arianism began to decline in the East. The ecumenical council of Constantinople, 381, by which Arianism was again anathematized, and the rigorous measures of the emperors, caused its overthrow. Though crushed in the Roman Empire, it remained for several centuries the religion of the Germanic tribes. The Ostrogoths until their power was lost, 553, the Visigoths until 589, the Vandals under Genseric, and the Burgundians, were all Arians. The last refuge of Arianism was with the Lombards, among whom it became extinct under Luitprand, d. 744.

A'rias Montanus, Benedictus, 1527-98; Spanish orientalist; b. Estremadura; a member of the Council of Trent, 1562, and under the auspices of Philip II edited a polyglot Bible (Antwerp, 1568-72, 8 vols. fol.), highly commended. He wrote, besides other works, "Jewish Antiquities," 1593.

Arica (ä-rë'kä), seaport of Chile; department of Tacna; formerly the principal port of Bolivia, and is yet the principal point of import and export, Bolivia having the right of transporting goods across this strip of Chile in bond. Pop. abt. 3,000.

Aricia (ä-rë'chë-ü), ancient city of Latium, on the Appian Way, at the foot of Mons Albanus, 16 m. SE. of Rome; was important in the reign of Tarquin the Proud. The Aricians took part in a war of the Latins against Rome, which ended in their defeat at Lake Regillus, 498 B.C. Here was a celebrated temple of Diana, and here is a beautiful lake called Lago di Nemi. The modern town, La Riccia, is on or near its site.

Ar'id Re'gion, that part of the U. S. in which the land is not sufficiently watered by rain for the successful cultivation of crops. It is approximately limited by the line of 20 in. mean annual rainfall, but in districts where the principal precipitation occurs during the agricultural season a less rainfall determines the limit. Between the arid region and the humid region—where rainfall meets the needs of agriculture—lies the subhumid region, a belt of country in which ordinary farming is successful in relatively moist years, but fails in other years. In such regions a system of intensive cultivation is practiced called dry farming, by which a rotation of crops during a season is secured by employing continuous cultivation as a substitute for natural humidity. The arid region includes Montana, Wyoming, Colorado, Utah, Nevada, Arizona, and New Mexico, together with those parts of North and South Dakota, Nebraska, Kansas, and northern Texas lying west of the 100th meridian, a belt of southern Texas extending 100 m. from the Rio Grande, all of California south of the 37th parallel, the E. half of N. California, the E. two thirds of Oregon, the SE. third of Washington, and nearly the whole of Idaho; a total area of about 1,340,000 sq. m. See IRRIGATION.

A'riel, "lion of God," or "altar of God"; sometimes applied to Jerusalem (Is. xxix, 1). Later the name was given to a water spirit.

A'ries, sign of the zodiac; the first 30° of the zodiac measured from the point at which the equator intersects the ecliptic—i.e., the vernal equinox; sun enters this sign about March 21st. Also the name of a constellation of the zodiac which once coincided with that sign, but which now occupies the same place as the sign Taurus. Among the ancient Romans, aries was the name of a battering ram—a machine with an iron head used to batter down the walls of besieged towns or forts.



ARIES.

Arimas'pi, in mythology, a one-eyed Scythian race which lived in continual warfare with treasure-guarding griffins; inhabited the extreme NE. of the ancient world.

Arion (ä-rí'ón), Greek musician and poet, who first gave the dithyramb an artistic form; a native of Lesbos, flourished abt. 625 B.C. Herodotus has preserved a legend, according to which Arion was returning from lower Italy to Corinth by sea with much treasure, to get which the mariners resolved to kill him. Having obtained permission to play one tune, he threw himself into the sea, and was received on the back of a dolphin, which had been charmed by the music, and carried him to land. This dolphin is supposed to be the same as that which figures among the stars.

Ariosto (ä-rë-ös'tò), Ludovico, 1474–1533; Italian poet; b. Reggio; was of a distinguished family, and composed dramas and lyrics which caused Cardinal Ippolito d'Este to attach him to his service, 1503–16. Later he served under Ippolito's brother, Alfonso I of Ferrara, and for three years was governor of Carfagnana, where he destroyed the banditti. His "Orlando Furioso" is a fantastic chivalrous story involving a multitude of episodes besides the plot, which is almost a sequel to Boiardo's "Orlando Innamorato."

Ariovistus (ä-rë-ö-vis'tüs), chief of the Marcomanni, a German tribe, who crossed the Rhine to aid the Sequani against the Ædui, and occupied a considerable territory in Gaul, but was finally defeated by Cæsar at Vesontium (Besançon), 58 B.C.

Arista (ä-rës'tä), Mariano, 1802–55; Pres. of Mexico; distinguished himself in the revolutionary and subsequent wars, and 1836 was second in command to Santa Aña. In the war with the U. S., commanded at Palo Alto and Resaca de la Palma; minister of war, 1848; president, 1850–53, when he resigned.

Aristæus (är-is-të'üs), Greek mythology, son of Apollo and Cyrene, and father of Actæon, worshiped as protector of pastoral life and husbandry.

Aristæus of Alexan'dria, fictitious person represented as a Jew who enjoyed the favor of Ptolemy Philadelphus (abt. 280 B.C.). His alleged letter to Philocrates, giving an account of the origin of the Septuagint, has been proved to be spurious.

Aristarchus (är-is-tär'küs), 222–150 B.C.; critic of Alexandria; b. Samothrace; founded a school which flourished at Alexandria, Rome, and elsewhere; said to have written 800 commentaries on the Greek poets; our text of Homer is based on that adopted by him.

Aristarchus of Sa'mos, Greek astronomer; abt. 275 B.C.; was one of the first who held that the earth revolves around the sun. His treatise on the distance and magnitude of the sun and moon is extant.

Aristides (är-is-tí'déz), surnamed THE JUST; d. 467 B.C.; Athenian statesman; appointed archon, 489; contributed to the victory of Marathon, 490. A few years later, by the intrigues of his rival Themistocles, he was ostracized; sought an interview with Themistocles before Salamis, 480, and concerted with

him the plan of that engagement. The victory at Plataea, 479, under Pausanias, was partly due to Aristides. When the Ionian states decided to form a confederation under the hegemony of Athens, Aristides wisely adjusted the relations of the various parties. He died so poor that he was buried at public cost.

Aristippus (ār-is-tīp'ūs), 435-366 B.C.; Greek philosopher, disciple of Socrates; b. Cyrene; founded the Cyrenaic school; his doctrine was systematized by his grandson, Aristippus the Younger.

Aristo (ā-ris'tō), or **Ariston**, of Chi'os, surnamed **THE SIREN**; Stoic philosopher who lived abt. 275 B.C.; disciple of Zeno; taught at Athens, and maintained that the chief good consists in indifference to everything except virtue and vice.

Aristocracy, signifies ideally a form of government controlled and administered by the best or noblest citizens. It is enumerated by Aristotle among the principal forms of government. Aristocracy is of very ancient origin, and in some countries of ancient times it prevailed as subsidiary to monarchy. Such was the republic of Venice. The aristocratic element also predominated originally in the republic of ancient Rome, which was governed by patricians, whose power was hereditary. The feudal system of the Middle Ages favored the formation of powerful aristocracies. Among modern nations Great Britain is perhaps that in which the aristocracy is most influential and respectable. In modern language, aristocracy denotes nobility, or the higher class of society, without reference to government. See **DEMOCRACY**; **MONARCHY**; **OLIGARCHY**.

Aristogiton (ā-ris-tō-jit'ōn), or **Aristogeiton**, Athenian conspirator, accomplice of Harmodius in the assassination of Hipparchus; was put to death by Hippias, 514 B.C. He was regarded as a patriot by the Athenians, who erected statues to him and to Harmodius.

Aristolochia (ā-ris-tō-lō'kē-ā), genus of plants of the family *Aristolochiaceae*; are mostly natives of tropical countries, and have twining stems. The *A. serpentaria*, or Virginian snakeroot, is a native of the U. S., possesses stimulant and tonic properties, and was once supposed to be a remedy for snake bites.

Aristomenes (ār-is-tōm'ē-nēs), Meesian general; commanded the army of his state in the second Messenian war; was renowned for valor and enterprise; finally defeated, 668 B.C.

Aristophanes (ār-is-tōf'ā-nēs), 450-385 B.C.; greatest of Attic comic poets. That he was a full-blood Athenian has been denied, but in character and art he was an Athenian of Athenians; his genius has the flavor of Attic soil and the light of Attic sky. An aristocrat by party allegiance, he was from the beginning in opposition to every form of sophistic phrase-making and humanitarian claptrap. Hence Aristophanes is to this day a powerful ally of conservative souls. Out of about forty of his pieces are left, "Acharnians," a burlesque

plea for peace; "Knights," an attack on Cleon; "Clouds," in ridicule of Socrates as the head sophist; "Wasps," a caricature of the Athenian jury system; "Peace," a frolic in anticipation of the close of the Ten Years' War; "Birds," in which the poet builds an airy cloud-cuckoo-town as a home for all manner of fancies. In the "Lysistrata," the women seize the helm of state; in the "Thesmophoriazusæ," they league against Euripides, the woman-hater. The truceless war against Euripides culminates in a formal siege in the "Frogs." The "Ecclesiazusæ," is a farce at the expense of women's rights and communism. The "Plutus" is a manner of allegory and marks a transition to middle comedy. In wit, humor, inventiveness, in lyrical perfection, in command of all the resources of language and rhythmical art, Aristophanes is one of the foremost masters of all time.

Aristophanes of Byzantium, 262-185 B.C.; Greek grammarian and librarian at Alexandria; published critical editions of Homer, Hesiod, the lyric poets, especially Alcæus and Pindar; wrote introductions to the plays of the tragic and comic poets, especially Aristophanes and Menander; made lexicographical collections; invented a series of critical signs; and developed the notation of prosody, including accent, breathing, and quantity.

Aristotle, 384-322 B.C.; Greek philosopher; b. Stagira. His father was Nicomachus, a physician, and his family was distinguished by the hereditary profession of medicine. Left an orphan at an early age, at seventeen he went to Athens, and became a pupil of Plato, with whom he continued twenty years, and by whom he was called the leader and the intellect of the school, and likened, in his ardor and restiveness to a colt which needed the bit more than the spur. Upon the death of Plato (348 B.C.), he took up his residence with Hermias, tyrant of Atarneus. Here he spent three years, but when Hermias was sent a prisoner to Persia, Aristotle fled to Mitylene, taking with him Pythia, whom he married. After her death he married his concubine, Herpyllis.

When Alexander of Macedon was born, Philip, his father, in flattering terms asked Aristotle to be the boy's tutor. The commission was accepted, and when Alexander was fifteen, Aristotle assumed the personal oversight of his instruction, continuing at the court during the lifetime of Philip, and for two years after his pupil had ascended the throne. When Alexander undertook the conquest of the East, Aristotle returned to Athens, and taught philosophy in the Lyceum, a temple with walks ornamented by trees and colonnades, whence it was called the Peripatetic, "shady walks." He here taught thirteen years, when, after the death of Alexander, he was accused of impiety and fled to Chalcis in order to escape the fate of Socrates, or, as he said, that Athens might not have the opportunity to sin against philosophy again. There he died. After his death his pupil Theophrastus conducted the school for thirty-five years.

Aristotle had one of the greatest intellects of all ages. All agree that his wealth of knowl-

edge, his unbiased judgment, his constructive power, and his depth of speculative insight are unsurpassed. By some of the ancients he is extolled for his patriotism, his reverence, modesty, moderation, love of truth and attachment to friends, while others hold him up as selfish, ungrateful, sordid, gluttonous, and impious. Of his numerous writings only about a fourth remains, all of which probably differ from the state in which he left them.

Aristotle's method is the reverse of Plato's. Plato insisted upon the unity of all being, while Aristotle developed the manifoldness of the phenomenal world. He is as analytic and discursive as Plato is synthetic and intuitive. Aristotle sees that the particular is necessary in order that we may know the universal. So he gathers particulars from all quarters—history, the human mind, and nature, furnish him with contributions. He has no rival in the variety or extent of the facts which he has collected, and has never been surpassed in the patient industry of his investigations. Both Plato and Aristotle agreed that the reality, or the essence of individual things, was in the idea. But while to Plato the idea had an objective existence independent of the individual object which participated in it, to Aristotle the idea was immanent in the individual and had no being separate from it.

Aristotle's Lan'tern. See SEA-URCHIN.

Aristoxenus (ār-is-tōx'ē-nūs) of Taren'tum, abt. 350-320 B.C.; Greek philosopher; a pupil of Aristotle; wrote a treatise on music, which is extant; founded a school of musicians, who rejected the system of Pythagoras, and judged of the notes in the diatonic scale by the ear exclusively.

Arith'metic, that branch of mathematics which treats of numbers, or the art of computation; the art of expressing numbers by symbols, combining these, and applying to them rules of the greatest practical utility. Among the ancient Greeks, Pythagoras, Archimedes, and others cultivated the science of numbers, but they labored under the disadvantage of a clumsy mode of notation, and had no sign for zero or naught. The Roman numerals, I, V, X, L, C, etc., continued to be commonly used in Europe until the fifteenth century. The invention of the Arabian numerals, now in use, is attributed to the Hindus. The use of the cipher (0) gives the modern arithmetic a great advantage over the ancient. Leibnitz showed that arithmetical operations could be greatly simplified by the use of *binary* arithmetic, a system of notation based on the smallest possible scale, that of two figures, 1 and 0. The regular series of numbers, one two, three, etc., is expressed thus: 1, 10, 11, 100, 101, 111, 1,000, etc.

Arithmet'ical Mean. See MEAN.

Arithmetical Progression. See PROGRESSION.

Arius (ā'ri-ūs), abt. 250-336; founder of Arianism; b. Libya, Africa; went as a layman to Alexandria, and there sided with Peter, Bishop of Alexandria, in the Meletian

schism; was ordained deacon by him, but subsequently excommunicated for joining the schismatics. He repented, was advanced to the priesthood and given charge of a church. He first came into wide public notice, 318, by reason of his controversy with Alexander, which caused Constantine to summon the first general council, Nice, 325.

Arizo'na (corruption of an Indian word signifying "Little Creeks"); territory in the Basin and Plateau division of the U. S.; bounded by Utah, New Mexico, Mexico, California, and Nevada; area, 113,020 sq. m.; pop. (1906) estimated 143,745; surface generally elevated and composed of wide, gradually descending, plateaus crossed by ranges rising 12,000-14,000 ft., these being riven by streams and rivers,



with beds from 1,000 to 6,000 ft. below the surface; chief rivers, Colorado, Little Colorado, Gila, Verde, Salt, and San Pedro, the first, the most remarkable river in the world, with a course through the Grand Cañon of 400 m.; San Francisco Mountains, originally a group of volcanoes; extensive lava beds in N.; mineral productions include gold, silver, platinum, quicksilver, copper, tin, lead, nickel, iron ores, coal, salt, sulphur, precious stones; soil fertile where irrigation has been introduced; forests of pine and spruce in the mountains; on the dry, hot plains mimosas and cacti the only vegetation; climate in the mountains and plateaus, warm, but healthful; mean temperature of year at Prescott, 65.49° F.; in S. Arizona very hot and dry; lack of rain very general; at Prescott about 10 in. in the year, at Yuma but 2 or 3. Mining is the most important industry; value copper mined (1906) \$50,625,257, gold, \$2,964,683; value principal crops—hay, corn, spring wheat, oats (1905), \$3,385,731; number of farms (1900) 5,809; value farm animals (1907), \$18,339,175; manufacturing industries chiefly copper mining, smelting and car building; national banks (1905), 13, aggregate resources, \$6,300,000; state banks, 18, aggregate resources, \$6,700,000; public and private schools (1907), enrolled 26,662 pupils; higher institutions include Univ. of Arizona, Tucson; normal schools,

Tempe and Flagstaff; St. Joseph's Academy, Prescott; Lowell Astronomical Observatory, Flagstaff; leading religious bodies, Roman Catholic, Latter-Day Saints, Methodist Episcopal, and Baptist; assessed valuation of property (1906), \$62,500,000; chief cities, Phœnix, the capital, Prescott, Tucson, Yuma, Tombstone, Jerome, Florence, and Bisbee.

Original inhabitants of Arizona, Aztecs or Toltecs; settlements by Spaniards and Jesuit missionaries before 1600; Arizona and New Mexico part of Mexico till 1848 when all N. of the Gila was ceded to the U. S., the rest obtained by the Gadsden Purchase, 1853; Arizona made a separate territory, 1863; attempts to have Arizona and New Mexico admitted as one state defeated by the former, 1906.

Arjish-Dagh (ār-jēsh'däg). See **ARGÆUS MOUNT**.

Arjuna (ār'jō-nā), Hindu mythology, the third son of Pundru; a hero of the Mahabharata, who, after many startling adventures withdrew from worldly affairs to the Himalayas. Another Arjuna, best known as Kartavirya, was given a golden chariot and the power of checking wrongs, because of his devout worship of Dattatreya.

Ark, vessel constructed by Noah during the deluge to preserve his family and the species of animals (Gen. vi). Ark of the Covenant was an oblong chest, 2½ cubits long by 1½ broad and deep, made to contain the tables of stone, on which was written the "covenant" from which it derived its name. It was made of shittim (acacia) wood, inlaid and overlaid with gold, and stood in the "Holy of Holies." Over its cover stood the two cherubim. It was carried before the people, and at the close of the judgeship of Eli was captured by the Philistines, but restored.

Arkadelphia (ār-k-ä-dél'fī-ä), capital of Clark Co., Ark.; at the head of steam navigation on the Washita River, 65 m. SW. of Little Rock. Its chief products are lumber and cotton. During the first two years of the Civil War Arkadelphia was a principal military depot for the states of Arkansas, Missouri, and Louisiana. A skirmish took place here February 15, 1863, between a detachment of union troops, under Capt. Brown, and a party of confederates, in which the latter were defeated. Pop. (1900) 2,739.

Arkansas (ār'kän-sä), name of an Indian tribe found by the first explorers; state in the SW. central division of the U. S.; bounded by Missouri, the Mississippi River, Louisiana, Texas, and Indian Territory; area 53,850 sq. m.; pop. (1906) estimated, 1,421,574. Popularly called the **BEAR STATE**; state flower, the apple blossom. The E. part from 30 to 100 m. W. of the Mississippi is low, with lakes, bayous, and swamps; W. of this, the land rises to tablelands and hills of Ozark, Washita, and Black Hills, some of these rising to 2,000 ft. or more; state crossed by the Arkansas, White, St. Francis, Washita, and Red rivers; 3,000 m. of navigable rivers; minerals include gold, argen-

tiferous galena, zinc, copper, manganese, iron ores, semibituminous coal, natural gas, marble; value coal mined 1906, \$3,000,339; soil of lowlands alluvial and very fertile; of river valleys and of some of the mountain slopes, productive; many kinds of trees found; wild and cultivated fruits abound; apples of best quality grown; climate on the whole very fine; mean annual temperature lowlands 60.6°, of tablelands (Little Rock), 62.66°; annual rainfall lowlands, 63.42 in., tablelands 55-60 in.; chief agricultural productions, cotton, wheat, Indian corn, potatoes, rye, hay, rice; number of farms (1900), 178,694; value crops (1906), \$30,293,311; value farm animals (1907), \$57,659,447; chief manufactures, cotton-seed oil, meal, flour and lumber, leather, cotton and woolen goods, wagons, and hones



of novaculite; number manufacturing establishments (1905), 1,907; value of products, \$53,864,394. The total assessed valuation of property (1903) was \$249,779,108; bonded debt, \$1,287,347; national banks (1905), 28, aggregate resources \$15,900,000; state banks, 120, aggregate resources \$17,500,000; public school enrollment (1904-5), 335,765; higher institutions include Arkansas Industrial Univ., Fayetteville, with normal and training departments, Arkansas College, Batesville, and Ouachita and Arkadelphia Methodist colleges, Arkadelphia, and a school of medicine. The leading religious bodies are the Baptists and Methodists. Cities and towns of over 3,000 pop., Little Rock, the capital, Fort Smith, Pine Bluff, Hot Springs, Helena, Texarkana, Jonesboro, Fayetteville, Eureka Springs, Mena, Paragould. The first settlement was by the French at Arkansas Post, 1685. Arkansas formed part of Louisiana Territory till 1812, and of Arkansas Territory 1819-36, when it was organized as a state; passed ordinance of secession May, 1861; was overrun by both armies, 1861-63; restored to the union, June, 1868; present constitution adopted, 1874.

Arkansas, river of the U. S., next to the Missouri the longest affluent of the Mississippi, rises in the Rocky Mountains, and enters the Mississippi in latitude 33° 54' N., longitude 91° 10' W.; length 2,170 m.; is navigable by steamers 800 m.

Arkansas Post, village of Arkansas Co., Ark., on the Arkansas River, settled by the French, 1685. During the Civil War was fortified by the confederates. January 11, 1863, a combined attack of the U. S. military and naval forces under Gen. McClelland and Admiral Porter was made, and its works carried by storm.

Arkansas, University of, a state institution organized under act of 1871 accepting public lands granted to each state for educational purposes by congressional act of 1862. The institution was opened January, 1872; has academic and technical departments at Fayetteville, law and medical departments at Little Rock and a normal department for colored students at Pine Bluff. It receives annually from the U. S. \$15,000 for maintenance of an experiment station, and \$25,000 to be applied only to instruction in agriculture, and branches of arts and science with special reference to industries. The university's total income is \$70,000, the grounds and buildings are valued at \$300,000. The student body numbers about 1,600. Instruction is free except in departments of law, medicine, music, and art.

Arkwright, Sir Richard, 1732-92; English inventor; b. Lancashire; applied himself to the invention of machinery for spinning cotton, when no machine could produce cotton yarn fit for warp. In 1768 he set up at Preston his first spinning frame, for which he obtained a patent, 1769. He removed to Nottingham, and formed a partnership with Need and Strutt. His machine caused a great extension of cotton manufactures and promoted the prosperity of the nation. He may be called the founder of the factory system; knighted by George III, 1786.

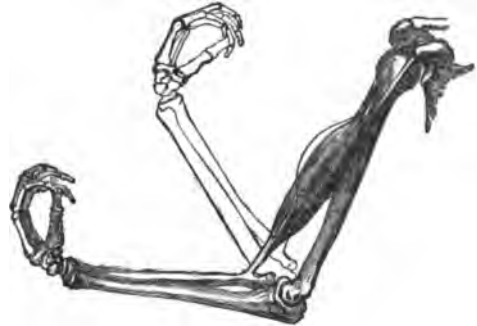
Arlberg, mountain mass which forms the boundary between the Austrian provinces of Tyrol and Vorarlberg; 5,400 ft. above the sea. In 1880-84 it was pierced, at an elevation of 4,030 ft.; with a railway tunnel, 6,720 yds. long.

Arles (Ariz), city of Bouches-du-Rhône, France, on the Rhône, 15 m. from the Mediterranean; has a cathedral of the seventh century; once the capital of the kingdom of Arélate. Important councils of the church were held here, 314, 354, 452, and 475 A.D.; has a Roman amphitheater. Pop. (1901) 28,573.

Arlington Heights, elevation in Fairfax Co., Va.; on the Potomac, opposite Washington; once the residence of Gen. Robert E. Lee; in Civil War was strongly fortified; now site of a National Soldiers' Cemetery.

Arm, in man and the higher animals, the upper or anterior limb, extending from the shoulder to the wrist. The human arm consists of the *brachium* or arm proper (sometimes called the upper arm) and the *antebrachium* or forearm. The former has one bone, the humerus; the latter two, the ulna, upon the inside (as the hand lies with the palm upward) and the radius, upon the outside. The humerus articulates with the shoulder blade or scapula, forming the shoulder.

This is a ball-and-socket joint, having universal movement. At the elbow joint the inner bone of the forearm, the ulna, articulates with the lower end of the humerus, forming a hinge joint. The upper end of the radius practically does not enter into the elbow joint, but acts as a fulcrum upon which the radius swings as the hand is pronated and supinated; that is, turned palm upward or palm downward.



BONES OF THE ARM WITH THE BICEPS MUSCLE.

ward. The lower end of the radius and ulna are bound closely to each other with ligaments, and form an articulation with the upper row of the carpal bones of the hand.

The shoulder joint is covered over and rounded by the powerful deltoid muscle which springs from the shoulder blade and clavicle, and is attached to the upper and outer part of the humerus, so that in its action the arm is moved from the side. It is opposed by the great pectoral muscle in front, and the *latissimus dorsi* behind, the two latter in their action drawing the arm to the side and downward. On the front of the arm proper is the biceps, which flexes the forearm upon the arm, and behind, the triceps acts in the opposite direction. The forearm has two groups of muscles, the one on the outer side surrounding the radius, containing the extensor muscles for the wrist and hand, that on the inner, or ulnar, side being composed of the flexor muscles. The blood supply is derived from the brachial artery, and the nerves of the arm are branches of the brachial plexus.

Arma'da, The Span'ish, often called the "Invincible Armada," a great Spanish fleet, fitted out by Philip II for the conquest of England, 1588; consisted of about 130 vessels, carrying 2,431 guns and more than 19,000 soldiers; commanded by the Duke of Medina Sidonia. Lord Howard of Effingham commanded the English fleet, greatly inferior in size. The armada sailed from Spain about the end of May, 1588, and in passing through the English Channel was harassed by the English, who avoided a general engagement. During a night in August Lord Howard sent 8 fire-ships against the armada, and produced a panic and great disorder, in consequence of which the English captured or destroyed about 12 ships early the next morning. This defeat induced the Spanish admiral to abandon the invasion of England, and return to Spain by

sailing around the Orkney Islands, the English Channel being closed by the enemy. Many of the Spanish ships were wrecked on their circuitous voyage, and only 53 returned to Spain.

Armadillo, common name of the *Dasypodidae*, a family of edentate mammals, natives of South and Central America. They derive their name from a bony armor which covers the body, and consists of polygonal pieces united to form solid bucklers, one over the rump,



ARMADILLOS.

one piece over the shoulders, and between them a dorsal cloak consisting of a number of plates disposed in transverse bands, which are movable and allow freedom of motion. The head is protected by a similar buckler, not continuous with that of the body. They have short legs and feet adapted to burrowing in the ground, in which, when pursued they bury themselves. They are nocturnal, and feed on insects, carrion, and vegetable food. Their flesh is often eaten by the natives, but has a rank flavor.

Armaged'don ("mount of Megiddo"), the plain of Esdraelon, the great battlefield of the Old Testament; used figuratively in Rev. xvi, 16.

Armagh (är-mä'), city of Ireland; capital of county of same name; 36 m. SW. of Belfast; is the archiepiscopal seat of the primate, and archbishop of all Ireland, both in the Anglican and Roman Catholic churches. It was the capital of Ireland in the sixth and seventh centuries, and was renowned as a school of theology, etc. Pop. abt. 7,500.

Armagnac (är-män-yäk'), Bernard d' (Count), d. 1418; constable of France; an ambitious and turbulent nobleman; became, 1407, the enemy of the Duke of Burgundy and chief of the faction called Armagnacs, who waged a civil war against the Burgundians. In 1415 he obtained the office of constable of France, the highest in the nation. Having excited the odium of the Parisians by his tyranny, he was killed by the populace.

Armatoli (är-mä-tö'le), or **Armatöles**, body of Greek militia organized abt. 1500 A.D. They operated in mountainous regions, difficult of access; were employed by the Turkish sultan to protect the fertile plains from the raids of the mountain robbers of Thessaly. Northern Greece was divided into districts, each under an armatol. In the war of Grecian independence the armatole fought against the Turks, with distinguished daring.

Ar'mature (Latin *armatura*, armor), a piece of soft iron placed in contact with the poles of a permanent magnet to provide a path for the lines of force, thus preserving its magnetic power; also called a "keeper." In a telegraph sounder or relay, the part which is attracted by the electro-magnet and which operates the lever. In dynamos and motors, the coil or

set of coils of wire which revolve in the magnetic field of the magnets or field coils and cut the lines of force therein, thereby generating electric current in a dynamo or motion in a motor.

Armenia (är-më'ni-ä), important country of western Asia, now belonging in part to Russia, Turkey, and Persia; interesting as the seat of an ancient civilized people, whose language belongs to the Indo-Germanic family, and who have preserved their nationality to the present time; situated between Asia Minor and the Caspian Sea; was divided into Armenia Major and Armenia Minor; country an elevated table-land inclosed on several sides by the ranges of Taurus and Anti-Taurus and partly occupied by other mountains, the highest of which is Ararat. It is drained by the Euphrates and Tigris; climate cold in the highlands, intensely hot in summer in the valleys; soil fertile; cattle raising and grazing more extensively followed than Artaxata, agriculture; chief towns of ancient Armenia, Anni, and Tigranocerta; chief modern towns, Erivan, Erzerum, and Van; people have excellent talent for business, especially banking and mercantile pursuits; call themselves Haiks or Haikans, after their first king. The kingdom was conquered by Alexander, afterwards ruled by the Parthian Arsacidae, then by the Armenian Sassanidae, then subject to Persia; subsequently invaded by the Turks, the Tartars, and the Turcomans, while the Kurds, Persians and Russians have at different times taken possession of certain portions; horrible massacres by the Kurds frequent occurrences; Christianity became state religion, 289; Armenian Church separated from the Roman Church, 491, though a small portion of the Armenians recognize the authority of the pope; doctrines of the Church mainly those of the Greek Church, including the denial of the existence of a purgatory; Evangelical Protestant Church established 1850, as result of labors of American missionaries; number of Armenians abt. 4,000,000, of whom 2,500,000 are in Turkey, and of these 1,000,000 live in Armenia. The Armenians in Turkey have been atrociously persecuted, and in 1895-96 many thousands of them were massacred with the apparent approval of the Sultan.

Armida (är-më'da), name of a beautiful sorceress in Tasso's "Jerusalem Delivered." Attempted to seduce Rinaldo and other crusaders. The former was fascinated for a time, but finally returned to the war against the infidels, and converted Armida to Christianity.

Ar'millary Sphere, ancient and obsolete astronomical machine contrived to represent the principal circles of the celestial sphere in their proper relative positions.

Armin'ianism, theology, which as opposed to Calvinism, or Augustinianism, affirms such doctrines as these: That God does not unchangeably and eternally foreordain whatsoever comes to pass; does not first decree the sin and then punish the sinner for the sin decreed; that the human race inherits the

nature of fallen Adam, not by being held guilty of his sin, but by the law of natural descent; that if man is not a free agent, God is not a sovereign, but sinks to a mere mechanist; that faith is as a power the gift of God, but as an act is the free, avoidable, yet really performed act of the intellect and will, by which the man surrenders himself to Christ; that no one of the human race, including infants, is damned who has not had full chance for salvation. Before the reformation Arminianism was, with minor exceptions, the doctrine of the Universal Church. Wesleyan Methodism is a modern Arminian development.

Armin'ius, or Her'mann, d. 19 A.D.; "the Deliverer of Germany," son of Segimer, a chief of the Cherusci; was sent to Rome as a hostage; educated and honored with citizenship and knighthood there; led a revolt of the German nations; drew Varus, Roman commander on the Rhine, into an ambuscade in which he and most of his troops perished; and after maintaining himself against the power of Rome for years, was killed by one of his own people.

Arminius, Takolus (family name in his native language, **HARMENSEN**), 1560-1609; Dutch theologian, chief leader of the movement called after him, **Arminianism**; b. Oudewater, S. Holland; pastor in Amsterdam, 1588-1603; Prof. of Divinity at Leyden, 1603-9; first to receive the degree of D.D. from the university; commended even by his enemies for ingenuity, acuteness and piety.

Ar'mistice. See **TRUCE** or **ARMISTICE**.

Ar'mitage, Thomas, 1819-96; American Baptist clergyman; b. Pontefract, England; in 1838 removed to New York, and entered the Methodist Episcopal Church; in 1848 became a Baptist, and settled as a pastor in New York City; retired in 1888; advocated Bible revision, which led, in 1850, to the formation of the American Bible Union; author of "A Complete History of the Baptists."

Ar'mor, garments of defense. The term includes all forms of shields. The materials usually employed are quilted and stuffed garments, leather; metal used in small pieces, such as plates or rings, metal in larger pieces, as the strips or ribbons of steel, and the larger splints or plates of steel used in large and elaborately made pieces such as the cuirass, the head-piece and the like. Armor in antiquity was nearly always light and manageable; it usually covered the body only in part, and was never allowed to interfere with ease of movement. The Roman and Greek warriors depended upon their helmet and shields for their chief defense; otherwise their armor was confined to the trunk, the tops of the shoulders, and the front part of the legs below the knees, the boots, however, affording some protection to the feet.

In the Middle Ages, however, there was a general disposition to cover the person completely. Chain mail, a fabric of small metal rings or links, interlinked so that four or

more links passed through each separate link to form a flexible material, was extensively used for garments. There was also a coat of mail, made either of chain mail or by sewing rings or small plates of metal upon leather or cloth. As early as the tenth century the



MAIL AND PLATE ARMOR.

helmet had a long nasal, which protected the face, and the hauberk had long sleeves (even gloves attached at a later period), and protected the thighs to the knees. As the skill of armorers became greater the hauberk was re-enforced by plates of steel applied to its sur-



CHAIN ARMOR.

face, covering the back of the upper arm, the whole of the forearm, the shoulder, the legs, and afterwards parts of the trunk. During the same epoch stuffed armor and armor made by quilting pieces of steel between two thicknesses of strong textile fabric were in constant use,

and it was customary to combine many kinds of armor in one equipment; thus the hauberk was worn over the stuffed gambison. In the fourteenth century smithwork had been greatly developed, and suits of complete steel were worn. The headpiece in particular had become a complete covering closed in front and fitting closely at the neck, so that the wearer looked through small openings in the movable visor, and obtained air through minute holes in the movable beaver. At this time the armor of mounted men became extremely heavy and cumbersome, sometimes weighing 200 lbs. The manufacture of armor reached the highest excellence abt. 1500. Soon after this it began to be given up, because only the most perfectly forged breast plates could resist a musket ball.

Armorica (ür-mör'Y-kü), ancient name of the NW. part of Gaul, bordering on the ocean, and extending from the Seine to the Loire, now Bretagne. The Armoricans engaged in maritime pursuits. Abt. 400 A.D. Mariadec, a Briton, obtained the chief power in Armorica, which became an independent state.

Ar'mor plate, iron or steel plates for the protection of vessels of war against projectiles. Armor plates were first made of wrought iron, but this is no longer considered suitable. It was soft and yielding under the impact, flowing readily from before the projectile after having exerted all its resistance which is usually expressed in terms of the thickness of wrought iron which the projectile used would have penetrated. With the coming of improved armor-piercing projectiles it was recognized that to prevent penetration of the plate the projectile must be made to expend its energy upon itself; that is, the resistance must be so great and so concentrated as to overcome the velocity of the projectile in a short space. This was accomplished, as far as possible, by means of a compound plate consisting of a plate made of very hard steel backed by a wrought-iron plate, the object of the steel plate being to break up the projectile, and that of the wrought-iron backing to hold the steel plate together, the two being rolled together under great pressure to form one plate. One of the best known processes for the manufacture of compound armor patented in England was as follows: The wrought-iron back was brought to a welding heat, placed in a mold, and melted steel run into the mold and left to solidify in contact with the iron. The compound plate was then taken from the mold, reheated and hammered, or rolled, until reduced to a proper thickness. After cooling, the plate was cut to proper dimensions. The steel face was about one third the thickness of the compound plate. These plates were capable of resisting the best cast-iron projectiles made. Projectiles then made of the best forged chrome steel were capable of penetrating the steel face of the compound plate. After the penetration of the face was accomplished the perforation of the softer wrought-iron backing required but little energy.

Further development of all steel armor is due almost entirely to Schneider & Co., of Creusot, France. Later the manufacture of steel armor

was taken up by the Terni Steel Works of Italy, and in the U. S. at Bethlehem, Pa. The metal was open-hearth steel cast into ingots from which it was reduced to plates by forging under powerful hammers. This plate was of the same degree of hardness throughout. In 1891, H. A. Harvey, of Newark, N. J., patented a process of imparting to the face of a steel plate a higher percentage of carbon, thus making it susceptible of being tempered to a higher degree of hardness than the rest of the plate. This process is called cementation. The face to be treated is covered or surrounded by powdered carbon and then heated to a high degree. By the chemical action which takes place the steel takes more carbon and the face becomes supercarbonized and susceptible of higher temper. Harvey then treated his red-hot plates to a process of cooling by means of spraying with fine jets of water to harden or temper the steel face. In 1895, Krupp, in Germany, brought out a rival method of face-hardening steel plates which for some time was considered unequalled. The cementation process has been adopted in all countries where armor plate is manufactured.

Ar'mour, Philip Danforth, 1832-1901, American philanthropist; b. Stockbridge, N. Y.; a miner in California, 1852-56; in commission business in Milwaukee, 1856-63; later member of grain commission firm, and head of pork-packing firm of Armour & Co., Chicago; founded Armour Mission and Armour Institute of Technology, and gave them upward of \$2,500,000.

Arm'strong, James, 1794-1868; American naval officer; b. Shelbyville, Ky.; captured by the British while serving in the *Frolic*, 1814; became captain; commanded the E. India squadron; captured the Barrier forts in the Canton River, 1857; was compelled to surrender Pensacola navy yard to a superior force of Confederates, 1861.

Armstrong, John, 1758-1843; American army officer; b. Carlisle, Pa.; served as major in the Revolutionary War; author of the anonymous and celebrated "Newburg Addresses," written March, 1783, to obtain from Congress payment of money due the officers of the army; member of the old Congress; U. S. Senator from New York, 1800; minister to France, 1804; secretary of war, 1813; censured for failing to defend Washington, 1814, he resigned.

Armstrong, William George (Lord), 1810-1900; English engineer; b. Newcastle-upon-Tyne; became a lawyer, but was diverted by a strong bent for scientific pursuits; invented the hydro-electric machine, the hydraulic crane, and the accumulator, to furnish an artificial head for working hydraulic machines; extended the application of hydraulic power; founded the Elswick engine works for the construction of this machinery. In 1854 he invented the rifled gun that bears his name; in 1858-63 was engineer of rifled ordnance; knighted, 1858; raised to the peerage, 1887; president of Institute of Mechanical Engineering and of the Institute of Civil Engineering.

Army, the entire organized land forces of a nation, or a force so organized, armed, and equipped as to be able to act independently or in combination with others, as the army of the United States, the French army, the army of the Potomac, the first, second, or third German armies, etc.; also organized bodies of less size which take their names from their duties, as a covering army, which interposes itself between the enemy and some place to be protected; a blockading army, which surrounds a place and prevents ingress and egress; an army of observation, which is held in close proximity to an enemy, watching his movements, but generally avoiding an engagement.

The feature which separates an army from a mob is its organization, that system of subordination which enables one man to control the entire mass. This implies a subdivision into units of such small size that the commander of each one can personally control the movements of each man in it. This is the unit of combat, and has varied at different epochs with the use of different weapons, from about 60 to 250 men. These units of combat combine to form tactical units, which while small enough to be under the personal observation and control of one man are yet large enough to be an efficient factor in attack or defense, and when acting alone may use their subdivisions for successive attack, mutual support, etc. In modern armies the tactical unit of infantry is the battalion. For administrative purposes, such as supplying clothing, food, arms, etc., and for recruiting and keeping records, the tactical units are united into units of administration, now called regiments. The regiments are again united into brigades, the brigades into divisions, the divisions into corps, and the corps into armies. Each of these subdivisions in turn is controlled by its immediate commander, who holds those beneath him to a strict accountability, and is himself similarly held by his superiors.

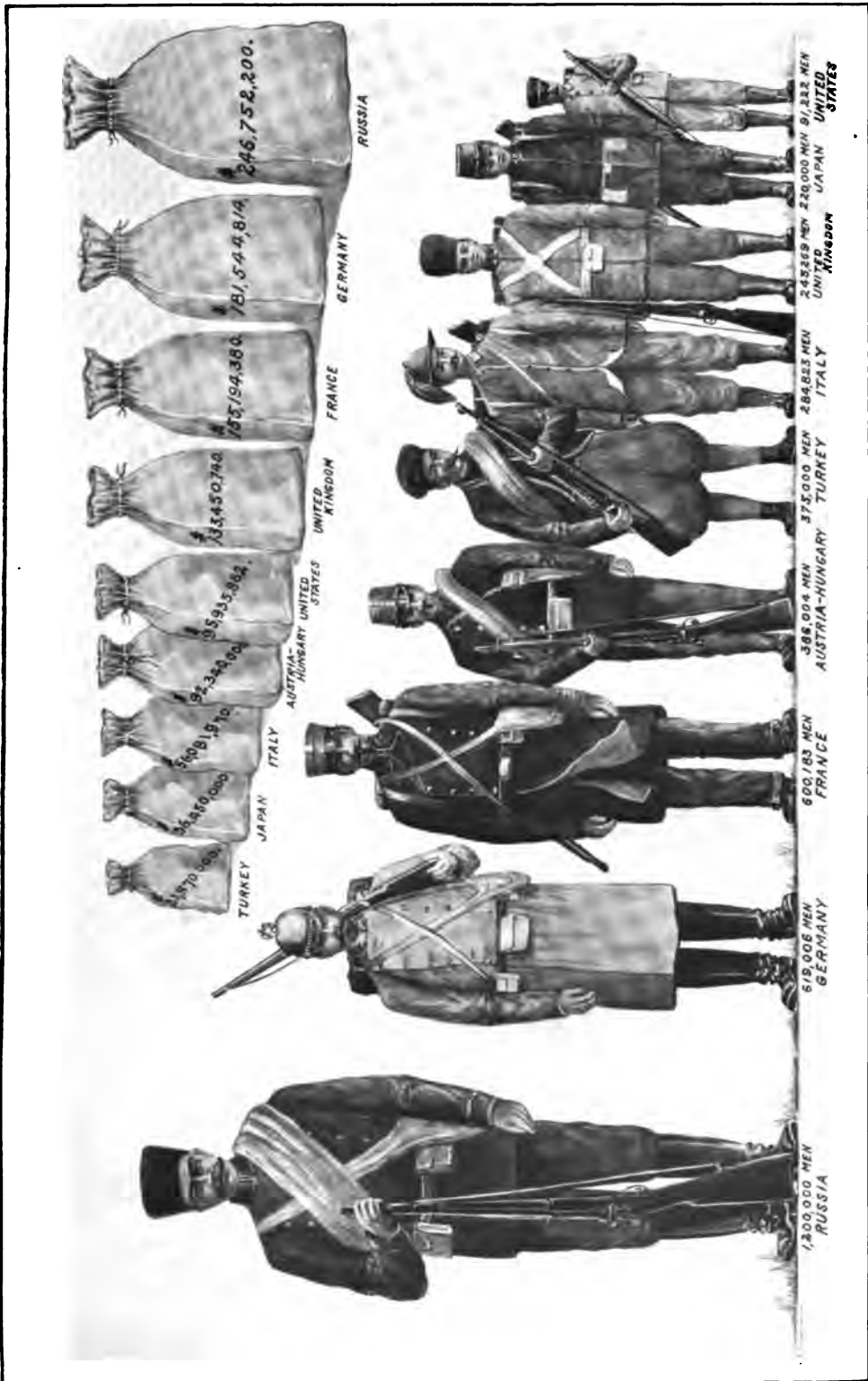
The military organization begins with the enlisted or conscripted men. From among the enlisted men are chosen the non-commissioned officers, as corporals, sergeants, etc., who hold their rank by virtue of warrants from the chief of staff, as distinguished from commissioned officers who hold commissions directly from the executive. (In the U. S. commissions are issued and signed by the President of the U. S.). The *line* includes all men serving with the colors, *i. e.*, active service in barracks or in the field; the *staff* denotes the administrative organization, such as quartermaster's office, intelligence bureau and the general board of strategy which considers beforehand the problems which may be presented by war.

History points to Egypt as the first nation to establish a military organization which may be called an army. The tactical formation of its infantry seems to have been in solid squares of 100 front and depth, or total of 10,000 men. But little is known of its cavalry, which was not a prominent arm. The Persian army was at first mainly cavalry. Each province was under a military commander who was responsible for the troops of his prov-

ince, who were annually mustered and inspected. The armies of the Greek states consisted almost entirely of infantry, their leaders fighting either on foot with the men or in chariots. Their military system was rather that of a state militia than of a standing army, since but few garrisons were maintained and the men were called out only when needed, returning to their homes when the war was over. Every citizen was called upon for military duty, and the term of service was between the ages of twenty and sixty.

The Franks and Germans in their warfare against the Romans were organized by tribes and families united into larger masses, who, under the direction of some selected ruler, fought usually in their wedge-shaped columns of attack, aided by their cavalry and light infantry, the latter at the time a *corps d'élite*, but which at a much later date lost this character, and the foot troops became merely attendants upon the mounted men or knights. All the freemen of these tribes were entitled to bear arms, and in peace claimed perfect liberty and a voice in deciding all public questions. In war, commanders were elected and given absolute power. The feudal armies were composed of knights, men at arms, and vassals, who were called out as needed, and when disbanded returned to their ordinary pursuits. The fighting power rested in the knights; the infantry, being poorly armed and equipped and almost without organization or training, were held in contempt. About the middle of the fifteenth century the victories of the Swiss pikemen over the chivalry of Burgundy, and the establishment by Charles VII of a standing army, demonstrated the superiority of trained and organized forces over the feudal bands, and in a degree reestablished the prestige of well armed and drilled foot troops. These changes marked the beginning of the downfall of the feudal system, which was completed by the almost universal establishment of standing armies and the general introduction of firearms at the beginning of the sixteenth century.

The immense losses during the Napoleonic wars so depleted the armies of France that new methods of recruiting became necessary. In consequence the "conscription" was established, by which every male citizen was declared liable to military service for five years, and under which every citizen between twenty and twenty-five years of age was enrolled by name and called out as required. In 1807 the Prussians established the "short-service system," by which each man, so soon as he was trained in his military duties, was sent home and was replaced by a recruit. By this method it became possible to augment indefinitely the trained force of the kingdom. This system once established became permanent in Prussia, and, with the necessary modifications due to the growth of the state and its relations to its neighbors, remains in force at the present time. It is now adopted with slight modifications by almost all the nations of Europe. The system is based upon the theory that military service is owed by every male citizen to his country. Every able-bodied man between the ages of twenty and thirty-two forms part of the



ARMIES OF THE LEADING POWERS.
THEIR COMPARATIVE PEACE STRENGTH AND COMPARATIVE ANNUAL COST.

army. No substitute or exemption by payment is permitted. All others between seventeen and forty-five are liable to be called out, but they are not regularly organized, although enrolled; they are called Landsturm. The standing army consists of the active army and the Landwehr. The active army comprises the field army and the reserves. Every man upon reaching the age of twenty must enter the active army, and serve with it six years; he serves the first two years continuously in the field army, after which he becomes part of the reserves, and is placed on furlough for the remaining four years. In the cavalry and horse artillery the period of active service is still three years, as it was for the whole army before 1893. At the expiration—of his six or seven years in the active army he becomes part of the Landwehr, and so continues for five years, when at the age of thirty-two he is freed from liability to service except as part of the Landsturm. The Landwehr is something like the militia of the U. S. About 8,000 join the army each year as volunteers, and they are not counted in the legal strength. These men furnish most of the officers of the Landwehr. The officers of the field army are permanent, and are usually taken from the aristocratic class. Officers of the reserve are appointed from among officers who have left the field service, or from among very meritorious soldiers whose active service has expired.

The armies of the other chief nations of the world are modeled on the German army, and in all the service is compulsory. In Austria-Hungary liability to service extends from the age of nineteen to forty-three, actual service beginning at twenty-one. Continuous service is at present, for three years in the common army, seven years in the reserve, and two years in the reserve of the Landwehr. After his twelfth year of service the Austrian soldier remains in the Landsturm until he has completed his service.

The French army consists of the national army and the colonial army, both under the war minister, but provided for by separate estimates. Liability to service extends from the age of twenty through the forty-fifth year. Under the law of 1905 service in the active army is now two years, after which the soldier belongs to the reserve for eleven years and completes his service with six years in the territorial reserve. The French army has no Landwehr.

Italy's army is divided into a permanent army, a mobile militia, corresponding to the German Landwehr, and a territorial militia corresponding to the Landsturm. Military service covers a period of nineteen years. An Italian soldier serves the first eight or nine years in the permanent army, and the following three or four in the mobile militia, and completes his service with seven years in the ranks of the territorial militia.

Japanese army organization of to-day may be said to date from abt. 1872, when the Japanese employed French instructors to modernize their army. In 1885 the organization and training of the Japanese army was given over to German officers, and it now ranks at the

very front of the world's armies. Liability to service extends from the age of seventeen through forty, actual service beginning at twenty. Seven years and four months are spent in the first line (Geneki), ten years in the second (Kobi), which corresponds to the German Landwehr, and the remaining two years and eight months are served in the Kournin, the territorial or home defense army, answering to the Landsturm.

The Russian army is divided into the army of the Caucasus, the Asiatic army, and the army of European Russia. Service begins at the age of twenty-one and extends to the end of the forty-third year. Service in the army of European Russia is five years in the active army, fourteen years in the reserves, and five years in the territorial army. In the army of the Caucasus, service in the active army is three years, in the reserves fifteen, and in the territorial army four years. In the Asiatic army, service is four years in ranks for all arms, thirteen in the first reserve, and four years in the second or territorial reserve.

The British army consists of a regular army comprising permanently embodied troops, the army reserve, and the territorial army, formerly called "auxiliary forces." Service, as in the U. S., is purely voluntary. The terms of enlistment in the infantry are now seven years in the ranks, five in the reserves; in the cavalry, eight years in the ranks and four years in the reserves. The British War Office has recently been remodelled on lines of the Admiralty, the general authority being termed the "Army Council," consisting of the Secretary of State for War, four military members and two civil members.

The people of the U. S. and Great Britain resemble each other in their jealousy of large standing armies and their abhorrence of a system of universal service, as well as in their warlike spirit and self-sacrificing patriotism. The result of such systems is that the army, having to compete with other employments for its recruits, is in time of peace much more expensive per man than that of continental powers, while the cost of carrying on war is enormously greater. The Civil War in N. America cost the U. S. double what it would have had it had such an organization as Germany.

The U. S. is the only power of any importance in the world, except Great Britain, which relies for defense on a purely voluntary army. Under acts of February 2, 1901, January 25, 1907, and April 23, 1908, the U. S. army in active service comprises 15 regiments of cavalry, 765 officers and 13,266 enlisted men; 6 regiments of field artillery, 220 officers and 5,245 enlisted men; a coast artillery corps, 170 companies, 628 officers and 19,321 enlisted men; 30 regiments of infantry, 1,530 officers and 26,616 enlisted men; 3 battalions of engineers, 2,002 enlisted men; the Porto Rico Regiment of Infantry, 31 officers and 576 enlisted men; staff corps, Military Academy, Indian scouts, etc., 8,900 enlisted men, and 50 companies of native scouts in the Philippines, 166 officers and 5,508 enlisted men. The total enlisted strength, staff and line, is 77,743, ex-

clusive of provisional force and hospital corps. The law provides that the total enlistment strength of the army shall not exceed at any one time over 100,000.

Enlistment in the U. S. Army is for three years in all arms, with privilege of reenlistment so long as the soldier is fit for service and maintains a good character. There is at present no army reserve. The authorized peace strength at present amounts to 83,286 in all ranks, including colonial (native) troops and hospital corps. In event of war, the U. S. could put into the field about 80,000 partially trained National Guard and about 50,000 regular troops. The administration of the army was revised in 1903, and there is no longer a commanding general. The President is Commander-in-chief and the Secretary of War controls the army with aid of Assistant Secretary and Chief of the Staff. The number of superior officers in the regular army of the U. S. in 1909 was as follows: one lieutenant general, 8 major generals, 27 brigadier generals, 119 colonels, 138 lieutenant colonels, 401 majors. The U. S. relies for protection upon: (1) The regular army which is officered by graduates of the U. S. military academy, by appointment of meritorious enlisted men, and by appointment of civilians chosen from the best cadet schools. The officers receive commissions from the President. (2) The organized militia, or National Guard, which is composed exclusively of state troops. Except when called into service of the U. S. these troops are under command of the state governors. See **ARMY RESERVE**; **MILITIA**; **NATIONAL GUARD**.

The war forces of the leading powers, their annual military expenditure exclusive of colonial troops and oversea garrisons, are shown in the table:

	WAR STRENGTH OF LAND FORCES OF THE PRINCIPAL NATIONS.	ESTIMATED COST OF MAINTAINING ARMIES.
United States....	130,000	\$103,000,000
Great Britain....	739,000	138,800,000
Germany.....	1,840,000	206,000,000
Austria-Hungary.	790,000	12,000,000
France.....	1,200,000	189,000,000
Italy.....	630,000	29,000,000
Japan.....	600,000	37,500,000
Russia.....	1,800,000	49,000,000

Army Hos'pital Train, railway train thoroughly equipped for the treatment of sick and wounded soldiers during their transfer from points near action to military hospitals; introduced by Surgeon-gen. Sternberg, U. S. A., in the Spanish-American War; believed to have been the first train service organized for this purpose.

Army Regula'tions. See **ARTICLES OF WAR**.

Army Reserve', in foreign countries, a military force combining regular army reserves and a militia reserve; the former embracing men who have completed their prescribed term of service or purchased their discharge, and enrolled pensioners liable only for home service; the latter, volunteers liable to be drafted

into the regular army in war time. The U. S. has no national army reserve. In an emergency, when the regular army is inadequate to the situation, the president calls on the governors of the states and territories for volunteers, and the volunteer army thus organized is drawn from the militia of the states, etc. See **ARMY**.

Army War Col'lege, established by Congress, 1900, as a part of the U. S. military educational system; designed to unify the courses of instruction at the four service institutions, and to promote the most advanced professional study of military problems.

Army worm, in the northern U. S. the larva or grub of a night-flying moth (*Leucania unipuncta*); varies considerably in color and size with age and locality; is usually from less than an inch to an inch and three quarters in length; dark gray, with three narrow yellow stripes above, and a broader one of nearly the same color on each side; thinly clothed with short hairs, especially about the head, which is of a dull yellow color. These worms, which sometimes march over grain fields in great numbers, are very destructive. The army worm of the southern U. S., a near relative of the above, sometimes appears in hosts and devours the cotton. In the W. Indies its ravages have led to a general abandonment of the cotton crop. Various other destructive larvæ are called by this name.

Arna'do. See **ARNOLD OF BRESCIA**.

Arnaud (âr-nô'), Henri, 1641-1721; a pastor of the Waldenses and military commander; b. Embrun, France; licensed by the Waldensian Church, 1670; was pastor in Tours at the time of the edict abolishing the Waldensian Church. This was the occasion of the daring resolve which eventuated in the "Glorious Return of the Vaudois." He was the commander of his brethren, who after defeating the French recovered their native valleys in France, 1689, from which they had been driven by persecution. He served as colonel in the allied army in the war of the Spanish succession (1702-13), but in his closing years preached to the exiled Waldensians at Schönenberg, Württemberg.

Arnauld (âr-nô'), Angélique, called also AN-GÉLIQUE DE SAINT-JEAN, 1624-84; French nun; b. Paris; was a zealous Jansenist; prioress of the convent of Port Royal, 1669; abbess of Port Royal, 1678; wrote memoirs of her aunt, the abbess Marie Angélique Arnauld, 1591-1661, and was principal author of "Mémoires pour Servir à l'Histoire de Port Royal."

Arnauld, Antoine, called **LE GRAND ARNAULD**, 1612-94; Jansenist theologian and philosopher; son of the preceding; b. Paris; educated in the Sorbonne, ordained a priest, 1641, became a doctor of the Sorbonne, 1642, and engaged in the controversy between Jansenius and his opponents on the subject of grace; published a work "On Frequent Communion," which was highly esteemed, but gave offense to the Jesuits, of whom he was a constant adversary. He was expelled from the

society of the Sorbonne, 1656, for maintaining that Jansen had been misunderstood, after which the Jansenists were generally persecuted, by both civil and ecclesiastical powers. To escape persecution he became an exile, 1679, and passed the remainder of his life in Flanders and Holland. His writings fill forty-five volumes.

Arndt (Ärnt), **Ernst Moritz**, 1769-1860; Ger. patriot and political writer; b. Schoritz, island of Rügen; Prof. of History at Greifswald, 1806; published a "History of Serfdom in Pomerania and Rügen," and animated the Germans against Napoleon in his "Spirit of the Times"; also promoted the patriotic cause by many poems and prose writings. Wrote the celebrated national song, "What is the German's Fatherland?"

Arne (Ärn), **Thomas Augustine**, 1710-78; English musician; b. London; set to music Addison's "Rosamond," 1731, and gained a high reputation by his music for Milton's "Comus"; national air "Rule Britannia" was his composition; among his chief productions were the operas "Artaxerxes" and "Eliza."

Ar'nee, or **Ar'na**, large animal of the family *Bovidae*; a native of India, nearly allied to the ox and bison. It is larger than an ox, and has very long horns.

Arneth (Är-nět), **Alfred** (Chevalier d'), 1819-97; Austrian historian; b. Vienna; vice-director of the Austrian imperial archives, 1858, director, in 1868; one of the leading historical authorities for the period preceding the French Revolution. He was elected president of the Vienna Academy of Sciences, 1879.

Arnheim (Ärn'hēm), or **Arnheim**, ancient *Arenacum*; fortified town of Holland, capital of province of Gelderland; on the Rhine, 57 m. SE. of Amsterdam; has a famous church containing the tombs of the dukes of Gelderland. It was taken, 1795, by the French, who were driven out by the Prussians, 1813. Pop. (1906) 62,279.



ARNICA MONTANA.

Arnica, a plant of Switzerland and Germany, with several species in the U. S., of which the flowers and root are used in medicine, generally in the form of the tincture or fluid extract. It contains an active principle, arnicin, two volatile oils and various resins. The preparations from the flowers are said to be stronger than those made from the root. The use of arnica in medicine is very limited,

and it possesses far less activity for good than is generally thought. It is used externally for bruises and sprains as a lotion.

Arnim, **Elisabeth**, or **Bettina**, von, 1785-1859; German authoress; b. Frankfort-on-the-Main; sister of Clemens Brentano. In her youth cherished a passionate admiration and platonic affection for Goethe, with whom she corresponded; married Ludwig Joachim von Arnim, 1811. Among her works are "The Correspondence of Goethe with a Child," three volumes, 1835, and "Die Gündertode," two volumes, 1840.

Arnim, **Harry Karl Kurt Eduard von** (Count), 1824-81; Prussian diplomat; b. Moitzelfitz, Pomerania; envoy to Rome, 1864, was noted for his attitude toward the Ecumenical Council, and was prominent, 1871, in negotiations with the French resulting in the treaty of Frankfort; ambassador to Paris, 1872, and to Constantinople, 1874; but dismissed by Bismarck, who dreaded his influence with Emperor William; was prosecuted for stealing state documents from the German embassy at Paris, and after he removed beyond the jurisdiction of German courts was sentenced to five years' penal servitude.

Ar'no, river of Italy; rises at Mt. Falterona in the Apennines, and falls into the sea 7 m. below Pisa. Its valley (*Val d'Arno*) is one of the most beautiful regions in Italy. The banks are partially dyked on account of floods; length, 140 m.

Arn'obius, **Afer**, Christian apologist of the fourth century; Prof. of Rhetoric at Sicca, Numidia; originally violent opponent of Christianity, but after conversion wrote treatise, "Adversus Gentes," exposing fallacies of paganism to prove his right to baptism.

Ar'old, **Benedict**, 1741-1801; American army officer; b. Norwich, Conn.; commissioned colonel soon after the Revolutionary War broke out; commanded a force sent to capture Quebec; made brigadier-general for his services in this campaign; commanded a small flotilla on Lake Champlain, 1776; took part in the battle of Bemis Heights; in command of Philadelphia, 1778; in command of West Point, July, 1780; arranged with Major John André to surrender that important post to the British; but in consequence of the capture of André, September 23d, the plan was discovered; Arnold escaped, joined the British army, and received a considerable sum of money as a reward; later took part in marauding expeditions into Connecticut and Virginia; soon sank into obscurity, and died in London.

Arnold, **Sir Edwin**, 1832-1904; English journalist and poet; b. Rochester; appointed principal of the Govt. Sanskrit College at Poona, in the Bombay Presidency, and fellow of the Univ. of Bombay; resigned, 1861, and joined the editorial staff of the London *Daily Telegraph*; knighted, 1888; besides many translations from Sanskrit and Persian, he wrote "The Light of Asia," "Indian Idylls," "The Light of the World," "Azuma, or a Japanese Wife," a drama, "Potiphar's Wife and other Poems."

Arnold, **Jonathan**, 1741-98; American patriot; b. Providence, R. I.; as member of the

colonial assembly, brought forward, 1776, a bill repealing the oath of allegiance to Great Britain; was a surgeon in the Revolution; member of Congress, 1782; judge of the Orange county court, Vermont.

Arnold, Matthew, 1822-88; English poet, critic, and "apostle of culture"; son of Thomas Arnold; b. Laleham, Middlesex; graduated at Oxford, 1844; private secretary to Lord Lansdowne, 1847; a lay inspector of schools, 1851; and was Prof. of Poetry at Oxford, 1857-87. He exerted a remarkable influence upon the young men in the universities and colleges of the English-speaking world by his essays, which are fresh in matter, peculiar in style, and very independent in thought. In 1883-84 he made a lecture tour through the U. S. Among his prose works are "Essays in Criticism," "Culture and Anarchy," "On the Study of Celtic Literature," "Literature and Dogma," "Irish Essays and Others." His poems did not enjoy the popularity of his essays.

Arnold of Brescia (brĕsh'ĕ-ā), abt. 1100-55; Italian reformer; b. Brescia. He was a pupil of Abelard, and adopted the monastic life; reproved the prevalent venality, luxury, and corruption of the clergy; and affirmed that they ought not to possess temporal power or property. The second council of the Lateran, 1139, condemned him as a disturber, and banished him. He retired to France, then to Switzerland, where he gained many adherents and, 1146, returned to Rome, again raised his voice for religious reform, and endeavored to organize a republic. A reaction ensued, and Pope Adrian IV reduced the Romans to submission by laying the city under an interdict, 1154. Arnold was arrested in Rome and hanged. A statue to him at Brescia was unveiled, 1882.

Arnold, Thomas, 1795-1842; English educator; b. Cowes; graduated at Oxford, 1814; began preparing young men for the universities, 1819; ordained priest and became head master of Rugby, 1828; Regius Prof. of Modern History at Oxford, 1841; chief literary work is a "History of Rome," three volumes, 1838-42, left unfinished.

Arnolfo di Cambio (ār-nōl'fō-dī-kām'bi-ō), 1232-1310; Italian sculptor and architect; b. Colle; was master of that combination of building and sculpture peculiar to mediæval Italy. The W. front of the cathedral of Orvieto and a tomb in the same city, the tomb of Honorius III in Santa Maria Maggiore and of Bonifacio VIII in St. Peter's, both at Rome, and other important works in central Italy, are of his design. His most important work was in Florence, where there still remains, the cathedral, Church of Santa Croce, etc.

Ar'nulf, abt. 850-99; emperor of Germany; elected king of Germany, 887 A.D.; invaded Italy abt. 894, and captured Rome, 896; crowned emperor, and was succeeded by his son, Louis IV.

Aro'ma, the principle in plants or other substances which constitutes their fragrance; the

peculiar odor of aromatic plants, such as nutmeg, cloves, vanilla, and lavender. It is extremely subtle, and seems to be almost imperceptible, as these substances diffuse their odors for a long time without sensible diminution of weight. Aromatic, spicy plants often contain oils or resins, which may be imparted to fixed oils by maceration. The term aromatic is also applied to several animal substances, as ambergris, musk, and castor.

Aromatic Vin'egar, a mixture of vinegar with aromatic oils, and a powerful perfume. As it is very volatile, and is an exciting when snuffed in the nostrils, it is a remedy for fainting and debility. It is prepared by combining acetic acid with the oils of cloves, lavender, rosemary, and *Acorus calamus*.

Aroostook (ā-rōs'tōk), river of Maine; rises in Piscataquis Co., flows NE. through Aroostook Co. into New Brunswick, and enters the St. Johns River; length about 120 m. There were hostilities on the Aroostook River in Maine, 1837-39, which grew out of the disputed boundary line between that state and New Brunswick; averted, 1839, through the efforts of Gen. Winfield Scott; settled by the Ashburton-Webster treaty of 1842.

Arpad (ār'pād), d. 907 A.D.; national hero of Hungary and chief of the Magyars, who in 899 A.D. migrated from Galicia, and conquered the Slavonic people of Croatia and Transylvania; called the founder of Hungary. The dynasty of Arpad terminated in Andrew III, 1301.

Arpeggio (ār-pĕj'ō), in music, a chord of which the notes are given in succession; so as to imitate the harp.

Arpino (ār-pĕ'nō), ancient *Arpinum*, town of Italy; province of Caserta; 5 m. S. of Sora; surrounded by very beautiful scenery. Here is a cyclopean wall and other remains of Arpinum, which was founded by the Volsci, and became a Roman *municipium* abt. 188 B.C. Pop. abt. 5,000.

Arqua (ār'kwā), town of Italy, province of Padua; 12 m. SW. of Padua City; the residence of Petrarch, and contains his sarcophagus.

Ar'rack, or **Rack**, liquor distilled from fermented rice; a common intoxicating drink in the E. Indies and other oriental countries. Also a drink obtained from the fermented sap of the palm tree, often called palm wine or toddy.

Ar'ragon. See ARAGON.

Ar'ran, island of Scotland, in the Frith of Clyde, Bute Co., 13 m. W. of Ayrshire; is abt. 20 m. long, 12 m. wide, area 165 sq. m. The surface is mountainous, the granite peaks of the N. part being remarkably grand. Goat-fell, the highest peak, is 2,860 ft. above sea-level. Here is a cavern in which Robert Bruce once hid himself. The geology of Arran presents a greater succession of strata than any other equal portion of the British isles.

Arran, South Isles of, three small islands lying across the entrance to Galway Bay, abt. 4 m. off the W. coast of Ireland, and 27 m. SW. of the city of Galway; named Inishmore, Inismain, and Inishere (or Innishere); area, 18 sq. m. They once contained twenty churches and monasteries, and St. Kenanach Church, built in the seventh century, is still standing. Here are also remains of a cyclopean fort of unhewn stone, supposed to have been built in the first century, among the most magnificent barbaric monuments of Europe. The old shrines and relics attract many visitors.

Arras (är-räs'), ancient *Nemetacum*, afterwards *Atrebatas*, fortified city of France, capital of the department of Pas-de-Calais, on the Scarpe River; 30 m. NE. of Amiens; formerly the capital of Artois, and the seat of a bishop as early as 390 A.D. It was fortified by Vauban. The citadel is separated from the town by an esplanade, but it is inclosed within the same wall. Here are manufactories of hosiery, lace, woolen and cotton goods, etc. In the Middle Ages it was so famous for its tapestry that this article was called *arras* by the English. Pop. (1901) 20,697.

Ar'rawak In'dians, race or collection of tribes in Guiana, remarkable for the euphony of their language and their mild and friendly disposition toward the whites; formerly very numerous and powerful.

Arrest', seizure of a person by lawful authority. In civil cases, if on mesne process, *i.e.*, before the conclusion of the case; it is to make sure that the person will answer the order of the court. If it is on final process he may be confined until the judgment is satisfied or until the court discharges him. Certain persons are privileged from arrest, as members of legislatures or witnesses going to or returning from courts or legislatures. This privilege is secured to members of congress by the U. S. constitution. In civil cases it is not lawful to break into a house to make an arrest, nor to make it on Sunday. The common law permits an arrest by night as well as by day.

In criminal cases none is privileged from arrest (except ambassadors and their servants), outer doors may be broken, Sunday is not regarded, and a warrant is not always essential. Even a private person may make an arrest without a warrant if he can show a felony has been actually committed, and he has reasonable grounds to suspect the party arrested; and he is bound to arrest for a felony committed in his presence. In making an arrest necessary force may be used, and in case of felony even life may be taken. An "arrest of judgment" means that a judgment, though rendered, is not to be entered, for some reason appearing upon the record. See EXTRADITION.

Arrhidæus (är-i-dé'üs), Philip, d. 317 B.C.; natural son of Philip of Macedon and the dancing girl Philinna of Larissa, and half brother of Alexander; accompanied Alexander in his campaigns in Asia, but held no command; on Alexander's death was nominated by the Mace-

donian troops in the East as joint king with the unborn child of Alexander's wife Roxana; was a puppet in the hands of Perdiccas, because naturally of feeble intellect; and was murdered by order of Olympias.

Arrière Ban. See BAN AND ARRIÈRE BAN.

Arrondissement (ä-rôn-dës'môn), principal civil division of the departments of France. Each department is divided into arrondissements, each arrondissement into cantons, and each canton into communes.

Artoo'. See ARU.

Ar'rowhead, aquatic plant of the genus *Sagittaria* and family *Alismaceæ*, native of both cold and tropical climates; has unisexual flowers, with many stamens and many carpels compressed, and one-sided. The *Sagittaria sagittifolia*, a native of Europe, is a beautiful plant with arrow-shaped leaves, which rise above the surface of the water. The *S. variabilis* of the U. S. is very similar to it. The *S. sinensis* (Chinese arrowhead) is cultivated in China in ponds and ditches for the sake of its starch.

Ar'row-headed Characters. See CUNEIFORM INSCRIPTIONS.

Ar'rowroot, starch, from the root of the *Maranta arundinacea* and other species of *Maranta*; much esteemed as an easily digestible diet for infants and invalids; large quantities are imported into the U. S. and Europe



ARROWROOT.

from Bermuda and Jamaica, where it is cultivated, and is also raised in Georgia and Florida. The roots, or rather rhizomes, yield about 25 per cent. of this starch, which is in the form of a light, opaque, white powder. It is often adulterated with potato-starch and other substances.

Arsaces (är-sä'séz) I, founder of the Arsacidae and of the kingdom of Parthia; lived abt.

250 B.C. His origin and history are obscure. He is said to have been the chief of a nomadic tribe of Scythians or Bactrians. All his numerous successors assumed the name of Arsaces. The dynasty of Parthian kings founded by him continued to reign till 226 A.D. The last king of this dynasty was Artabanus IV (Arsaces XXIX).

Ar'senal, storehouse or magazine of arms and military stores, or a manufactory of arms, equipments, etc. The arsenals of ancient castles and strongholds were located in their keeps, and served as repositories of arms, etc. The Tower of London remains as a type of this class, and contains a collection of antique arms, armor, etc. Corresponding collections exist at Vienna, Delft, Berlin, Paris, and Madrid. Great modern arsenals are located at Cherbourg, Brest, and Toulon, France, with lesser ones at the centers of military districts. Similar repositories of arms, supplies, etc., usually known as depots, are established in each of the military districts of Germany, Russia, Austria, and the other European states, at which are collected everything necessary for the immediate mobilization of the troops of the district. In Great Britain there is the great arsenal of Woolwich, which has given employment to more than 10,000 men at one time, and at which immense quantities of all kinds of warlike material are manufactured and stored. There are also great dockyards at Chatham, Sheerness, Portsmouth, Plymouth, Pembroke, etc. The principal arsenals of the U. S., 1907, were the Allegany (Pa.); Augusta (Ga.); Benicia (Cal.); Columbia (Tenn.); Fort Monroe (Va.); Frankford (Pa.); Indianapolis (Ind.); Kennebec (Me.); New York (N. Y.); Rock Island (Ill.); San Antonio (Tex.); Watertown (Mass.); and Watervliet (N. Y.). There were also powder depots at St. Louis (Mo.) and Dover (N. J.); a noted armory at Springfield (Mass.), and an ordnance proving ground at Sandy Hook (N. J.).

Ar'senic, symbol, *As*; atomic weight, 75; common name of arsenious acid or white oxide of arsenic, a virulent poison; name limited in scientific language to the metal. Arsenic is found native to a limited extent, but occurs usually in combination with metals or with sulphur, or both. The most important arsenical minerals are those in which arsenic is combined with iron, cobalt, and nickel, as, for example, *mispickel* or *arsenical pyrites*, $FeAsS$; *cobalt glance*, $CoAsS$; *nickel glance*, $NiAsS$; *arsenolite* or *arsenite*, As_2O_3 , etc. Arsenic also occurs in small quantities in other minerals, especially in antimony ores, iron pyrites, etc., hematite iron ores, the soil, mineral waters, etc. Arsenic is, in fact, a diffused element. Metallic arsenic is prepared by sublimation: (1) from arsenical pyrites; (2) from a mixture of arsenious acid and charcoal. Metallic arsenic is rarely used in the arts. Lead containing a small proportion of arsenic is used for the manufacture of shot, and iron containing a little arsenic is very fluid when melted, and better adapted for fine castings for which strength is not essential. For the detection of arsenic, see ARSENIOS OXIDE.

Ar'senious Oxide, or **Anhy'dride**, As_2O_3 ; commonly called arsenic, white arsenic, or arsenious acid. It is found native, as arsenolite, in silky, crystalline crusts on ores of silver, lead, nickel, antimony, etc., in the Hartz Mountains, and elsewhere. Usually appears as a very heavy, white, gritty, crystalline powder. It has no decided taste. At $218^\circ C.$ it volatilizes to a heavy, colorless, odorless vapor, which condenses to octahedral crystals on cool surfaces. When heated with charcoal it is reduced to metallic arsenic. Arsenious oxide, when taken into the stomach is soon absorbed into the blood, and circulates with that fluid, exhibiting power over certain diseases, especially malaria and skin diseases, as psoriasis, lepra, eczema, etc. It is also a tonic, and is given for nervous disorders, especially those which are periodic.

The most effective antidote for arsenical poisoning is ferric hydroxide, prepared by the rapid precipitation of a solution of a per-salt of iron (as the persulphate or trichloride) by an alkali (as ammonia). The mixture of ferric hydroxide with magnesia, obtained by precipitating the iron solution with an excess of calcined magnesia, is still more efficacious. In case of an overdose or of intentional poisoning, evacuate the stomach by the stomach-pump, using lime water; administer large draughts of tepid sugar and water, magnesia and water, or lime water; avoid the use of alkalies, but administer charcoal and ferric hydroxide. If the fatal symptoms be averted, let the patient for a long time subsist wholly on farinaceous food, milk, and demulcents.

Arsin'oë (är-sin'ö-ë), daughter of Ptolemy I, King of Egypt; b. abt. 316 B.C. Was married 300 B.C. to Lysimachus, King of Thrace; instigated Lysimachus to put to death his son Agathocles (born before her marriage), in order to promote the succession of her own son. By this crime Lysimachus was involved in war with Seleucus, King of Syria, and was killed, 281 B.C. Her sons having been murdered by Ptolemy Ceraunus, she fled to Egypt, and became the wife of her brother, Ptolemy Philadelphus.

Arsinoë, d. 41 B.C.; Egyptian princess; daughter of Ptolemy Auletes, and sister of Cleopatra. Cæsar, having conquered Egypt, 48 B.C., took her as a captive to Rome, but soon released her. She was assassinated by Mark Antony.

Arsinoë, ancient city of Egypt; capital of a nome; near Lake Moeris, about 50 m. SSW. of Cairo; originally called Crocodilopolis (the city of crocodiles) because it had a temple devoted to the worship of those reptiles. Ptolemy Philadelphus gave it the name of Arsinoë in honor of his queen. The site is now occupied by the town of Medinet-el-Faium.

Ar'sis and **The'sis**, in music, denotes the rising and falling of the foot in beating time. It is also applied to the elevation and depression of the voice, and to the accentuation of syllables in the scansion of poetry, thesis being the stress of voice given to the strongly

accented syllables, and arsis being the withdrawal of stress in the other syllables.

Ar'son, the willful and malicious burning of the house of another. There must be an actual burning—an unexecuted attempt, or an act of negligence only is not arson. The English law on this subject has been modified in the U. S. Arson may be divided into degrees, and cases included in it which were not offenses at common law. It is made a crime by statute to set fire to one's own house with intent to injure another—as, for instance, to defraud insurers. The punishment for arson is severe, and, in some of its degrees, capital.

Art, (1) the systematic application of knowledge in producing a desired result. (2) A collection of principles and rules for attaining a desired end. Under this last head the arts are divided into (1) those intended to produce material results, termed the useful arts; and (2) those intended to produce æsthetic results, termed the fine arts (*q.v.*). The application of æsthetic principles, or the laws of taste to works which are intended to produce a religious effect, is termed religious art; the application of the laws of taste to works of a material nature is termed industrial art. In modern times the term liberal arts, is applied to the studies in philosophy, science, art, and history which compose the academic and collegiate (ante-professional) course of study; hence to graduate in the arts, bachelor of arts (A.B.), master of arts (A.M.).

Arta (Ar'tā), Gulf of, ancient *Sinus Ambracicus*; gulf of the Ionian Sea, in the NW. of Greece; between Acarnania and Albania; is nearly landlocked; is about 25 m. long and about 10 m. wide. The naval battle of Actium was fought near this gulf.

Artabanus (Ar-tā-bā'nūs), written also **ARTAVAN** and **ARDOVAN**, d. 226 A.D.; King of Parthia, and the last of the Arsacids; began to reign abt. 216 A.D., and waged war against the Roman Emperor Macrinus; was defeated by the Persians under Ardshir, who put him to death.

Artaba'zus, Persian general; a favorite of Xerxes; commanded a large division of the army which invaded Greece, 480 B.C.; took part in the battle of Platea, 479 B.C., after which he retreated with his division by forced marches to Byzantium, and thence crossed into Asia.

Artaxerxes (Ar-tāks-ērks'ez), name of several kings of Persia, **ARTAXERXES I**, **LONGIMANUS**, d. 425 B.C.; was son of Xerxes I, whom he succeeded, 465 B.C.; called Longimanus (long-handed) because his right hand was longer than his left. The Egyptians revolted against him abt. 460, but they were reduced to subjection abt. 455 B.C. In 449 the Persians were defeated by the Athenian forces of Cimon, near Salamis, Cyprus. Artaxerxes left the throne to his son, Xerxes II. **ARTAXERXES II** (surnamed **MNEMON**, because he had a good memory), d. 362 B.C.; was eldest son of Darius II of Persia; became king, 405 B.C. His

younger brother, Cyrus, who was Governor of Asia Minor, revolted and raised a large army, in which were 10,000 Greeks. The king, commanding in person, defeated the army of Cyrus at Cunaxa, 401. Cyrus was killed in this action, which was followed by the retreat of the Ten Thousand. Agesilaus, the Spartan, invaded the dominions of Artaxerxes, and gained several victories, but this war was ended by the peace of Antalcidas, 387 B.C. He put to death Darius, his eldest son, for conspiracy; succeeded by his son, Artaxerxes III.

Artemidorus (Ar-tē-mī-dō'rūs), famous interpreter of dreams; lived under Hadrian. His "Dream-book" was edited by Hercher (Leipzig, 1864).

Artemis (Ar'tē-mīs), Greek goddess corresponding to the Roman Diana (*q.v.*).

Artemisia (Ar-tē-mīsh'ī-ā), Queen of Halicarnassus; a tributary or ally of Xerxes I, King of Persia. She commanded her fleet, which fought for Xerxes against the Greeks, and displayed skill and courage at the battle of Salamis, 480 B.C. The gods compelled her to jump from the Leucadian rock, the famous "lover's leap," into the sea, wherein she was drowned, because she put out the eyes of a youth who did not return her affection.

Artemisia, oriental princess celebrated for her conjugal affection and her grief for the loss of her husband, Mausolus, prince of Caria, who died 352 B.C. She erected to his memory at Halicarnassus a magnificent mausoleum (so called in honor of Mausolus), which was one of the seven wonders of the world. Remains of it still exist. She mingled his ashes with her wine and died of grief.

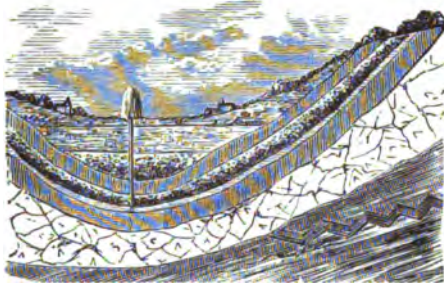
Artemisia, a genus of plants of the *Compositæ*; comprises numerous species, natives of Asia and Europe. They generally have an aromatic odor, and a warm or bitter taste. The *Artemisia absinthium* (wormwood) grows wild in Great Britain and the U. S., is perennial, and has bipinnatifid leaves. Containing a bitter principle and an essential oil, both very strong, it is used in medicine as a vermifuge. Among the other species which have medicinal properties are the southern-wood, Indian wormwood and tree wormwood. The dried flower buds of several species of *Artemisia* are sold as wormseed. On the Western plains and the dry table-lands of the Rocky Mountains several species are known as "sagebrush," the largest of which is *A. tridentata*.

Artemus Ward. See **BROWNE, CHARLES FARRAR**.

Artery, any of the vessels which convey the blood from the heart to the various parts of the body. Except the pulmonary, arteries derive their blood, which has been oxygenated in the lungs, from the left side of the heart. The pulmonary arteries carry venous blood from the right heart to the lungs. The arterial walls consist of three coats—an inner (*intima*), lined with endothelial cells; a middle (*media*), principally muscular and elastic tissue coat; and an outer (*adventitia*), fibrous

tunic. The arteries are not rigid, like metal tubes, but capable of distension and contraction. This power is most important in the maintenance of proper circulation. Arteries are liable to various diseased conditions, such as inflammation and aneurism. In wounds of arteries bright-red blood issues in spurts, whereas from injured veins dark blood flows in continuous stream. The arteries are usually deep-seated, the veins near the surface. In people of advanced age and in those addicted to alcohol and irregular habits the arteries often become stiffened by fibrous and even calcified deposits. This condition, known as arteriosclerosis, may be so extreme that the superficial arteries feel like hard tubes (pipe-stem arteries). This lessening of elasticity is a strong factor in apoplexy, for any cause which raises blood pressure, as unusual effort or emotion, may rupture an inelastic artery wall. Hence the maxim: "A man is as old as his arteries." See CIRCULATION OF THE BLOOD; VEIN.

Artesian (är-tě'zhän) Well, drill hole sunk into the earth, usually several hundred feet, through which water from previous strata rises to the surface. Compared with their depth, the diameter of these holes is very small, being in general from 3 to 6 in., though sometimes as small as an inch. In the U. S. the tendency is to apply the epithet artesian to any deep-drilled well, even though the water ob-



AN ARTESIAN WELL.

tained is brought to the surface by pumps. The principal conditions upon which artesian flows depend are the existence of pervious strata, such as sandstone, inclined at a gentle angle to the horizontal, and inclosed between less pervious layers, as, for example, shales or clays. Also the higher edge of a pervious bed thus conditioned must receive an abundant supply of water from rainfall or drainage of adjacent country, and there must be little or no escape at lower levels. When this bed is full of water, and the water is not in motion, the pressure at the lowest part of the bed is equivalent to that exerted by a column of water of the height to which complete saturation extends. If, however, there is a small outlet and the water moves toward this, the pressure at the lowest point of the saturated rock will be reduced, and will be less and less, according as the place of escape is made larger or is lower down. When water thus under pressure finds for itself a natural outlet, a

spring is formed, but when the bed is tapped artificially by a drill hole, and the water rises to the surface, an artesian well is the result. In all cases the water has come from higher ground by working its way gradually down through the interstices or crevices in the inclined rock, and, pressed by the other particles behind, rises through the easiest outlet.

Throughout the U. S., artesian wells are numerous, being found on the Atlantic coast, in the valley of the Mississippi, along the Gulf of Mexico, in the N. plains region, in valleys among the Rocky Mountains and those near and along the Pacific coast. They furnish in the aggregate a large amount of water for municipal and domestic supply, for cattle, and for cultivating the soil. In W. New York and Pennsylvania, Ohio, Indiana, West Virginia, Kentucky, and Tennessee are probably over 50,000 wells of from 1,000 to 2,000 ft. in depth, drilled for the purpose of obtaining petroleum, and in nearly every respect as to structure, method of drilling, and other circumstances, these may be classed as artesian wells.

Artevelde (är'tě-věl-dě), **Jacob van**, 1285-1345; Flemish demagogue; b. Ghent; a rich brewer who by his talents and eloquence acquired much influence. The people of Ghent, who had revolted against the Count of Flanders, chose Artevelde as their commander. He banished a number of Flemish nobles and knights, and adopted a despotic and arbitrary policy. As an ally of Edward III of England, he waged war against France. By a design to give the sovereignty of Flanders to the English Black Prince, he provoked a revolt of the Flemings, who killed him in Ghent.

Artevelde, Philip van, 1340-82; regent of Flanders; son of the preceding; b. Ghent; was a popular favorite, but passed many years as a private citizen. When Ghent was besieged by the Count of Flanders, 1381, and reduced to a desperate condition, Artevelde was appointed to the chief command. May 3, 1382, he defeated the count, and then assumed the title of regent. Charles VI of France intervened in favor of the Count of Flanders with an army, and Artevelde was defeated and killed at Roosenbeeke.

Arthropoda (är-thröp'ō-dä), a great branch of the animal kingdom. They have bilaterally symmetrical bodies made up of a series of similar segments, each of which may bear a pair of jointed feet. The mouth is near the anterior end, upon the lower surface; the intestine terminates below, near the posterior end. The heart is dorsal and propels the blood forward. The nervous system consists of a "brain" above and in front of the mouth, and a series of secondary nerve centers on the lower surface behind the mouth there being a pair of these centers in each segment. These centers are connected by two longitudinal nerve cords, which also connect them with the brain, one cord going on either side of the throat, so that the alimentary canal passes through the nervous system. From the brain nerves go to the eyes and other sense organs of the head;

from the other centers to the appendages and muscles of the corresponding segments. The outer wall of the body is usually a hardened substance, "chitine," and the external jointing is produced by a thinning of this chitine to form a hinge, allowing one part to move upon another. As this external crust cannot increase in size, the animal grows by periodical sloughings of the skin. The appendages vary much in size and function. Some become supporters of sense organs, some are modified to form jaws to chew the food, some are for walking, some for breathing. The Arthropods reproduce exclusively by eggs, but both *Crustacea* and *Hexapoda* afford numerous instances of Parthenogenesis.

Three great divisions of *Arthropoda* are recognized: (1) *Crustacea*, breathing by gills; (2) *Arachnida*, breathing by gills, lungs, or air tubes (trachea); and (3) *Antennata* or true insects, breathing by air tubes and provided with antennæ. The species are very numerous, there being about 10,000 *Crustacea*, 2,000 *Arachnida*, and 500,000 true insects. Yet in all the similarities of structure are plain.

Arthur, Ar'tur, or Ar'tus, a semifabulous British hero and king of the Britons; supposed to have flourished abt. 500 or 550 A.D., after the Romans evacuated the island. He married Guinevere, established the famous order of the Round Table, and reigned in peace, surrounded by a splendid court, for twelve years. After this, he conquered Denmark, Norway, and France, slew the giants of Spain, and went to Rome. He was called home from Rome to subdue his subjects, who had been stirred up to rebellion by his nephew. He subdued the rebellion, but died of the wounds received in the struggle. The story of Arthur is supposed to have some foundation in fact. It is generally believed that Arthur was one of the last of the great Celtic chiefs who led his countrymen from the W. of England to resist the settlement of the Saxons in the country, although some authorities regard him as leader against Saxon invaders on the E. coast and the Picts and Scots in the N. He is celebrated as the hero of romances of the Round Table, and his exploits were favorite themes of mediæval romances.

Arthur, Chester Alan, 1830-86; twenty-first President of the U. S.; b. Fairfield, Vt.; graduated at Union College, New York, 1848; studied law in Vermont, supporting himself by teaching; went to New York City, 1853, and was admitted to the bar; delegate to the first Republican State Convention at Saratoga, 1856. Before the Civil War he was judge advocate of the second brigade of New York State militia, and afterwards engineer in chief on staff of Gov. Morgan. In 1861 he was inspector general of New York, and subsequently quartermaster general until the expiration of Gov. Morgan's term. He was collector of the port of New York under Grant, 1871-78, and was chairman of the Republican State Committee of New York. He was nominated for vice president of the U. S. by the Republican convention at Chicago, Ill., June 8, 1880, and elec-

ted November 2, 1880. Upon the death of Pres. Garfield, September 19, 1881, he became president. He chose an excellent cabinet, and gave the country a clean and able administration.

Arthur's Seat, rocky hill which rises in the environs of Edinburgh to the height of 822 ft. above sea level, and commands a prospect of great extent and superlative beauty.

Ar'tichoke, perennial herbaceous plant (*Cynara Scolymus*) of the natural order *Compositæ*; nearly allied to the thistle; is a native of the Mediterranean region, and is cultivated for food. The Jerusalem artichoke (*Helianthus tuberosus*) is an entirely different plant, a native of N. America, cultivated for its potato-like tubers.

Articles, in law, instruments drawn up under distinct heads or divisions; as a libel in admiralty, where the libellant (or plaintiff) is said to articulately propound, articles of agreement, articles of impeachment, articles of partnership, or of peace or of war. Articles of Confederation is a term employed to designate the compact made between the original states of the U. S., forming a general government before the present constitution, and which was in effect 1781-89. Articles of war in the U. S. are rules for the government of the army (1806) and navy (1802, amended 1804), established by Congress, and ordered to be read at specified intervals at all military and naval posts and stations.

Articles, The Six, articles set forth by King Henry VIII and accepted by Parliament, 1539. They asserted the doctrine of transubstantiation and the sufficiency of communion in one kind, condemned the marriage of priests, enjoined the continued observance of vows of chastity, and sanctioned private masses and auricular confession. They were repealed in 1547.

Articula'ta. See ARTHROPODA; WORMS.

Artificial Horizon, a horizontal mirror, as the surface of a basin of mercury, used to determine the altitude of a star or other object when the sensible horizon is ill-defined.

Artigas (âr-tê'gäs), José, 1755-1851; S. American general; b. Montevideo, Uruguay; became in early life a leader of the gauchos, a class of outlaws; 1811 entered the service of the junta of Buenos Ayres, for which he fought against the Spaniards or royalists; defeated the latter in several battles, and became, 1814, master of Uruguay; attempted to conquer Buenos Ayres, but was defeated, 1820.



GLOBE ARTICHOKE.

Artillery, previous to the introduction of gunpowder all kinds of missiles employed in warfare, as well as the machines by which they were propelled. Since the introduction of gunpowder the term "artillery" has been used to denote all firearms other than hand weapons. It is generally used in the plural sense and is synonymous with ordnance. The singular form is a *piece of artillery*. Carriages upon which cannon are mounted or transported, also the ammunition, implements, equipments, etc., connected therewith, are classed as *artillery material*. Previous to 1846 all cannon were made with smooth cylindrical bores; their sizes were designated by the weight of their solid shot, in pounds, or by the diameter of their bores. The latter method is now generally employed for all rifled cannon.

The earliest record of the construction of cannon is about the middle of the fourteenth century, but contemporaneous invention is obscure and refers to cannon more as curiosities



CANNON OF THE FIFTEENTH CENTURY.

than as weapons of warfare. The first well-authenticated use of cannon in battle was by Edward III of England in the battle of Crécy in 1346. At first they were crude affairs of small caliber for throwing stones or leaden balls weighing 3 or 4 lbs., but by the close of the century field guns were made, capable of throwing stones weighing 50 lbs., and siege and fortification cannon, 200 lbs. The earliest cannon were built up of iron or wooden bars joined together longitudinally and strengthened by exterior hoops of iron, rope, or wire. One of the most famous of the old large cannon was known as the Mons Meg, built at Mons, Brittany, in 1455, and now on exhibition in Edinburgh Castle. It was made of iron bars hooped together and its bore was 20 in. A splendid specimen of much later date is the Tsar Cannon, in the Kremlin Palace, Moscow. Its caliber is 30 in. and it is of bronze beautifully ornamented. Early in the manufacture of cannon the breech-loading principle was thought of, but lack of mechanical skill prevented its development. The first cannon of cast iron appeared about the middle of the fifteenth century, and toward the latter part alloys were used. About the year 1447 projectiles for large cannon of cast iron began to replace stone missiles. Shells began to be used about the same time, and are recorded as being used by Charles VII of France in the battle of Naples,

1494. Brass cannon appeared in England and Scotland about 1535. Mortars for throwing shells were introduced in Germany in the last half of the sixteenth century. They were first discharged by igniting the shell before it was introduced in the mortar, and then igniting the charge afterwards. Naturally the danger was great, yet this method was not abandoned for nearly half a century. The howitzer, a short cannon, was introduced in the seventeenth century. It was used for firing large shells by direct fire. Another short cannon of relatively large caliber, called the carronade, came into use about the same time. The first long cannon for firing hollow projectiles at long range by direct fire were introduced in 1812. They were invented by Col. George Bomford at the U. S. ordnance department. These he afterwards improved in 1814 under the name Columbiad. In 1841 a cannon of somewhat different model was made in the U. S., called a sea-coast howitzer, and several years later Columbiads of altered model, increased weight, and greater power were introduced. Lieut. J. A. Dahlgren, U. S. N., after a long series of experiments, produced in 1856 a gun bearing his name. These guns were of cast iron, cast solid, and cooled from the exterior; they were of great thickness at the breech and as far forward as the trunnions or bearings, and from thence to the muzzle they rapidly diminished in thickness, giving them the appearance of a huge champagne bottle. In 1860, as a result of several years' investigations for the improvement of gunpowder, Capt. Thomas J. Rodman, U. S. A., produced a gun known as the Rodman gun. It was of cast iron, cast hollow, and cooled from the inside by means of a stream of cold water flowing through a hollow core occupying the place of the bore, the exterior being, in the meanwhile, kept from rapid cooling by fires built around the gun as it stood in the casting pit. These guns were distinguished by great thickness of metal at the breech, by graceful curves of exterior lines, and by the absence of all ornamentation, sharp angles or edges and swell at the muzzle. The trunnions were at the center of gravity, thus doing away with preponderance and greatly facilitating the management of the gun. With the exception of the "siege rifle" (4.5 in.) all the Rodman guns were smoothbore, having calibers of 8, 10, and 15 in. respectively. A very few of 20-in. bore were made for experimental purposes. They were all adapted to use either solid or hollow projectiles. The 15-in. gun weighed 25 tons, fired a projectile weighing 450 lbs. and the charge used was 100 lbs. of mammoth powder. It was mounted on a carriage of wrought iron provided with two pneumatic buffers for checking the recoil. At the time of its introduction it was the most powerful piece of artillery in existence. In 1846 cast-iron rifled cannon, loaded at the breech, were invented by Col. Cavalli, of Sardinia, and Baron Wahrendorf, of Sweden, for firing elongated projectiles.

From that time to the present date inventors have been actively engaged in perfecting rifled ordnance. A great variety of guns have been produced, and long and exhaustive experiments

have been made to determine the best form of construction of piece, number, and twist of grooves, character of breech mechanism, form of projectile, and kind of powder best suited to the attainment of the desired result. There has been a constant rivalry between the armor-plate manufacturers and the inventors of ordnance. As soon as projectiles and cannon were invented to pierce the existing armor plate improved armor plate would be invented only again to urge the inventors to produce guns and projectiles of greater penetrating power; and the struggle still continues.

The history of modern artillery may be divided into three epochs—the first, the introduction of rifled cannon in the Italian campaign of 1859, the second the general adoption of rifled cannon by all European powers in the campaigns of 1866, 1870–71; third, the introduction of the armaments by the different European powers after the Franco-German war, which caused a demand for improved and more powerful guns. The increased power, accuracy, and range of the modern rifle called for a greater improvement in field artillery, while improved armor-plating for ships of war required that heavy ordnance should have sufficient power to pierce this armor. After the Franco-German war all European countries adopted breech-loading rifled guns for field artillery using explosive shell with percussion fuse. Since that period many improvements have been made in field guns. In 1890 a great change was made in the rifle used by infantry. The rifle firing from 8 to 10 shots a minute was discarded for the small-caliber magazine rifle, firing from 20 to 40 shots a minute. In consequence, ordnance experts have perfected the field gun in ballistic power and rate of fire. France led the way and was closely followed by other nations until the mechanical difficulties have been overcome by the majority. Rapid-fire field guns are provided with some means to take up the recoil; that is, to store up the energy of the recoil in springs or other elastic bodies and use the same to return the gun to its original position automatically, the carriage remaining stationary. In this way the necessity of the gun being brought back to the firing position by the crew after each round is avoided and the rapidity of the fire thus increased. The majority of field guns are now made of nickel steel, the toughest material known. The same material is used for the carriages and, in harder form, for shields. The gun consists of a tube, in length, usually, from 28 to 33 times the diameter of the bore. On this is shrunk a jacket enveloping the breech end for a distance of about 40 in. A locking ring, shrunk on or screwed to the parts, secures the tube and jacket longitudinally. The gun is provided with means for holding the gun to the carriage and with guides for the gun during recoil. Means are provided for securing the gun to the brake arrangement. In order to reduce the energy of the recoil the caliber of the gun has been reduced. The caliber finally adopted was 77 millimeters, or 3 in. (2.95"). The three principal forms of breech mechanism now in use are the Krupp

horizontal quick-loading wedge, the swinging-block interrupted-screw, and the Nordenfeldt eccentric-screw mechanisms. The most popular are the wedge and swinging-block interrupted-screw. Breech mechanisms have been greatly improved and open with a single motion and are provided with an efficient percussion firing device.

Various types of carriages have been adopted by the different countries. In some the recoil is absorbed or checked by a spadelike arrangement in the trail which projects downward into the ground and is secured to the



KRUPP RAPID-FIRE GUN.

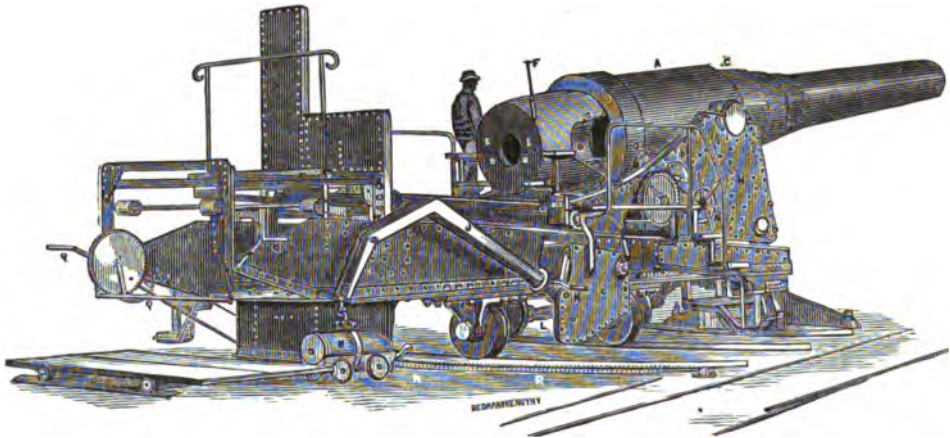
trail by an elastic device. This type is known as the rigid carriage. Another type is provided with an arrangement for absorbing the recoil and to this the gun itself is attached. Wheel brakes are provided which are hooked up for traveling and let down when firing. Shields are also provided which are attached to the carriage. To secure greater steadiness the latest models are built with low wheels and abnormally long trails, the average diameter of the former being 51 in., and the average length of the latter being 9 ft. and as long as 10 ft. in the U. S. model. Hydraulic buffers and springs for recuperators are used almost entirely.

England uses the Armstrong interrupted-screw breech-closing gun with carriage of the rigid type. Germany uses the Krupp gun with the elastic trail spade. The French field batteries are equipped with rapid-fire guns of 75 mm. caliber of modern design by Col. Deport, of their own service. They were built under great secrecy in government shops. In Italy the field artillery armament is in a state of transition. Russia until recently used guns of several patterns. Japan used up to 1901 a bronze 9-pounder Krupp, but in that year a complete new armament was issued. The new gun is known as the Arisaka and not many details have been published in reference to it. Previous to the Civil War the field artillery of the U. S. was equipped with smoothbore 6- and 12-pounder guns, and 12-pounder howitzers, all of bronze, mounted on wooden carriages. At the outbreak of the Civil War rifled muzzle-loading pieces were introduced. Robert P. Parrott, of the West Point gun foundry, at Cold Spring, N. Y., introduced a 10- and 20-pounder—3 in. and 3.67 in. respectively. These guns had a cast-iron body, of the usual form and dimensions, strengthened by shrinking a band

of wrought iron over that portion of the piece surrounding the charge. The grooves had an increasing twist. The projectiles were solid shot, shell and case-shot designed by the inventor of the gun. A malleable ring or cup attached to the bottom of the projectile and expanding by the effect of the discharge, caused the projectile to take to the grooves. The smaller of these two guns proved to be an excellent weapon, and did good service; the larger gun was not a success. At the same time another rifled gun was introduced by the U. S. Ordnance Dept. This piece had a bore of 3 in. and was made of wrought iron by wrapping boiler plate around an iron bar so as to form a cylindrical mass which, being brought to a welding heat, was passed through rollers to unite it solidly; the trunnions were

consisted of mechanics and laborers for the handling of the guns and management of the trains. The systems of field and siege artillery in the U. S. were chiefly derived from those of France. After the War of 1812 with Great Britain the artillery arm was almost entirely neglected; no field batteries were kept up and the heaviest gun mounted on the seacoast in 1820 was a 24-pounder. The four artillery regiments, though mostly garrisoning forts on the Atlantic coast, performed little more than infantry duty.

HEAVY or SEACOAST ARTILLERY. In 1862 Capt. Palliser introduced into England a method of converting smoothbore cast-iron guns into rifled cannons by inserting a wrought-iron or steel tube into the bore and rifling it. This system was soon taken up in the U. S.



16-INCH KRUPP GUN, MOUNTED ON COAST CARRIAGE.

afterwards welded on and the piece bored, rifled and turned to its proper size and shape. The projectile giving the best results with this gun was of cast iron with a papier maché sabot surrounding the rear part. The force of the discharge swedged the sabot into the grooves and caused the projectile to rotate. A heavier gun of 4.5 in. bore was also used to some extent for siege purposes, but was found to be somewhat cumbersome for bad roads. It proved, however, a useful weapon. The present U. S. 3.2 in. field gun was adopted abt. 1885. The gun is mounted on an all-steel carriage of the rigid type, with wheels of wood; caliber 3.2 in., length 23 calibers, weight of projectile 13 lbs., muzzle velocity 1,610 foot-seconds, weight of gun and carriage 2,121 lbs. In 1902, after exhaustive tests, the U. S. Ordnance Dept. adopted the long recoil type of field artillery material with certain modifications. This pattern is known as the 3-in. model, 1902, and is a breechloader of the interrupted-screw type. Steel wheels were brought out in 1899, but most nations have gone back to the wooden wheel. During the Civil War the confederate states used rifled cannon of the Armstrong, Whitworth, and Blakely patterns.

In the early stages of artillery the *personnel*

in order to make use of the large stock of smoothbores on hand. The Parrott guns brought out during the Civil War were cast hollow on the Rodman plan. They were 300, 200, 100, 30, 20, and 10 pounders, the diameters of the bores being respectively 10, 8, 6, 4, 4.2, 3.67 and 3 in., and the projectiles weighed 200, 150, 86, 28, 19 and 10 lbs. A large number of these guns was made and used on both land and sea, and the amount of work done by them was very great. They were the first rifles used in any country for bombardment and breach work. In the siege of Charleston they were employed at a range of 7,000 yards. Germany was the pioneer in the manufacture of steel cannon, and with the well-known works of Krupp still holds the lead in capacity for manufacture. Krupp has furnished large numbers of guns for other countries. France has also greatly developed the manufacture of steel cannon. The U. S., although late in entering into the manufacture of modern steel guns, has now well-equipped gun factories in Washington, D. C., under the navy, and at Watervliet, N. Y., under the army. Both factories have made a large number of high power rifles up to 12 and 13 in. in caliber. There are also some extensive commercial plants. Experiments have been made with

larger calibers, but the opinion is inclining to the belief that no advantage is gained in the use of larger calibers than 12 and 13 inches. Rifled howitzers and mortars rapidly followed the introduction of rifled cannon. Breech-loading methods have been introduced and rifled mortars are now taking the place everywhere of the old smoothbore muzzle loaders. Steel has superseded wood in the construction of carriages for heavy guns and many plans have been tried for checking the recoil, but the most successful is what is known as the "hydraulic buffer." This device in reality uses glycerin, oil, or some other non-corroding fluid contained in a cylinder, the fluid being forced through baffle plates filled with holes by the action of a piston. The rate of flow of the liquid may be regulated by regulating the size or number of holes in the plates. Much labor and thought has been expended to perfect a successful disappearing-gun carriage. The carriage finally adopted by the U. S. is known as the Crozier-Buffington, named for the officers who invented it. The recoil causes the gun to disappear or lower itself from above the parapet or firing position to the loading position. When ready to fire the restraining mechanism is released and the gun is returned to the firing position by the aid of weights. Greater improvement has been made in navy ordnance during the period since the war than in several centuries preceding. In 1862 the 100-pounder, cast-iron, muzzle-loading Parrott rifle was considered one of the most effective guns in the service. This gun weighed 4.35 tons, its bore was 6.4 in., and its length was 12 ft. 4 in. With a charge of 10 lbs. it fired a shell weighing 100 lbs. The velocity of the projectile at the muzzle was 1,080 ft. per second and the muzzle energy was 810 foot-tons, or 136 tons energy per ton of gun. The modern 6 in. breech-loading rifle weighs 8.5 tons, is 25 ft. in length, and with a charge of 40 lbs. of smokeless powder fires a 100 lb. shell with an initial velocity of 2,900 ft. per second and an initial energy of 5,838 foot-tons, or 784½ foot-tons per ton of gun. The heaviest piece carried during the Civil War was the 15 in. smoothbore, which weighed 42,000 lbs. and was 15 ft. 1 in. in length. With an ordinary charge of 35 lbs. of black powder it fired a spherical shell weighing 350 lbs. The ordnance regulation of the navy allowed this gun to be fired 20 times, using 100 lbs. of hexagonal or cubical powder, and a shell weighing 350 lbs. The muzzle velocity was 1,600 ft. per second, and the muzzle energy 7,997 foot-tons. The modern 12 in. breech-loading rifle weighs 53.4 tons, and is 45 ft. long, fires a shell weighing 850 lbs. with a charge of 360 lbs. smokeless powder. The muzzle velocity is 2,800 ft. per second and the muzzle energy 46,246 foot-tons. The useful life of this rifle is about 500 rounds. The field artillery of the U. S. army is a part of the mobile army and consists of six regiments of three battalions of two batteries each. The commissioned *personnel* consists of 6 colonels, 6 lieutenant colonels, 12 majors, 66 captains, and 156 lieutenants. The seacoast artillery consists of 170 companies, 44 of which are

torpedo companies instructed in mine or torpedo planting. The commissioned *personnel* consists of 1 brigadier general, 14 colonels, 14 lieutenant colonels, 42 majors, 210 captains, and 420 lieutenants. To care for and operate the electrical mechanism there are master electricians, electrician sergeants, and firemen. See GUNNERY; MACHINE AND RAPID-FIRE GUNS.

Artiodactyl (är-tī-ō-dāk'tīl), a hoofed mammal in which the number of toes is even, either two or four in all the existing forms. The axis of the foot passes between the third and fourth toes, which are equal in size. In the perissodactyls the axis passes down the center of the third digit, and the number of toes is odd in all existing forms save the tapir. The artiodactyls contain two principal groups—the *Pecora* or ruminants, in which the stomach is compound, and the *Suina* or allies of the hog and hippopotamus, in which it is simple.

Artocarpa'ceæ, a natural order of exogenous plants, of which the *Artocarpus incisa*, or breadfruit, is the type; regarded by some as a suborder of *Urticaceæ*.

Aru (ä'-rō), group of islands S. of New Guinea, nominally in the Dutch govt. of the Moluccas. There are five principal islands; total area abt. 3,000 sq. m.; largest is 70 m. long and 20 m. wide.

Arundel, Thomas, 1353-1413; b. at Arundel; bishop of Ely at the age of twenty-one; successively Lord High Chancellor of England; Archbishop of York and Canterbury; persecuted the Lollards and followers of Wyclif.

Arundel, Thomas Howard (Earl of Arundel and Surrey); 1592-1646; art collector; b. London; made famous collection of ancient sculptures bearing the name of the "Arundel Marbles," which was presented to the Univ. of Oxford, 1667. The principal portion of it is the "Parian Chronicle," originally chronological tables of Greek history, from 1582-264 B.C. The Arundel Society, London, is named after him. Its object is to promote a knowledge of art by the publication of photographs and facsimiles.

Aruspice (är-üs'pīs), or *Haruspice*, Roman soothsayers, who foretold events from the inspection of the entrails of the victims sacrificed. See AUGUR.

Ar'val Breth'ren, ancient college of priests, at Rome, 12 in number, chosen by co-optation for life, from the highest families, and under the empire, including the emperors. They celebrated a yearly festival for three days in the latter half of May, offering sacrifices for the fertility of the fields.

Arvic'ola, genus of small animals of the order *Rodentia*, allied to the rat and mouse. There are over twenty species, called field mice, in the U. S.

Arx, in Roman archæology, a stronghold within, or closely connected with a city; applied to the citadels of the towns of Italy,

and those where the Roman civilization prevailed; thus we speak of the arx of Tusculum; term nearly equivalent to acropolis in a Greek city.

Aryan (ār'yan), also spelled **Arian**, term which the stricter usage of modern philologists limits to the Indo-Iranians and the Indo-Iranian speech-family, *i.e.*, the family whose chief ancient representatives are the Sanskrit and Zend. It represents a name which this people applied to itself in distinction to the darker-skinned peoples about it, and of which the Sanskrit form was *āria-* or *ārya-*.

Arzachel, lived abt. 1050-1150; Jewish astronomer; b. Spain; ascertained the obliquity of the ecliptic, and prepared astronomical tables, called "Toledo Tables."

As (āz), also called **LIBRA**, Roman weight; nearly equal to a pound; divided into unciae, ounces, and equal to 10 oz. 18 dwts. 13½ grs. Troy; also a brass Roman coin which originally weighed a pound, but was gradually reduced to half an ounce.

Asa (ā'sā), third king of Judea; son of Abijah; reigned 955-914 B.C.; noted for his wise government and his support of the worship of God.

Asa'ba, town in British Nigeria, W. Africa; is on the Niger, 150 m. from the coast and 75 above the delta.

Asafe'tida. See **ASSAFŒTIDA**.

A'saph (ā'sāf), psalmist, appointed chief chorister by David; founded a school of poets and musicians, who were called "the sons of Asaph."

As'ben, also called **A'ir**, kingdom of southern Sahara, bordering on the Sudan, within the French sphere of influence.

Asbes'tos, or **Asbes'tus**, fibrous mineral of fine, flexible filaments of a silky luster; composed chiefly of silica, magnesia, alumina, and ferrous oxide; a variety of actinolite and tremolite; it resists the action of ordinary flame; the ancients wrapped the dead in cloth made of asbestos, in order that when they were burned their ashes might be kept separate; it was also used for the wicks of the lamps in the temples. It is used for fireproofing, roofing, boiler-felting, night-lamp wicks, steam-packing, and paper-stock. Asbestos is abundant in Canada, Corsica, Savoy, the U. S., the Valtelline, and the Tyrol.

Asbolin (ās'bō-lin), nitrogenous substance found in soot.

As'bury, Francis, 1745-1816; American Methodist bishop; b. Handsworth, England; became a local preacher at sixteen, an itinerant under Wesley at twenty-two; removed to America, 1771, as missionary; in 1772 became Wesley's assistant in America; in 1784 elected bishop of the new M. E. Church, and consecrated by Bishop Coke.

Asbury Park, city in Monmouth Co., N. J.; on the Atlantic; 5 m. S. of Long Branch; in-

corporated, 1897; enlarged, 1906; noted summer resort; park and grove laid out by Methodists for camp-meeting and other religious purposes, 1869. Res. pop. (1901) 4,148.

Ascalon (ās'kā-lōn), called **Ash'kelon** in the Bible; one of the five capital cities of the Philistines, a former seaport of Palestine, 10 m. N. of Gaza; was a place of importance; the seat of the Philistine licentious Astarte worship; now a small village called **Asculan**.

Ascanius (ās-kā'nī-ūs), son of Æneas and Creusa; accompanied his father in the flight from Troy; landed in Italy; supported Æneas in the war with the Latins; succeeded him in the government of Latium; built Alba Longa and reigned there thirty-eight years.

Ascaris (ās'kā-rīs), genus of intestinal parasites, of which the most common, the round worm, *Ascaris lumbricoides*, is frequently found in the small intestines of children. This worm has a round, smooth body of reddish or yellowish color which tapers toward the anterior extremity; it is transversely furrowed by many fine lines, and is marked with four lines from head to tail. The female is 7 to 12 in. long, the male 4 to 8 in. A few round worms may cause no disturbance, though itching of the nose, twitchings and convulsions, swelling of the abdomen, grinding the teeth when asleep are often noted. These worms may pass into the stomach and be vomited. They may even crawl into the larynx. *Oxyuris vermicularis* (seat-, thread-, or pin-worm) is from ¼ to ½ in. long. The itching produced by seat-worms, particularly at night, is very distressing. They may enter the body through water or salads. Both these ascarides may burrow through the bowel wall and cause peritonitis. See **ANTHELMINTICS**.

Ascension, fortified island in the Atlantic, 750 m. NW. of St. Helena; belongs to Great Britain; area, 35 sq. m. It is volcanic and mountainous, one peak rising to the height of 2,810 ft. It is used as a coaling, victualing, and store depot for British ships; chief town, Georgetown.

Ascension, in astronomy. See **RIGHT ASCENSION**.

Ascension Day, or **Ho'ly Thurs'day**, a great religious festival of the Roman Catholic and Anglican churches, held on the fortieth day after Easter, to commemorate the ascension of Christ into heaven; has been observed since 68 A.D., perhaps earlier.

Asceticism (ā-sēt'ī-sizm), voluntary retirement from the world and the mortification of the body by fasting, etc., the object being spiritual advancement. Asceticism was practiced among Jewish and pagan nations long before the time of Christ, especially in India. The Essenes in Judea and the Therapeutæ in Egypt were bodies of Jewish ascetics. Now asceticism is most prevalent among Brahmans, Buddhists, and Christians of the Armenian, Coptic, Greek, and Roman Catholic churches. Early in the second century zealous Christians devoted themselves to lives of poverty, celibacy,

and abstinence from sensual gratification. Some remained among men, others dwelt apart. The union of hermits into one body was first made by Pachomius, 340 A.D. This was the virtual origin of Monachism.

Ascham (äs'käm), Roger, 1515-68; English writer; b. Kirby Wicke, York; distinguished as a classical scholar; tutor to the Princess Elizabeth, 1548-50; secretary of embassy at court of Emperor Charles V; Latin secretary to Queen Mary, 1553-58; secretary and tutor to Queen Elizabeth; published "Toxophilus," a defense of archery; "The Schole-Master," etc.

Ascians (äsh'yäns), or **As'cii** (from Greek *ἄσκιος*, shadowless), people of the torrid zone, who twice in the year have the sun perpendicularly above their heads, and hence are without shadow.

Ascid'ia (äs-sid'i-ä), or **Ascid'ians**, a subclass of animals belong to the *Tunica*. They are flask-shaped, attached by one end, and inclosed in a gelatinous or leathery tunic, and have the mouth and arms usually close together. They have no organs of special sense, but they have hearts and a circulation of blood, with a peculiarity that its direction is sometimes reversed. In their mature state they are fixed by the base to some solid substance, as a rock or seaweed, but the young, resembling tadpoles, swim by means of a vibratile tail, which disappears when they settle. These young forms are in many respects fishlike, a fact which suggested the conclusion that the tunicates have degenerated from a fishlike type. The majority are solitary or simple forms, but some live in colonies formed by budding, the members of which are connected by a stem, though each has its own heart, respiratory apparatus, and digestive organs. In other kinds, compound ascidians, the tunics of many are united into a mass, and they form systems like zoöphytes. The individuals in these systems have always sprung by gemmation from one, and both the solitary and compound ascidians propagate by eggs. "In the dim obscurity of the past," says Darwin, "we can see that the early progenitor of all the *Vertebrata* must have been an aquatic animal provided with branchiæ, with the two sexes united in the same individual, and with the most important organs of the body (such as the brain and heart) imperfectly developed. This animal seems to have been more like the larvæ of our existing marine ascidians than any other known form." "Descent of Man" (vol. ii., p. 372).

Ascites (äs-si'téz), dropsy of the abdominal cavity, usually an indication of portal obstruction caused by cirrhosis or a contracted hardened condition of the liver, which hinders the return of venous blood to the heart and leads to transudation of serum into the abdominal cavity. In children it may appear as a temporary and inexplicable phenomenon, without danger or distress. Ascites in almost all cases is a grave symptom. The treatment is governed by the cause, but is largely pallia-

tive. Diuretics may be useful, but hydragogue cathartics are more effective. Tapping may be practiced where the abdomen is seriously distended.

Asclepiadacæ (äs-klē-pi-ä-dä'sē-ē). See MILKWEED FAMILY.

Ascoli di Satriano (äs-kō'lē di sä-tri-ä'nō), episcopal city of Italy, province of Foggia; 25 m. S.E. of Foggia. Near it, Pyrrhus, 279 B.C., won a victory over the Romans.

Ascoli-Piceno (-pē-chä'nō), episcopal city of central Italy; province of the same name on the Tronto, 53 m. S. of Ancona; annexed to the Papal States, 1426. A battle was fought here between Tancred of Sicily and the Emperor Henry VI of Germany, in which the latter was defeated, 1190. Pop. (1901) 28,890.

Ascomycetes (äs-köm-i-cē'téz), class of mostly parasitic plants producing enlarged end-cells which divide internally into spores; includes the lichens, rusts, and smuts.

As'cot Heath, noted race course in Berkshire, England, 29 m. SW. of London; horse racing believed to have been instituted here by Queen Anne, 1711.

Ascutney (äs-küt'nī) **Mountain**, isolated mass of granite in Windsor Co., Vt., 3,165 ft. above sea-level.

Aselli (ä-sél'lē), **Gasparo**, abt. 1580-1626; Italian anatomist and physician, b. Cremona; became Prof. of Anatomy at Pavia, and acquired distinction by the discovery of the lacteals, 1622.

Asex'ual Genera'tion. See ALTERNATION OF GENERATIONS.

As'gard, home of the Scandinavian gods. See SCANDINAVIAN MYTHOLOGY.

Ash, tree of the genus *Fraxinus* and family *Oleaceæ*, distinguished by imperfect flowers,



MOUNTAIN ASH.

sometimes destitute of corolla, and leaves unequally pinnate. The fruit (*samara*) is winged.

The genus *Fraxinus* comprises about thirty species, mostly natives of Europe and N. America, and valuable for timber, fuel, and shade trees. The mountain ash, conspicuous for its clusters of red berries, is a species of *Pyrus*, having no affinity with the genus *Fraxinus*.

Ashango (ä-shän'gō), territory in S. Africa between the Ogowe and Lower Kongo rivers; inhabitants, who belong to the Bantu stock, include a race of dwarfs, *Obongo*, not over 4½ ft. tall.

Ashantee (ä-shän'tē), former kingdom of western Africa, Upper Guinea; lies inland from the coast between the Volta and Comoé rivers; area about 11,000 sq. m.; pop. about 2,500,000; chief town, Kumasi; generally mountainous, well watered, and abounding in forests; gold is abundant; made an English protectorate, 1896; annexed to Gold Coast colony, 1901.

Ashburton, Alexander Baring (Lord), 1774-1848; Eng. diplomat; b. London, son of Sir Francis Baring; employed in his youth in business in the U. S.; married a daughter of Sen. Wm. Bingham of Pennsylvania, 1798; in 1810 became the head of Baring Bros. & Co. of London; member of Parliament from 1806; created baron, 1835. In 1842 he concluded with Daniel Webster the "Ashburton treaty," signed at Washington, which defined the N.E. boundary between Maine and Canada.

Ashby, Turner, 1824-62; American military officer; b. Rose Hill, Fauquier Co., Va.; became a captain in C. S. A.; brigadier-general in 1862; distinguished as a cavalry commander. During Banks's pursuit of Jackson in the Shenandoah Valley, Ashby commanded the cavalry covering the rear of Jackson's army, and in an engagement near Harrisonburg, 1862, was killed.

Ashby-de-la-Zouche (äsh-bē-dē-lā-zōch'), market town in Leicester, England; 20 m. NW. of Leicester; has a ruined castle in which Mary, Queen of Scots, was confined; has an ancient church, iron-smelting works, and manufactures of hats and hosiery. The place has been made famous by Scott's "Ivanhoe."

Ash'dod, or **Azo'tus**; ancient city of the Philistines, in Palestine, about 3 m. from the Mediterranean and 12 m. NE. of Ascalon; an important city and stronghold, and was destroyed by the Maccabees. Near its site is a village of mud houses called *Asdood* or *Esdūd*.

Ashe (äsh'ē), **Ash'i**, or **As'ser**, 353-427; Jewish rabbi of Babylon; eminent for learning and genius; reputed author or compiler of the Babylonian Talmud, a vast collection of traditions and legal documents, regarded among the Jews as the highest authority on legal questions.

Ash'er, tribe of ancient Israelites, descended from Asher, eighth son of Jacob by the handmaid Zilpah. They were assigned a portion of land in the NW. of Palestine. The tribe furnished but one noteworthy person, the prophetess *Anna*.

Ashera (ä-shē'rā), Phœnician idol or image of wood, probably the goddess Ashtoreth, frequently mentioned in the Old Testament.

Ash'eville, named for John Ashe (1720-81), American military officer; capital of Buncombe Co., N. C.; between the French Broad and the Swannanoa rivers; 142 m. W. by S. of Salisbury; is in a tobacco-growing region, 2,389 ft. above sea-level; a summer and winter health resort; has Asheville College for Women, Bingham Military Academy, Normal College and Collegiate Institute, Home Industrial School for Girls, Asheville Farm School for Boys, and Industrial School for Colored Youth. George Vanderbilt's grand estate of Biltmore is in the suburbs, as are also Pisgah Forest, Battery and Riverside parks Mount Beaumont (2,800 ft.), and a notable botanical garden. Pop. (1906) estimated 18,414.

Ash'land, capital of Ashland Co., Wis., on Chequamegon Bay, Lake Superior; 80 m. E. of Duluth; is the center of lumber, iron, steel, and brown stone industries; has immense ore docks, blast furnaces, N. Wisconsin Academy, Sisters' Hospital (R. C.), Rhinehart Hospital; one of the finest harbors on the lake, and large lake traffic; is a shipping port for the hematite ore of the Gogebic iron range, 40 m. SE. Pop. (1905) 14,519.

Ash'-leaved Ma'ple. See **BOX ELDER**.

Ash'ley, Lord. See **SHAFTESBURY**.

Ash'mole, Elias, 1617-92; English antiquary; b. Lichfield; served as gentleman of ordnance under Charles I in the civil wars. In 1646 began to study astrology and Rosicrucianism, and became one of the earliest English Freemasons. He was Windsor herald, 1660-75. His collection of curiosities became the basis of the Ashmolean Museum at Oxford.

Asho'ka. See **ASOKA**.

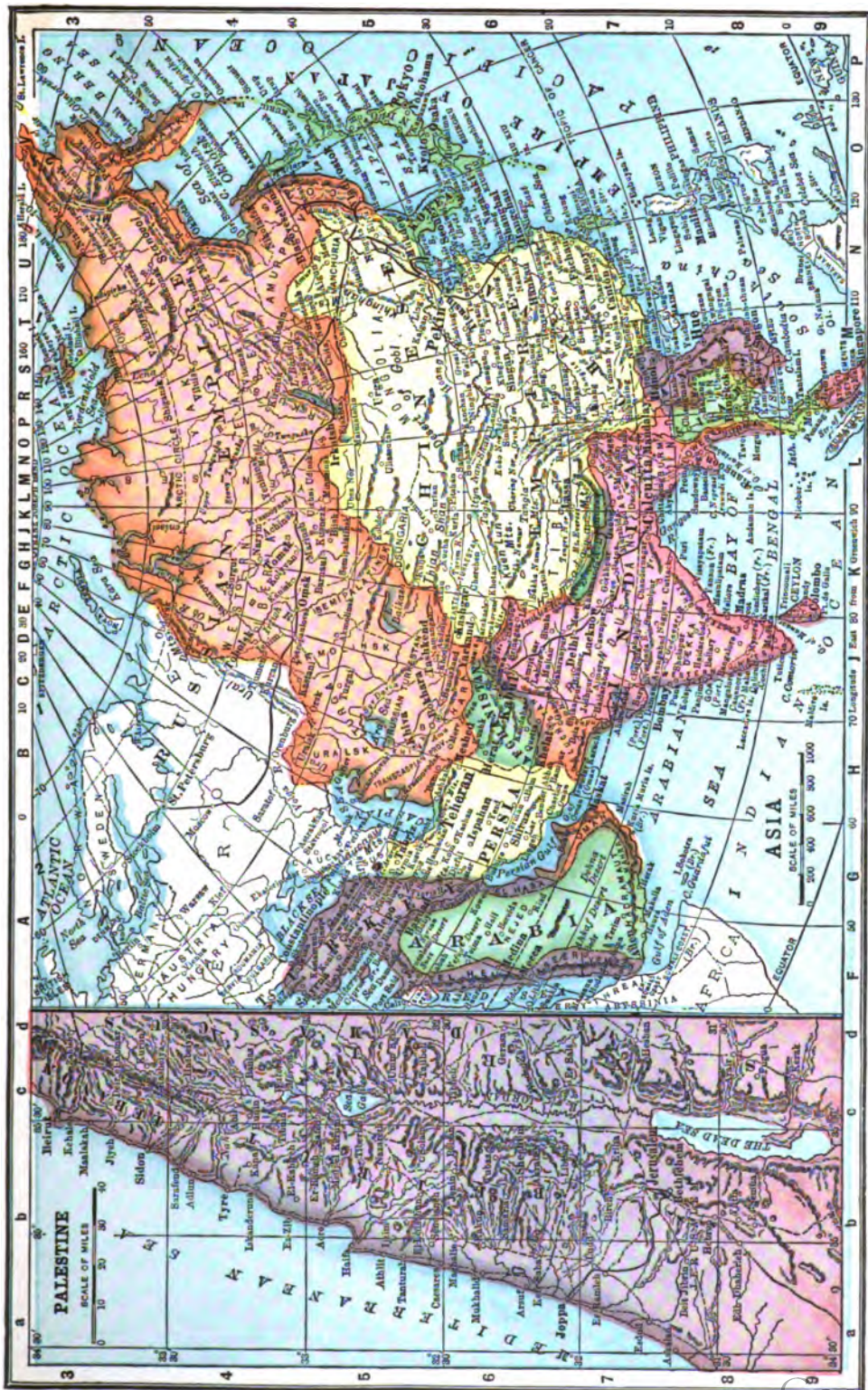
Ashtabula (äsh-tä-bū'lā), railroad center, Ashtabula Co., Ohio; 55 m. E. of Cleveland; has connections with the coal-mining regions of Ohio and Pennsylvania and the districts of Pittsburg and the Mahoning Valley; has a splendid harbor, and receives the largest amount of iron ore of any port in the U. S., and in the amount of ore shipped, is surpassed by few on the lakes; is becoming an important manufacturing center. Pop. (1900) 12,949.

Ashtaroth (äsh'tä-rōth). See **ASHTORETH**.

Ash'toreth (in plural form, **Ash'taroth**), Syrian goddess, worshiped by the ancient Israelites and other nations of W. Asia; called the Queen of Heaven, a personification of the moon; identified with Astarte (*q. v.*) Her chief temples were at Tyre and Sidon.

A'shur. See **AS'SHUR**.

Ashwanipi (äsh-wän-īp'i), or **Ham'ilton** (locally the **GRAND RIVER**); a river of Labrador; rises in the highlands, and after a course of 600 m. empties into the Atlantic through Eskimo Bay or Hamilton Inlet; about 100 m. above its mouth are falls exceeding Niagara in height.





Ash-Wednes'day, first day in Lent, also known as *Caput Jejuni*, the head or beginning of the fast; called Ash Wednesday because it was the custom for penitents to appear in the church covered with sackcloth and ashes.

Asia, largest continent on the globe, is supposed to be the oldest habitat of the human race; comprises nearly one third of the land surface of the earth, having between 16,000,000 and 17,000,000 sq. m., and about 850,000,000 inhabitants, or nearly two thirds of the entire population of the earth; bounded N. by the Arctic, E. by the Pacific, S. by the Indian oceans; SW. by the Red Sea, lying between it and Africa, and W. by Europe and the Mediterranean, Black, and Caspian seas; coast line exceeds 33,000 m., and is indented, forming the peninsulas of Asia Minor, Arabia, India, Siam, Anam, Korea, and Kamtchatka; connected with Africa by the Isthmus of Suez, which has been penetrated by the Suez Canal, uniting the Red Sea with the Mediterranean; on the NE. divided from America by Bering's Strait. The mountains surpass all others in height, the loftiest being Mt. Everest, in the Himalayas, 29,002 ft., while the mean height of the range is 18,000 ft. The Altai Mountains stretch 3,000 m. across N. Asia; the Ural Mountains divide Asia from Europe. The Caucasus are 10,000 to 18,000 ft. high; Mt. Ararat, in Armenia, 17,000 ft.; the Taurus, in Asia Minor, the Kamtchatka range in northeastern Asia, and many others diversify the face of the country. Immense plains or steppes (the plain of Siberia being larger than all Europe) lie between the ranges. The tableland of Tibet is nearly 15,000 ft. high, of Persia 2,000 to 6,000 ft. Asia has rivers flowing hundreds of miles through fertile regions, the Indus, Ganges, Euphrates, Tigris, Hoang-Ho, Amoor, Obi, Yenisei, and Yang-tse-kiang being the chief. The Caspian Sea and Aral Lake are the principal inland bodies of water. Extremes of heat and cold are found, the mean temperature of upper Siberia being near zero, and the highest mean temperature of India about 82°, with continuous heat, at some seasons, nearer 100°. A large part of Asia lies in the temperate zone and has a mild climate. The bleak regions of northern Asia have a sterile soil, with little rainfall, the earth being frozen to a depth of 300 ft. The hotter regions near the Indian Ocean and China Sea are subject to violent cyclones or typhoons, and the heated air blown over southern Asia by the SW. monsoon brings watery vapor and heavy falls of summer rain. The annual rainfall varies from 5 to 100 in. The great diversities of climate, water distribution, and soil yield a variety of natural productions. Gold, silver, iron, copper, tin and many other metals are abundant, also salt, coal, petroleum, and precious gems.

The inhabitants represent every degree of civilization; those in a savage state are few in number. The great Tartar race, embracing the Mongols, Manchus, and Turks, is divided into Buddhists and Mohammedans. The Chinese and Japanese are partially Buddhists, though mostly followers of Confucius and Lao-tse.

Brahmanism is the religion of India, but in certain regions the Mohammedans are in the majority, while W. of India Asia is almost wholly Mohammedan. The Greek Church has many adherents in Russian Asia, and Armenians and Nestorians are numerous in Turkey and Persia. The inhabitants of Asia are of the Mongolian, Aryan, and Semitic races; the Mongols include the whole of eastern and southeastern Asia. The languages used by this great division are exceedingly various. The Aryan race embraces the people of Afghanistan, Baluchistan, Persia, and N. India. These use the Indo-European languages—viz., Sanskrit, Persian, and Armenian. The third group includes the Syrian, Hebrew, and Arabian races, speaking the Semitic tongues. The oldest historical records are of Asiatic origin. About 600 B.C. the union of the kingdoms of Babylonia, Assyria, Persia, and Media took place under Cyrus the Persian, whose dominion reached from the Mediterranean to the Indus. About 500 B.C. begin the remarkable records of the Vedic theology in India. The Persian monarchy was destroyed by Alexander abt. 330 B.C., soon after which his Asiatic empire was dissolved. The Roman invasions of Asia about the beginning of the Christian era, made no advance beyond Armenia. Christianity was born in Syria, spread over Asia Minor and the Roman empire, becoming the only religion of Europe, but producing no similar effects in Asia. Mohammedanism made great advances and acquired a permanent foothold. A prodigious change has been effected in Asia by British, Russian, and French settlement. For details as to the various countries see their respective titles.

Asia Mi'nor, ancient name of a peninsula forming the W. extremity of Asia, now called Anatolia; bounded N. by the Euxine and Propontis, S. by the Mediterranean, and W. by the Ægean seas; principal divisions, Bithynia, Cappadocia, Cilicia, Galatia, Ionia, Lycaonia, Lydia, Lycia, Mysia, Pamphylia, Phrygia, Pontus, and Paphlagonia. The Mt. Taurus range extends through the S. part, and Anti-Taurus through the N. The principal rivers are the Halys (Kizil-Irmak), the Sangarius (Sakareeyah), and the Meander. Here flourished many famous and powerful kingdoms of antiquity.

Asiarchs (ä'shî-ärks), "certain chiefs of Asia" (Acts xix, 31), wealthy citizens chosen by the cities of that part of the province of Asia of which Ephesus was the metropolis under the Romans, to preside at and to pay for the public games, and watch that the customary rules were not infringed upon.

Asinari (ä-zë-nä'rë), nickname originally given to Jews because they were said to worship an ass; also applied to Christians, against whom the same accusation was made.

Asinais (äs-I-nä'is), tribe of Indians formerly on Trinity River, Tex.; mentioned in accounts of La Salle's expedition and early Louisiana history under the name of Ceniz; Spaniards established missions among them, 1715; now unknown, at least, by this name.

Ask, in Scandinavian mythology, the first man created by Odin, Honer, and Loder from an ash-tree. See SCANDINAVIAN MYTHOLOGY.

As'kalon, or **Ash'kelon**. See ASCALON.

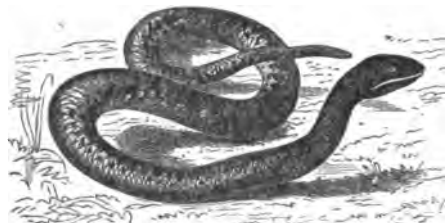
Askja (äsk'yä), largest volcano of Iceland. The crater has an area of 23 sq. m., circumference of 17 m., depth of 700 ft. Height of mountain is 4,633 ft.

As'mai, or **As'mayi**, abt. 741-830; preceptor of Harun-al-Rashid, and the most celebrated representative of Arab scholarship of his century; most widely known of his many productions, are a contemporaneous history of Persia and Arabia before Islam, and his romance of "Antar," the "Iliad" of the desert.

Asmodeus (äs-mö-dē'ūs), or **Asmo'doi**, demon who figures in the apocryphal work of Tobit, and who in the "Talmud" is called the prince of demons.

Asmonæans (äs-mö-nē'äns), or **Asmone'ans**, proper designation of the family of Jewish princes better known as the Maccabees; name derived, according to Josephus, from one Asmonæus who lived about 300 B.C.

Asoka (ä-sö'kä), **Aço'ka** or **Asho'ka**, d. abt. 231 B.C.; ancient king of Maghada, India; grandson of Chandragupta (or Sandracottus); reigned abt. 250 B.C., was converted to Buddhism, became its great patron, and erected many monasteries. He ruled over the greater part of Hindustan.



ASP.

Asp, or **As'pic**, species of venomous serpent mentioned by ancient writers; identified with the hooded viper found in Egypt and figured on the monuments of the ancient Egyptians; name also applied to a serpent common in many parts of Europe, much dreaded for its bite.



ASPARAGUS.

Aspar'agus, genus of plants of the family *Liliaceæ*, natives of southern Europe and Africa. Its species are partly shrubs and partly herbaceous; most important, *Asparagus officinalis*, the common asparagus of gardens.

Aspasia (äs-pä'shī-ä), abt. 470-410 B.C.; woman of historic Greece, remarkable for her genius, beauty, and political influence; b. Miletus, Asia Minor; became, in her youth, a resident of Athens and leader of the *hetairai*. Her house was a resort for the most eminent Athenians, including Socrates, who professed to be her disciple.

Aspasia the Young'er, Ionian woman whose original name was Milto; favorite mistress of Cyrus the Younger, who changed her name to Aspasia; distinguished for beauty and intellect; taken captive by Artaxerxes, and consecrated by him as a priestess of Anaitis.

As'pect, look, appearance, countenance. In astrology the position of one planet with respect to another. "The angle formed by the rays proceeding from two planets and meeting at the earth." (Kepler.) The ancients reckoned five aspects—conjunction, indicated by the symbol ζ ; opposition, by δ ; trine, by Δ ; quartile, by \square ; and sextile, by \times . Planets in conjunction have the same longitude; in opposition the difference of their longitude is 180° .

As'pen, or **Trem'ulous Pop'lar** (*Populus tremula*), a tree of the natural family *Salicaceæ*; a native of Europe and W. Asia. It is remarkable for the mobility of its leaves, which, having long petioles laterally compressed, are caused to flutter by the gentlest breath of air. The name aspen is also applied to the *Populus tremuloides* and *grandidentata*, natives of the U. S., resembling the European aspen in the proverbial quivering of their leaves.

Aspern (äs'pärn), or **Gross As'pern**, village of Austria; on the Danube, 5 m. ENE. of Vienna; with the adjacent village of Essling, was the scene of a battle (1809) between Napoleon and the Austrian Archduke Charles, after the French army had taken Vienna.

As'phalt, general name for solid bitumen (*q.v.*), a produce of organic matter which has been buried and undergone change, as the oxidation of mineral tar, or primarily of petroleum. Is widely distributed but does not always occur in quantity or condition commercially to justify its extraction. Asphaltic coal is ancient asphalt which through the ages has become compact and dry. In Vera Cruz, Mex., a small mountain 1,200 ft. high, is largely composed of asphalt. In Trinidad, and near San Timolis, Venezuela, lakes of asphalt occur. They are each about 3 m. in circumference, and are supposed to float on water. While the surface of Trinidad Lake is sufficiently hard to admit of teams being driven over it, the whole mass is in constant motion around several vortices. Trunks of trees arise and after a time disappear again. The lake is in the crater of an extinct volcano, and the supply is partly renewed (estimated 20,000 tons a year) from a subterranean source. Pure asphaltum is a dry solid with a black, or when impure a brown, surface. When rubbed it has a peculiar odor, and is very inflammable. It is a most tenaciously adhesive substance, as proved by the persistence with which for unknown centuries the alabaster slabs of Nineveh and

Babylon have been held in their places by the asphalt that was used to retain them. It is now used to make construction waterproof. Foundations of brick or stone are saturated with asphalt dissolved in some more fluid form of bitumen and then laid in asphaltic mortar or cement. This makes a waterproof foundation of the most durable character. It is also largely used for varnish, insulation, cement and paving. Five million square yards of asphalt pavements have been put down in Paris. It has also met with great favor in the larger cities of the U. S. Besides its clean and even surface, a political inducement to its adoption in some countries, has been the obstacle it presents to the raising of barricades by rioters.

Asphyxia, originally cessation of the motion of the heart; but now signifies disturbance and finally arrest of breathing by suffocation or strangulation, as in drowning, hanging or choking, or breathing certain gases, as chlorine. After death by asphyxia the left cavities of the heart are empty, and the right distended with blood, because venous blood not renewed by exposure to the oxygen of the air, will not circulate through the lungs, thus being forced to accumulate in the right side of the heart.

In partial strangulation moderate bleeding may unload the heart and promote the movement of the blood, after the cause of obstruction has been removed. For asphyxia from irrespirable gases the first necessity is pure air. When the heart has almost or quite ceased to beat for a few moments, life is sometimes restored by artificial respiration or by application of galvanic electricity to the chest.

As'pic. See **ASP.**

As'pinwall. See **COLON.**

Asphodel (äs'fö-dël), herbaceous plant of the genus *Asphodelus* and family *Liliaceæ*, nearly related to the asparagus and onion; native of Barbary, Sicily, Greece, and other parts of the Levant. *A. ramosus* is said to be the flower which Homer describes as growing in the meadows of Elysium. The ancients imagined that the *manes* of their friends fed on its roots, and they planted it near their tombs.



ASPHODELUS RAMOSUS.

Aspirator, an apparatus to draw air or gases through bottles or other vessels. It is a tight vessel filled with water, having a tube with a stopcock connected with the upper end, and another tube with a stopcock connected with the lower end. The former tube is attached to the vessel through which the gas is to be drawn; the stopcocks are both opened, and the weight of

the water issuing from the lower tube acts as a suction, and draws in the gas.

As'pis, or **Clu'pea**, ancient fortified Carthaginian city on the Mediterranean, about 50 m. E. of Carthage; founded abt. 310 B.C.; was the place where Regulus landed in the first Punic war, and was a distinguished episcopal see, 411-646 A.D.

Aspromonte (äs-prö-mön'të), mountain at the SW. extremity of Italy; 6,300 ft. high; 16 m. ENE. of Reggio. Here Garibaldi was wounded and taken prisoner with the bulk of his army, 1862.

Aspro-Potamo (äs-prö pöt'ä-mö), ancient *Achelous*; the largest river in Greece; rises in Albania, and after a course of about 100 m. enters the Mediterranean nearly 15 m. W. of Missolonghi.

Ass, or **Don'key**, a quadruped of the genus *Asinus* and family *Equidæ*. It has long ears, a black cross over the shoulder, and short hairs on the upper part of the tail. It is noted for its patience, stolidity, and power of endurance, and has been the drudge of man from time immemorial. The ass is probably a native of central Asia, as it is now found wild in that region. Vast numbers of the wild ass roam over the Asiatic deserts and steppes, feeding on saline herbage. They also inhabit Persia, Asia Minor, and Syria. The wild ass is a high-spirited animal of great speed, and an object of the chase in Persia, where its flesh is esteemed as food. There appears to be some doubt whether the domesticated ass is descended from this wild animal, so much superior in speed and other qualities. In oriental countries the custom of riding the tame ass is common; and the Old Testament informs us that it was thus used in the earliest times. The asses raised in the East are a better breed than those of Europe. The animal is not much employed in the U. S., except for the propagation of mules (*q. v.*) which are the hybrid progeny of the ass and mare. Being sure-footed and able to live on scanty fare, the ass is adapted for service in rocky and mountainous regions. Its milk is good for dyspeptics and consumptives.

Assab (äs-säb'), bay, territory, and town on the African shore of the S. part of the Red Sea. The territory is on the coast near the bay, in the Danakil country, now the Italian colony of Eritrea. The town is an Italian station.

Assafœtida (äs-ä-fët'ī-dä), or **Asafet'ida**, gum resin or concrete juice of root of *Narthex assafœtida*; a native of Persia and Afghanistan; has a disagreeable odor; is used as an antispasmodic.

Assal (äs-säl'), salt lake of E. Africa; 25 m. SW. of Tajura, and about 760 ft. below the sea level. Its shores are covered with crusts of salt about a foot thick.

Assam', prov. of British India, bordering on China, and part of the valley of the Brahmaputra; area, 56,243 sq. m.; well watered, fertile

soil; staple products are rice, tea, cotton, opium, and mustard. Gold, silver, and precious stones are found, and coal, petroleum, and iron are abundant. The large and dense forests are infested by many wild animals. Assam was ceded to the British by Burma, 1826. Pop. (1901) 6,126,343.

Assas'sin, one who kills by treachery or surprise a person who is unprepared for defense; originally a fanatical sect or order, the disciples of Sheikh-el-Jebel, or the Old Man of the Mountains. The founder of the order is said to have been Hassan-ben-Sabah, who flourished in Persia abt. 1080 A.D. They were called Assassins from their immoderate use of hashish.

Assault (äs-sält'), in military language, a sudden and vigorous attack on a fortified post or camp, or an effort to carry by open force a breach in a fortress.

Assault and Bat'tery, an assault is an offer or attempt to inflict corporal injury upon another, under circumstances which indicate an intent, coupled with a present ability, to do actual violence. If violence be actually inflicted, the act is a battery; but the offer or attempt is alone sufficient to constitute an assault. If threats of violence be made, but there is an apparent present inability to carry them into effect, there is no assault committed: thus one might threaten actual violence, but if an impassable barrier, as a ditch or wall, intervened between him and the person menaced, the act would not be an assault. A battery is the consummation of an assault, by the actual use of violence. An assault and battery is sometimes justifiable, as when it is committed in defense of one's person or property, but in no case should the force used be greater than is adequate to repel the assault or prevent the injury. An assault and battery is both a civil and a criminal wrong, and there may be a civil action for damages, and also a criminal prosecution instituted. Aggravated assaults, as an assault with intent to kill, or to inflict serious injury, as blindness, etc., receive severer punishment than common assault.

Assay (äs-sä'), or **Assay'ing**, process of ascertaining the proportion of pure metal in a metallic ore. The apparatus employed consists of a cupel, a small shallow vessel made of bone ash, and a muffle, made of fire clay. Weighed fragments of mixed silver and lead are placed on cupels, which, introduced into a muffle, are heated in a furnace until the metals are melted. At the end of this cupellation there remains a globule of pure silver, which by its diminished weight shows how much alloy was contained in the sample. During the assay of silver by the foregoing process, called the dry method, a small loss of silver occurs. For this reason the humid process has been adopted in the mint. This consists in dissolving the compound or impure silver in nitric acid of density 1.25, and adding a solution of common salt (NaCl), which causes the precipitation of the chloride of silver (AgCl) in white flocculi. The metallic button

which is the result of cupellation is hammered on an anvil, and rolled into a thin plate or ribbon, *cornet*, and coiled up. This is exposed in a glass vessel to the action of nitric acid, which, dissolving the silver, leaves a brown, spongy mass of gold. It is then heated in a crucible, annealed, and weighed. As jewelry and other articles cannot be assayed either by the dry or humid method without injuring their form, their purity is ascertained by the use of the touchstone, with which a streak is drawn on the surface of the gold and this compared with the streak made by metal of known composition. Black basalt is used as a touchstone.

Assaye (äs-si'), village of S. India, in the Nizam's dominions, 24 m. N. of Jaulna; scene of Wellington's first great victory, September 23, 1803, when he defeated from 30,000 to 50,000 men of Mahrattas.

Assemanni (äs-sä-mä'nē), Giuseppe Simone, 1687-1768; bishop of Tyre in *partibus*; a learned Maronite; b. Tripoli, Syria; sent, 1715, by the pope to Syria and Egypt to collect manuscripts, and was keeper of the Vatican library, 1738-68; published a valuable work on Syrian literature.

Asses'sor, in Great Britain, the legal adviser of a magistrate in determining police and similar cases. An assessor is also a person elected as in the U. S., or appointed, to assess or appraise all taxable property. This valuation is called assessment. The assessed value is usually less than the real, or less than the price for which the property could be purchased.

Assignment (äs-sin'mënt), the act of making over to another one's estate or interest. The person making the assignment is an assignor; the recipient is an assignee or assign. The word is mainly used in reference to transfers of leases, incorporeal rights, such as copyrights and patents, and rights of action. Such transfers are to some extent by statute law required to be in writing. It is a frequent practice on taking an assignment of a claim to obtain a statement from the debtor that he has no defense to it. He would then be precluded from setting up any that he might have on the doctrine of estoppel. Assignment also indicates the setting apart of dower for a widow in the real estate of her husband; employed in bankruptcy or insolvency, to indicate the transfer of a failing debtor's property to an assignee, who is in effect a trustee for the benefit of the creditors. A failing debtor by the laws of some states is permitted to make a voluntary and even preferential transfer to such an assignee, though these laws are substantially superseded for the time being when there is a U. S. bankrupt law in operation.

Asshur (äsh'ör), or **Ash'ur**, ancient populous city; capital of Assyria; on the Tigris, 40 m. below Calah, and 60 m. S. of Nineveh; site marked by extensive ruins at Kileh-Sherghat.

Asshurbanipal (äsh-ür-bän'i-päl), i.e., "Asshur creates a son"; greatest of the kings of

Assyria; ruled at Nineveh, 688-626 B.C. Many literary remains from his library, and treasures of art from his palace, are in the British Museum.

Assiento (äs-yën'tō), or **Asien'to**, word applied to treaties which Spain made with several foreign nations to supply her colonies with negro slaves. The British acquired the privilege by the treaty of Utrecht, 1713, but resigned or sold it to Spain abt. 1750, since which no such contract has been made.

Assignat (äs-ë-nyä'), one of the notes forming the paper currency issued by the French Govt., 1790, and at subsequent periods of the revolutionary régime, based on the security of the national domains, the confiscated estates



ASSIGNAT.

of the Church and wealthy *émigrés*. The total of assignats issued was 45,578,000,000 frs. The government, in order to check their depreciation, passed a law to fix the maximum prices of commodities, which law was very injurious to trade. In July, 1796, the assignats were recalled, and replaced by the *mandats*.

Assimilation (in plants), the series of changes made upon the carbon dioxide and water in green cells, resulting in the production of a carbohydrate (usually sugar or starch). In fact these changes constitute only a part of assimilation, and botanists now term them photosynthesis. In photosynthesis (carbon assimilation) carbon dioxide (CO₂) is absorbed from the air by green cells. On coming in contact with water (H₂O) the carbon dioxide becomes carbonic acid (H₂CO₃). In sunlight, the carbonic acid is broken up in the green cells. The resulting compound is thought to be formic aldehyde (CH₂O), the surplus oxygen being set free. It is further thought that by polymerism six molecules of CH₂O are brought together as C₆H₁₂O₆, glucose, one of the sugars common in plants. Photosynthesis takes place only in the light. Plants destitute of green cells must derive their carbon compounds from other plants (or animals).

Assiniboia (äs-sin-i-boi'ä), formerly a district of the Canadian NW. territories, containing 89,535 sq. m. and lying across the international boundary from Montana and N. Dakota. It was merged, in 1905, in the provinces of Saskatchewan and Alberta, the former

getting by far the greater part of it, and no longer exists as a separate territorial entity. The district occupied a part of the great plain E. of the Rocky Mountains, and contained much of the most fertile wheat land in the Canadian West.

Assiniboin (äs-sin'i-boin), river in the provinces of Saskatchewan and Manitoba, Canada; rises about lat. 52° N., long. 103° W., and after flowing S. about 130 m., winds to the E. and empties into the Red River of the North at Winnipeg, Manitoba; length over 400 m.

Assin'iboins, tribe of American Indians, of the Dakota family; originally a part of the Yankton Sioux, from whom they separated over 250 years ago; remnant, partly in Canada and partly in Montana.

Assisi (äs-së'së), town of Italy; province of Perugia; 13 m. SE. of Perugia; surrounded by a wall; has a cathedral and many monasteries; is the native place of St. Francis.

Assis'tance, **Writ of**, in Great Britain, a writ issued by the court of chancery to the sheriff directing him to put a party in possession of land to which the decree has declared him to be entitled; now called a writ of possession. In the American colonies these writs were misused to enable revenue, or other crown officials, to enter any building where dutiable goods were supposed to be concealed and to seize such goods for the benefit of the Crown. The legality of this procedure was fiercely contested by the colonists.

Assiut (äs-ë-öt'), **Assiout'**, or **Siut'**, ancient *Lycopolis*, district and city of upper Egypt; very fertile; area, 840 sq. m.; pop. (1897) 782,720. The city is the capital of upper Egypt; is near the Nile; terminus of the railroad on the left bank of the river, 228 m. S. of Cairo. It is the handsomest city in Egypt, except Cairo, and has fine mosques and bazaars, a palace, baths, and a cotton factory; is the chief resort of the caravans from the Sudan; is also an important military station, and has a factory for pipe-bowls. Pop. 42,000.

Associate Presbytery. (1) Organization formed by Ebenezer Erskine and others, who seceded from the Church of Scotland, 1733. In 1745, having grown to forty-five congregations, it was reconstituted as Associate Synod. In 1747 it was torn into two bodies, known as Burgher and Antiburgher, each of which claimed the name Associate Synod, though from 1778 the Antiburghers are called the General Associate Synod. 2. In 1799 the "Old-light" Burghers, having separated from the "New-light" majority, called themselves at first the Associate Presbytery, but from 1805 the Associate Synod, or Original Burgher Synod. Constitutional Associate Presbytery is the name taken by the Old-light Antiburghers, when they separated from the New-light majority, 1804. These bodies are now represented in various existing Presbyterian churches, particularly those known as United, or Reformed, or Secession, or Seceder.

Associated Press, cooperative organization of newspapers in the U. S. for the collection of news. Its principal center is in New York, where items of news are collected and distributed. It furnishes news only to its own members, and buys its European news from other news agencies.

Association of Ide'as, in psychology, a principle or law exercising an important influence on the operations of the mind; the conditions under which one idea is able to recall another. Aristotle reduces the principle to three parts: Proximity in time and contiguity in place as one; resemblance; contrast. Hume says: "There appear to be only three principles of connection among ideas—namely, resemblance, contiguity in time or place, and cause or effect." Augustine reduces the principle to one: What is once together is afterwards together. Alexander Bain reduces the primary attributes of intellect to three, of which the third is retentiveness, the facts connected with which may, with few exceptions, be comprehended under the principle called the law of contiguity or continuous adhesion. Modern psychologists have simplified the principle by limiting the conditions to the laws of continuity and resemblance.

Assonance (äs'sō-nāns), in prosody, the repetition of the same accented vowel with different consonants, as hat and man, late and shape. As a substitute for rhyme it is common in Celtic, Spanish poetry, and also in old French poetry.

Assos (äs'sōs), or **As'sus**, ancient Greek city and seaport of Asia Minor, territory of Mysia; on the N. shore of the Gulf of Adramyttium, about 7 m. from the opposite coast of Lesbos or Mitylene; occupied a commanding position; was protected by walls, and was still visited by shipping in the time of Paul. The surrounding country was famous for its wheat. The Archaeological Institute of America made a thorough exploration of the site of Assos, 1881-83.

Assouan (äs-wān'), town of upper Egypt, on the Nile, near the border of Nubia, 115 m. S. of Thebes; 2½ m. below the First Cataract; remarkable for its picturesque situation, ancient monuments, and the great dam and irrigation reservoir completed 1902. The total length of the dam was 1¼ m., the maximum height from foundation about 130 ft. Since the dam's completion, Egypt has decided to raise it 20 ft. in order to increase the irrigated area by 1,000,000 acres, thereby increasing the yearly value of the cotton crops by about \$20,000,000.

Assump'sit, a contract not under seal, either written or oral, express or implied, as distinguished from a covenant, or written contract under seal; also, an action to obtain damages for the violation of such an agreement.

Assump'tion of the Vir'gin, a festival of the Greek and Roman churches in commemoration of the resurrection and miraculous ascent of the Virgin Mary to heaven. It is held August 15th.

Assumption of Mo'ses, an apocryphal book containing an account of the death of Moses and the assumption of his soul to heaven. Jude, v. 9, may be a quotation from it.

Asswan'. See ASSOUAN.

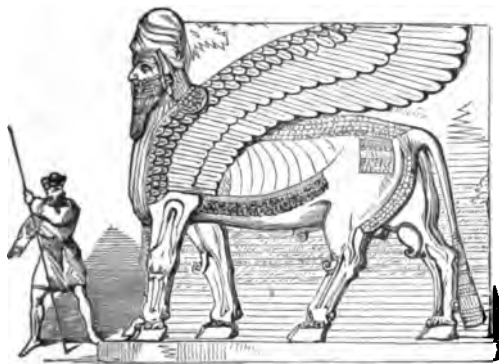
Assye'. See ASSAYE.

Assyria (äs-sīr'ī-a), ancient semitic kingdom of Asshur, whose great capitals were Asshur, Nineveh, and Calah, on the Tigris. Assyria proper was a small region about these cities. Assyria was bounded N. by what is now Armenia, E. by Media, S. by Babylonia, with an indeterminate line on the W. At times the boundaries were enlarged by conquest, and included Babylonia and portions of Palestine, Egypt and other countries, most of Asia W. and S. of Assyria proper. The social organization of the ancient Assyrians and Babylonians was complex and highly developed. While the monarchy was hereditary, the insurrections, revolutions, and dynastic changes show that the subjects often made their wishes felt. Real estate was owned by the people, who bought and sold it at will. Slavery was an old institution. While the king and perhaps also the wealthy had many wives, monogamy was the rule. Women might hold property and engage in commerce. Lawsuits, in the later Babylonian times at least, were decided by a board of judges, apparently without the intervention of lawyers. Fraudulent claims were punished by fines as well as by loss of the suit. The complexity of the social organization must have divided the society into numerous castes and guilds. The good order, industrial activity, and prosperity are clear from the commercial records.

The Assyrians and Babylonians were a very religious people. All their wars were carried on in the name of the gods, and in important commercial transactions the gods were invoked to punish violators of agreements. The great gods were largely the striking objects and moods of nature—as the heavens, Anu; the sun, Shamash; the moon, Sin; the weather, Raman. There was no supreme deity, but there was in Assyria a special national god called Asshur.

From the mounds of Mesopotamia have been exhumed a great variety of documents in Assyrian, in cuneiform characters. These prove that the language was Semitic. It was more closely related to the Aramaic and Hebrew than to Arabic. The documents were inscribed on slabs, on obelisks of stone, on clay tablets, and on cylinders, or prisms, of fine terra-cotta. The materials which they used most extensively for documents were stone and plastic clay, the latter of which, being afterwards baked, has resisted the ravages of time. The number of characters was about 300. The Assyrians were artists of ability, as is witnessed by the sculptured slabs exhumed by explorers. These formed a wainscoting for the crude brick walls of the royal palaces, and represent scenes of war and the chase, and mythological subjects. They surpass the Egyptian in fidelity to nature, especially in animal life. More striking even are the portal guardians—winged

and human-headed bulls and lions of great size and terrible aspect—flanking the city gateways and palace entrances. The Assyrians achieved colossal architectural works in spite of the scarcity of stone and timber and the lack of fuel, which compelled them to use their clay-deposits in the form of crude brick, and to employ the more costly burned brick only for facings and decorations. Buildings in sev-



ASSYRIAN WINGED BULL WITH HUMAN HEAD.

eral stories being impracticable with such poor materials, they raised enormous clay mounds, carefully drained; faced them with hard brick or stone, and built upon them palaces of vast extent, elaborately planned with courts, halls, and chambers, separated by crude brick walls from 10 to 30 ft. thick.

The Assyrian people were originally a colony from Babylonia. The oldest date yet recovered relates to the erection of a temple abt. 1820 B.C. In the 16th century B.C. royalty was well established, and Assyria began a series of quarrels with Babylonia, which, with interruptions, continued till Nineveh was destroyed. The first king of whom we have long records was Tiglathpileser I. With Tiglathpileser III (745-27) began the period of Assyria's greatest glory. The last dynasty was founded by Sargon, 722-05, and includes some of the greatest names in the history—Sennacherib, 705-681; Esarhaddon, 681-668; and Assurbanipal, 668-26. Under this dynasty the kingdom reached its greatest enlargement. Sargon put an end to the kingdom of Israel, 722. Assurbanipal, called by the Greeks Sardanapalus, the most illustrious Assyrian ruler, gathered in his palace at Nineveh a library of clay books, and was a great patron of letters. A war with his brother, ruler of Babylon, hastened the decay of Assyrian greatness. In 606 B.C. the country became subject to Media.

Explorations have been made on the site of ancient Assyria. In 1842-43 Paul Emile Botta, French consul at Mosul, excavated at Khorsabad, a few miles N. of Nineveh, where he discovered the palace of Sargon. His successor, Victor Place, continued the work, 1851-55. Austen Henry Layard took up the work at Nineveh, at Calah and other ruined cities of Assyria and Babylonia, and enriched the British Museum with his finds. Other explor-

ers, English, French, and German, followed. In 1884-85, an American party, under W. H. Ward, of New York, excavated in Babylonia, and found hundreds of tablets, seals, and other objects, many of which are in the Metropolitan Museum, New York City. In 1889-92, diggings were carried on at Niffer, S.E. of Babylon, by Prof. John P. Peters, of Philadelphia, resulting in the discovery of clay tablets and other objects, some thousands of which are now in the library of the Univ. of Pennsylvania.

Ast (äst), **Georg Anton Friedrich**, 1778-1841; German philologist and critic; b. Gotha; Prof. of Classical Literature at Landshut, 1805; same chair in the Univ. of Munich, 1826; wrote, besides other works, a "Manual of Æsthetics," "Introduction to Philology," and "The Life and Writings of Plato," 1816.

Astarte (äs-tär'të), goddess of the Phœnicians, Syrians, and Carthaginians; original of the Greek Aphrodite (Venus). Baal was the sun-god and **Astarte** the moon-goddess, or goddess of the heavens. She is usually represented with four wings (the two uppermost of which are intended to symbolize the horns of the moon), wearing a pointed cap, and holding a dove in her hand. Her chief temples, besides that at Hierapolis, Syria, were at Tyre and Sidon. The Assyrian goddess called Ishtar or Istar is identified with Astarte.



ASTARTE.

Astatic (äs-tät'ik), applied to the magnetic needle when it is withdrawn from the action of the earth's magnetism, and has no longer a statical position of equilibrium under the influence of this force; also to the galvanometer of which such needles form an essential part.

As'ter, genus of plants of the family *Compositæ*; comprises a great number of species, generally herbaceous, mostly natives of the U. S. The ray-florets, which are never of the same color as the disk, are purple, blue, violet, white, etc.



ASTER.

Asteria (äs-tě'ri-ä). See **SAPPHIRE**.

Asteroid (äs'tér-oid), one of the small planets which revolve around the sun, between the orbits of Mars and Jupiter. The name was first used by Herschel, but was not universally recognized, "small planets" being sometimes preferred. The first was discovered by Piazzi, an astronomer of Palermo, Italy, January 1, 1801, and named Ceres; the second, by Olbers, of Bremen, March 28, 1802, and named Pallas. Between March 29, 1807, and December 8, 1845, no further addition was made to the number. Since 1847 each year has added to the list, the average rate of discovery since 1850 being about 10 per year. The list now exceeds 450. The asteroids are distinguished from the planets by their small size, and the greater eccentricity and inclination of their orbits. Judging from the amount of light which they reflect, the largest may be 300 or 400 m. in diameter, the smallest perhaps 10 or 20. See **COMET**; **METEOR**; **PLANET**; **STAR**.

Asteroi'dea, a class of the division *Echinodermata*, including the starfishes. It is characterized by the star shape, with five or more angles, and ambulacral feet confined to the ventral surface. Two orders, *Stellerida* or *Asteridea*, the starfishes, and *Ophiuridea*, the brittle stars, are usually recognized.

Asthma (äs'mä), a disease characterized by difficulties of breathing, occurring in paroxysms. True asthma includes only those cases where the point of irritation is at the origin of the vagus nerve or in some remote part of its course. Irritability and engorgement of the bronchial mucous membrane seem to be essential elements of asthma. True or nervous asthma is a paroxysmal spasm of the muscles of the bronchial tubes, diminishing their caliber, obstructing respiration, and accompanied by the secretion of a thick mucus. The wheezing sounds are due to the air passing through these narrow tubes. An attack of asthma, though distressing, is never fatal. The smoking of saltpeter paper or stramonium leaves, or a few whiffs of chloroform may, or may not, relieve the attack. Iodide of potassium is of great benefit in many cases. Compressed air baths give relief during paroxysms. Asthmatics should have a nutritious diet, and avoid flatulency. The climate of Florida, California, and Egypt seems beneficial.

Asti (äs'tè), city of Italy, province of Alessandria; on River Tanaro, 36 m. ESE. of Turin. It is a bishop's see, has a Gothic cathedral, royal college, theological seminary, printing-office established 1479, and manufactories of silk stuffs. Asta Pompeia was a town of great antiquity. In the Middle Ages it was the capital of a republic. Pop. (1901) 18,372.

Astigmatism (äs-tig'mä-tizm), defect in the eye which consists in its refracting the rays of light differently in different planets, causing imperfect images or indistinctness of vision. This may be corrected by means of a cylindrical or spherico-cylindrical lens.

Astol'phus, or **Astul'phus**, d. 756; king of the Lombards, 749-56. Having seized Ravenna

abt. 752, he threatened Rome. The pope then applied for help to Pepin, who defeated Astolphus, and forced him to cede Ravenna and the Pentapolis to the pope.

As'tor, John Jacob, 1763-1848; German-American merchant, b. Waldorf, near Heidelberg, Germany; emigrated to the U. S., 1783; settled at New York City and engaged in the fur trade, exporting to Europe in his own vessels. In 1811, founded Astoria on the coast of N. America, near the mouth of the Columbia, as a depot for the fur trade; purchased in New York much real estate, the value of which increased enormously. At his death his fortune was estimated at \$20,000,000. He left \$400,000 to found a public library in New York.

Astoria (äs-tö'ri-ä), city and port of entry; capital of Clatsop Co., Ore.; on the Columbia, 15 m. from its mouth; the headquarters of the salmon and fishery business of the Northwest; is the general depot for coast and river steamers, has large lumber, flour, and grain trade, iron works, machine shops, etc. Pop. (1900) 8,381.

Astor Li'brary, public library in New York City, founded by John Jacob Astor; consolidated with the Tilden and Lenox foundations as the New York Public Library, 1898.

Astrachan (äs-trä-kän'). See **ASTRAKHAN**.

Astræa (äs-tré'ä), goddess of justice in classic mythology; a daughter of Jupiter and Themis. At the end of the Golden Age, when violence began to prevail in the world, she ascended to heaven, being the last of the goddesses to leave the earth. Astræa is also the name of an asteroid discovered by Hencke, 1845.

Astræa, genus of coral animals of the order *Madreporaria*. They live in the sea, and



ASTRÆA VIRIDIS.

form calcareous skeletons (star corals). The polyps are often an inch in diameter. They form large, hemispherical masses of coral.

Astragalus (äs-träg'ä-lüs), in anatomy, the first or uppermost bone of the tarsus, which forms with the leg bones the hinge of the ankle joint. Its lower surface rests on the os calcis, or heel bone.

Astragalus, genus of herbaceous and shrubby plants of the family *Leguminosæ*; leaves,

pinnate, with an odd leaflet; pod, two-celled; comprises numerous species, mostly natives of the temperate and cold parts of the eastern hemisphere. Several species of *Astragalus* growing in Persia and Asia Minor yield gum tragacanth. The *A. boeticus* is cultivated in Hungary and Germany for its seeds, which are used as a substitute for coffee.

Astrakhan (äs-trä-kän'), city of Russia, capital of a government of the same name; on an island of the Volga, 40 m. from the Caspian Sea; contains a cathedral, about 35 churches, 15 mosques, an archiepiscopal palace, a botanic garden, an Indian temple, and a gymnasium. Fish, leather, fur, linen, and woolen goods are exported. The seat of Greek and Armenian archbishops; has an extensive trade, and manufactories of silk and cotton. Steamboats ply between it and Caspian ports. Pop. (1900) 121,600.

Astralite (äs'träl-ite), variety of glass resembling aventurine, containing crystals of a cuprous compound, which exhibits an iridescence of dark red and greenish blue.

As'tral Spir'its, spirits supposed by the ancient Persians and other orientals to animate the stars. This opinion or superstition was adopted by some Greeks and Jews. Demonologists of the Middle Ages conceived them as fallen angels or souls of departed men.

Astringent (äs-trin'jënt), in medicine, agent which produces contraction in tissues, and thus checks discharges, such as excessive purging or hemorrhages. They are of two classes, vegetable and mineral.

Astrocaryum (äs-trö-kä'ri-üm), genus of palms; comprises about sixteen known species, natives of tropical America, and remarkable for the sharp spines with which the stem and almost every part are armed. The *A. murumuru*, and the *A. tucuma* which grow on the Amazon bear edible fruit, and the *A. vulgare* produces a strong fiber from which cordage and nets are made.

Astrolabe (äs'trö-läb), Greek name of a circular instrument used to make astronomical observations; consisted of two or more circles having a common center, and so inclined to each other as to enable the astronomer to observe in the planes of different circles of the sphere at the same time.

Astrol'ogy, originally, astronomy; later, a spurious science which professed to explain the events of human life by the influence of the stars or planets. Astrology, which is very ancient, is the study of horoscopes and an attempt to predict the fortunes of men by the positions and aspects of the stars. Judicial astrology, or the determination of character and fate by the position of the stars at birth, is supposed to have originated in Chaldæa. In ancient Rome, during the empire, astrol'ogers were numerous and influential. In the Middle Ages astronomy proper was studied as subsidiary to astrology, which was considered the more important. The Copernican system contributed to bring astrology into discredit.

The fundamental conception of astrology seems to have been drawn from the actual influence of the sun upon the earth in affecting health, fertility, and temperature. Connected with these facts was the worship of the heavenly bodies as divinities. Astrological predictions are founded on the relative positions and aspects of the sun, moon, and planets at the moment of birth, and on certain arbitrary influences supposed to belong to each of these bodies.

Astron'omy, that science which treats of the structure of the universe, and of the constitution and motions of the bodies contained therein. It is perhaps the oldest of the sciences. The foundations of astronomy as an exact science were laid by Hipparchus and Ptolemy. Ptolemy taught that the earth was stationary in the center of the universe, and that the stars moved around it in the course of a day. This teaching was generally believed for 1700 years, and retarded the growth of astronomy. It was exploded in 1543 by Copernicus, who demonstrated that the apparent daily motion of the stars was caused by the earth's turning on its axis. He also showed that all the planets moved around the sun as a center. A little later, Kepler proved that the planets moved around the sun in elliptical paths, in accordance with his celebrated three laws of motion. Then came Isaac Newton, who announced the law of universal gravitation, and began the task of unraveling the intricacies of the celestial motions, which was completed by the brilliant Laplace, Lagrange, Bessel, and others.

The invention of the telescope by Galileo, in 1609, was the most important single advance ever made in astronomy. By its aid all the wonders of the heavens were unfolded, and astronomy immediately took immense steps forward. New planets, nebulae, and stars in countless millions were discovered. The total number of stars visible to the unaided vision is about seven thousand. The most powerful telescopes of the present day make it possible to see at least two hundred million. By its aid, the surface structure of the sun and planets was clearly seen. It showed the sun to be a white-hot ball, covered with immense spots and granulations and shooting flames. It showed that the planets shine only by reflected light, and were in much the same condition as the earth, being round balls of immense size, upon which it was possible for life in some form to exist. And lastly, but by no means least, the telescope enabled the positions of the heavenly bodies to be obtained with an accuracy hitherto impossible. Careful study of these accurate positions led astronomers to the discovery of new laws, such as the aberration of light and the nutation of the earth's axis. It also enabled astronomers to measure the distances of the planets from each other, and the distances to the fixed stars. Without the assistance of the telescope, the distances of the stars would never have been known.

The planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune, named

in the order of their distance from the sun, are the principal members of the solar system. The planet Mercury is the smallest, with a diameter of 3,000 m.; Jupiter is the largest, with a diameter of 86,000 m. The diameter of the sun is 10 times that of Jupiter, and its weight 1,047 times that of Jupiter, and 327,000 times that of the earth. The distance of Mercury from the sun is $35\frac{1}{4}$ millions of miles, while Neptune, the most distant of the planets, is 2,780 millions of miles away. The earth, lying between the two, is 93 millions of miles from the sun. Such is the accuracy attained by astronomers of the present that all these distances are known with an error of less than one tenth of one per cent.

The densities of the planets, or their weight with respect to that of an equal bulk of water, varies from 0.75 for Saturn to 6.85 for Mercury. This value for Mercury is, however, uncertain. The value for the earth is 5.66. Recent estimates make the earth the most dense of the planets. It is known with certainty that the Sun, Mars, Jupiter, and Saturn rotate on their axes, just as the earth does. The rotation of the remaining planets is still in doubt. The sun rotates on its axis in 25 days, Mars in about 24 hours, and Jupiter and Saturn in about 10 hours. All of the planets, with the exception of Mercury and Venus are accompanied by moons, or satellites. Saturn has ten, Jupiter eight, Uranus four, Mars two, and the Earth and Neptune one each. In addition to its satellites, Saturn is surrounded by a system of rings which makes it the most beautiful object in the heavens. These apparently solid rings are in reality a closely packed mass of separate particles each moving in its own orbit around Saturn. The most interesting of all the planets is Mars. The condition of its surface seems to show a possibility of life existing there. Powerful telescopes show a system of lines on its surface, which are supposed by many astronomers to be canals for conducting water for irrigation purposes. Mars has an atmosphere which is much rarer than ours. The surface of our own moon presents a beautiful sight in even a small telescope. Its general appearance is that of the mountainous desert regions of our earth, with numerous craters of extinct volcanoes. The moon is considered to be a dead world, devoid of air, water, and life. Between the orbits of Mars and Jupiter there exist a large number of small planets or asteroids as they are called. About 500 have been discovered up to the present time. Large numbers of new ones are being discovered every year. They are exceedingly small, the largest being probably less than 400 m. in diameter. On account of their number, it has become a very difficult matter for astronomers to keep track of them all. One named *Æthra*, discovered by Watson, has already been lost. It is supposed that they are fragments of an exploded planet. Comets are very spectacular members of the solar system. Their origin and constitution are not well understood. They are not permanent features of the solar system, but are drawn in from outside space by the sun's attraction. Their appearance is

continually changing. In fact so flimsy is their structure that they sometimes disappear entirely. They are probably related to meteors and shooting stars. It is known that swarms of meteors follow in the path of some comets which have disappeared. In brilliancy comets vary from the great comet of 1843, which was visible in full daylight, down to the comets too faint to be well seen through the most powerful telescope. By far the largest number of comets are too small to be seen with the naked eye.

Outside the boundaries of the solar system, and separated from it by immense distances, are the fixed stars. They are called fixed only because they are so far away that their motion was not detected until recent times. The nearest star, Alpha Centauri, visible only in the southern hemisphere, is 20 millions of millions (20,000,000,000,000) of miles distant. Light traveling at the rate of 185,000 m. a second, takes three and one half years to cross the space intervening between us and it. The measurement of these immense distances is one of the most difficult in astronomy, and was first successfully made by Bessel in the middle of the nineteenth century. The vast majority of stars are so far away as to defy measurement. We know that the light of the more distant stars consumes thousands of years in reaching us. Most of the stars visible to us are crowded together in an immense disk-shaped mass, forming the so-called Milky Way. To the unaided eye this appears as a band of continuous light, which in a telescope is resolved into a mass of almost countless stars. All of these stars, taken together with the sun, form what is known as the stellar system. Outside of this system there are countless other systems so far away that light from them never reaches us.

Our own sun is in reality a star. If it were removed to the distance of the other stars, it would appear no larger or brighter than they. In fact some of the stars are hundreds of times larger than the sun. They are all immense glowing bodies composed of different elements and metals such as exists in the earth. The spectroscope enables us to tell of what elements each star is composed. Their heat is probably maintained by their contraction. In time they will all cool off, leaving the universe without light or heat. Scattered throughout the stellar spaces are the nebulae. They are extended masses of glowing gases of different forms, and are supposed to be stars in the first stages of development. They suggest the theory of the development of worlds which was enunciated by Laplace, and is still generally accepted. Briefly, his theory was that of an immensely extended mass of gases, subject to the mutual gravitation of its parts. As the parts gravitate toward the center, heat is developed and rotation is set up. When the rotation has reached a certain speed, the centrifugal force throws off a ring of matter, which afterwards condenses into a planet. In this way all the planets are supposed to have been formed.

Astul'phus. See ASTOLPHEUS.



ASTRONOMICAL PHENOMENA.

- 1. November Meteors
- 2. Aurora Borealis
- 3. Total Eclipse of the Sun
- 4. Solar Protuberances
- 5. Great Nebula in Orion
- 6. The Planet Jupiter
- 7. The Planet Mars
- 8. The Planet Saturn

Astu'ria, former kingdom in N. of Spain; bounded N. by Bay of Biscay and S. by the Cantabrian Mountains. The Asturians made a long and brave resistance to the Goths and Vandals who invaded Spain abt. 500 A.D., but were finally subdued. Asturia was the only part of Spain not conquered by the Moors.

Asturias, ancient division of Spain, now the province of Oviedo. The eldest sons of the kings of Spain have borne since 1388 the title of Prince of Asturias.

Astyages (äs-ti'ä-jéz), last king of Media; son of Cyaxares and grandfather of Cyrus, by whom, according to Herodotus, he was dethroned after a reign of 35 years (504-59 B.C.).

Asuacion (ä-sön-si-ön'), capital of Paraguay, S. America; on the Paraguay River, 645 m. N. of Buenos Ayres; founded by the Spaniards, 1536; has a cathedral, government palace, college, public library, etc. Hides, tobacco, timber and yerba mate (or Paraguay tea) are shipped here by river. Pop. (1905) 60,259.

Asylum, sanctuary and place of refuge for criminals and others; any place of retreat and security. In ancient Greece the temples, altars, and sacred places were such. Asylums became so numerous under the Roman empire that they were considered nuisances by honest people, and were nearly all abolished by Tiberius. In modern usage the term is applied to charitable institutions for the relief of the blind, insane, orphans, etc.

Asylum, in international law, that exercise of sovereignty which forbids one government to apply its laws to its own or its enemy's subjects when within the jurisdiction of another government. When one of its subjects takes refuge within another state he becomes amenable to the laws of that state. It may be used to protect individuals, ships with their crews, or armed bodies. It may apply within the territory of a state, upon its ships on the high seas, in certain cases even in its embassies in foreign parts. Where the refugee is a common criminal, the country of his refuge, not wishing crime to go unpunished, yet undesirous of assuming this burden itself, will probably surrender him. This is solely under treaty regulation, however. Extradition is thus a limitation of the right of asylum.

Atacama (ä-tä-kä'mä), a territory of Chile, containing 41,180 sq. m. Mountainous and sterile except along river lands; has rich copper mines; warm, dry climate; capital, Copai-po. Pop. (1905) 75,567.

Atacamite (ä-täk'ä-mit), ore containing 55 or 60 per cent of copper, abundant in the desert of Atacama (whence its name), and also a crust on the lavas of Vesuvius and Etna; natural varieties of atacamite, crystallized, massive, and pulverulent or granular.

Atahualpa (ä-tä-hwä'l'pä), or **Atabalipa** (ä-tä-bä-lä'pä), d. 1533; last inca of Peru, son of Huayna Capac; Huascar, Huayna Capac's legitimate heir, voluntarily divided the kingdom with Atahualpa, who, according to the doubtful story of the Spanish annalists, col-

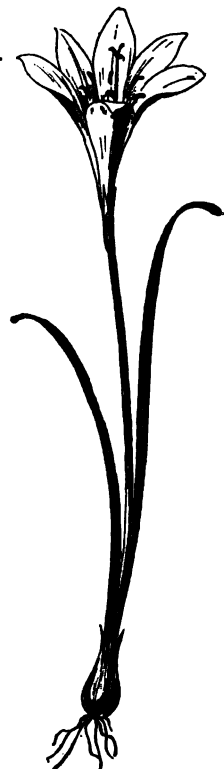
lected an army, captured Huascar in Cuzco, loaded him with chains, and exterminated all his family and adherents. Pizarro was now in Peru, and Atahualpa opened negotiations with him. An interview was arranged, 1532, at which Atahualpa's followers were massacred, and he was thrown into prison.

Atalanta (ät-ä-län'tä), in Greek legend, the swiftest-footed of mortals; outran the centaurs; took part in the Calydonian hunt and the Pelian games. Her suitors had to contend with her in running, with the penalty of death if vanquished. Milanion defeated her by dropping three golden apples, given him by Venus, which she stopped to pick up.

Atamas'co Lil'y, amaryllislike ornamental bulbous plant, with white or flesh-colored flowers, native of the southern U. S.

Ataulf (ät'ä'lf), **Ad'aulf**, or **Ad'olf**, d. 415 A.D.; king of the Visigoths, and a brother-in-law of Alaric I, whom he succeeded, 411 A.D.; aided Alaric in the capture of Rome, 410; captured and married Placidia, a sister of Honorius; defeated Jovinus; took Bordeaux; and conquered Aquitania.

Atavism (ät'ä-vizm), in natural history, the reappearance in animals or plants of traits belonging to their remote progenitors which their immediate parents did not present. Domesticated breeds of animals allowed to run wild become, after a time, nearly (seldom exactly) like their wild ancestors. Domestic hogs running wild assume, in a few generations, a moderate size, slender figure, and (in some places at least) a nearly black color, with head and tusks approaching those of the wild boar of Europe. In human pathology, a reversion (similar to the above) to morbid traits existing in ancestors, but not in parents. A deaf-mute man married a woman whose hearing was perfect, and had two children by her—one a deaf-mute son, who died childless; the other a hearing daughter, who married a hearing man, and gave birth to two deaf-mute daughters and a hearing son. This son married a woman also with good hearing, and had by her a deaf-mute son. One of the daughters married a deaf-mute and bore a hearing son. Gout, consumption, insanity, and other diseases sometimes thus disappear for one, two, or more generations in a family.



ATAMASCO LILY.

and yet return in a manner evidently due to hereditary (though interrupted or latent) transmission. See HEREDITY.

Athara (ät-bä'ra), extreme N. tributary of the Nile; rises in the Abyssinian highlands, receives several tributaries, traverses the desert of S. Nubia, and enters the Nile about 25 m. S. of Berber; length about 550 m.; regarded as a leading cause of the inundation of Egypt.

Atchafalaya Bayou (äch-äf-ä-lf'ä b'ö), outlet in Louisiana, connecting with the Mississippi near the mouth of the Red River; flows nearly S. through Chetimaches Lake, and enters Atchafalaya Bay, Gulf of Mexico; length 225 m.

Atch'ison, David R., 1807-86; American politician; b. Frogtown, Ky.; practiced law in Missouri; U. S. senator, 1843-55; acting President of the U. S., Sunday, March 4, 1849; conspicuous in the slavery debates and in the Kansas-Nebraska struggle. Atchison, Kan., was named for him.

Ate (ä'tē), in classic mythology, goddess supposed to avenge crimes, and also to stir up mischief. According to Homer, she was a daughter of Jupiter, who, for her mischief-making character, banished her from Olympus.

Ateles (ät'ä-léz), genus of S. American monkeys, characterized by the absence of a rudimentary condition of the thumb of the anterior hands; have long, prehensile tails.

A Tem'po (literally, "in time"), a term in music used to denote that after some short relaxation in the time the performer must return "to the (proper) time," or original degree of movement.

A Tempo Gius'to (in the correct time). In music, a direction to the performer to keep the rhythm true and correct without retarding or accelerating the time.

Athabasca (äh-ä-bäs'kä), river in province of Alberta, lake in Alberta and Saskatchewan, Canada. The lake extends E. and W. about 230 m., and has an average width of 20 m. The river rises in the Rocky Mountains, flows N.E. and enters the lake near its W. extremity. The water of the lake is discharged through Slave River, eventually into the Mackenzie.

Athabasca, formerly a district of the NW. territories of Canada, containing 251,300 sq. m. It has ceased to exist as a separate territorial district, and now forms the N. portion of the provinces of Alberta and Saskatchewan. The district contained Athabasca Lake, and was watered by the Peace, Slave, Athabasca, and Churchill rivers. Surface, wooded plains broken by low mountain ranges; population mostly Indians.

Athabas'cans, family of N. American Indians, comprising two large divisions, one bordering on the Eskimos in the NW., and extending from Hudson Bay to the Pacific, the other on the Mexican frontier, extending from Gulf of California to Texas, with smaller bands along the Pacific from Cook's Inlet, Alaska, to

Umpqua River, Ore. The former division includes the Tinne, or Chipewyans, Tahkali, or Carriers, Dog Ribs, Slaves, Kenaiaans, Umpquas, and other tribes; the latter, the Navajos, Apaches, and Lipans. The name Athabasca is sometimes applied to the whole stock or family of N. American Indians; it also belongs to a tribe dwelling around Athabasca Lake and along Slave River.

Athaliah (ä-tä-lē'ä), Queen of Judah; daughter of Ahab, King of Israel, and Jezebel; married Jehoram, King of Judah, whom she survived, and became a notorious idolater. After the death of her son Ahaziah, 884 B.C., usurped the royal power and murdered all the males of the royal family except Joash. In 878 B.C. was killed by the partisans of Joash. She is the subject of one of Racine's tragedies. See II Kings viii. and xi.

Athanasian (äh-ä-nä'shē-än) Creed, symbol chiefly composed of theological definitions of the doctrines of the trinity and incarnation, incorrectly ascribed to Athanasius; authoritative formulary of faith in the Roman and Greek churches, and the Church of England, but not used in the Protestant Church in the U. S.

Athana'sius, Saint, abt. 296-373; Greek Father of the Eastern Church; educated under Alexander; bishop of Alexandria, 326; was persecuted by the disciples of Arius. A synod at Tyre declared him deposed, 335, and at Jerusalem banished him to Treves, 338; recalled by Constantius, 338; and afterwards four times deposed and restored. His festival in the Greek churches is January 18th, and in the Latin Church, May 2d.

Athapas'can Indians. See ATHABASCANS.

A'theism, the denial of the existence of God, or the doctrine that there is no God. Atheism may be either speculative or practical; the former consists in denying the existence of God; the latter in living as if there were no God. The belief in a God would seem to imply a belief in his personality—that is, in his existence as a conscious being. But, according to its modern acceptation, atheism denies not merely the existence of a personal Deity, but also the presence in the universe (apart from individual intelligences) of any Principle of intelligence, or goodness. See AGNOSTICISM; SKEPTICISM.

Atheling (äh'el-Ing), title of honor among the Anglo-Saxons, applied first to the descendants of the first nobles, then to princes of the royal house, and finally (ninth and tenth centuries) only to sons and brothers of the reigning king.

Athelstan (äh'el-stän), or Æth'elstan, abt. 895-940; King of England; natural son of Edward the Elder, and grandson of Alfred the Great; began to reign, 925, and was the first actual sovereign of all England. On the death of Sihtric, King of Northumbria, Athelstan annexed that country. A league was formed against him by the Welsh, Scots, and Picts,

whom he defeated at Brunanburh, 937. He reigned over nearly all the island, except Scotland and Wales; was reputed one of the wisest of kings; and was succeeded by his brother Edmund.

Athēna, or **Pal'las Athena**, goddess of wisdom, and one of the principal divinities of Greek mythology, daughter of Jupiter, from whose head she issued in full armor; the favorite national divinity of the Athenians, whose capital was named in her honor. She presided over the sciences, inventions, arts of peace, laws, etc., and invented every kind of art or work proper to women; corresponds to the Roman *Minerva* (*q.v.*).

Athenæum (ăth-ĕ-nĕ'ŭm), in classical archæology, a school founded by Hadrian at Rome for the cultivation of Greek learning. In modern time a term used somewhat loosely for literary institutions, such as support libraries, conduct courses of lectures, etc.

Ath'ens, ancient Hellenic city and republic; about 4 m. NE. of the Saronic Gulf, in the portion of the Attic peninsula known as the plain, which forms a grand natural theater, inclosed by mountains on every side except the S., where it opens seaward. It is bounded N. by Mount Parnes, NE. by Mount Pentelicus, SE. by Mount Hymettus, and W. by Mount Ægaleos. About 1 m. NE. of the city rises Mount Lycabettus, an isolated peak (height, 900 ft.). Within the city walls were lower hills, namely, the Acropolis, with the Areopagus (Mars Hill) W. of it, and the Museum SW. The plain of Athens is watered by the Cephissus, and its tributary rivulet, Ilissus. Piræus, a rocky peninsula near the mouth of the Cephissus, had three harbors, protected by a fortified city and a citadel built on the eminence called Munychia. The walls of Athens, 6 m. in circumference, in its most prosperous period, inclosed not only the city proper, but also a long and narrow suburb which extended from the city to Piræus. A third long wall extended to the beach at Phalĕrum, some miles E. of Munychia. There were four chief divisions of the city, *viz.*: the town proper, on the Museum Hill, the citadel, occupied by the royal residence and later reserved for sacred buildings, the court and assembly grounds on Areopagus and Phyx, and the marketplace in the depression between the hills. The buildings and structures included the Parthenon and the Erechtheum, the Propylea, a grand gateway, the temples of Zeus Olympius, and of Athena Victory, the "Lantern of Demosthenes," the Tower of the Winds, the great Stoa, or courthouse, in which St. Paul addressed the Areopagus, and the theater of Dionysius.

Athens was founded by Cecrops, and was first called Cœcroplia or Cranaĕ. The name was changed to Athĕnĕs owing to the prominence acquired by the worship of Athena (*Minerva*). Theseus, the national hero of Attica, is said to have united the independent communities into which Cecrops had divided Attica, and to have made Athens the capital of the new state. The last king of Athens was Codrus (who sacrificed himself for his country), abt. 1068

B.C. The state then became an aristocratic republic or oligarchy, ruled by archons, one of whom presided over the court of the Areopagus. Solon, a descendant of Codrus, who became archon, 594 B.C., revised the constitution, drew up a code of law, abolished slavery for debt, and reclassified the citizens according to property. Pisistratus and his sons, Hippias and Hipparchus, exercised a mild despotism, 560-14. Clisthenes, 509, rendered the constitution essentially democratic. In 499 Athens aided the Ionian cities in their revolt against Persia. The Persians, invading Greece, were defeated at Marathon, 490, by the Athenians under Miltiades. In 480 Xerxes invaded Greece and destroyed Athens, but his fleet was routed and destroyed at Salamis by the Greek fleet under Themistocles. Athens now became a great maritime power and the head of an important confederacy of Greek states. Under Pericles, 469-29, Athens reached the pinnacle of her glory, by brilliant achievements in politics, literature and art. The Peloponnesian War between Athens and Sparta and her allies, 431-04, resulted in the loss of the former's army and fleet, the capture of the city, the destruction of the democracy, and the establishment of the rule of the Thirty Tyrants. In 403 Thraasybulus expelled the tyrants and reestablished Athenian democracy. The military and political power of Athens continued to decline, but her intellectual, literary and artistic supremacy did not diminish. Philip of Macedonia defeated the Athenians and Thebans at Chæronea, 338, and Greece became subject to Macedonia. In 146, Greece was reduced to a Roman province (*Achaia*), but under the Romans Athens enjoyed much prosperity and was the center of philosophy, literature and art. Having taken the part of Mithridates, the city was besieged and captured by Sulla, 85 B.C.; its walls and fortifications were destroyed and its commerce was annihilated. St. Paul visited Athens, probably about the middle of the first century, A.D., and delivered his discourse on Mars Hill. The emperor, Hadrian, in the first part of the second century, established a public library; Marcus Aurelius increased the number of the Athenian schools. About the middle of the third century the Goths descended upon Attica, but Athens, making a brave defense, suffered but little. In the fifth century the empress Eudocia promoted Christianity in Athens, and the temples received Christian names. Toward the end of the sixth century, A.D., Athens began to decline. In 1204 it became the capital of a duchy which during the fourteenth century belonged to Naples. In 1394 a Florentine became duke of Athens, and his family held this position till 1456 when it was taken by the Turks. Under Turkish rule Athens declined steadily and had a population of only 6,000 or 8,000. The Greek war of independence, 1821-29, was the cause of great destruction to the city. In 1834, it became the capital of the new kingdom of Greece, it rapidly changed and was greatly improved. The population of Athens, including Piræus, at the time of its greatest prosperity, just before the Peloponnesian War, has been estimated at 192,000.

Athens, Mod'ern, capital of Greece, nomarchy of Attica; an attractive city with broad boulevards and a fair number of handsome public buildings, most of which are in the Neapolis or modern quarter. The royal palace and park, the university (founded, 1837), and the cathedral are conspicuous landmarks. There are American, British, French, and German archaeological schools. Piræus has a government naval school. The city is connected by rail with Piræus, through which port passes about half the trade of Greece. Pop. (1906), 170,000; Piræus, 70,000.

Athens, capital of Limestone Co., Ala.; 27 m. WNW. from Huntsville. September 23, 1864, the Confederate general, Forrest, with a large body of cavalry, invested the town, held by Col. Campbell of the 110th U. S. colored troops and 600 men, and demanded its surrender, which was finally made just as reinforcements were on their way. The place was again occupied by U. S. forces, and again attacked by the Confederate general, Buford, October 2, 3, 1864, but this time the place was firmly held by Col. Slade, of the 73d Indiana, and Buford repulsed. Pop. (1909) 2,500.

Atherina (ăth-er-i'nă), genus of fishes of the family *Atherinidae*, related to the mullets; abound in both America and in Europe; on the U. S. coast are called "silversides" and "smelt" and "Pease Rey."

Atherospermaceæ (ăth-ê-rô-spêr-mă'sê), natural order of incomplete aromatic exogenous shrubs found in New Holland and S. America, remarkable for having their flowers in a cup-shaped involucre, and the peculiar anthers of *Lauraceæ*.

Athlete (ăth'lêt), plural **Athletes**, or **Athletæ**, among the ancient Greeks, a person who contended for a prize in public games as a wrestler, pugilist, or runner; a man who competed for honor or awards in contests of physical strength or agility.

Athle'tics. See SPORTS.

Athlone (ăth-lôn'), market-town of Ireland, in Westmeath and Roscommon counties; on both sides of Shannon River; 76 m. W. of Dublin; contains Athlone Castle, built in the reign of King John; now an important military position. Pop. abt. 7,000.

Athos (ăth'ôs), extreme E. peninsula of ancient Chalcidice, in the Ægean, now part of the vilayet of Salonica, European Turkey; about 30 m. long; ends in the forest-clad Mount Athos, about 6,350 ft. The remains of the canal which Xerxes is said to have cut across the isthmus are visible. Of the many mediæval hermitages and monasteries, twenty still remain, which contain old and beautiful Byzantine manuscripts. The monks number about 6,000. No female, either human or beast, is allowed in Athos.

Athrepsia (ă-thrêp'si-ă). See MARASMUS.

At'kinson, Edward, 1827-1905; American political economist; b. Brookline, Mass.; organized a fire insurance company on new principles;

invented an improved cooking-stove; conspicuous in the Anti-Imperialist League after the battle of Manila Bay, 1898; issued the pamphlets "Criminal Aggression by Whom?" "The Cost of the National Crime," and "The Hell of War and Its Penalties," which the Govt. excluded from the mails, 1899; other publications, "The Distribution of Products," "Industrial Progress of the Nation," "The Science of Nutrition," and "Taxation and Work."

Atlan'ta, capital of Georgia and of Fulton Co.; 171 m. NW. of Augusta; called "the Gate City"; is the largest city in the state, and one of the most important historically and commercially in the South; is 1,100 ft. above sea-level, at the base of the Blue Ridge Mountains and midway between the Atlantic and the Mississippi River. The city is the seat of the Georgia Institute of Technology, Agnes Scott Institute, Atlanta Baptist, Clark, and Atlanta universities, Washington Seminary, Morris Brown College, Gammon Theological, and Spelman seminaries, Atlanta and Southern Medical colleges, Southern Military and Female colleges, state capitol (cost \$1,000,000); Grant, Piedmont, and Red Wood parks, and Fort McPherson. In 1905 the manufactories had capital of \$21,631,162, and output valued at \$25,745,650. The wholesale and retail trade exceeds \$40,000,000 annually; exchanges at the clearing house, \$175,000,000; assessed property valuations, \$75,000,000. Settled, 1836, and known as Terminus and Marthasville, the city was incorporated under its present name, 1847; was a confederate manufacturing center and supply depot; besieged for forty days by Sherman, 1864; after capture was Sherman's starting point on his march to the sea; rebuilt rapidly after the war; Cotton States Exposition held here, 1881 and 1895; pop. (1906) 104,984.

Atlan'tic Cit'y, city and watering-place, in Atlantic Co., N. J.; on the Atlantic Ocean, 60 m. SE. of Philadelphia; on a sandy island, known as Absecom Beach, 10 m. long and less than 1 m. wide; at the N. extremity is Absecom Light, known to all coastwise seamen. The city has many hotels, some splendid in proportion and equipment, and scores of boarding houses, all open the year around, also a board walk along the ocean front for several miles. Pop. (1905), 37,593; in summer, over 200,000.

Atlantic O'cean, that part of the aqueous envelope of the earth which separates America from Europe and Africa. Where it adjoins other oceans its boundaries are indefinite. Usage separates it from the Arctic at the N. by lines from northern Labrador to Greenland and from Greenland to Iceland and southern Norway; and from the Southern Ocean by a line joining the extremities of America and Africa. In common parlance includes open bays, as the Bay of Biscay and the Gulf of Guinea, but not the Gulfs of St. Lawrence and Mexico, the Caribbean, Mediterranean, Black, North and Baltic seas, all of which are landlocked. With the addition of these dependencies the Atlantic has an extent of 30,000,000 sq. m., nearly one fourth the water area of

the globe; without them its area is about 27,000,000 sq. m., and its mean depth 2,220 fathoms. The length of the Atlantic from N. to S. is 7,500 m., and its average width 3,600 m. Midway it is constricted to about 1,800 m. by the approach of the E. angle of S. America to the prominence of the African coast N. of the Gulf of Guinea. The great lobes thus separated are nearly equal in area and depth, and are called the North Atlantic and South Atlantic Oceans. The deepest sounding of the Atlantic, 4,561 fathoms, was obtained a few miles N. of Porto Rico island.

Atlantides (ăt-lăn'ti-dēs), in classic mythology, the daughters of Atlas; also called Hesperides, Pleiades, and Hyades. See **HESPERIDES**.

Atlantis, according to the Greek geographers (in which some recognize a vague knowledge of America), a large island in the Atlantic, W. of the NW. coast of Africa. Its inhabitants were said to have become desperately wicked, and the island to have been swept away by a deluge. Plato, in his "Timæus," states that an Egyptian priest gave Solon a description of it.

Atlas, in Greek mythology, son of Japetus and Clymene, and brother of Epimecheus and Prometheus; defeated with the other Titans by Jupiter; condemned to support heaven on his head and hands.

Atlas, in anatomy, the first cervical vertebra; the piece of the vertebral column nearest to the skull.

Atlas Moun'tains, mountain system of Africa; mostly in Morocco and Algeria; from Cape Gher on the Atlantic to Cape Bon on the Mediterranean; divided into greater and lesser Atlas, the latter of which is nearer to the Mediterranean; highest point is in Morocco, estimated at 13,000 ft. above the sea. Mt. Miltain rises to 11,400 ft.

Atmometer (ăt-môm'ê-têr), hollow ball of porous earthenware joined to a graduated glass tube, used for measuring amount of evaporation; invented by Sir John Leslie.

At'mosphere, aëriform fluid envelope which surrounds the earth or any celestial body; composed of air (a mixture of 77 parts by weight of nitrogen, 21 of oxygen, one of argon, with variable proportions of carbonic acid, aqueous vapor, and small amounts of ammonia. To ordinary observation it seems so light as to be almost immaterial, as is evinced by the phrase "as light as air"; yet 12 cubic ft. weigh a pound. To the ordinary vision air is invisible, and therefore does not reflect light. But the light of the blue sky can be nothing but light reflected from the great mass of at-

mosphere above our heads; and the glow of the evening twilight can also arise from nothing but reflected sunlight. But dust and other impurities may play an important part in the reflection of light. See **AIR**; **ETHER**.

Atoll, low, circular reef of coral, inclosing a lagoon, which often communicates with the ocean by one or more narrow inlets. See **CORAL**.



ATOLL.

At'om, minute, indivisible particle of matter. According to one theory, matter is infinitely divisible; on the other hand, chemists maintain that all matter consists of particles which do not suffer decomposition, whatever chemical influences the matter may be subjected to. See **CHEMISTRY**; **MOLECULE**.

Atom'ic Theory. See **CHEMISTRY**.

Atomic Weights, proportions by weight in which chemical elements unite. See **CHEMISTRY**.

Atomiza'tion, in medicine, very minute subdivision of liquids for inhalation or application to the throat; first introduced in France by Sales-Girons.

Atonement (ă-tôn'mênt), derived from "at-one-ment"; in its earliest signification was synonymous with "reconciliation"; in later and present usage, with "satisfaction for an offense," or "expiation." In the authorized English version of the New Testament the word occurs once only and there means "reconciliation"; in the Old Testament it occurs fifty-eight times in the text and once in the margin, and there, in general, means expiation of sin by sacrifice.

Atrato (ă-tră'tō), river in Colombia, S. America; rises near the Cordillera, flows N. through Cauca, and after a course of 280 m. enters the Gulf of Darien by several mouths; traverses a region rich in gold, and has been suggested several times as a route for a canal between the Atlantic and Pacific.

Atrous (ă'trē-ūs), ancient king of Mycenæ; called a son of Pelops; was the father of the *Atridae*—i.e., Agamemnon and Menelaus. The story of Atrous and his family was embel-

lished by the ancient fabulists and tragic poets with many wild legends, involving horrible crimes and calamities.

Atrium (ă'trĭ-ŭm), in Roman architecture, entrance hall or living room of a private house. Here stood the lares and penates, and here the female servants were employed in weaving and other labors; also used as a waiting room for clients and other visitors. In ecclesiastical architecture, denotes an open space before a church, forming part of the narthex or ante-temple.

Atrophy (ăt'rō-fl), wasting or decrease in size of parts of the body; occurs normally at advanced age; also in the uterus after pregnancy, and in the thymus gland in early life.

Atropine (ăt'rō-pĭn), or *Atro'pia*, an alkaline principle obtained from the *Atropa belladonna*; is very poisonous; exists in all parts of the plant. A very minute portion of it has the power to dilate the pupil of the eye.

Atropos (ăt'rō-pōs), in Greek mythology, that one of the fates who cut the thread of life.

Attaché (ăt-tă-shă'), **Military** or **Na'val**, an officer detailed for duty at an embassy or legation, to keep his own government informed upon all questions relating to the militant forces and equipment of the power to which he is accredited. In the event of war such attachés are usually permitted to accompany the armies engaged and to report their observations to their own government.

Attach'ment, in law, the apprehension of a person or seizure of a thing by virtue of a writ or order issued by a court or judge under authority of law; sometimes used to denote the process itself.

Attain'der, in law, extinction of civil rights as the consequence of a judicial sentence of death for a capital crime. Its two most important consequences are forfeiture and corruption of blood. By the U. S. Constitution no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attained.

Attalea (ăt-tă'lē-ă), genus of palm trees including about 20 species, native of tropical S. America and the West Indies. Some are of economic interest—*e.g.* *A. funifera*, the Piasabe or Coquilla palm of Brazil, which yields fiber and Coquilla nuts, and *A. cohune*, the Cohune palm of Honduras, whose seeds yield a valuable oil.

Attalus I (ăt'tă-lŭs), 269-197 B.C.; King of Pergamus; succeeded Eumenes I., 241 B.C.; defeated the Gauls who had occupied Galatia; became an ally of the Romans in a war against Philip.

Attalus II, surnamed **PHILADELPHUS**, 210-138 B.C.; King of Pergamus; second son of Attalus I; succeeded his brother, Eumenes II, 159 B.C.; was a constant ally of the Romans; patronized arts and sciences.

Attalus, Flavius Priscus, Roman emperor; b. probably in Ionia; converted from paganism to Arianism; prefect of Rome when the city was captured by Alaric, 409 A.D.; proclaimed emperor by Alaric; deposed by Alaric, 410; and banished by Honorius, 416.

At'taman, or **Het'man**, title of the chiefs of the Cossacks, formerly elected by the people. After the revolt of Mazeppa the office was suppressed by the Czar of Russia until 1750. Catherine II abolished the office among the Cossacks of the Ukraine; among those of the Don it still exists, but its prerogatives have been greatly reduced. The heir-apparent of the Russian crown is principal attaman of the Cossacks.

Attar-Ferid-ed-Din (ăt-tăr'fē-rēd-ēd-dēn'), 1119-abt. 1229; Persian poet; b. near Nishapur; became one of the greatest mystics of Persia; wrote 40 poetical works.

At'tar of Ro'ses, oil or essence of *Rosa centifolia* and its varieties, *R. damascena* and *R. moschata*; prepared by distillation of the petals in Persia, India, and other Eastern countries, whence it is exported in small vials; very costly, and often adulterated; 100,000 roses, from 10,000 bushes, are said to yield but 180 gr. of attar; often called otto of roses. Bulgarian attar is reputed the best.

Atten'tion, turning of the mind toward an object or idea indicated by such expressions as "being occupied with," "concentrating upon." The two sorts of attention commonly distinguished are "reflex" or "passive," sometimes inappropriately called "spontaneous," and "voluntary," or "active"; attention being reflex when drawn without the subject's foreknowledge by an unexpected stimulation, such as a long peal of thunder, and voluntary when foreseen and intended. To these may be added "primary attention," which indicates the supposed form of attention or its organic analogue in organisms so low as to be incapable of having a life of presentation.

At'terbury, Francis, 1662-1732; English prelate; b. Buckinghamshire; early secured church preferment by his eloquence; acquired special notoriety from the discussion regarding the "Epistles of Phalaris," in which he attacked Richard Bentley; was a Jacobite in politics; zealous defender of high church doctrines; chaplain to Queen Anne, 1702, dean of Carlisle, 1704, and bishop of Rochester, 1713; convicted of participation in plot to restore the Stuarts and banished, 1723; died in Paris.

At'tic, pertaining to or characteristic of ancient Athens, or its people, etc. In architecture an attic base is a form of base employed in the Ionic and sometimes in the Corinthian order. An attic story, or, an attic, is a subordinate story introduced into the uppermost frieze or immediately below the architrave, or added above the main cornice. It is of less height than the other stories, and usually has small square, oval, or horizontally oblong windows. The attic is a feature of frequent occurrence in the Italian palaces, especially of

Rome, Vicenza, and Venice. Attic wit and Attic salt signify a poignant and delicate wit characteristic of the Athenians.

Attica (ăt'tik-ă), State of ancient Greece; bounded N. by Bœotia, E. by the Ægean Sea, SW. by the Saronic Sinus, and W. by Megaris; occupied a triangular peninsula, at the SE. extremity of which is the promontory of Sunium. A range of hills called Mount Cithæron extends along the border. About 10 m. NE. of Athens rises Mount Pentelicus, 3,884 ft., which contains quarries of superior white marble. Among the physical features of the country are Mount Hymettus, about 3,500 ft. high, and Mount Laurium, whose silver mines have attracted attention. The principal streams are the Cephissus and Ilissus, which flow SW. into the Saronic Gulf. The climate is dry and extremely pleasant. The chief productions are wheat, olives, figs, and grapes. Silver mines were worked at Laurium. Attica was advantageously situated for commerce, and was at one time the greatest maritime power of the world. The capital of Attica was Athens (Athenæ), and the inhabitants of Attica were citizens of Athens, possessing legislative and judicial rights. The ancient population is estimated at 500,000, the majority of whom were slaves. Attica and Bœotia form a department of the modern kingdom of Greece, comprising Megaris and the islands of Egina and Salamis.

Atticus (ăt'ti-kûs), d. 426; Patriarch of Constantinople; b. Sebaste, Armenia; went to Constantinople; became a presbyter; was a leader in the conspiracy against Chrysostom, patriarch of Constantinople, and testified against him in the synod. Atticus was, after some months of intrigue, elected patriarch, 406, and held that office till his death. Atticus declined for a long time to put the name of Chrysostom on the diptychs of the church.

Atticus, Titus Pomponius, 109–32 B.C.; Roman of the equestrian order; passed many years, 86–65, in Athens, to which city he rendered important services; was a friend of Cicero, whose letters to him are still extant. Having returned to Rome, 65 B.C., he declined to take part in political affairs, and distinguished himself by his moderation, generosity, and mediatorial spirit. He was on friendly terms with the leaders of both parties that divided the Romans. He wrote, beside other books, an epitome of Roman history called "Annalis," but all his works are lost.

Attila (ăt'til-ă), d. 453 A.D.; king of the Huns; succeeded his uncle, 434 A.D.; extended his dominion by conquest over Germany and Scythia, and obtained the surname of "The Scourge of God." The Vandals, Ostrogoths, and Gepidæ fought under his banner. In 447 he invaded the Roman empire of the East, and defeated Theodosius II, who, after the Huns had devastated Thrace and Macedonia, obtained peace, 448, by the payment of an annual tribute. In 451 A.D. Attila invaded Gaul with an army of 700,000 men, and besieged Orleans, which was relieved by a Roman army commanded by Ætius. Attila retired to Champagne, near the site now occupied by Chalons-

sur-Marne, where he was defeated by the combined armies of Ætius and Theodoric, king of the Visigoths, June, 451 A.D. Attila then retired into Germany. In 452 he led an army into northern Italy and threatened Rome. The Emperor Valentinian III, unable to defend his capital, invoked the mediation of Pope Leo I, who, it is said, persuaded Attila to grant a truce. He retired from Italy, and died in Pannonia on the night after his marriage with Ildico. The prisoners who dug his grave were killed so that the place of his burial might be kept secret. He was short, somewhat misshapen, with broad shoulders, a large head, flat nose, and small, deep-set and piercing eyes.

Attiwen'daronks, former tribe of N. American Indians, of the same family as the Hurons and Iroquois, on the Niagara River, chiefly in Canada. The French called them the Neutral Nation. They were much reduced in war with the Iroquois, 1651–53, and afterwards joined the Senecas and Hurons.

Attock', fortified town in the Punjab, India, on the Indus, 40 m. SE. of Peshawur; but built by Akbar to command the route by which invasions from the NW. generally entered.

Attorney, one who acts for or on behalf of another. Attorneys are of two kinds—in fact and at law. An attorney in fact is an agent, though the term is commonly applied to one who is authorized to act for another by a writing called a power of attorney. An attorney at law is one who is authorized by law to act in the place of another in the conduct of law proceedings. See BARRISTER; POWER OF ATTORNEY.

Attorney-gen'eral, law officer whose general duties, prescribed by constitution or statute, are to prosecute and defend actions on behalf of the people; to give legal advice to the chief of the state or nation; and to prepare legal instruments for use in actions.

Attraction, tendency of bodies to approach each other and unite; the force which brings bodies together and resists their separation. The principal kinds are: the attraction of gravitation; capillary attraction; chemical attraction; the attraction of cohesion, which unites the particles of a body, and operates only between two portions of matter that are in contact; and magnetic attraction. These attractions are divisible into—1, those which act at sensible and measurable distances, as gravitation and magnetic attraction; and 2, those which extend only to extremely small or insensible distances, as chemical attraction and the attraction of cohesion.

At'tucks, Crispus, d. 1770; mulatto or half-breed Indian, said by John Adams to have led the attack on the British troops resulting in the Boston massacre, in which he was killed.

At'wood's Machine, a machine invented by George Atwood, English mathematician (1746–1807), to illustrate the law of falling bodies, i.e., if it is assumed that all bodies meet with no resistance from the air, and all fall according to the same law, then their velocity

constantly increases at a rate, in N. temperate latitudes, of 32.2 ft. per second, or, the distance increases as the square of the time of the fall. Thus, if the total distance be computed it will be found that in two seconds a body falls four times as far as in one; in three seconds, nine times as far, etc. The essential part of the machine rests on a small platform



ATWOOD'S MACHINE.

supported by an upright column about 8 ft. high. It consists of a light wheel delicately supported upon large friction-wheels and carrying two equal weights suspended at the extremities of a slender and very flexible silken cord which runs in a groove upon its circumference. While these two weights continue to be equal the system remains at rest, but if an additional weight, however small, be placed upon either, this one will descend, and in descending will generate a velocity in a given time as many times less than that produced in the same time by gravity in bodies falling freely, as the added weight is less than the entire mass moved. In preparing for experiment one of the weights is loaded and raised nearly to the platform at the top of the column, where it is detained by a movable arm brought beneath it, and is held at rest at the zero of a divided scale, shown in the figure, on which the distances of descent are to be noted. A clock, supported by a bracket on the side of the column, is connected with the movable arm above mentioned by a mechanism which causes the arm to drop just as the second-hand marks zero. Sliding on the scale is a small movable brass stage, which may be placed at any point at which it is desired to arrest the fall. And there is also a ring sliding on the same scale, on which the load of the descending weight may rest, leaving the weight afterwards to descend unloaded. The clock marks the seconds with a loud tick. The moment at which the load is taken off by the ring, or at which the moving weight strikes the stage, is indicated by the sound of the contact. The law of motion is illustrated by noting the points on the scale at which coincidence takes place between these sounds and the beats of the clock.

Atypical (ā-tīp'ī-kāl) **chil'dren**, children defective physically or mentally; oftentimes abnormal because of the neglect of parents. Formerly such children were segregated in the schools they attended because they could not keep up with regular class work. Both in Europe and the U. S. special schools have been established recently for these unfortunates; manual training being a leading branch of the curriculum. The results are remarkable, and many a child thus educated is enabled to earn a good living or otherwise to become a useful citizen. See **CHILD STUDY**.

Atys (ā'tīs), in Greek mythology a priest of Cybele, who broke his vow of chastity, was punished by the goddess with madness, and attempted suicide, but was restored to his senses.

Aubanel (ō-bān-ēl'), **Joseph Marie Jean Baptiste Théodore**, 1829-86; Provençal orator and poet; b. Avignon; one of the group who have aimed to restore the Provençal tongue to its old-time literary dignity. In 1854 he was one of the seven persons who founded the Society of Felibrige, to purify and renew the degraded dialects of Provence and Catalonia; has been called the French Petrarch.

Aube (ōb), river of France; rises in Haute-Marne, flows NW. through the department of Aube, passing Clairvaux, Bar-sur-Aube, and Arcis, and after a course of 140 m. enters the Seine about 24 m. below Troyes.

Auber (ō'bār), **Daniel François Esprit**, 1782-1871; French composer; b. Caen; was a pupil of Cherubini. He produced "La Bergère Châtelaine," "Emma," "La Muette de Portici," or "Masaniello," "Fra Diavolo," "Le Domino Noir," "Haydée," and "Manon Lescaut." His works are remarkable for grace, originality, and ingenious combinations.

Aubert (ō-bār'), **Jean Louis (Abbé)**, 1731-1814; French poet and fabulist; b. Paris; edited a journal called *Les Petites Affiches*, and published, 1756, a collection of fables which gained a wide reputation; Prof. of French Literature in the Collège Royal, Paris, 1773.

Aubert du Bayet (-dū-bā-yā'), **Jean Baptiste Annibal**, 1759-97; French general; b. Louisiana; fought for the U. S. under Rochambeau; chosen, 1791, a member of the French legislative assembly, in which he supported the same principles as La Fayette; commanded at the siege of Mentz, which was taken by the Prussians, 1793; minister of war, 1795; and died while ambassador at Constantinople.

Aubigné (ō-bēn-yā'), **Merle d'**. See **MERLE D'AUBIGNÉ**.

Aubigné, **Théodore Agrippa d'**, 1550-1630; French Protestant historian and soldier; b. Saintonge; at an early age joined the Huguenot army, then waging a civil war against the court; afterwards entered the service of Henry of Navarre, and distinguished himself at Coutras, 1587. His chief work is a history of

his own times, entitled "Histoire Universelle," 1550-1601.

Auburn (a'bŭrn), capital of Cayuga Co., N. Y.; 174 m. W. of Albany; on the outlet of Owasco Lake, which supplies it with water-power; has a Presbyterian theological seminary; was long the home of Wm. H. Seward; has a large state prison (on the silent system), insane asylum, and armory. The city has manufactories of wool-carpets, iron, reapers, mowers, and binders, thrashing-machines, rope and binding twine, agricultural implements, etc. Pop. (1906) 31,422.

Aubusson, Pierre d', 1423-1503; grand-master of the order of St. John of Jerusalem; b. France; distinguished by his energy in fighting pirates, and was employed on important missions to several courts. In 1458 he formed a league between the kings of France and Hungary against the sultan, Mahomet II. He was elected grand-master of his order, 1476, and fortified Rhodes as an advanced post for the defense of Christendom against the victorious Turks. In May, 1480, Mahomet II commenced the siege of Rhodes with 100,000 men. The Turks were repulsed in several desperate assaults, in which Aubusson was severely wounded, and they were forced to abandon the enterprise in July. In 1489 he was appointed a cardinal; in 1501 chosen general-in-chief of the armies of the German emperor, the king of France, and the pope, who had formed a league against the Turks. He is regarded as one of the ablest Christian statesmen and commanders of his time.

Aubusson (ô-bŭs-sôn'), town of France; department of Creuse; on the Creuse; 22 m. SE. of Guéret; has celebrated manufactory of carpets, velvets, woolen stuffs and tapestries. Pop. (1901) 6,949.

Auchenia (a-kŕn'ä), genus of S. American animals of the order *Ruminantia* and family *Camelidæ*; includes the alpaca and the llama, and other species, all of which inhabit the mountain ranges of the Andes. They are closely allied to the camel, which they resemble in general form and in the structure of the stomach.

Auckland (âk'lând), former capital of the British colony of New Zealand; on the NE. coast of New Ulster or N. island of New Zealand; has two fine harbors and large trade. It is the see of an Anglican bishop. Pop. (1906) 37,736.

Auckland, William Eden (Lord), 1744-1814; English diplomat; b. Durham; one of the three commissioners appointed, 1778, to negotiate with the revolutionists in the U. S. Having been sent as ambassador to France, 1785, he negotiated a commercial treaty with that nation. He published "Principles of Penal Law," 1772, and other works.

Auckland Islands, group of islands of volcanic origin; discovered, 1806, by the British in the S. Pacific, abt. 180 m. S. of New Zealand; largest island is about 30 m. long and 15 m. wide, and has two good harbors.

Auction, in law, the act of exposing property for sale by open competition to the highest bidder by an auctioneer. Every bid is deemed to be an offer, which is accepted by the auctioneer when his hammer falls. On general principles the offer may be withdrawn by the bidder at any time before acceptance. The acceptance of a higher offer is the rejection of the lower one. In what is known as a Dutch auction, the auctioneer starts with a high price and comes down till he meets with a bidder.

Audæus (â'dê-ŭs), or **Audius** (in Syriac U'do), founder of a religious sect called Audians; d. abt. 370; a native of Mesopotamia; banished to Scythia, 338 A.D.; incurred the enmity of the clergy by censuring their vices. The Audians were accused of anthropomorphism.

Audiphone (â'di-fôn), a fan-shaped instrument of vulcanized rubber, for use of the deaf. It is kept in contact with the upper teeth so that sounds striking it are communicated to the ear through the teeth and skull.

Auditor, person whose duty it is to examine and pass upon the accounts of those who have been intrusted with money, or to examine a particular account and certify the result. Most public and private corporations have such officers. An auditor is appointed by courts in the course of some actions to examine and state accounts, and report them to the court for further proceedings.

Auditory Nerve, special nerve of hearing, called also the acoustic nerve. It is the eighth cranial nerve, and lies in close association with the facial nerve.

Audran (ô-drôn'), **Edmond**, 1842-1901; opera composer; b. Lyons, France; composed overtures, marches, masses, and motets, but achieved his greatest fame as a composer of light operas; his best are, "Olivette," "The Mascot," and "Gillette de Narbonne."

Audran, Gérard, 1640-1703; French engraver; b. Lyons; studied under Carlo Maratti at Rome; returned to Paris abt. 1670; appointed engraver to the king; engraved for him the masterpieces of Le Brun, "The Battles of Alexander"; two cartoons of Raphael, the "Death of Ananias" and "Paul and Barnabas at Lystra," and "Coriolanus," after Poussin. Others of the Audran family attained eminence as engravers: as Benoit (1661-1721); Claude père (1592-1677); Claude fils (1640-84); Germain (1631-1710); and Jean (1667-1756).

Audubon (âw'dŭ-bôn), **John James**, 1780-1851; American naturalist; b. near New Orleans, La.; educated partly in Paris, whither he was sent abt. 1794; studied design under David, the painter; returned to the U. S. abt. 1798, and settled on a farm in eastern Pennsylvania, where he found time for his favorite study. Abt. 1810 he began extensive excursions through the primeval forests of the southern and southwestern states, in the exploration of which he passed many years, and made colored

drawings of the birds that he found. He went to England, 1826, and commenced in London the publication of his great work, for which he obtained many subscribers at \$1,000 a copy. This work was entitled "The Birds of America," 10 vols. folio, 1830-39, and was illustrated with 448 colored plates of 1,065 species of birds, natural size. The work was pronounced by Cuvier the most magnificent monument that art ever raised to ornithology. Audubon returned to America, 1829, and again explored the forests, lakes and coasts from Canada to Florida to collect materials for his "Ornithological Biography, or an Account of the Habits of the Birds of the United States," etc., Edinburgh, 5 vols., 1831-39.

Auer (öw'ër), Alois, 1813-69; Austrian printer; b. Wels; director of the state printing establishment in Vienna, 1841; discovered spontaneous impression, or nature-printing, in photography, and invented several presses; author of "Discovery of Spontaneous Impression," issued the Lord's Prayer in 603 languages in Roman type, and the same in 200 languages with the national alphabets.

Auerbach (öw'ër-bäkkh), **Berthold**, 1812-82; German author; b. Nordstetten, Würtemberg; earliest work, "Judaism and modern Literature," but his merit was not recognized till he issued his "Village Tales of the Black Forest." Among his novels are "Edelweiss," "On the Heights," "Joseph in the Snow," and "Waldfried." "The Professor's Lady" is perhaps his most characteristic work. There can be traced in all his books the influence of Spinoza, whose works he translated into German.

Auerbach, Heinrich, 1482-1543; German physician; erected a large building in Leipsic, still known as Auerbachshof, 1530; friend of Luther, and in the latter's discussion with Eck offered him the use of his house and table. In the Auerbachshof is the cellar where Luther drank, and whence, according to tradition, Dr. Faust rode on a barrel.

Auersperg (öw'ër-spërg), **Adolph Wilhelm Daniel** (Prince), 1821-85; Austrian statesman; b. near Vienna; son of Prince Wilhelm Auersperg and brother to Prince Carlos; entered the army very early; left the service, 1870; was elected to the Bohemian diet, and president of the assembly on the resignation of Count Hartig, 1867; a member for life of the upper chamber of the Austrian reichstag, 1868; made governor of Salzburg, 1870; and succeeded Count Beust as president of the Austrian ministry, 1871.

Auerstädt (öw'ër-städt), village of Prussian Saxony, 10 m. W. of Naumburg; noted as the scene of a victory gained by the French Gen. Davoust over the Prussians, commanded by the Duke of Brunswick, October 14, 1806.

Au'fidus, ancient river in Italy, near the mouth of which was fought the battle of Cannæ, 216 B.C.

Augeas (ä'jä-äs), mythical king of Elis, said to have owned 3,000 oxen. One of the 12 labors imposed on Hercules by Eurystheus was to

cleanse in one day the Augean stables, in which the dung of these oxen had accumulated for many years. Hercules turned the river Menios or Alpheus through the stables, and killed Augeas because he refused to pay his wages, which was one tenth part of the herd.

Augereau (ö-zhër-ö), **Pierre François Charles** (Duc de Castiglione), 1757-1816; French marshal; b. Paris; enlisted as a private in the army, 1792, and gained the rank of general of division, 1796; contributed to the victories of Lodi, Castiglione, and Arcola; enforced the will of the majority of the directory in the *coup d'état* of the 18th Fructidor of the year 5 (September 4, 1797); was chosen a member of the Council of Five Hundred, 1799; marshal of France, 1804; duke of Castiglione, 1805; served with distinction at Jena, 1806; wounded at Eylau, 1807; transferred his allegiance to Louis XVIII in 1814.

Augian (ä'jä-än) **Co'dex**, defective uncial manuscript of the Pauline epistles; found in the monastery of Augia Dives or Major, at Reichenau, Lake Constance, Switzerland; purchased by Dr. Bentley, 1718, and now in Trinity College, Cambridge. It is known as F in the list of uncials of the New Testament, has the Latin Vulgate in parallel columns to the Greek, and dates from the ninth century.

Augier (ö-zhër-ä'), **Guillaume Victor Émile**, 1820-89; French dramatist; b. Valence; contributed many pieces to the French stage; first success was "La Ciguë," 1844. In 1848 his play, "L'Aventurière," after the manner of the romantic school, was acted with great success, and is still by many considered his masterpiece. In 1849 "Gabrielle" was not merely a great success upon the stage, but also obtained from the French Academy the Montyon prize because of its moral tendency. "Le Gendre de M. Poirier" is one of his best-known plays. Augier became a member of the French Academy, 1857.

Au'gite, sometimes called **Pyr'oxene**, a crystalline mineral nearly allied to hornblende. It often occurs in volcanic rocks, is composed of silica, lime, and magnesia, and is usually of a greenish color. It crystallizes in six- or eight-sided prisms variously modified, and is an essential component of basalt, dolerite, and augite porphyry.

Augsburg (äwgs'börg), ancient *Augusta Vindelicorum*; city of Germany, in Bavaria; capital of the province of Swabia and Neuburg; on the Lech, at the mouth of the Wertach, 39 m. WNW. of Munich. Augustus planted a colony here, 12 B.C. It became a free imperial city, 1276, after which it was an important commercial emporium. This city was also one of the chief centers of German art. Some decline in its prosperity occurred after 1500, but it still has an extensive trade in cotton, silk, machinery, and paper. Pop. (1900) 88,700.

Augsburg Confes'sion, first Protestant Confession of Faith; presented to Emperor Charles V at the Diet of Augsburg, June 25, 1530. When the elector, John of Saxony was summoned to the Diet, he requested the Wittenberg

theologians, Luther, Melancthon, Jonas, and Bugenhagen, to prepare a paper setting forth the complaints to be made concerning abuses in the church. This was done by them with considerable haste in the memoranda known as the Torgau Articles, from the name of the place where the last notes were made. The Articles on Abuses, prepared on the basis of the Torgau Articles, constitute about two thirds of the Confession. To this were prefixed 21 doctrinal articles. Of these the last two are based on the Torgau Articles, and the other articles principally upon the Marburg Articles, revised at Schwabach in October, 1529.

Au'gur, among the ancient Romans, a soothsayer, a diviner, one who professed to foretell events by the flight of birds or other omens. The augurs were supposed to be capable of interpreting the will of the gods. Their office was considered very important, no public enterprise being undertaken unless they declared the omens favorable. In early Roman history the number of augurs was only two, one from each of the tribes, Ramnes and Tities. Julius Cæsar appointed a 16th, but after him the number remained at 15. The augurs held office for life. See **AUSPICES**.

Au'gust, eighth month of the year, named in honor of Augustus Cæsar. Before his time it was called *Sextilis*—i.e., the sixth month, because the Roman year once began on March 1. In the calendar of Julius Cæsar the first, third, fifth, seventh, ninth, and eleventh months consisted of 31 days, and each of the other months of 30, except February, which in common years had 29, and in leap year 30 days. To gratify the vanity of Augustus, one day was taken from February and added to August.

Augus'ta, capital of Richmond Co., Ga.; on the Savannah River, 120 m. NW. of Savannah; widely known for its cotton mills, two of which cost \$1,000,000 each. In 1905 manufacturing interests had capital of \$8,101,109, and output valued at \$8,829,305; annual bank clearings exceed \$88,000,000; assessed property valuations, \$20,500,000. The city is the seat of the state medical college, Richmond Academy, Paine Institute, Louise King Home, the city and two Roman Catholic orphan asylums, Masonic and Odd Fellows halls, and U. S. arsenal; and has several parks, granite monument to Georgia signers of Declaration of Independence in City Hall Park, and confederate monument in Broad Street. Summerville, a suburb, is a winter and health resort, and has large fair grounds. Besides cotton, manufactures include fertilizers, flour, iron, lumber, ice, cottonseed oil, and tobacco; a 33-ft. head of water power is obtained from the river by a canal. Augusta was settled by English colonists under Oglethorpe; laid out under royal charter, 1735; incorporated as a city, 1817; captured by the British, 1779, and recovered by "Light Horse Harry" Lee, 1781; was for several years the state capital; and was not molested in any war. Pop. (1906) 43,125.

Augusta, capital of Maine and county seat of Kennebec Co., 63 m. NNE. of Portland; chief

part of the city is on the right bank of the Kennebec River, and many of the residences stand on ground much higher than the river. The state house is a handsome granite structure, rebuilt and enlarged in 1890. Among public institutions are a hospital for the insane, a U. S. arsenal, a national soldiers' home (in suburbs), U. S. Govt. building, and St. Catharine's school for young women. Augusta has abundant water power, employed in manufacturing of cotton goods, paper, wood pulp, and lumber. The city has the Lithgow public library, and Maine State Library. Nearly all its business portion was consumed by fire in September, 1865. Pop. (1906) 12,359.

Augus'tan Age, the reign of Augustus, first emperor of Rome, under whom Roman literature reached its highest development. Ovid, Horace, Cicero, Vergil, and Catullus, are among the famous names of this period.

Augustine (a'güs-tin), Saint, 353-430; most eminent of the Latin Fathers of the Church; b. Tagaste, Numidia; son of a pagan father and a Christian mother (Monica or Monnica), by whom he was instructed in religion. Educated at the best schools of Madaura and Carthage, he learned rhetoric, Greek, philosophy, etc. About the age of 19 he became a Manichæan, and returned to Tagaste, where he taught rhetoric and grammar. He adhered to Manichæism about nine years, during part of which he lectured on rhetoric at Carthage. He wrote at Carthage in his 27th year a treatise, "De Apto et Pulchro," not extant; appointed professor of rhetoric, Milan, 384. He was deeply interested in the Platonic philosophy, and studied the Bible from a Platonic point of view. The sermons of St. Ambrose made a deep impression on him, and he became a Christian, 387. In 388 he went back to Tagaste; was ordained presbyter at Hippo, 391; associate bishop, 395; and bishop, 396. He published abt. 397 his "Confessions," in 13 books. He was an opponent of Pelagianism, against which he wrote "On the Grace of Christ," and "On Original Sin." Semi-Pelagianism was opposed by him, 428, in two treatises on "Predestination" and on "Perseverance"; also wrote against the Donatists. He finished, abt. 426, a work, "De Civitate Dei," the greatest monument of his genius and learning. Near the end of life he wrote the "Retractationes," in which he reviewed all his own works. Other treatises are the "De Doctrina Christiana" and the "De Trinitate." He left behind him also exegetical treatises, sermons, and letters in great number.

Augustine, or **Aus'tin**, Saint, d. 607; the apostle of England and first Archbishop of Canterbury; a Benedictine connected with a monastery in Rome, when he was sent by Pope Gregory I to convert the Anglo-Saxons, 596. He was received amicably by King Ethelbert, whose wife Bertha was already a Christian. He converted Ethelbert, and is said to have baptized 10,000 of his subjects; consecrated archbishop at Arles by the Metropolitan of Arles, Vergilius.

Augustin'ian Monks, monastic order of the Roman Catholic Church; formerly divided into three classes, of which two still remain: 1. **Canons Regular**: This class originated at Avignon, 1038; so called because they were recruited from the lay and clerical canons who had not previously taken monastic vows; assumed the name and rule of Augustine, 1139; had 170 houses in England and 28 in Scotland. 2. **Hermits of St. Augustine**, one of the four mendicant orders of the Church; regard St. Augustine of Hippo as their founder; organized in their present form by Pope Alexander IV, who united a number of existing communities and placed them more strictly under the rule ascribed to St. Augustine. While not so important as formerly, the Augustinians have still more than 200 communities. 3. The **Barefooted Augustinians** originated, 1582, by command of the king of Spain, and have a very severe rule. They are nearly or quite independent of the former.

Augustinian Nuns, members of communities dating back to the company of nuns gathered at Hippo by Perpetua, the sister of Augustine. They are now of four classes: 1st, those under the guidance of Augustinian monks; 2d, those under the control of diocesan bishops; 3d, barefooted nuns; 4th, Augustines of the Interior of Mary.

Augustulus (â-gûs'tû-lûs), **Romulus**, last Roman emperor of the West; son of Orestes, a rich patrician; obtained the title of emperor, 475 A.D., and deposed by Odoacer, 476.

August'us, Latin word signifying majestic, sacred, venerable; was a name or surname conferred on Caius Julius Cæsar Octavianus by the senate, 27 B.C.

Augustus, or **Au'gust I**, 1526-86; elector of Saxony; son of Henry the Pious; b. Freiberg; succeeded his brother Maurice, 1553; an intolerant promoter of Lutheranism, and persecuted the Calvinists, but was a patron of learning, and under his administration the country made great advance; was chiefly instrumental in negotiating the peace of Augsburg, 1555; succeeded by his son, Christian I.

Augustus II of Saxony and **Augustus I** of Poland, 1690-1733; b. Dresden; second son of John George III, elector of Saxony, and Anna Sophia of Denmark; elector on death of his brother, 1694, and king of Poland, 1697, having adopted the Roman Catholic religion. He formed, abt. 1700, an alliance with Peter the Great against Charles XII of Sweden, by whom he was defeated in several battles. By a treaty signed, 1706, he renounced the crown of Poland, which Charles XII gave to Stanislas Leszczynski. In consequence of the defeat of Charles XII by the Russians in 1709, Augustus recovered the throne of Poland, and as an ally of Peter the Great warred against Sweden for several years.

Augustus III, **Frederick**, 1696-1763, King of Poland; b. Dresden; son of the preceding; joined the Roman Catholic Church; married, 1719, Maria Josephine, daughter of Joseph, Emperor of Austria; in 1733 became elector of

Saxony, and was chosen king of Poland by a party of the Diet; in 1742 he formed an alliance with Maria Theresa against Frederick the Great, who defeated the Saxons, 1745, and captured Dresden. This war was ended, 1746, but Augustus was soon involved in the Seven Years' War, which began, 1755, and was again defeated.

Augustus Cæ'sar, or simply **Augustus** (called in his youth **CAIUS OCTAVIUS**, 63 B.C.-14 A.D.; first Roman emperor; b. Velitræ; son of Caius Octavius, a senator, and Attia, niece of Julius Cæsar. At 16 he was adopted as a son by Julius Cæsar, whom he attended in his expedition to Spain, 45 B.C. He became a pupil of Apollodorus, under whom he was studying when Cæsar was killed. As heir of the dictator, he hastened to Rome to claim his inheritance. Mark Antony refused to deliver the property and papers of the late dictator. Octavius gained the favor of the senate, which gave him the command of an army, which defeated that of Antony near Mutina (Módena). The adhesion of the army to his interest enabled him to defy the senate. He marched to Rome, was elected consul in August, 43, and formed a triumvirate against Brutus, Cassius, and the senate. Antony and Octavius defeated Brutus and Cassius in the decisive battle of Philippi, 42 B.C., and to confirm their power, proscribed and massacred thousands of their opponents in Italy. Augustus then obtained control of Italy by a new division of the provinces, but dissensions soon arose between him and Antony, who had command in Asia. An open rupture was, however, postponed, and Antony married Octavia, the sister of his rival. Abt. 38 B.C. the triumvirate was renewed for another period of five years, during which Octavius and Antony were virtually masters of the Roman world. In the meantime, Antony, infatuated with Cleopatra, neglected his own interests, and by his ill-treatment of Octavia broke the only bond of union with his colleague. The contest for supreme power was decided by a naval victory which Octavius gained at Actium, 31 B.C., after which he was the sole master of the Roman empire. He was thrice married; the names of his wives were Clodia, Scribonia, and Livia Drusilla. He had an only child, Julia. His reign was remarkably pacific and prosperous, and the Augustan Age was rendered the most brilliant in the Roman literature by the genius of Vergil and Horace, whom the emperor liberally patronized. He was a prudent and popular ruler, governing men with artful policy, and using their passions and talents to promote his designs. The peace and prosperity which his subjects enjoyed under his mild tyranny reconciled them to the loss of liberty. He centralized the administration and enforced discipline in the armies. He adorned the city of Rome so that it was said he found it a city of brick and left it a city of marble. He was not happy in his domestic relations. He was temperate in his diet and moderate and frugal in his style of living. He had studied oratory with some success, but on important

occasions he would never speak without careful preparation.

Augustus Wil'liam, 1722-58; prince of Prussia; younger brother of Frederick the Great; b. Berlin; distinguished himself at Hohen-Friedberg, 1745; became a general of infantry; displayed skillful generalship at the battle of Lowositz, 1756; left a son, who became King Frederick William II.

Auk (Ak), common name of several species of sea fowl belonging to the family *Alcidae*. The auks are thickset, heavily built birds, with short wings and tail, and three-toed, webbed feet. They are found only in the colder portions of the northern hemisphere, and many breed within the Arctic Circle, migrating in winter. They are strictly aquatic,



GREAT AUK.

visiting the shore only to breed; fly rapidly, though heavily, owing to the shortness of their wings, but are expert swimmers and divers, using their wings as well as their feet when swimming under water. The most noted as well as the largest member of the family is the great auk or garefowl, *Alca impennis*, which has become extinct within the last 50 years. About 20 skeletons, 80 skins, and 70 eggs are known to be preserved in collections. Although not the rarest of birds, specimens of the great auk are very highly valued, an egg having been recently sold in London for £300.

Aulic (A'lik) Coun'cil, one of the two highest councils of the former German empire, coördinate with the imperial chamber. As organized, 1495, consisted of a president, vice-president, and 18 councilors, six of whom were Protestants, whose unanimous votes could not be overruled by the Catholic majority. The members and officers were appointed by the emperor, and had jurisdiction over all matters of feudality; all questions of appeal made by states from decisions in favor of the emperor in inferior courts. After the dissolution of the German empire, 1806, the term aulic council was applied to the emperor of Austria's council of state.

Aulis, town of ancient Greece, in Bœotia, on the Euripus; had a temple of Artemis (Di-

ana). Agamemnon here assembled the Grecian fleet before the siege of Troy, and here he offered his daughter Iphigenia as a sacrifice. Aulis was in the territory of Tanagra, and is supposed to have been about 3 m. S. of Chalcis. Its present name is Vachtli.

Aulus Gell'ius, a Latin author who lived during the reigns of the Antonines. He resided much at Athens, where, abt. 160 A.D., he composed his "Noctes Atticæ," a mass of curious information upon a variety of subjects. It is valuable to critics, because of the light it throws upon many obscure points of ancient history and literature.

Aumale (ô'mäl), **Claude II** (Duc d'), 1526-72; French general; brother of the famous Duke of Guise; fought against the Huguenots at St. Denis, 1567, and Moncontour, 1569; was one of the chief instigators of the massacre of St. Bartholomew, 1572, and was killed during the siege of La Rochelle.

Aumale, Charles de Lorraine (Duc d'), 1556-1631; French general; son of Claude; an ardent partisan of the Catholic League. After the death of his cousin, Henry, Duke of Guise, 1588, Aumale and the Duke of Mayenne were the leaders of the league, and commanded the armies that fought against Henry IV. He had ill-success as a general. Having plotted treason with the King of Spain, he was condemned to death by Parliament in 1595, but escaped.

Aumale, Henri Eugène Philippe Louis d'Orléans (Duc d'), 1822-97; fourth son of Louis Philippe, king of the French; b. Paris; entered the army, 1839, served in Algeria, and was rapidly promoted. In May, 1843, having defeated Abd-el-Kader, he became lieutenant-general of Algeria, and Abd-el-Kader surrendered to him. On learning of the abdication of his father, he resigned and went into exile, residing many years in England. He was chosen a member of the national assembly, 1871, soon after which it annulled the decree excluding the Orleans princes from France. He was elected to the French Academy, 1871; banished, 1886, but the decree was revoked, 1889; in 1886 he gave his magnificent château at Chantilly to the Institute of France, with its priceless contents, in trust for the French nation.

Aumale, formerly Albemarle'; small town of France: department of Seine-Inférieure; 13 m. ENE. of Neufchâtel. In the reign of Henry II Aumale was erected into a duchy, and the title of Duke of Aumale was given to Claude, brother of Francis, Duke of Guise.

Aune (ôn), old European cloth measure, having many values in different places, varying between 27 and 54 in. The name survives only in Switzerland, where it signifies a measure equal to four ft. in length, the foot being 30 cm. The Swiss aune is therefore about 47½ in. long.

Aura (A'râ), subtle vapor or exhalation: *A. electrica* (literally the "electrical breeze"), the sensation as of cold air experienced when

electricity is received from a sharp point; *A. epileptica*, a sensation felt by epileptic patients as of a cold fluid ascending toward the head, premonitory of a seizure; *A. hysterica*, the sensation as of cold air ascending to the head, said to occur sometimes in hysteria; *A. seminalis* or *aura seminis*, the supposed vivifying principle of the *semen virile*, formerly believed to ascend through the Fallopian tubes, thereby impregnating the ovum in the ovarium; *A. vitalis*, a name for the principle of life.

Anrangzebe (ō-rāng-zēb'). See AURUNGZEBE.

Aurelian (ā-rē'lī-ān), **Claudius Lucius Valerius Domitius**, 214–275; Roman emperor; b. Sirmium, Pannonia, or, some say, lower Dacia; of humble origin, but distinguished himself in the army, rising to the highest rank. On the death of Claudius, 270, Aurelian was elected emperor by the army. Early in his reign the empire was invaded by the Alemanni, whom he defeated. He then vanquished and captured Zenobia, Queen of Palmyra, 273; received at Rome a triumph of extraordinary magnificence; recovered Gaul from Tetricus; and, after obtaining the title of restorer of the empire, was assassinated by one of his officers.

Aurelius Antoninus, Marcus. See ANTONINUS, MARCUS AURELIUS.

Aurelius Victor, Sextus, Roman historian who flourished abt. 360, under the Emperor Constantian and his successors; made prefect of Pannonia Secunda by Julian, abt. 360, and was prefect of Rome under Theodosius I; wrote biographies of the Roman emperors from Augustus to Constantian, entitled "De Cæsari-bus Historia," which are extant.

Aurelle de Paladines (ō-rē'l' dēh pā-lā-dēn'), **Claude Michel Louis d'**, 1804–77; French general; b. Malzieu; received a military education; served in Algeria, 1841–48; distinguished himself and was made a general of division in the Crimean War; was commander-in-chief of the first army of the Loire in Franco-German War. At Coulmiers, November 9, 1870, he defeated Von der Thann, and compelled the Germans to retire from Orléans; but his attack at Beaune-la-Rolande failed; on December 2 he was defeated at Artenay. Gambetta, instituting an inquiry into his conduct, D'Aurelle resigned his command.

Aureus (ā-rē-ūs), or **Dena'rius Aureus**, standard and most ancient Roman gold coin, first struck, 217 B.C., value \$5.10. The average weight of the aureus was about 121 gr.—about the same as the Greek *stater* and the Persian *daric*.

Auricles, of the heart, those cavities which receive the blood returning from the veins, and convey it to the ventricles. See HEART.

Auricula (ā-rik'ū-lā), plant of the family *Primulaceæ*, nearly related to the primrose, and much cultivated in flower gardens; is a native of the Alps and other mountains of Eu-

rope and Asia; prized for the beauty and fragrance of its flowers, which grow in the form of an umbel on a scape. The size and color of the flowers have been much improved by cultivation.

Auricula, genus of *Auriculidæ*, a family of *Mollusca* of the class *Gasteropoda*; have a spiral shell covered with a horny epidermis; chiefly found in and near warm seas. Several species are fossil.

Auricular Confes'sion, private confession of sins to a priest. The practice is held by Roman Catholic writers to come from apostolic times. Origen says, "If we reveal our sins not only to God, but also to those who can heal our sins and our wounds, our sins will be blotted out by Him," etc. St. Basil's words, "It is necessary to confess our sins to those who are intrusted with the dispensation of God's mysteries," are definite and direct. In the English prayer book a rubric directs that "the sick person be moved to make a special confession of his sins, if he feels his conscience troubled with any weighty matter. After which confession the priest shall absolve him (if he humbly and heartily desire it) after this sort," etc. Confession, thus understood, is only a part of the sacrament of penance. Roman Catholics and the Eastern churches hold that confession is of divine institution, and therefore imposed by Church authority in the fourth Lateran Council (1215 A.D.), and that it was practiced from the very beginning of Christianity. Confession must (1) be entire, (2) humble and sincere, and (3) accompanied by supernatural sorrow for sin, and a firm purpose of amendment. The seal of the confessional, or *stigillum confessionis*, means the obligation of a confessor or priest not to divulge the secrets of the confessional. A violation of this law by a priest would make him subject to the severest ecclesiastical penalties. Most Protestants assert that such confession is not enjoined in the New Testament.

Aurifaber (ow'ri-fā-bēr), **Johann**, 1519–75; one of Luther's companions; b. Weimar; studied theology in Wittenberg, 1537–40; tutor to the young count of Mansfeld, 1540–44; amanuensis to Luther in Wittenberg, 1545, and was with him when he died; acted as army chaplain during the Schmalkald war, 1547; court chaplain at Weimar, 1551; deposed as a Flacianist, 1561; fled to Eisleben; became minister at Erfurt, 1566, where he died; edited the German writings of Luther and his "Epistolæ" and "Table Talk."

Auriga (ā-ri'gā), in astronomy, a N. constellation sometimes called, "the Wagoner," contains Capella, a star of the first magnitude, which may be seen near the zenith in winter.

Aurispa (ā-rēs'pā), **Giovanni**, 1370–1459; celebrated humanist and itinerant teacher, Venice, Bologna, Florence, Ferrara; arrived in Venice from Constantinople, 1423, taking with him 238 MSS., including the works of Plato, Lucien, Demosthenes, Dio Cassius, Arian, Diodorus, Strabo, Æschylus, Sophocles, Apollonius, Rhodius, Callimachus, Pindar, and many

others, nearly all of these authors having been till then lost to western Europe.

Aurochs (A'róks), common name for the European bison, *Bison bonassus*; once found in great numbers in many parts of Europe, it is now limited to the forests of Lithuania and the Caucasus. It bears many points of simi-



AUROCHS.

ilarity to the American bison. It is a very powerful animal, being somewhat larger than an ordinary ox, and, though clumsy in appearance, can run rapidly for a short distance. The body exhales a strong odor, somewhat resembling musk. The aurochs is a good swimmer, and delights in dabbling in the water and rolling in the mud. See BISON; BUFFALO.

Auro'ra, Latin "morning," or the "goddess of morning," the daughter of Hyperion, the wife of the Titan Astræus, the mother of Hesperus, Boreas, Zephyrus, and Memnon. According to Greek mythology she adopted the habit of carrying off young men distinguished for their beauty, such as Orion, Cleitus, and others, till Zeus became angry and put a stop to that practice; sometimes represented as dressed in a saffron-colored robe, with a torch in her right hand.

Aurora, luminous phenomenon common in certain regions surrounding the magnetic and geographical poles of the earth. In the northern hemisphere it is called the aurora borealis or northern lights, and in the southern hemisphere the aurora australis or southern lights. It is intimately associated with the electro-magnetic system of the earth, both as to its origin and visibility, although the causes and conditions of its intermittent manifestations are not yet fully understood. The most probable explanation is that the solar radiations possess electro-magnetic energy, which at the earth is distributed into two principal fields, one passing through the earth in a direction nearly parallel to the line joining the two magnetic poles, and the other nearly parallel to the plane of the ecliptic, the former acting by the law of magnetic induction, and the other by the law of magnetic refraction. The first field is peculiar to the polar regions, embracing the magnetic and the geographical poles, and the second is characteristic of the middle latitudes. Besides these fields there is the normal terrestrial magnetic field surrounding the earth, in which a freely suspended magnet comes to rest in definite positions according to the locality. There is an oval belt where these three fields come together,

and overlapping each other produce an interference of vibrations which gives rise to the auroral luminosity. The light is apparently electrical, shooting out in long, thin streamers, which flash and quiver, though sometimes these become diffused and continuous over large spaces, here and there traversed by lines in certain directions, controlled by the magnetic fields.

Aurora, city in Kane Co., Ill., on Fox River, 39 m. WSW. of Chicago. Besides locomotive works and shops, Aurora has many manufacturing industries, including iron works, silver-plated ware, wood-working machinery, smelting, etc. Pop. (1906) 28,823.

Aurangábád (á-rún-gá'bád), "abode of Aurungzebe," city of Hindustan; in the territory of the Nizam; 68 m. NE. of Ahmदनagar; was a favorite residence of Aurungzebe. Among its monuments are a ruined palace, and a mausoleum with domes of white marble erected by the emperor to the memory of his daughter. Many of the mosques and other public buildings are substantial, but decaying. Pop. (1901) 26,165.

Aurangzebe (á-rúng-zéb'), or **Aurangzebe'**, "ornament of the throne," afterwards called **ALUMGEER**, or **ALAMGIR**, "conqueror of the world," Mogul emperor of Hindustan; a younger son of Shah Jehán, who ceased to reign, 1657. The elder sons, Dara and Shuja, contended for the crown in battle, while Aurungzebe affected indifference to temporal power, but procured the assassination of Dara and Shuja; became master of the empire, 1658, and detained his father in prison till his death, 1666. He persecuted the Hindus and provoked the Maharrattas to revolt; added Bejapur and Golconda to his empire; and was one of the most powerful of the Mohammedan monarchs of India.

Auscultation (ás-kül-tá'shün), the method of determining the condition of the heart and lungs by the sounds heard on applying the ear to the chest walls, introduced by Laennec early in the nineteenth century. Some few observations had been made before his time, but it is to Laennec and to his application of a hollow tube or stethoscope that we are indebted for the accuracy of auscultation. The diagnosis of pulmonary and cardiac diseases now rests very largely on auscultation, and by this method much has been learned of the successive stages of various diseases, their progress, etc.

Ausones (á'só-néz), one of the most ancient tribes of Italy, according to Niebuhr, of Osca race. From them southern Italy, later known as Magna Græcia, was called Ausonia.

Ausonius (á-só'ní-ús), **Decimus Magnus**, abt. 310-394; Latin poet; b. Burdigala (Bordeaux); Prof. of Rhetoric there; tutor of Gratian; successively count of the empire, quæstor, governor of Gaul, Lybia, and Latium, and consul. He was converted to Christianity; and wrote epigrams, epistles, idyllia, etc.

Auspices (á'spí-cés), among the ancient Romans, divinations founded on the flight of

birds or other omens, by which the augurs or soothsayers professed that they could ascertain the will of the gods and predict events. No important enterprise or business was undertaken without consulting the auspices. In performing this ceremony the augur with a wand marked out a portion of the sky for his observations, which portion, called a *templum*, was divided into right and left. If the birds appeared on the right hand, the omen was favorable; if they flew toward the left (*ad sinistram*), it was unfavorable. See AUGUR.

Aus'ten, Jane, 1775-1817; English novelist; b. Steventon; published anonymously "Sense and Sensibility," "Pride and Prejudice," "Mansfield Park," "Emma," and other works, mainly dealing with the ordinary life of the middle classes of England. Many consider them the best novels ever written by a woman.

Aus'terlitz, small town in Moravia, on the Littawa, 12 m. E. of Brünn, where Napoleon won a brilliant victory over the united Austrian and Russian armies, December 2, 1805, compelling the peace of Presburg. Emperors Francis and Alexander were both present. The allies lost in killed, wounded, and prisoners about 30,000; the French about 12,000.

Aus'tin, Alfred, b. 1835-; English poet; b. near Leeds; studied law, but applied himself to literature; editor *National Review*, 1883-93; appointed poet laureate, 1896; author of numerous political works, novels, and volumes of verse.

Austin, Saint. See AUGUSTINE, SAINT.

Austin, Stephen Fuller, 1793-1836; American pioneer; b. Austinville, Va.; son of Moses Austin, founder of the state of Texas, who abt. 1820 received a land grant and permission from the Mexican Govt. to establish an American colony in the province of Texas. The father dying before his project was completed, Stephen took it up and located a colony on the site of the present city of Austin, 1821.

Austin, capital of Texas and of Travis Co.; on the Colorado, here spanned by two bridges; 250 m. NW. of Galveston; originally built on a plateau in the bend of the river, but now extends back from the original front about 2 m. and along the river about $2\frac{1}{2}$ m. The dam, 1,200 ft. long, 60 ft. high, and 60 ft. thick at base, across the Colorado River at a point 2 m. above the city, furnishing 14,500 horse power, was carried away April 7, 1900, during a flood, and caused great losses to life and property. The city is intersected by two central avenues 120 ft. wide, extending from the capitol grounds to the original city limits, which are bounded E. and W. by avenues 200 ft. wide. Most of the other streets are 80 ft. wide, and none is less than 60 ft. The chief public buildings are the capitol, U. S. Govt. building, general land office, and graded-school building, asylums, and the governor's mansion. The State Univ. is on College Hill, in the northern part of the city. Austin became the capital of the republic of Texas, 1839; and in 1872 the capital of the state. Pop. (1900) 22,258.

Australasia (As'trāl-ā'sh-i-ā), "southern Asia"; the islands of the S. Pacific, with Australia. It includes (1) Australia and Tasmania, area, 2,972,906 sq. m., pop, 3,771,715; (2) New Guinea group, area, 313,000 sq. m., pop. 837,000; (3) New Zealand group, area, 104,000 sq. m., pop. 620,000; (4) Melanesia, including the Bismarck archipelago, Solomon islands, New Caledonia, Fiji, and others, area, 57,000 sq. m., pop. 642,000. The total land area is abt. 3,531,000 sq. m., and pop., 5,429,000, consisting in part of a brown Polynesian race, in part of black Papuans and Australians, in part of European immigrants and some Malays. Great Britain claims all of (1) and (3), about one third of (2), and about one fifth of (4). The remainder is divided among the Germans, Dutch, and French, very little of the area being now without at least a nominal protector.

Austra'lia, formerly New Holland, largest island on the globe, sometimes reckoned as a continent; lies between the Indian and Pacific oceans, SE. of Asia; greatest length 2,500 m., greatest breadth N. to S. 1,900 m. The few mountain ranges are of insignificant height, the Australian Alps, Grampians, etc., rising to an average of 1,500 ft. only, though there are occasional summits in the SE. of near 7,000 ft. The vast plain lying between the coast ranges is a lowland surrounded by plateaus of sandstone formation, 1,000 to 3,000 ft. The principal river, the Murray, 1,100 m. long, is navigable in the interior; the Victoria runs in a deep channel between cliffs 300 ft. high. Other rivers are the Glenelf, Prince Regent, Brisbane, Richmond, Clarence, Swan, etc. In southeastern Australia, extending from the lake district on the W. to the mountains on the E., and from the coast far into the interior, is a vast region of grassy highlands, with scattered thin forests of magnificent trees. This district, drained by the Murray and its tributaries, has great areas of remarkable fertility. In ordinary seasons these tracts furnish sustenance to great numbers of sheep, cattle, and horses. The W. half of the S. coast is low and sandy, the W. coast is skirted by detached mountain ranges, with intervening fertile valleys, and the coast is in many parts low and swampy. The climate in general, is warm, dry, and very salubrious. Southern Australia gets little rain, while Victoria, New South Wales and parts of Queensland have from 32 to 44 in. annually. In the tropical regions there are but two seasons, the wet and the dry. Here the seasons of America and Europe are reversed, January and February being the hottest months of summer, and July the coldest of winter. The part of Australia lying in the tropical region has forest products of great luxuriance, while the highlands, almost bare of trees, abound in pasture grass and herbaceous vegetation. None of the cereals, and few of the esculent fruits or roots are natives of the soil. There are found the kangaroo, opossum, flying squirrel, bear, wild dog, duck-billed platypus, peculiar to Australia, black swan, emu, lyre-bird, etc. Food-fish abound. Large coal fields exist, also profitable gold, copper, iron, and lead mines. Wool is

a great staple of Australia. Cotton, wheat, sugar, and tobacco are produced, and the grape flourishes. Aggregate annual exports exceed \$287,000,000, imports, \$185,000,000; chief exports, wheat, wool, gold, copper, silver ore and lead, tin, timber, butter, coal.

The aborigines, abt. 31,000 in number, though similar to the Africans in thick lips, flat noses, etc., are lighter in color, and have straight or curly black hair. Their intelligence is of a low order; they build only hovels; their peculiar weapon is the boomerang. Australia was first discovered by the Dutch and Spaniards, 1601-06. Capt. Cook, 1770, explored the E. coast, and took possession of the country for the British. In 1788 the first settlement of New South Wales began, Botany Bay following as a penal colony of Great Britain. Western Australia was set apart, 1829, Southern Australia, 1834, Victoria, 1851, and Queensland, 1859. A federal council was established, 1883. A bill for the federation of the colonies was passed, May 15, 1900; and the Earl of Hopetoun appointed the first governor of the commonwealth of Australia, which dates from January 1, 1901. The constitution provides for a federal parliament consisting of a governor-general, appointed by the sovereign, and a senate and a house of representatives elected by the people. The judicial power is vested in the high court of Australia and minor federal courts. A uniform postal and telegraph service, government control of the railways, national defense, and a common tariff are provided for. The several state parliaments retain legislative authority in all matters which are not transferred to the federal parliament. The principal ports of the states are protected by fortifications. The military forces of the states aggregate 84,287. Australia is divided as follows:

Original States.	Sq. Miles.	Pop. (1906).
New South Wales.....	310,372	1,526,697
Victoria.....	87,884	1,231,940
Queensland.....	670,500	535,113
South Australia.....	903,690	383,829
Western Australia.....	975,920	281,746
Tasmania.....	26,215	180,156
Total.....	2,974,581	4,119,481

A site for the permanent capital has been chosen at Dalgety, New South Wales; in the meantime the government has its seat at Melbourne.

Australian Ballot Sys'tem. See **BALLOT.**

Australia, E. dominions of the Franks under the Merovingians; made a kingdom by Clovis, 511 A.D., comprising the present Lorraine, Belgium, and adjacent territory; merged in the empire of Charlemagne.

Austria, archduchy and nucleus around which the Austrian empire has grown; area, 12,285 sq. m.; bounded N. by Bohemia and Moravia, E. by Hungary, S. by Styria, and W. by Bavaria; comprises the crown lands of upper and lower Austria. Pop. of upper Austria (1900) 3,100,493; lower Austria, 810,246. Both provinces are mountainous, abound in beautiful scenery, and are drained by the Danube.

Austria-Hungary, empire in the SE. part of central Europe, consisting of two states, the Austrian empire and the Hungarian kingdom; between lat. 42 and 51 N.; bounded by Italy, Switzerland, Bavaria, Saxony, Prussia, Russia, Roumania, Serbia, Turkey, Montenegro, and the Adriatic Sea; area, including Bosnia-Herzegovina, 261,035 sq. m.; pop. (1902) 47,142,267.

The present constitution of Austria-Hungary, adopted, 1867, recognizes the existence of two states, united politically under one crown, but for local purposes quite independent. Those parts of the government associated with the prerogatives of monarchy are common to Austria and Hungary. These include (1) foreign affairs; (2) military and naval affairs; (3) finance; (4) defense; (5) coinage. The headship of the common monarchy is hereditary in the Hapsburg-Lothringen dynasty, the official title being "Emperor of Austria, King of Bohemia, and Apostolic King of Hungary." The monarch (who must be a member of the Roman Catholic Church), exercises legislative authority, with the cooperation and consent of the representative bodies. These are the imperial parliament (the reichstag and the reichsrath) and the provincial parliaments. The two bodies of the imperial parliament, known as the delegations, consist each of 60 delegates, 20 having been chosen from each of the upper houses of the Austrian and the Hungarian parliaments, and 40 from the lower. The Austrian and Hungarian delegates legislate separately, communicating with each other in writing; but in case of disagreement, after three such interchanges, all come together and vote without discussion. The meetings are held annually and alternately at Vienna and Budapest. The ministry is responsible to the delegations.

Bosnia and Herzegovina have been under the administration of Austria-Hungary since 1878. In 1908 they were annexed by Austria, in violation, as was claimed, of the Berlin Treaty. Austria in 1909 offered Turkey \$10,800,000 as indemnity for the annexation, and the offer was accepted by Turkey. Besides the political connection between Austria and Hungary, a commercial union exists, which is not permanent, but renewable every ten years. It is prolonged provisionally, but in 1906 was bitterly opposed by Hungary, which country obtained a formal recognition of her economic independence. Each state pays a proportional part of the cost of the administration of common affairs. The estimated revenue for Austria, 1905, was \$370,396,125; expenditure, \$370,068,050; for Hungary, \$225,286,850, \$223,719,610; value imports, \$448,560,000; exports, \$451,685,000; public debt of Austria (1904) \$1,913,699,350; Hungary, \$1,098,395,000. Fiume and Trieste are the ports of entry. The peace footing of the army, 1905, was 318,347; the war footing, 2,580,000. Austria-Hungary is a member of the Triple Alliance.

Austria (Cisleithania, i.e., the country this side of the Leitha, a river forming part of the boundary between it and Hungary), area, not including Bosnia and Herzegovina, 115,903 sq. m.; pop. (1902) 26,150,708; capital Vienna.

The Alps extend over the SW. portion; the Carpathians form the boundary between Galicia and Hungary; principal rivers, Danube, Elbe, Drave, Mur, Dniester, Moldau, San, March; mineral products include ores of iron, silver, copper, lead, brown-coal, quicksilver, zinc; chief industries, agriculture, raising of live stock, mining and manufacturing. The leading religions are the Roman and Greek Catholic. The educational organization consists of elementary schools, *gymnasias* and *real* schools; colleges and universities; technical schools; schools for special subjects. The parliament of Austria consists of an upper and a lower house. The upper house is made up of imperial princes, nobles possessing large estates, archbishops and bishops, and of men distinguished in art or science, appointed for life by the emperor. The lower house consists of 425 members, elected, in part directly, by vote of citizens over twenty-four years of age and possessing a small property. The provincial diets legislate in all matters not expressly reserved for the reichsrath or parliament. Austria became a margraviate, 799; a duchy, 1156; an archduchy, 1453; came under the rule of the Hapsburgs, the present ruling dynasty, 1282. Chiefly by marriages, its dominion was increased, and its princes secured election to the imperial throne of Germany. In the Thirty Years' War, the War of the Spanish Succession, and the Seven Years' War, the country played a leading part. Francis I proclaimed himself hereditary emperor, 1804, but renounced the crown, 1806, and thereby practically dissolved the old empire. In the new German empire, Austria became entitled to the presidency of the diet, and acquired a predominant influence. In consequence of the war with Prussia, 1866, the dominant influence and authority passed to the former country, and Austria was excluded from the German confederation. A new constitution was adopted, 1867, and the emperor was crowned King of Hungary. The population is made up of many distinct races. Of these the Germans number a little more than 9,000,000; Bohemians, Moravians, and Slovaks, 5,955,400; Poles, 4,252,500; Ruthenians, 3,381,600; Slovenes, 1,192,800. About two thirds of all the people profess the Roman Catholic religion. The Greek Catholics number about one tenth of the entire population.

Hungary (Transleithania), area, 125,430 sq. m.; pop. (1902) 19,254,559; capital Budapest; country in its chief parts a large basin surrounded almost entirely by mountains, the Carpathians encircling the N.; chief river, the Danube, with many affluents; mineral productions largely those of Austria; agriculture, silk and bee culture, mining and manufacturing; leading religious bodies, Roman Catholic, Greek Oriental, Greek Catholic, Evangelical; public education comprises grades similar to those of Austria. The legislative power is vested in a parliament (summoned annually by the king, at Budapest) consisting of an upper and a lower house; former comprises hereditary peers, ecclesiastical dignitaries of the Roman Catholic, Greek, and Protestant churches, life peers appointed by the crown, life peers elected, once for all, by the upper house, state

dignitaries and high judges, and delegates from Croatia-Slavonia. The lower house is composed of members elected by open voting and limited suffrage. Croatia and Slavonia have autonomy for home affairs, public instruction and justice.

Aus'trian Succes'sion, War of. See **SUCCESSION WARS.**

Autochthones (a-tōk'thō-nēz), literally those sprung from the land itself; the original inhabitants of a country. The Athenians made this claim, and wore on their headdress an emblematic grasshopper, in reference to their origin.

Auto-de-Fé (a-tō-dā-fā'), Spanish, "act of faith"; name given in Spain and Portugal originally to the public announcement of the sentence passed by the Inquisition against heresy; later, the execution of that sentence by burning at the stake. High church days by preference were chosen for the deed. The first to take place was in Seville, 1481; last, probably, in Mexico, 1815.

Au'tograph, a manuscript, usually a signature, written by the person himself; an original manuscript as distinguished from a copy. Some people study autographs as exponents of the character or temperament of the writers.

Autom'aton, plural **Autom'ata**, a piece of mechanism so constructed as to imitate the actions of an animal. Dædalus was among the first who excelled in this art. Archytas of Tarentum, who lived abt. 400 B.C., is said to have made a dove that could fly. Among the most wonderful automata of modern times was the flute-player which Vaucanson exhibited in Paris, 1738. This had the form of a man and performed with its fingers.

Automobiles (a-tō-mō-bēl'), or **Motor Vehicles**, vehicles propelled by steam, gasoline, petroleum, or electricity. The first work in this line was by a Frenchman, Cugnot, 1700, who constructed an operative though crude steam carriage for heavy draught service. This is preserved in the Conservatoire des Arts et Métiers, Paris. A steam carriage was constructed in Halifax, England, by Robert Fourness, 1788, and Nathan Reed, of Massachusetts, constructed and operated one in the same year. In 1803 Jean Richard Trevithick built a steam carriage and ran it on the highway in London. The principle of the gas engine was understood as early as 1794, when a patent on this form of motor was granted to Robert Street in England; but not until the improvements by Dr. Otto, of Germany, 1867, did steam have any competitor as a motive power. Then the ability to construct a practical and reliable explosion engine, and the feasibility of substituting hydrocarbon oils for gas and carrying condensed fuel, such as naphtha, seemed to solve the question of an automatic vehicle motor.

Among the first to construct a practical vehicle was Gottlieb Daimler, of the Otto Gas-Engine Works, Cologne, Germany. Contemporaneous with Daimler many experimenters appeared in France, England, and the U. S. The first public demonstration was a contest



TRUCK.



OBSERVATION CAR.



LIMOUSINE CAR.



TOURING CAR.



RACING CAR.



FIRE APPARATUS.



AMBULANCE.



OMNIBUS.

of "automobile vehicles" in Paris, 1894. It consisted of a trial of speed from Paris to Rouen and back. Two of the vehicles were propelled by steam and 13 in various ways by the exploding of gasoline or naphtha. The winner was a vehicle propelled by a Daimler gasoline motor, which covered the 75 m. of the course in 5 hours and 40 minutes. In 1895, in a race from Paris to Bordeaux and return (705 m.) 12 vehicles competed. The winner (48 hours, 48 minutes) was a vehicle propelled by a Daimler gasoline explosion motor. In these contests vehicles propelled by electric storage batteries appeared, but in every case failed to make any important showing. In 1895, a contest for motorcycles was held in the U. S. The route was from Chicago to Evans-ton, Ill., and return (54 m.). Six vehicles competed, four gasoline and two electric, and of these but two finished, both gasoline. The winner made the course in 10 hours, 23 minutes.

From this time, contests and races followed with frequency, including the London "Engineer" contest of 1896, to celebrate the modification of the odious English road laws; a race from Paris to Marseilles and return; a trial of heavy vehicles in Liverpool, 1898; and a contest of passenger-carrying cabs in Paris, 1898, on the results of which was based the decision to transform the entire Paris cab service from horse-drawn vehicles to electric automobiles. In 1906, in Florida, a Stanley steam car and a 200-horse power Darracq both covered 2 m. within a minute, the patrol-car's record being 58½ seconds. The steam car made 1 m. in 28½ seconds, equal to 127 m. per hour. In the same year a 100-horse power Darracq won the Vanderbilt cup race in America, its time for the 297 m. being 4 hours, 50 minutes, 10½ seconds. A new record was made in 1908, when, in a 400-mile race at Savannah, Ga., a 120-horse power Fiat maintained an average speed of 65.1 m. an hour. London, New York, and other cities have large electric-cab and electric-omnibus stations, and electric and patrol engines are extensively used for commercial vehicles, where heavy loads are concerned. Steam, however, is still used to some extent in England, both for carriages and for vehicles for heavy traffic.

Auton'omy, power or right of self-government; political independence; term used to designate the characteristic of the political condition of ancient Greece, in which nearly every city was a separate state, and very tenacious of its independence and sovereignty.

Au'toplasty, operation by which lesions are repaired by means of healthy parts taken from the patient himself and made to supply the deficiency caused by wounds or disease; the commonest form is skin grafting.

Au'topsy. See POST MORTEM EXAMINATION.

Autrefois Acquit (ô'trê-fwâ ä-kê'), French, formerly acquitted; plea by a person indicted that he has previously been tried for the same offense and acquitted. These pleas, if true, are a bar to the action by the rules of the common law. They are in the U. S. established

as constitutional rights, both by the federal constitution and those of the states. The constitutional provision is that no person shall be subject for the same offense to be put twice in jeopardy of life or limb. This rule does not apply where a new trial is ordered for errors in a previous trial, nor where the judge discharges the jury, so that there is no acquittal nor conviction.

Au'tumn, season of the year which follows summer, sometimes, especially in the U. S., called fall, in reference to the fall of the leaves; in a popular sense comprises September, October, and November; in the language of astronomy, the time which elapses between the autumnal equinox and the winter solstice. In the southern hemisphere, March, April, and May are the months of autumn.

Autun (ô-tün'), city of Saône-et-Loire, France, on the river Arroux; 26 m. NW. of Chalons-sur-Saône; has a Gothic cathedral, college, library, museums, and Roman antiquities; also manufactures of cloth, paper, and carpets.

Auvergne (ô-vârñ'), Latour d'. See LATOUR D'AUVERGNE.

Auvergne, former province in central part of France; coincided nearly with present departments of Cantal and Puy-de-Dôme; chief towns, Clermont and Aurillac.

Auvergne Moun'tains, branch of the Cevennes, in the French departments of Cantal and Puy-de-Dôme; separate the basins of the Allier, Cher, and Creuse from those of the Lot and Dordogne; highest summit, Mont d'Or, 6,188 ft.

Auxanometer (äks-ä-nöm'ë-tër), instrument for measuring the rate of growth of plants.

Auxerre (ô-sâr'), town of France; capital of department of Yonne; 93 m. SSE. of Paris; has a fine Gothic cathedral, college, museum, and public library. Manufacturers of calico, serge, hosiery, and wine. Pop. (1901) 16,291.

Ava (ä'vä), former capital of Burma; on the Irawadi River. In 1853 the capital was transferred to Mandalay. The city is adorned with numerous temples with gilded spires, and has large monasteries; at one time contained 50,000 inhabitants or more. Pop. abt. 7,000.

Ava, or **Ka'va**, narcotic plant of the natural order *Piperaceæ*; a native of many South Sea islands, the inhabitants of which intoxicate themselves with a fermented liquor prepared from its root.

Avalanche (ä'vä-länçh), mass of snow or ice sliding or rolling down a steep slope; name sometimes applied, rather figuratively, to sliding masses of rock. Avalanches abound on the steep upper slopes of all mountains reaching above the snow line, and are important feeders of glaciers.

Avari (ä-vä'rë), or **A'vars**, warlike tribe of Mongolians that entered the countries near the Don, the Caspian Sea, the Volga. Part of them remained near the Caucasus, and another part

proceeded abt. 555 A.D. to Dacia. Obtained Pannonia, 568; oppressed the Slavi, and made inroads into Germany and Italy; defeated by Charlemagne, 769, and nearly exterminated.

Avatar (ä-vä-tär'), or **Avatar'a**, in Hindoo mythology signifies descent or transformation, and is applied to incarnations, especially Brahma, Siva, and Vishnu. The avatars of Vishnu, which are particularly celebrated are reckoned as follows: 1, Matsya, the fish; 2, Kūrma, the tortoise; 3, Varāha, the boar; 4, Nara-singha, the man-lion; 5, Vāmana (or Wāmana), the dwarf; 6, Parasurāma (called in the common dialect Pūrasoorām); 7, Rāma Chandra; 8, Krishna; 9, Buddha; 10, yet to come, is called Kalki, the horse.

Avatcha (ä-vät'kä), or **Avatch'ka**, bay in the SE. part of Kamtchatka; has the best and most extensive harbor of the peninsula. The capital, Petropaulovski, is on this bay.

Avebury (ä'bér-ī), **Sir John Lubbock** (fourth baronet and first baron of, created 1900), 1834—; British scientist; b. London; son of Sir John W. Lubbock, third baronet; entered his father's banking house, 1848; partner, 1856; elected to parliament, 1870; represented London University there, 1880-1900; member of numerous government commissions and member and officer of many scientific associations; author of many works in archaeology, natural history, and political history, including "Prehistoric Times," "Origin of Civilization," "Origin and Metamorphoses of Insects," "British Wild Flowers in their Relation to Insects," "Pleasures of Life," "Fifty Years of Science," and "The Beauties of Nature."

Avebury, or **A'biry**, village of England, in Wiltshire, 25 m. N. of Salisbury; site of extensive remains of the prehistoric period. The principal relics, formerly ascribed to the Druids, consist of 100 large blocks of stone placed on end in a circle, inclosing a level area of about 470 yds. in diameter.

Avellaneda (ä-vèl-yä-nä'dä), **Gertrude Gomes de**, 1816-75; Spanish poet; b. Cuba; published lyric poems, novels, and tragedies entitled "Alfonso Munio" and "Egilonā."

Avellino (ä-vèl-lè'nō), fortified town of Italy; province of Avellino; 25 m. E. of Naples; at foot of Mount Vergine; has a cathedral, a college, manufacturers of paper, woolen goods, and macaroni, and an extensive trade in nuts and grain. Pop. (1901) 15,403.

A've Mari'a, or **Angel'ica Saluta'tio**, form of prayer to the Virgin Mary (beginning Ave Maria, "Hail Mary"), which at first was simply the "annunciation" or salutation of the Angel in Luke i. 28, and the words of Elizabeth (ib. 42). The latter part, "now and at the hour of our death," came into use in the fifteenth century.

Aven'ger of Blood, in early ages, the nearest male relative of a murdered person, whose duty was to pursue and slay the murderer. The Mosaic law (Num. XXXV) placed this custom under regulations, prohibiting the commutation of the penalty of death for money,

and appointing six cities of refuge, for the manslayer who was not a murderer, in which he might live till the death of the high priest under whom the deed was committed. He then was free to return home. A willful murderer was, however, to be given up to the avenger.

Aventine Hill (äv'ën-tin). See **ROME**.

Aventurine (ä-vèn'tü-rin). See **QUARTZ**.

Aventurine Glass, also called **GOLD FLUX** or **GOLD STONE**, variety of glass used as an ornament by jewelers. The ground is of a rich yellowish-brown color, with innumerable golden scales.

Average, in mathematics, a mean proportion; medial sum or quantity intermediate between several unequal quantities. The average of several quantities—for example, 3, 7, 9, and 13—is obtained by adding them together and dividing the sum by the number of quantities. The sum 32, divided by 4, gives 8 as the average.

Average, used in maritime law in different senses when preceded by the words general, particular, or petty. General average, the case where interests connected together, as being engaged in a common adventure at sea, such as ship and cargo, are exposed to a marine peril, and one of these interests is voluntarily sacrificed, either in whole or in part, as the price of the safety of the residue of the property at risk; or expense is incurred for the same reason, when the amount of such sacrifice or expenditure is charged upon the respective interests in proportion to their value. Particular average, damage happening to interest, ship, cargo, and freight, at risk at sea through pure accident. The loss in such a case rests upon the owner of the property injured or upon his insurer. Petty average refers to certain charges in port for pilotage, lights, towage, anchorage, and the like, formerly apportioned upon the owners of the ship and cargo. The modern practice is to include these in the freight.

Aver'nus (Italian, **LAGO D'AVERNO**), famous lake of Italy, 10 m. W. of Naples; occupies the crater of an extinct volcano, about a mile in diameter and 170 ft. deep. The ancients imagined it the entrance to the infernal regions.

Averroës (ä-vèr'ō-èz), or **Averrhoes**, originally **Ibn-Roshd**, 1126-98; Arabian philosopher and physician; b. Cordova, Spain; rose to great dignity in the Moorish kingdom; an admirer of Aristotle, on whom he wrote a celebrated commentary. In the Middle Ages he was called "The Commentator."

A'verysboro, village in Hartnett Co., N. C.; on Cape Fear River, 40 m. S. of Raleigh. There, in March, 1865, a battle occurred between federal troops under Sherman, and a confederate force under Hardee; resulted in retreat of latter.

Aves (ä'vez), birds as a class, a group best distinguished by the presence of feathers. See **BIRDS**.

Aves'ta, or **Zend-Aves'ta**, the Zoroastrian Bible, forming with the Pahlavi books (see PAHLAVI) the scriptures of the Parsis. Much of it may date beyond 1,000 B.C., but there are many portions several centuries later.

Avesta has been supposed to signify "knowledge, the book of wisdom"; but more probably "the text," or "the law." *Zend* means "commentary, or explanation"; i.e., of the original *Avesta* or "text."

Tradition has it that the *Avesta* was once far greater in extent than in its present form. Pliny mentions 2,000,000 verses composed by Zoroaster; the semblance of truth is given to this statement also by Arabic authorities and by the Pahlavi works which tell of twenty-one Nasks, or books, of the original *Avesta*, inscribed in gold letters upon 12,000 cow-hides, and deposited in the palace library at Persepolis. These books were destroyed by the Greeks under Alexander the Great, when he allowed the library to be burned. What now remains of the *Avesta* would equal perhaps one tenth of our Bible in extent. Like our own sacred text the extant portions of the *Avesta* are divided into several books.

In style, much of the *Avesta* is easy and simple; the Gāthās, however, are difficult. The keynote of their thought is the doctrine of the new kingdom, a better life, and the hereafter. They are written in verse resembling the Vedic meters. The rest of the *Avesta* is either composed in verse analogous to our familiar Hiawatha, or is in prose. Meter is the sign of antiquity; prose a mark of later age. The metrical portions of the *Avesta* are not without poetic merit; most of the prose passages are young, without spirit, or even stupid.

Aves'tan, or **Avesta Lan'guage**, ancient speech preserved in the *Avesta*, and oldest member of the Iranian group of languages, sometimes erroneously called *Zend*, which really signifies, interpretation or commentary, and refers to the Pahlavi version of the *Avesta*. Two dialects are recognized: (1) the Gāthā, the oldest form of the language as preserved in the Gāthās, or Psalms of Zoroaster. (2) The Younger *Avesta*, or the language of the rest of the texts.

Avezzana (ā-vēt-sā'nā), Giuseppe, 1789-1879; Italian patriot; b. Chieri, Piedmont; merchant in New York, 1834-48; returned to Italy to fight for its independence; commander national guard at Genoa, 1848; minister of war of the Roman republic and commander of army, 1849; again resided in New York City; fought under Garibaldi, 1860; head of Italian irridenta party, 1878.

Avianus (ā-vī-ā'nūs), or **Avian'ius, Flavius**, Latin fabulist, probably of the fourth or early fifth century A.D., who threw into elegiac verse 42 Æsopic fables. His version of the fables became popular, and as a schoolbook was much used and imitated during the early Middle Ages.

Avicenna (āv-ā-sēn'ā), Latin form of *Ibn-Sīna*, d. 1037; most eminent Arabian physician; b. Afshena, near Bokhara. Before he

was twenty reputed the most learned man of his time; employed as a physician by several Samanide sovereigns, and resided at Ispahān and Hamadān; wrote in Arabic on medicine and philosophy; most important work is his "System of Medicine," which, translated into Latin, 1595, was for five centuries a standard book of the highest authority in the schools of Europe. His writings exercised a powerful influence in spreading a knowledge of Aristotle's logic.

Avicen'nia, genus of plants of the family *Myoporaceæ*; consists of trees or shrubs resembling mangroves, and growing in salt swamps in tropical regions and in the southern hemisphere. Its bark is used for tanning, its gum is used as food in New Zealand, and its seeds as food in India.

Avid'ius, Cassius, d. 175 A.D.; Roman general; b. Syria; commanded for Marcus Aurelius an army which defeated the Parthians, 165 A.D.; became governor of Syria and commander of several legions; revolted, 175 A.D., and took the title of emperor; obtained possession of Egypt and part of Asia; killed by his own officers.

Avignon (ā-vēn-yōā), ancient walled city of France; capital department Vaucluse; on Rhône, 74 m. NNW. of Marseilles; seat of papal government, 1348-77, when it was annexed to France; contains the former palace of the popes, cathedral, museum of natural history, college, public library, botanical garden; manufactures silk, and trades in wine, brandy, grain, etc. Pop. (1901) 46,900.

Avis (ā-vēz'), or **Avis'**, order of knighthood in Portugal, instituted by King Alphonso I, 1143, to promote the defeat of the Moors. The King of Portugal is grand master.

Avitus (ā-vī'tūs), **Alcimus Ecdicius, Saint**, b. abt. 450, d. abt. 525; bishop of Vienne and Christian poet; b. Auvergne, France; succeeded his father in the episcopacy, abt. 490; a vigorous representative of Roman Catholicism among the Arian Burgundians; endeavored to convert King Gundobad to orthodoxy; belonged to the party which for ecclesiastical reasons helped on the subjection of southern Gaul to the Franks; chiefly known as the author of a poem, similar in theme, and at times in treatment, to the "Paradise Lost" of Milton, called "De Spiritalis Historiæ Gestis."

Avitus, Marcus Mæcilius, d. 457; a Roman emperor of the West; b. Auvergne; father-in-law of Sidonius Apollinaris; fought under Aëtius; prefect of Gaul, 439; succeeded Maximus as emperor of the West, 455 A.D. He was deposed, 456.

Avocado Pear (ā-vō-kā'dō), or **Al'ligator Pear**, fruit-tree of the family *Lauraceæ*; native of the warm parts of America; has leaves which resemble those of the laurel; fruit is a drupe, like a pear in shape, with a soft pulp of delicate flavor, which is called vegetable butter.

Avocet (āv'vō-cēt), web-footed bird of the genus *Recurvirostra*, having long legs and

very long, slender bills; are of powerful wing, and better adapted for flying and walking than swimming.



AVOCET.

The *Recurvirostra americana* abounds in the U. S.

Avogadro (ä-vö-gä'drö), **Amadeo** (count), 1776-1856; Italian physicist and chemist; b. Turin; held a position under the government, 1796-1806. In 1809 he became Prof. of Physics at the gymnasium in Vercelli. In 1820 he was elected Prof. of Mathematical Physics at the Turin Univ.; known chiefly as the discoverer of the law governing the relations between the specific gravity and the molecular weight of substances in the gaseous state, commonly called Avogadro's Law.

Avoirdupois (äv-ër-dü-poiz'), standard of weight, used for merchandise, except precious metals, gems, and medicines. The pound avoirdupois contains 7,000 grains, the pound troy 5,760. The ounces are differently proportioned, there being 16 in the former and 12 in the latter.

Avon (ä'vön), name of several rivers in England, Wales, Scotland, and France; England and Scotland have three each; France has four.

Avranches (äv-röñsh'), town of France; department of the Manche; 32 m. SW. of Saint Lo; has a ruined cathedral, and a college; trade in grain, cider, and salt, and manufactories of candles, lace, nails, etc. Pop. (1901) 7,008.

Avulsion (ä-vül'shün), soil suddenly and perceptibly formed by the washing of the waters along the banks of a river or the sea. See ALLUVION.

Award', result of an arbitration. An award must conform to the agreement whereby the matters in dispute were submitted to arbitration; it must embrace them all; it must be final, as well as certain and reasonable. Where several matters are submitted, it is not necessary that each one should be specifically referred to in the award. An award does not have the force of a judgment in a court of justice. If not performed, an action may be brought upon it. If a sum of money were directed to be paid, a debt would be created which could be collected by action.

Awe (ä), **Loch**, a lake in Scotland, Co. of Argyle; 8 m. NW. of Inverary; length 24 m., average width about a mile. The NE. end is overshadowed by rugged mountains, one of which, Ben Cruachan, is 3,669 ft.

Awn, stiff and pointed bristle which occurs in the flowers of many grasses, forming the extremity of a glume or palea, as the beard of

wheat and barley. The parts which are furnished with this organ are called *aristate*.

Axe, a tool used by carpenters and others for cutting wood; is of very ancient origin. Savage peoples of antiquity formed axes of stone, copper, bronze, etc. The axe of modern civilized nations is constructed of wrought iron, with a cutting edge of steel, which is welded to the iron when they are heated to a white heat. After it has been hammered and ground into the proper form, it is carefully tempered by heat and cold water.

Axholme (äx'höm), **Isle**, once marshy tract in Nottingham, England; was drained, 1634, and was for a long time inhabited by French and Dutch Protestant refugees.

Axinite (äks'i-nit'), anhydrous silicate of alumina, lime, etc., with boracic acid; so named because it occurs crystallized in prisms, so flat as to appear tabular and sharp like the edge of an axe.

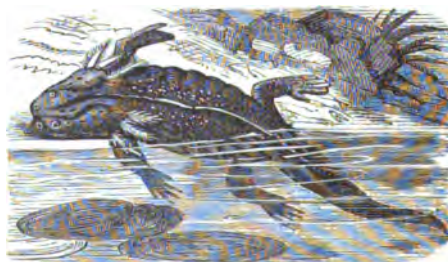
Ax'iom, in geometry, a proposition which admits of no demonstration, but is taken for granted as a self-evident truth; as, The whole is greater than its part. It is an axiom in logic that he who admits a principle admits its consequence.

Ax'is, plural **Ax'es**, a straight line, real or imaginary, about which a body revolves is called the axis of rotation. Axis is an important term in astronomy, botany, crystallography, geometry, and mechanics.

Axis, species of deer found in India and in many of the East Indian islands; resembles in size and color the European fallow-deer; is easily domesticated.

Ax'minster, town of England, Devon Co., 16 m. E. of Exeter; has manufactures of woollen and cotton goods, etc. The so-called Axminster carpets are now made elsewhere.

Axolotl (äks'ö-löt'l), a large larval salamander of the *Amblystoma* found in the lakes of Mexico and through the Rocky Mountains. It has bushy external gills, such as are perma-



AXOLOTL.

nent in the mud puppy (*Necturus*). It loses these gills, under some circumstances at least, when it develops into the common tiger salamander, *Amblystoma tigrinum*. It reaches a length of 8 or 10 in. It is claimed that the true axolotl of the Mexican lakes never leaves the larval state.

Ax'um, or **Ax'oom**, ancient and decayed town of Abyssinia; 85 m. NW. of Antalo, former capital of the province of Tigre, which extended over Abyssinia and Yemen in Arabia.

Ayacucho (I-ä-k'ö'chö), town of Peru; department of same name; 25 m. ENE. of Huan-cavelica. Here the armies of Colombia and Peru completely defeated the Spaniards, December 9, 1824. This victory ended the Spanish dominion on the American continent. Pop. abt. 20,000.

Aye-Aye (ä'f'äi), quadruped of Madagascar, belonging to the order of lemurs; has a long, bushy tail, and is about as large as a hare.



AYE-AYE.

Each of its four extremities has an opposable thumb, and the digits are armed with pointed nails. It is nocturnal in its habits.

Ayeshah (ä'f-shä or f'ä-shä), or **Aieshah**, d. 677; favorite wife of Mohammed; b. Medina abt. 610; a daughter of Abu-Bekr, afterwards caliph; after Mohammed's death took an active part in public affairs as an enemy of the caliph Othman and his successor Ali, who defeated her in battle.

Aylmer (äl'mër), or **El'mer**, John, 1521-94; English prelate; b. St. Mary, Norfolk; tutor to Lady Jane Grey; archdeacon of Stow, 1553; of Lincoln, 1562; bishop of London, 1576; bitterly opposed both Catholics and Puritans; wrote a work in reply to John Knox's "First Blast of the Trumpet."

Ayr (är), county town of Ayrshire, Scotland; at the mouth of the Ayr; 42½ m. SSW. of Glasgow; has an excellent academy, public library, the gift of Andrew Carnegie, a handsome spire, a race course, elegant suburbs, and a marine esplanade; carpet factory and extensive docks; chief export, coal. Pop. (1901) 28,624.

Ayr'ton, William Edward, 1847-1908; English electrical engineer and inventor; b. London; entered Indian government telegraph service, 1867; Prof. Natural Philosophy and Telegraphy, Imperial College of Engineering, Japan, 1873-79; first educator in any country to give courses of instruction in electrical engineering; Prof. Electrical Engineering, Central Technical College, South Kensington, 1884; pres. Mathematics and Physics section, British Association, 1888; of Physical Society, 1891-92; of Institute of Electrical Engineers, 1892; author of "Practical Electricity," and many papers.

Aytoun (ä'tön), William Edmondstoune, 1813-65; Scotch poet and essayist; a noted advocate in criminal cases; Prof. of Rhetoric in Univ. of Edinburgh, 1845; contributed to *Blackwood's Magazine*; published, 1849, "Lays of the Scottish Cavaliers, and Other Poems," and later "Bothwell," and other works; with Theodore Martin produced the "Bon Gaultier Ballads"; a political writer on the conservative side.

Ayuntamiento (ä-yön-tä-mē-än'tō), literally, a joining or meeting; in Spain, a council or governing body of a town. These councils acquired political influence and importance during the wars between the Moors and Spanish Christians. The councils were elected by vote of the citizens; were abolished under the Bourbon kings; restored, 1837; deprived of political power, 1844.

Azadirine (ä-zäd'ir-ën), bitter principle found in an East Indian tree (*Melia Azadirach*), used to some extent as a substitute for quinine. This tree is called "Pride of China" in the U. S.

Azalea (ä-zä'lë-ä) section of the genus *Rhododendron*, of the family *Ericaceæ*, still commonly regarded as a distinct genus;

comprises about 100 species or more, natives of N. America, China, and other countries; many of them cultivated for their flowers, which are beautiful and fragrant. The *Azalea indica*, a native of India, is a favorite of florists, and is remarkable for its brilliant colors. The *Azalea calendulacea*, found in the southern U. S., sometimes clothes the mountains with a robe of flame color.



AZALEA VIBCIOSA.

Azani (ä-zä'në), an ancient and ruined city of Asia Minor, in Anatolia, on the Rhyndacus, here crossed by two Roman bridges, 73 m. SSW. of Brusa. Here are extensive remains, among which are an Ionic temple of Jupiter, with 18 columns standing, and a theater 232 ft. in diameter.

Azara (ä-thä'rü), Don Felix de, 1746-1811; Spanish naturalist; b. Barbunales, Aragon; a member of a commission sent, 1781, to S. America to determine the boundary between the Spanish and Portuguese possessions; remained there twenty years, prepared many maps of S. America, and published in Spanish "Observations on the Quadrupeds, Reptiles, and Birds of Paraguay and La Plata," also wrote "Travels in S. America."

Azari'ah, name of frequent occurrence in the Old Testament: (1) Another name for Uzziah, the tenth king of Judah. (2) One of Daniel's three friends, carried captive to Babylon, whose name was changed to Abednego. (3) The name of some twelve other persons, most of whom were priests or high priests.

Azeglio (ä-d-zäl'yö), **Massimo Tapparelli** (Marquis d'), 1798-1866; Italian statesman, author, and artist; b. Turin; a skillful landscape painter; published, 1833, an historical novel, "Ettore Fieramosco"; stimulated the national spirit and patriotism by a popular historical romance, "Niccolò de' Lapi"; wrote numerous political treatises, and fought against the Austrians, 1848; in 1849, appointed president of the council by King Victor Emmanuel; was superseded by Cavour, 1852.

Azevedo (ä-zä-vä'dö), **Manceo Antonio Alvares de**, 1831-52; Brazilian poet; b. S. Paulo; had become a learned lawyer before his premature death; chiefly known as the most passionate of Brazilian romanticists; edition of his poems published, 1862.

Azimuth (äz'f-müth), angle made at the zenith by the meridian and the vertical circle in which a heavenly body is situated, or the angle measured along the horizon between the N. or S. point and the point where a circle passing through the zenith and the body cuts the horizon. Azimuth circles or vertical circles are great circles of a sphere, passing through the zenith and intersecting the horizon at right angles.

Azincourt (ä-zhän-kör'). See AGINCOURT.

Azo-colors (ä'zö), important class of dye-stuffs; belong to a group known as azo compounds, the simplest of which is azo-benzene. This is related to benzene, as shown in the formulæ C_6H_6 , benzene, and $C_6H_5.N_2.C_6H_5$, azo-benzene. Among the most important azo-colors are: The tropæolines, helianthin, acid yellow, anisol-red benzo-purpurin. Dyestuffs formed by the action of diazo compounds on phenols are known in general as acid azo-colors. Secondary azo-colors are those that contain two azo-groups, all of them being derivatives of the substance oxy-azo-azobenzene. The benzidine colors are also secondary azo-colors. Both acid and basic azo-colors dye silk and wool readily, but a mordant is used to make them take upon cotton. The secondary azo-colors, however, have a decided affinity for cotton. Benzopurpurin is the most extensively used of all the azo-colors.

Azores (ä-zörz'), or West'ern Is'lands, groups of islands in the N. Atlantic, about 500 m. W. of Portugal, to which they belong. The first group consists of Flores and Corvo. About 114 m. SE. of this group is the central group of Terceira, St. George, Pico, Fayal, and Graciosa. St. Michael and St. Mary form the third group, which is nearly 70 m. SE. of the central group. St. Michael, the largest, is 50 m. long, area 340 sq. m. They are of volcanic formation, have fertile soil, though the surface is mostly mountainous. The highest point is the Peak of Pico, 7,613 ft. The chief

exports are wine, brandy, grain, and oranges. The land is held by feudal tenure. The Azores have no good harbors. Area, 922 sq. m. Pop. (1900) 256,290.

Azotus (ä-zö'tüs). See ASHDOD.

Azov (ä-zöv'), town and fort of Russia; government of Ekaterinoslav; near the mouth of the Don, 25 m. ESE. of Taganrog. It has declined in pop. and importance. Azov was taken from the Turks by Peter the Great; settled by the Carians, and in ancient times had the name Tanais. After the taking of Constantinople by the Italians it passed into the hands of the Venetians, who held it till 1410, when it was captured by the Tartars. The Christians were put to death by the captors. Pop. (1897) 27,000.

Azov, Sea of (Russian, MORE ASOVSKOE), a large body of water in SE. Europe, between Russia and the Black Sea, with which it communicates by the Strait of Yenikale or Kerch; extends from the Crimea to the mouth of the Don, about 200 m., and is in some places 100 m. wide or more; area about 14,000 sq. m.; water nearly fresh; a canal connects it with the Gulf of Perekop.

Azpeitia (äs-pä'ë-të-ä), Spanish town; province of Guipúzcoa, 18 m. SW. of San Sebastian. In the convent of Loyola, a mile from the village, St. Ignatius, founder of the Jesuits, was born. Pilgrims flock to the festival held here in his honor in July.

Aztecs (äz'tëks), a Mexican nation inhabiting the table-land of Anahuac at the time of the Spanish conquest of Mexico; according to tradition, Aztecs came from Aztlan; supposed to have founded City of Mexico (or Tenochtitlan) abt. 1325; made much progress in



AZTEC WARRIORS.

(From a Mexican Sculpture).

civilization and the useful arts, derived partly from the Toltecs; conquered several tribes and extended their dominion from ocean to ocean; religion, polytheistic, with human sacrifice;

cultivated astronomy to an extraordinary degree. They acquired proficiency in agriculture, but had no animals of draught; used bronze, gold, and silver, but were ignorant of iron; had no alphabet but had a system of picture writing or hieroglyphical painting.

Azuni (ăd-zô'ně), **Domenico Alberto**, 1749-1827; Italian writer on maritime law; b. Sassari.

Azure, blue color of the sky; also blue pigment used in coloring porcelain; in heraldry, one of the colors employed in blazonry, represented in engraving by horizontal lines; in painting, a sky-colored blue, called ultramarine.

Azure-stone. See LAPIS-LAZULI.

Azurine (ăzh'ŭr-in), blue variety of the red-eye or rudd, or blue roach, a minnow or chub found in the waters of England.

Azurite (ăzh'ŭ-rĭt), deep blue carbonate of copper, differing slightly in composition from malachite, and often occurring with it as an ore of copper, and occasionally as an ornamental stone.

Azymites (ăz'ŭ-mĭ-tēs), opprobrious epithet applied by the Greek Church polemics to the Latins because the latter used unleavened bread in the celebration of the Eucharist, while the Greek Church uses leavened bread. The Latins in reply called the Greeks "Frumentarians."

B

B, second letter in alphabets of Phœnician origin, as Hebrew, Greek, Latin, English, French, German, Italian, Spanish, and Russian. It is a sonant consonant of the labial mutes. In modern Greek it is pronounced like *r*, and in Spanish nearly so. See ABBREVIATIONS.

B, in music, the seventh letter in the natural diatonic scale of either C major or minor; forms the leading note of the C scale, calling for the octave C to follow it.

Baader (bă'der), **Franz Xaver von**, 1765-1841; German mystic; b. Freiberg; Prof. of Philosophy and Speculative Theology, Univ. of Munich. His views tended to reconstruct civilization on the basis of religion and the Church, but without a pope.

Baal (bă'al), or **Bel**, god of the Phœnicians, Chaldeans, and Carthaginians; a personification of the sun. Among the Phœnicians, Baal was the vivifier of nature, and **Astarte** (or **Baal'tis**) the goddess of the moon. Baal was identical with the **Bel** or **Belus** of the Babylonians and Assyrians. His worship prevailed among the ancient Jews in the time of the prophet **Elijah** and earlier.



BAAL.

Baalbec (băl-băk'), **Balbec'**, or **Baalbek'**, ancient city of Syria (Greek *Heliopolis*, "city of the sun"; situated

in a valley near the foot of **Anti-Libanus**, about 42 m. NW. of **Damascus**, and 3,800 ft. above sea-level. Its origin and early history are not known. It was formerly one of the most populous and important cities of Syria, and contained many palaces and monuments. **Antoninus Pius** built here a temple, which

later became a Christian church. In 636 it was captured by the Mohammedans, and in 748 was sacked by the Caliph of **Damascus**. The site is now occupied by a small village and extensive ruins, among which is the temple of the sun. This was 324 ft. long, and had a peristyle of 54 Corinthian columns, about 7 ft. in diameter and 89 ft. high, including capital and pedestal.

Baba-Dagh (bă'bă-dăg), town of Roumania, acquired from Bulgaria, 1878; former capital of the Dobruja; on a tributary of the Danube; 93 m. NE. of **Silistria**; has the tomb of **Baba**, the saint, which attracts Moslem pilgrims; stormed by the Russians, 1771 and 1828, and ineffectually besieged, 1864.

Babbage (băb'ij), **Charles**, 1792-1871; English mathematician; b. Devon; inventor of a calculating machine and an analytical engine; wrote "On the Economy of Machinery and Manufactures," and the "Ninth Bridgewater Treatise."

Babbitt, **Isaac**, 1799-1862; American inventor; b. Taunton, Mass.; became a goldsmith, and made the first britannia ware produced in the U. S. In 1841 received a gold medal for his invention of the alloy which bears his name. Congress also gave him \$20,000.

Babbitt Met'al, a soft alloy invented by Mr. **Isaac Babbitt**, of Boston, and used in lining boxes for axles and gudgeons, in order to diminish the friction and abrasion. These boxes are extensively used in the machinery of steamboats and locomotives. The alloy is prepared thus: to 4 lbs. of melted copper add gradually 12 lbs. of the best Banca tin, then 8 lbs. of antimony, and finally 12 lbs. more of tin.

Bab'cock, **Orville E.**, 1835-84; U. S. army officer; b. Franklin, Vt.; graduated at West Point, 1861; distinguished as an engineer in the Civil War; served on Grant's staff, and when the latter became president was his private secretary; engineer in charge of the

Washington aqueduct; indicted for complicity in the famous St. Louis whisky frauds, 1876. but acquitted.

Babcock, Stephen Moulton, 1843—; American agricultural chemist; b. Babcock Hill, N. Y.; applied himself to the chemistry of milk; invented the milk tester used to determine amount of fat in milk; instructor in chemistry, Cornell, 1875-76; chemist of New York State Experiment Station, 1882-88; Prof. of Agricultural Chemistry, Univ. of Wisconsin, and chemist of the State Experiment Station of that state.

Bab-el-Man'deb, "gate of tears"; strait connecting the Red Sea with the Gulf of Aden and the Indian Ocean; on the Arabian side is a cape called Bab-el-Mandeb. The strait is about 20 m. wide, and incloses the rocky island of Perim, on which is a British fort.

Babel (bā'bēl), Hebrew name of Babylon, the Greek form of Babel; also the name of the tower which the descendants of Noah began to build soon after the deluge, on the plain of Shinar, but which in consequence of the confusion of tongues, they did not finish. There is no evidence that the work was ever raised above the foundations. Sir Henry Rawlinson identified Babel with the ruin now called Am-rân, within the city of Babylon itself; but it is generally identified with Birs Nimrud in Borsippa, a suburb of Babylon; is sometimes confounded with the temple of Belus.

Baber (bā'bēr), **Ba'bur**, or **Ba'bour**, **Mohammed**, surnamed **ZAHEER-ED-DEEN**, "protector of religion"; 1483-1530; emperor of India, and the first of the great Moguls; was a descendant of Tamerlane (Timur-Leng); succeeded his father, 1494; performed remarkable exploits in war, and extended his dominions by the conquest of Kandahar, Kabul, etc. He crossed the Indus, 1524, defeated Ibrahim, king of Delhi, on the plain of Paniput, 1526, and became master of India. He was succeeded by his son Humayoon.

Babeuf (bā-bōf'), **François Noel**, 1760-97; French socialist (assumed the name of Caius Gracchus); b. Saint-Quentin; founded in Paris, 1794, *The Tribune of the People*, a journal in which he advocated equality and community of property. His disciples were called Babouvistes, and his system Babouvisme. He formed a conspiracy against the directory, was arrested, and when convicted stabbed himself, but not fatally; was guillotined the next day.

Bab'ington, Anthony, 1566-86; English conspirator; b. Dethick; led a band of young Catholics formed to free Mary Stuart and murder Queen Elizabeth; was betrayed and executed.

Bab'ists, Mohammedan sect originating in Persia abt. 1843; said to derive its name from a prophet named Bāb, who was killed by order of the King of Persia, 1850. Many of the early Babists who took up arms to propagate or defend their religion, were taken and put to death. Its adherents are said to number sev-

eral millions. They profess to be reformers, assert the absolute unity of God, and claim that Bāb is as much superior to Mohammed as the latter is to Christ.

Babo (bā'bō), **Franz Marius von**, 1756-1822; German dramatist; b. Ehrenbreitstein; wrote "Otto von Wittelsbach," considered next to Goethe's "Goetz von Berlichingen" the best German historical tragedy.

Baboon', one of a group of monkeys belonging to the *Simiidae*, distinguished by long truncated muzzles and cheek pouches. The face resembles that of a dog, and the ridges over the eyes are very distinct. Baboons have a repulsive physiognomy. They walk or run easily on the ground, climb trees with agility; are exceedingly strong, cunning, and mischievous. Troops of these animals sometimes enter a plantation for plunder, and destroy much besides what they eat and carry away in their cheek pouches; found chiefly on the continent of Africa, and feed mostly on fruits and vegetables. The group is divisible into two genera—baboons proper (*Cynocephalus*), which have long tails, and mandrils (*Mormon*), which have very short tails. See APE, CHIMPANZEE, MONKEY.

Babuyanes (bā-bō-yāns'), group of five islands, Fuga, Dalupiri, Calayan, Babuyanlaro and Camigum, at the N. end of the Philippine archipelago; about 30 m. N. of Luzon; all are volcanic and a source of sulphur supply; area about 175 sq. m.

Babylas (bāb'ī-lās), **Saint**, bishop of Antioch from 237-250 A.D., when he suffered martyrdom. Miracles are reported in connection with his remains. Chrysostom wrote about him in 382, and in 387 delivered a discourse on him.

Babylon (bāb'ī-lōn), Semitic form of name *Bābīlu*, i.e., "gate of God"; ancient powerful city on the Euphrates, about 60 m. S. of the present Bagdad; for many centuries the most important center of civilization in W. Asia; about 2300 B.C. became the chief city, through the wars waged by its king, Hammurabi. Political supremacy resulted in religious supremacy, and Marduk, the god of the city, became the national god. After Hammurabi's time we have little more than the names of the kings and the length of their reigns. In the sixteenth century B.C. occurred the wars with Assyria, since which time Babylonian political history is involved in that of Assyria, and what we know on the subject comes from Assyrian sources. The early records of the city doubtless perished in war. When Sennacherib, abt. 690 B.C., sacked and demolished it, he cast the debris into canals, and made the very site unrecognizable. There is a tradition that Nabonassar, King of Babylon, 747-733 B.C., destroyed all the records he could find of former kings, so that history might date from his reign. During the time of the Assyrian foreign wars Babylon was often subject to Assyria. The brutal policy of Sennacherib was reversed by his son, Esarhaddon, who early in his reign rebuilt Babylon. During the reign of Assurbanipal at Nineveh, a

brother of this monarch was for twenty years on the Babylonian throne, 668-48 B.C., after which the city was again directly subject to Assyria. Nabopolassar, 624-04 B.C., began the restorations and new buildings for which the city became famous. With the fall of Nineveh, abt. 606 B.C., Babylon again acquired political significance; but in 538 B.C. it fell into the hands of Cyrus, and lost forever its independence. Its subsequent political history is Persian and Greek.

Babylonia (bāb-i-lō'ni-ā), ancient country of Asia, called in the Bible "the land of Shinar" and "the land of the Chaldees"; on both sides of the Euphrates; extended from the Persian Gulf NW. more than 300 m.; area about 23,000 sq. m.; the great rivers of this region are the Euphrates and Tigris. Babylonia was favorably situated for commerce, and was one of the most commercial nations of the ancient world. The Babylonians were a mixed race, in which the dominant element was Semitic. They were distinguished for intellectual ability, high civilization and martial spirit; excelled other ancient nations in astronomy; were especially addicted to the study of astrology; and attained superior skill in architecture. Agriculture and commerce were their chief occupations. The Babylonian empire included, besides Babylonia proper, Susiana (Elam), Mesopotamia, Syria, Palestine, Idumea, and part of Arabia. The government was a loose organization of provinces under native princes. Chaldea proper was a district in southern Babylonia whose inhabitants frequently disputed with Assyria the possession of Babylon, and finally became supreme, so that Babylonia and Chaldea became synonymous. To Babylonia, far more than to Egypt, we owe the art and learning of the Greeks.

Babylonia Captivity, in Hebrew history, the period from 605 B.C., when Nebuchadnezzar first took Jerusalem, to 536 B.C., when Cyrus permitted the return of the Jews, or, that from 586 B.C., when Nebuchadnezzar destroyed Jerusalem, burned the temple, and carried away all except the common people, to 516 B.C., when the temple was reconstructed under Darius I.

Babyroussa (bāb-i-rōs'sā), or **Babirus'sa**, an animal (*Babyroussa alfurus*) allied to the hog; found only in the islands of Celebes and Buru. It is remarkable for the long tusks of the upper jaw, which are curved backward and resemble horns. Its legs are more slender than those of the hog.

Baccarat (bāk-kā-rā'), game of cards, of French or Italian origin, played with one or more packs, any number of bettors, and a banker. Each bettor plays a stake which the banker duplicates, after which two cards are dealt by the latter to each player, including himself. The face cards count ten and the others according to the spots. The aim is to make the value of the player's cards foot up the total of 9, 19, 29, or as nearly so as possible. The player may call for more cards at the risk of exceeding 29, in which case his stake is forfeited. If a player has 9, 19, or 29 he declares it, and the banker pays all hands

superior to his own their bets and takes the stakes of the inferior hands.

Bacchanalia (bāk-ā-nā'li-ā), feasts and orgies of the votaries of Bacchus among the ancient Greeks and Romans. On account of the licentious practices and drunkenness which prevailed at these feasts, they were prohibited by the senate, 186 B.C.

Bacchantes (bāk-kān'tēz), those, whether male or female, who joined in the orgies of Bacchus. According to legend, Orpheus was torn to pieces by female Bacchantes.

Bacchus (bāk'ūs), god of wine (called **DIOSYBUS** by the Greeks, and sometimes **LIBER** by the Romans); the son of Jupiter and Semele, or, of Ammon, King of Libya, and Amalthea; taught men the culture of the vine, and first produced wine from grapes. His worship was spread over many countries, and the myth of Bacchus was variously modified by different peoples.

Bach (bāk), name of a German family which for upward of two centuries was noted for great musical talent and produced more than fifty distinguished artists. Its founder was Veit Bach, a native of Presburg, who emigrated to Thuringia abt. 1600. The most noteworthy members were Heinrich, 1615-91, organist at Arnstadt, and father of Johann Michael; Johann Christian, 1640-82; Johann Christian, 1735-82, organist in Milan cathedral and in London, author of operas, masses, etc.; Johann Christoph Friedrich, 1732-95, music master to Count Schaumburg; Johann Michael, 1648-94, composer and instrument maker; Johann Sebastian (see below); Karl Philip Emanuel, 1714-88, court musician to Frederick the Great and voluminous composer; and Wilhelm Friedemann, 1710-84.

Bach, Johann Sebastian, 1685-1750; in some respects the greatest musician that ever lived; b. Eisenach, Germany; youngest son of Johann Ambrosius Bach, court musician; was treble singer in a choir at Lüneburg till his voice changed, then became a violinist at the court of Weimar; organist at Arnstadt, 1705; court organist at Weimar, 1708; concert master to the Duke of Weimar, 1714; elected by city authorities of Leipzig musical director and cantor of the Thomas School, where he labored the remainder of his life, 1723. Bach published few works, but left a great number in manuscript. He wrote for voice and instrument—for orchestra, organ, pianoforte, instruments of wood and metal, himself being a performer on them all. He wrote for sacred occasions masses, oratorios, concerted pieces of every kind; his preludes, fugues, cantatas are famous; but his stately genius unbent at festive occasions, births, and weddings; and even comedy was not out of his range.

Bache (bäch), **Alexander Dallas**, 1806-67; American scientist; b. Philadelphia; great-grandson of Franklin; graduated at West Point, 1825; Prof. of Natural Philosophy and Chemistry, Univ. of Pennsylvania, 1828-36; organizer and first president of Girard College; organizer of public-school system of

Philadelphia; superintendent U. S. coast survey from 1843 till his death; regent of the Smithsonian Institution, 1846-67; and president National Academy of Sciences, 1863. While at the head of the Coast Survey he omitted no opportunity of securing for science the collateral results that could be gathered during the prosecution of the work; organized a systematic exploration of the Gulf Stream, an extended series of tidal observations, of the magnetism of the earth, of the direction of the winds; and instituted researches in regard to the bottom of the ocean within soundings, and to the forms of animal life existing there.

Bach'lor, a term applied anciently to a person in the first or probationary stage of knighthood who has not yet raised his standard in the field. A knight bachelor is one who has been raised to the dignity of a knight without being made a member of any of the orders of Chivalry, such as the Garter or the Thistle. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college or university; or a man of any age who has not married.

Bachelor's-but'ton, the double-flowered forms of one of the buttercups (*Ranunculus acris*).

Bachman (bäk'män), **John**, 1790-1874; American naturalist; b. Dutchess Co., N. Y.; pastor of a Lutheran church at Charleston, S. C., 1815 to death; contributed to Audubon's work on ornithology and wrote the principal part of the work on the quadrupeds of N. America.

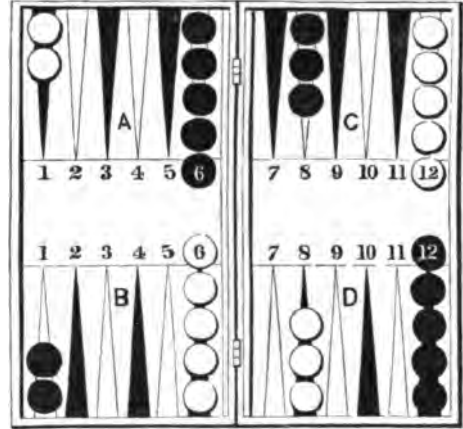
Bacillariaceæ (bä-sil-ä-rî-ä'sè). See DIATOMS.

Bacillus (bä-sil'lūs). See BACTERIA.

Back (bäk), **Sir George**, 1796-1878; English explorer; b. Stockport; entered the British navy, 1808; accompanied expedition to Spitzbergen; went with Sir John Franklin to the arctic regions, 1819 and 1825; led the Sir John Ross Search Expedition, 1833; made his last trip to the North, 1836; promoted admiral, 1867.

Back'gammon, game of combined skill and chance, played upon a board or table with men and with dice. The men are of two colors, and the table is divided into two compartments, each with two sets of points, of which there are twenty-four in all. Upon these points the men are placed in playing, and their movements are determined by throws of the dice alternately made by each player; but the game is such that much skill may be exercised in executing the movements of the men as indicated by the dice. The object of the game is for the player to bring his own men into his own inner table, and to prevent his adversary from doing the same. The men, fifteen of which are black and fifteen white, are arranged, as shown in the cut, on a board each quarter of which is marked with six lines, alternately white and black or red and black. Each of these quarters is called a table; those marked *A* and *B*, in which the game begins, are the inner tables,

the others the outer. The number of lines across which a player is allowed to move his men is decided by the dice; and the object of the player having the white men, for instance, is to move those of his men which are in his opponent's table (*A*) through the tables *C* and *D*, and finally into his own inner table *B*—at the same time endeavoring also to bring into that table all his other men, wherever on the board they may be placed. The player having



BACKGAMMON BOARD.

the black pursues a similar course in moving his men gradually around to his inner table *A*. Neither player can, no matter what throw he makes with the dice, place his men on a line already occupied by more than one of his opponent's pieces. Should only one of these, however, be found on a line to which he has otherwise the right to move, he can "take up" this solitary man—that is, remove him from the board—and oblige his adversary to begin with him anew in the farthest table from his own inner one. When a player has brought all his men safely into his inner table, he may begin to "throw off" his pieces; that is, remove from the board a man standing on any point the number of which he throws. Should he throw doublets, he may remove four from the point indicated by them. The player who by this means first rids himself of all his men wins the game. Should he win it before his opponent brings all his men into his inner table, he is said to "gammon" him; if before the latter even has all the men out of his first table, to "backgammon" him.

Bacolor (bä-kö-lör'), town in the island of Luzon, P. I., 10 m. NW. of Manila; capital of the archipelago during the British invasion, 1702, and scene of much American military activity against the Filipino insurgents, 1899. Pop. (1903) 13,493.

Ba'con, **Francis** (Viscount St. Albans and Baron Verulam), 1561-1626; English philosopher; b. London; educated at Trinity College, Cambridge, and Gray's Inn; admitted to the bar, 1582; entered parliament, 1584; counselor-extraordinary to the queen, 1590; unsuccessful

ful candidate for office of solicitor-general, 1594; knighted, 1603; solicitor-general, 1607; attorney-general, 1613; and lord high chancellor of England, the highest civil office to which any subject could attain, 1618. Accused of accepting bribes by a man against whom he had decided a case in chancery, Bacon first denied and then admitted his guilt, was tried, condemned, fined, and removed from office, 1621. But the fine was remitted, he was allowed a pension, and resumed his seat in the House of Lords. Bacon's celebrated "Novum Organum," and his "De Augmentis," are but parts of a more extensive work entitled "Instauratio Magna," or "Great Restoration," so called because he hoped to recall philosophy from what he considered the idle speculations of the Aristotelian school, to the office of interpreter of nature. Among his works should be mentioned "Essays," and "On the Wisdom of the Ancients," 1609. An attempt has been made by some scholars to prove that Bacon was the author of the plays attributed to Shakespeare.

Bacon, Nathaniel, "the Virginia rebel," abt. 1630-77; b. London, England; emigrated to Virginia, 1673; became a member of the governor's council; led the people who took up arms to force the authorities to do their duty, July, 1676; forced Gov. Berkeley both to make concessions and flee the province after the burning of Jamestown, the capital; he died while organizing a new government. See BACON'S REBELLION.

Bacon, Roger, 1214-92; English philosopher; b. near Ilchester, Somerset; entered Franciscan monastery at Oxford, 1240, where he devoted much time to experimental philosophy; made discoveries in several sciences; wrote much on chemistry, optics, physics, etc.; and displayed mechanical skill and such insight into nature that he was suspected of magic. Thus, he became in the popular imagination the necromancer, Friar Bacon, who figures largely in legends. His writings having been condemned by a council of Franciscans, he was imprisoned, 1278, for 10 years. His capital work, which treats of several sciences, is "Opus Majus," written abt. 1266; several of his works, such as the "Opus Tertium," "Opus Minus," and "Compendium Philosophiæ," were published for the first time, 1859. It appears that he was familiar with gunpowder, that he anticipated many great discoveries, and that his method of research followed the best principles of inductive reasoning.

Bacon's Rebellion, the civil conflict which, under the leadership of Nathaniel Bacon, took place in Virginia, 1673-76. An act of parliament declared that all goods intended for Virginia should be shipped first to England, and then reshipped in British vessels to the colony. This practically limited the market for tobacco to England and increased the price of all foreign articles. A series of forts was erected in Virginia and it was ordered that no produce could be sold except where there was a fort. Also, abt. 1673 the crown assigned the province of Virginia to the royal favorites,

Lords Arlington and Culpepper as practically absolute rulers, permitting them to collect all revenue for their own use. The governor, Sir Wm. Berkeley, enforced these unpopular ordinances, but he incurred the most extreme dissatisfaction by his refusal to protect the colonists against the Indians. Nathaniel Bacon, member of the governor's council, applied to the governor for authority to organize the people, but his request was ignored. With fifty-seven men he destroyed the Indian fort, and with forty men he went to Jamestown and demanded the restoration of his seat in the House. Berkeley arrested him, but did not deem it prudent to retain him. He also demanded a commission as major general for himself and thirty blank commissions for his subordinates. Further, he extorted a letter from the governor and directed to the king, exultating himself and his followers. The governor even assented to many laws, some repealing the most obnoxious statutes. As soon as Bacon had left to repel an Indian attack, Berkeley revoked his concessions, but fled upon Bacon's return. After a complete victory over the Indians at Bloody Run, near Richmond, Bacon marched rapidly to besiege Jamestown which Berkeley had occupied, and set fire to all the buildings of the town. This was practically the end of his career; he died October 29, 1676. He had enacted or caused to be promulgated many laws so favorable to the people that, long after his death, and when all his acts had been reversed, there was a popular clamor for the reenactment of "Bacon's laws."

Bacte'ria, minute chlorophyll-less plants, belonging to the lowest class (*Schizophyceæ*) in the vegetable kingdom; allied to the minute aquatic green plants, water slimes, so common in pools of water, and belonging to the genera *Nostoc*, *Oscillaria*, *Leptothrix*, *Spirulina*, etc., from which they may have been derived by degeneration due to their parasitic habits. Bacteria multiply by the simple process of transverse division, and are known as *Schizomycetes*, or fission fungi. The simplest forms appear under the microscope as spherical bodies varying in size from minute points just visible under the high powers to $\frac{1}{1000}$ in. in diameter. These are called *Micrococci*. Others are rod-shaped *Bacilli* from $\frac{1}{1000}$ to $\frac{1}{100}$ in. in length, and usually much less than half that in breadth. Others appear as undulating threads, or rods twisted like a corkscrew, *Spirilla*.

In nature many species of bacteria are usually present as a heterogeneous mixture, and to study the individuals comprising the group the separation of the individual species into "pure cultures" is necessary. This is done by means similar to the separation of different granules from a handful of mixed seeds, by spreading them out on a comparatively large flat surface. If the bacteria can be diffused in some medium that has the property of being at one time fluid and at another solid, they can be scattered so that each drop of the fluid will contain a few of these microscopic bodies. Now, while fluid, this diluted culture medium is poured out upon a large

glass surface, the individual bacteria are widely separated, and if the medium can then be solidified the bacteria are fixed in this separated condition, and will multiply into colonies. Each colony represents the offspring from a single bacterium that was fixed at the point at which it appears. They are therefore each a pure culture of the organism from which they sprang. Many bacteria—the chromogenic varieties—possess the property of producing brilliant pigments, by which their colonies can be recognized. If a portion from a colony is introduced into a tube containing a sterile, nutrient medium the growth that results will be a pure culture of the organism forming the colony from which the bit was taken. This process is the method of Koch for the isolation and cultivation of bacteria on solid media. With certain mixtures of bacteria suspected of containing pathogenic (disease-producing) organisms, another method of separation is often resorted to: the inoculation of susceptible animals with the suspicious mixtures. The disease-producers perform their specific function, and can then be obtained from the blood or organs in pure culture.

Some *Bacilli* can pass into a stage in which they are much more resistant to detrimental influences than when growing normally. This is known as the spore, resting, or permanent stage. Many spores retain their vitality for years. Spores cannot divide into two and form other spores, but they lie dormant until favorable conditions appear: they then germinate, not into spores, but into rods identical in every way with the rods from which they were formed. Many bacteria are motile—they possess the power of independent motion, and, by the lashing movements of hairlike appendages (flagella), move about in the fluid in which they float. Owing to the rapidity of their life processes, they produce profound decomposition and fermentative changes in materials to which they gain access. Decomposition and fermentation are the results of the growth of saprophytic bacteria or those which feed on dead matter, whereas the parasitic forms produce changes in the tissues of their hosts, which may result in disease, and often death, but the number of species of bacteria capable of causing disease is relatively small. The majority of them are concerned in processes that are not only in no way related to disease, but are directly beneficial to the whole animal and vegetable kingdoms; in fact, they are essential to life. Through their action the complicated tissues of dead animals and vegetables are resolved into simple compounds—carbonic acid, ammonia, and water—in which form they serve as nutrition for plants. It is through the production of carbonic acid and ammonia by bacteria, that the demands of vegetation for these compounds can be supplied. Without the carbon and nitrogen compounds resulting from the activities of saprophytic bacteria, the growth of higher vegetation would cease. But the parasites also play a part in no way beneficial to higher organisms. Their host must always be a living animal or vegetable, in which are

present conditions favorable to the development of the parasite. With this development substances are appropriated as nutrition that are essential to the health and life of the tissues in which the parasite is located. At the same time the materials formed as a result of the nutrition of the parasites are direct poisons to the surrounding tissues.

There is a definite fauna of water bacteria from open watercourses over the entire earth. These are saprophytes, and do not induce disease. By their presence in water complex nitrogenous matter is converted into simpler forms, in which it is either taken up as food by the higher inhabitants of the water, or is precipitated to the bottom of the stream by chemical processes, or remains in solution in the water in the form of harmless inorganic salts. In the soil are countless bacteria, the majority of which are concerned in processes of decomposition and disintegration. Of these, certain species are directly instrumental in a specific feature of decomposition—nitrification, i.e. the production of soluble salts of nitric acid from the more complex forms of nitrogenous organic matter. It is through the agency of these organisms, most probably in combination with other organisms that are concerned in the primary process of decomposing the nitrogenous organic matter as such, that the purification of sewage by filtration through the soil is accomplished. It is also due to the activities of the same organisms that ammonia, nitrous and nitric acid are found in water polluted by nitrogenous wastes, and it is these microscopic creatures that are instrumental in perpetuating the niter or saltpeter beds of Chili and Peru. Study of the air has shown that the number of organisms present is in proportion to the amount of floating matters, i.e., the dust; and examination of these dust particles shows them to be covered in most cases with a group of adherent organisms. Individual bacteria alone are probably not present in the air, but, as stated, are deposited upon dust particles. The bacteria found in the air are commonly the ordinary saprophytes, though under certain conditions disease-producing bacteria may be detected not in the open air, but in that of closed apartments occupied by persons or animals suffering from infectious diseases. The bacillus of tuberculosis (consumption) is found in the dust of apartments occupied by consumptives, especially when cleanliness is not rigidly observed—where the expectoration finds its way to the floor and is ground into dry dust. As this expectoration contains the tubercle bacilli, it is easy to conceive of the danger of breathing the dust-laden atmosphere of such rooms. Bacteria can only be swept into the air from dry surfaces, and do not find their way into the air from moist surfaces.

The size of bacteria is indicated in microns (μ), or millionth parts of a meter, and they are usually identified by their shape, size, arrangement, and power of absorbing or resisting certain dyes and coloring solutions. Bacteria invade and destroy the vitality of tissues in which they are located, principally by the production of poisonous products that are of an



BACTERIA.

1. Primary forms of bacteria
2. *Bacillus tetani* from a culture
3. *Gonococcus* in pus cells
4. *Bacillus typhosus* from culture
5. Spiral bacteria with cilia from a putrefying vegetable infusion

6. Yeast—*Saccharomyces*
7. Cocci in groups of eight (*Sarcina*)
8. Spheroidal bacteria (cocci), in pairs (*Diplococcus*)
9. Cocci in chains (*Streptococcus*)
10. *Diplococcus pneumoniae* in blood

11. Mould—*Penicillium*
12. *Spirillum cholerae* in segments
13. *Bacillus anthracis* from a culture
14. Rod-like bacteria (bacilli) with spores
15. *Bacillus tuberculosis* in sputum

albuminous nature. These products are the weapons, so to speak, of the invading foe, and the result of the contest depends mainly upon the power of the tissues to resist the action of these agents; this they do through substances which are chemically of a similar nature to the products of the bacteria, but which neutralize the poisons as fast as formed. Many bacteria are normal inhabitants of various parts of the body—the skin, mouth, intestinal track, etc., teem with them—and though an animal whose intestines have been cleansed of bacteria can live, it appears that the germs usually found there assist the progress of digestion by giving off ferments which act upon the food.

The study of bacteria in disease is by no means the only direction in which bacteriological research is being directed. The employment of bacteria in the industries is an important problem. It is to the activities of peculiar species of bacteria that certain cheeses owe their flavor; it is by bacteria and closely allied forms that many of the organic acids, such as vinegar, are produced, and the part played by the yeast fungus, which though not a bacterium is usually considered with them in the manufacture of beer, ale, and alcohol, is important. Most bacteria are destroyed by a solution of one part of corrosive sublimate to 10,000 of water. Spores are more resistant, and require a long exposure in a stronger solution. Formaldehyde or formalin is an effective disinfectant. In hospitals and quarantine work, dry heat and steam under pressure are generally preferred as bactericides for fabrics and instruments. Among the more common diseases caused by bacteria may be mentioned diphtheria, tuberculosis, typhoid fever, etc. See GERM THEORY OF DISEASE; MICROBES.

Bactria (bāk'trī-ā), or **Bactriana** (bāk-trī-ā'nā), ancient country of central Asia, bounded N. by the Oxus (Amoo or Gihon) and S. by the Hindu Kush Mountains. Its boundaries are not perfectly known; but the country is considered identical with the modern province of Balkh, supposed by some to have been the native country of the Aryan race. Bactria was the center of a powerful kingdom which flourished before the historical period. Its capital, Bactra, or Zariaspa, which stood on the site of the modern Balkh, was the headquarters of the Magi. In the time of Cyrus the Great, Bactria became a Persian province, and was conquered, with the rest of the Persian Empire, by Alexander. In the third century B.C., by the revolt of the satrap Diodotus, it gained independence, and was ruled by a dynasty of Greek origin. In the early Christian centuries it became a powerful seat of Buddhism. With Bokhara, to which it was subject, it passed under Russian control abt. 1868.

Bacup (bāk'ūp), town of Lancashire, England; 22 m. N. of Manchester; has extensive cotton factories, foundries, and dye works; coal mines in the vicinity. Pop. (1901) 22,505.

Bad'-Lands (called *Mauvaises terres pour traverser* by the French explorers, from the

irregularity of the surface), as a specific geographical name, refers to an extensive region lying partly in S. Dakota and partly in Nebraska, between the N. Fork of the Platte and the S. Fork of the Cheyenne rivers. It afforded the refuge of a natural fortress to the Sioux Indians in their wars with the U. S. and is famous for the palæontological work done there by geologists.

Badajoz (bäd-ä-hös'), or **Badajos'**, ancient *Pax Augusta*, fortified town of Spain; capital of province of same name; on the Guadiana; 132 m. E. of Lisbon. The river is crossed here by a granite bridge of twenty-eight arches. The town contains an old cathedral, an arsenal, and a cannon foundry. It has manufactories of soap, coarse woolen stuffs, and leather, and a brisk contraband trade. Badajoz was taken by Marshal Soult in March, 1811. Wellington attempted to retake it in April, but failed. Having renewed the siege in March, 1812, he took it by storm on April 6th ensuing, after a desperate contest, in which the British lost 4,824 men, killed and wounded. Pop. (1900) 30,899.

Badakhshan (bä-däk-shän'), portion of eastern Afghanistan, between Bokhara and Kafiristan, W. of the Pamirs and N. of the Hindu Kush Mountains; includes several valleys of the head streams of the Oxus. Here are ruby mines and massive cliffs or quarries of lapis-lazuli. Iron, salt, and sulphur are also obtained. The people are Mohammedans. Capital, Faizabad.

Baden (bä'dën), anciently called *Therma Helvetica*, i.e., "Helvetian baths"; town and watering place of Switzerland; canton of Aargau; on the Limmat; 14 m. NW. of Zurich. Tacitus mentions it; the Goths despoiled it; the Hapsburgs held it until it became Swiss, 1415. The dispute of Zwingli and Cœcolampadius with Eck was held here, 1526, and the treaty which ended the Spanish Succession War was made here, 1714. In January, 1834, the conference of Baden was held here, in which the representatives of Lucerne, Aargau, Thurgau, Soleure, Berne, Basel city, and St. Gall met to settle the relations of the Catholic Church with these cantons.

Baden-Baden (ancient *Civitas Aurelia Aquensis*), town and celebrated watering place in Baden; in the Oos valley at the foot of the Black Forest Mountains, 23 m. SSW. of Karlsruhe and 6 m. from the Rhine. Here are saline springs, the temperature of which ranges from 117° to 154° F., which have been much resorted to since the time of the Roman emperors. Relics of Roman sculpture and architecture have been found. From the fourteenth century the margraves dwelt here. Pop. (1900) 15,718.

Baden - bei - Wien (bä'dën-bi-vën), ancient *Therma Cetiæ* or *Pannonia*; town and bathing place of lower Austria; on the Schwachat; 12 m. S. of Vienna. Many of the Austrian nobility have mansions here, among them the imperial castle of Weilberg. Small steel tools are the principal manufacture. Pop. (1900) 17,700.

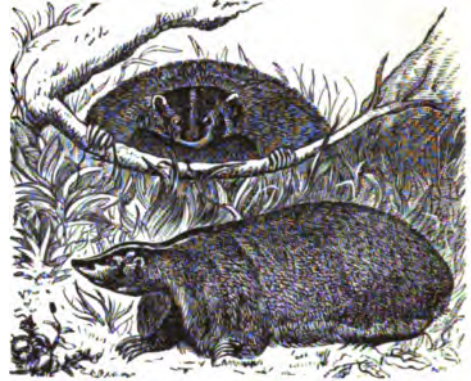
Baden, Grand Duch'y of, state of Germany; bordering on Alsace and Switzerland; bounded N. by Hesse-Darmstadt, E. by Würtemberg, and S. and W. by the Rhine; area, 5,822 sq. m.; pop. (1905) 2,010,728. A long mountain range called the Black Forest (*Schwartzwald*) extends along the E. border. The highest point is the Feldberg, 4,886 ft. The W. part of Baden is a long plain extending along the Rhine from Basel to Mannheim. The chief rivers, besides the Rhine, are the Danube, which rises in Baden, and the Neckar. Among the products are grapes and other fruits, wheat, barley, rye, oats, pulse, potatoes, and tobacco. Good pine timber abounds in the Black Forest. About 14,000,000 gal. of wine are produced annually. The mineral produce consists of salt and building stone. Baden is rich in mineral springs, which are much frequented as watering places, as Baden-Baden, Badenweiler, etc. The manufactures are silk ribbons, hats, brushes, leather, paper, clocks, musical instruments, and machinery. The chief exports are wine and timber. The chief towns are Mannheim, Karlsruhe (the capital), Freiburg, Heidelberg, Pforzheim, and Constance. Hermann II, d. 1130, was the first to assume the title of margrave of Baden. The grand ducal family now reigning in Baden are his lineal descendants. In 1746 Charles Frederick became margrave of Baden, which under his reign increased in extent and importance. He acquired the dignity of elector, 1803, and the title of grand duke, 1806. Baden became, 1870, a state of the German empire, in the federal council of which she has three votes.

Baden-Powell, Sir George Smyth, 1847-98; British diplomat and author; b. in Oxford; commissioner to investigate W. Indian affairs 1882-84; and, 1884, made a tour of investigation in Basutoland, Zululand, S. Africa; came to Canada and the U. S. to prepare a statement of the fishery dispute, 1886-87; knighted, 1887; among other works published, "New Homes for the Old Country: A Personal Experience of the Political and Domestic Life, the Industries, and the Natural History of Australia and New Zealand," which has been called a cyclopedia of Australian knowledge.

Baden-Powell, Robert Stephenson Smyth, 1857- ; British military officer; b. London; served in India, Afghanistan, Zululand, Ashanti, Matabeleland; and signally distinguished himself by his defense of Mafeking, Cape Colony, against the Boers. 1899-1900, for which he was promoted major general; author of several military works; visited the U. S., 1903.

Badeni (bäd-ē'nē), Cassimir Felix (Count), 1846- ; Austrian statesman; b. Poland; early entered Austrian civil service; Minister of the Interior, 1873; Governor of Galicia, 1888, and Prime Minister of Austria-Hungary, 1895; started racial conflict between Germans and Czechs by introducing the "language ordinance," permitting use of the Czech in Bohemia and Moravia.

Badger, carnivorous animal of the family *Mustelidæ*, belonging to the genus *Meles*, *Mydaus*, *Arctonyx*, or *Taxidea*. It attains the size



AMERICAN BADGER.

of a cat or medium-sized dog. The fur of the American badger (*Taxidea americana*) is fine and soft, and is used for muffs and rugs.

Badger, Oscar C., 1823-99; American naval officer; b. Windham, Conn.; entered the navy, 1841; in 1861-62 commanded the *Anacostia* of the Potomac flotilla, was engaged at various times with the batteries on the Potomac; in command of the ironclads *Patapsco* and *Montauk* in their engagements with the forts and batteries of Charleston harbor in the summer of 1863; was acting fleet captain on the flagship *Weehawken* in attack on Fort Sumter, September 1, 1863; promoted commodore, 1881; retired, 1885.

Badia y Lablich (bā-dē'ā ē lā-blēk'), Domingo, 1766-1818; Spanish traveler; b. Barcelona; disguised as a Musselman, and aided by a perfect knowledge of Arabic, he crossed to Africa, 1801, and after two years' residence in Morocco made a tour to Mecca, traveling through Barbary, Greece, Syria, and Egypt; first Christian to visit Mecca since the institution of Islam; returning to Spain, was appointed prefect of Cordova, 1812; published "Voyage d'Ali-Bei en Afrique et en Asie," 1814; d. in Syria on his way to Damascus.

Badlam, Stephen, 1748-1815; American army officer; b. Milton, Mass.; entered the army in 1775; commanded the artillery in Department of Canada; became a Revolutionary officer; took possession of the heights opposite Ticonderoga on the Declaration of Independence; was made brigadier general, 1779.

Bad'minton, seat of the Duke of Beaufort in Gloucestershire, England, from which have been named a kind of claret cup and a game resembling lawn tennis, played with a shuttlecock instead of a ball.

Baedeker (bā'dē-kēr), Karl, 1801-59; German publisher; b. Essen; began publishing, 1827, at Coblenz. As the originator of a celebrated series of guidebooks, his name is known to all travelers. The first guidebook

he published was on the Rhine, 1839; the series now comprises guides to every country visited by travelers, and is published in the principal languages.

Baez (bă'ez), **Buenaventura**, abt. 1810-84; Dominican statesman; b. Azua, president of Santo Domingo, 1849-53; reflected, 1856, 1865, and 1868. The treaties which he signed for the annexation of Santo Domingo to the U. S., and for the cession of Samana Bay failed of ratification in the U. S. senate, and caused his downfall.

Baffin, **William**, d. 1622; English navigator; b. probably in London; accompanied James Hall in an Arctic expedition, 1612, and on a later expedition discovered Baffin Bay, 1616; wrote narratives of these voyages, and gave a new method of ascertaining the longitude at sea by observation of the heavenly bodies; killed at the siege of Ormuz.

Baffin Bay, large gulf or inland sea of N. America; communicates with the Atlantic by Davis Strait, and with the Arctic by Smith Sound. It is about 950 m. long; average width about 300 m.; greatest depth about 1,050 fathoms; shores generally high and rocky, backed by ranges of snow-covered mountains.

Bagatelle (băg-ă-těl'), Italian *bagatella*, trifle; a game resembling billiards. A bagatelle table is usually about 7 ft. long and 21 in. wide, and lined with cloth. The apparatus of the game consists of small ivory balls and a cue.

Bagdad (băg-dăd'), city of Asiatic Turkey; formerly capital of the empire of the caliphs, now capital of the pashalic of Bagdad; on the Tigris; about 60 m. N. of Babylon; river here about 700 ft. wide, and crossed by a bridge of boats; streets narrow, crooked, and dirty; contains about 100 mosques, some of which have beautiful domes and minarets; bazaars filled with European and Turkish native products; formerly a magnificent city, and long the emporium of commerce of the surrounding countries; has manufactures of silk and cotton stuffs and leather; founded by the Caliph Almansur abt. 763 A.D.; in the ninth century enlarged by Harun-al-Rashid; in the tenth and eleventh centuries said to have had 2,000,000 inhabitants. Pop. (1900) 145,000.

Baghot (băj'ót), **Walter**, 1826-77; English publicist; b. Somerset; in 1852 called to the bar, but made banking his lifelong business; editor of the London *Economist*; author "The English Constitution," "Physics and Politics," "Lombard Street," "The Depreciation of Silver"; works posthumously published, "Literary Studies," "Economic Studies," and "Biographical Studies."

Bagirmi (bă-gr'mē), or **Baghir'mi**, sultanate of central Africa; under French influence; SE. of Lake Tchad, on the lower Shari, between Bornu and Wadai; area, 56,600 sq. m.; greatest length about 250 m.; capital, Massenya. Pop. abt. 1,500,000.

Bag'pipe, wind instrument of great antiquity; consists of a leather bag which the play-

er inflates by blowing with his mouth through a tube, or, in some cases, by a bellows worked by the elbow; music proceeds from three or four pipes, whose mouthpieces are inserted into the bag, the wind being forced out by pressing the bag under the arm; one of the pipes, called the chanter, is pierced with eight holes, while the others, or drones, sound each only one continuous low note. The national instrument of the Scottish Highlanders.

Bag'radites, name of a royal family of Georgia and Armenia; of Jewish extraction; began to reign in 748 till 1079; in Georgia ruled the country, 574-994, in direct line, and in collateral branches till 1424.

Bagration (bă-gră'shūn), **Peter Ivanovitch**, Russian general, 1765-1812; descended from the Bagradites; served under Suvarrow in Italy, 1799; in 1805 kept in check for six hours a superior force of French under Murat; led the vanguard at Austerlitz, 1805; rendered important services at Eylau and Friedland, 1807; mortally wounded at Berodino.

Bag'shot Beds, named from Bagshot Heath, Surrey; a British geologic formation of Eocene age. The Eocene rocks of England occupy two basins in the SE. part of the island. The Bagshot beds constitute the upper part of the series in the London basin, where they rest on the London clay. They range in thickness from 200 to 700 ft., and consist chiefly of sand. In the lower part are clays and marls containing marine shells and the remains of sharks and turtles. In districts where much of the formation has been eroded, scattered blocks of the sandstone remain, and the distribution of these "Druid stones" is popularly ascribed to prehistoric races.

Bahama Islands (bă-hă'mă), or **Lucayos** (lŭ-kī'ōs), group of British islands in the Atlantic; NE. of Cuba, from which they are separated by the old Bahama Channel; consists of twenty-six islands, 647 keys, and 2,387 reefs and cliffs, together 3,060 islands and islets, twenty-five of which are inhabited. They extend like a chain for a distance of about 700 m.; climate in winter, mild and salubrious; soil produces maize, cotton, oranges, pineapples, bananas, etc.; area, 5,450 sq. m. Pop. (1907) 59,713. Capital, Nassau, New Providence; names of larger islands, Grand Bahama, Abaco, Eleuthera, New Providence, Andros, San Salvador, Exuma, Long, Crooked, Inagua, and Caicos; San Salvador (or perhaps Watling's island) was the first land discovered by Columbus, 1492; English obtained possession, 1629; chief island politically is New Providence.

Bahia (bă-ē'ă), or **São Sal'vador**, maritime city of Brazil; capital of state of same name, 740 m. NNE. of Rio Janeiro. The name is derived from Bahia de Todos-os-Santos (All Saints' day), at the entrance to which it is situated. The upper part of the city is several hundred feet higher than the lower, and contains the governor's palace, cathedral, and many churches and convents. The harbor is one of the best in America, and admits vessels of the largest size. Bahia is the oldest city of

Brazil, founded, 1549, and was, until 1763, the capital. It is now next to Rio de Janeiro, the largest commercial city of Brazil. Pop. (1902) 230,000.

Bahrain (bā-rān') **Islands** (ancient *Tylos* or *Tylos*), a group of British islands in the Persian Gulf; near the Arabian coast; about 200 m. S. of Bushire. The chief island, Bahrain, is 27 m. long and 10 m. wide, and is surrounded by several small islands. The islands derive their importance from their pearl fisheries, the annual product of which is often \$2,000,000. Area, 270 sq. m. Manama, the capital, on the N. extremity of Bahrain has a good harbor. Pop. abt. 25,000.

Bahr-el-Abiad (bāhr-ēl-ā-bē-ād'), Arabic, "white stream"; an old Arabic name of the White Nile.

Bahr-el-Azrek (-āz-rēk'), Arabic, "blue river"; one of the two great branches of the Nile; unites with the other branch, the Bahr-el-Abiad, at Khartum; course, probably exceeds 1,000 m.; navigable to Fazogl, 1,500 m. from Rosetta.

Bahr-el-Ghazal (-gā-zāl'), *i.e.*, "Gazelle river"; a name applied to two distinct African rivers, and sometimes to the area of their basins, both in the Sudan. One in the E. Sudan joins the Bahr-el-Jebel to form the Bahr-el-Abiad, or White Nile. Its basin is very extensive and rich in river courses. The second is a desert watercourse on the E. side of Lake Tchad. It lies in the district between Wadai and Borku, E. of Kanem and NW. of Dar-Fur. It is a desert area, inhabited by Arabs, and is very little known.

Bahr-el-Yusuf (-yū'sūf'), artificial channel connecting the Nile below Sint with the Fayum, 270 m. long; according to Coptic traditions was constructed by Joseph's direction for irrigation, and is called "Joseph's Canal."

Baiæ (bā'ē), modern *Baja*; an ancient town of Italy, on the bay of same name, in Campania, 10 m. W. of Naples. It was the favorite watering place of the ancient Romans, who were attracted by the beauty of its position and adjacent scenery, the amenity of the climate, and the virtues of its warm mineral springs. Julius Cæsar and Pompey had country houses at Baiæ, and Horace preferred it to all other places. Ruins of ancient temples of Mercury, of Venus, and of Diana, all of which are in reality only parts of Roman baths, are visible in this vicinity.

Baikal (bī'kāl), also called the **HOLY SEA**, lake in S. Siberia, between Irkutsk and Transbaikal; an expansion of the Angara River; about 400 m. long; average width 45 m.; area estimated at 13,200 sq. m.; in some places 300 fathoms deep; receives the Selenga, Barguzin, and other rivers, and discharges by the Angara, an affluent of the Yenisei; is frozen from November to April; has seal and sturgeon fisheries.

Baikie (bē'kī), **William Balfour**, 1825-64; Scotch traveler; b. Kirkwell, Orkney; assistant surgeon royal navy, 1848; surgeon and

naturalist to Niger expedition, 1854, in which he succeeded to the command of the *Pleid*, which was wrecked on the second expedition; he founded a settlement, built roads, opened the Niger to navigation; works include "Observations on the Haussa and Fulfulde Languages," and books on natural history. D. at Sierra Leone.

Bail, word used as a noun and a verb; refers to property, as well as persons, in the custody of the law. It implies safe-keeping or delivery for a special purpose, and may signify the delivery of a person arrested, either on civil or criminal process, from the custody of the sheriff or officer, into the safe-keeping of persons who bind themselves for his appearance in court or obedience to its processes. Again it denotes the persons into whose keeping the party discharged from actual arrest is delivered, also the amount of security given or required for his appearance.

Baile, **Gamaliel**, 1807-59; American physician and philanthropist; b. Mt. Holly, N. J.; aided in founding (1836) the *Cincinnati Philanthropist*, an antislavery journal, which he, although his press was destroyed by a mob, continued till 1847, when he issued the *National Era* at Washington. "Uncle Tom's Cabin" first appeared in this journal.

Bailey, **Nathan**, d. 1742; English lexicographer; kept school at Stepney; in 1721 published "Universal Etymological English Dictionary," the first English dictionary which aimed at completeness, and was the basis of Dr. Johnson's celebrated work; wrote also a "Domestic Dictionary," and other books on education.

Bailey, **Philip James**, 1816-1902; English poet; b. Nottingham; called to the bar 1840; in 1839 published "Festus," a poem which had a wide success; wrote other poems, "The Angel World," afterwards incorporated with "Festus"; "The Mystic"; "The Age," a satire; and "The Universal Hymn."

Bailey, **Theodorus**, 1805-77; rear-admiral U. S. N.; b. Chateaugay, N. Y.; served in the Mexican War, and 1861-62 commanded the frigate *Colorado*, W. gulf blockading squadron; April 24, 1862, commanded the right column of Farragut's fleet in the passage of forts St. Philip and Jackson and at the capture of the Chalmette batteries and the city of New Orleans, where he led the fleet; in command of the E. gulf blockading squadron, 1862-65; promoted rear-admiral and retired, 1866.

Bailie, Scottish law term of several applications; most common and popular is to a superior officer or magistrate of a municipal corporation, with judicial authority within the city or burgh; office in royal burghs is analogous to that of alderman in England.

Bailiff, in Great Britain a deputy of a sheriff or magistrate; also a magistrate of certain towns and a keeper of a castle. Bailiffs arrest culprits, summon juries, and collect fines. Men employed by the sheriff on account of their adroitness and dexterity are called bound bail-

iffs, because the sheriff being responsible for their official misdemeanors, they are annually bound in an obligation with sureties for the due performance of their service. The sheriff himself is the sovereign's bailiff. The term bailiff is seldom used in the U. S.

Bail'ie, Joanna, 1762-1851; Scotch dramatist and poet; b. Bothwell, Lanark; in early life settled in London; published "Plays on the Passions"; "De Montfort," a tragedy; "Basil," a drama; ballads, songs, and other works.

Bailly (bā-yē'), **Jean Sylvain**, 1736-93; French astronomer; b. Paris; published, 1771, "Treatise on the Light of the Satellites of Jupiter"; in 1775, produced the first volume of his "History of Astronomy, Ancient and Modern"; first president of the states-general or national assembly, 1789, and mayor of Paris in July, 1789. He offended the Jacobins by commanding the national guard to fire on a riotous crowd in July, 1791, and resigned office soon after; during the Reign of Terror was proscribed by the Jacobins, and after insulting treatment was guillotined; wrote "Memoirs of the Revolution by an Eyewitness."

Bail'ment, delivery of goods for some particular purpose or trust, or on mere deposit, upon contract, express or implied, that after the purpose has been performed the identical goods shall be redelivered to the bailor, or dealt with according to his direction. If the contract permits the return of an equivalent instead of the thing bailed, there is no bailment, but the transaction constitutes a debt or some cognate engagement.

Bai'ly, Francis D., 1744-1844; English astronomer; b. Newbury, Berks; a founder of the Astronomical Society; improved the "Nautical Almanac" and produced the "Astronomical Society's Catalogue of Stars."

Baily's Beads, a phenomenon attending eclipses of the sun, the unobscured edge of which appears discontinuous and broken immediately before and after the moment of complete obscuration. It is classed as an effect of irradiation.

Bain, Alexander, 1818-1903; Scottish philosophical writer; b. Aberdeen; early in life a weaver; Prof. Natural Philosophy, Andersonian Univ., Glasgow, 1845; Examiner in Logic and Moral Philosophy, Univ. of London, 1857-69; Prof. of Logic, Univ. of Aberdeen, 1860-80; lord rector of same institution, 1881-87. He belonged to the Spencerian or experimental school, and his psychology is physiological. Published works include, "The Senses and the Intellect," "The Emotions and the Will," forming together a complete course of mental philosophy; "English Composition and Rhetoric," 1866, revised and enlarged, 1887-88; "Mental and Moral Science." "Logic, Deductive and Inductive," "Mind and Body: Theories of their Relation," "Education as a Science," "James Mill" and "John Stuart Mill," "Practical Essays."

Bain, Alexander, 1810-77; Scottish electrician; b. Watten, Caithness; invented the electric fire-alarm and sounding apparatus, and the automatic chemical telegraph.

Bain'bridge, William, 1774-1833; American naval officer; b. Princeton, N. J.; commissioned captain 1800, and commanded the frigate *Philadelphia* in the war against Tripoli; was captured and remained a prisoner until peace was concluded, 1805; promoted to commodore; in command of a squadron consisting of the *Constitution*, *Essex*, and *Hornet*; December, 1812, he captured the British frigate *Java*.

Bairam (bī'rām), a Mohammedan feast; begins at the end of the fast of Ramadan; inaugurated with public rejoicings and illuminations; observance commanded by the Koran. Little Bairam occurs seventy days later.

Baird, Spencer Fullerton, 1823-87; American naturalist; b. Reading, Pa.; Prof. Natural History, Dickinson College, 1846-50; assistant secretary Smithsonian Institution, 1850-78; secretary from 1878 till his death; head of U. S. Commission of Fish and Fisheries, 1871. His most elaborate original memoirs are the catalogue of N. American serpents; "Mammals of North America"; "Review of North American Birds," and "History of North American Birds."

Baireuth (b'roit). See BAYREUTH.

Bai'rut. See BEIRUT.

Baja (bā'yā) California, Mexican territory comprising Lower California.

Bajada de Parana (bā-hā'thā dā pā-rā-nā'). See PARANA.

Bajazet (bā-jā-zēt'). See BAYAZID.

Ba'ker, Sir Benjamin, 1840-1907; English civil engineer; b. near Bath; professional training began in Wales; took part in many important engineering works, including the London underground railway; repaired and strengthened the three historical bridges of Telford, the Menai suspension bridge, the Buildwas cast-iron arched bridge, and the masonry bridge over the Severn; in 1877 designed the cylindrical ship in which Cleopatra's Needle was transported. His great work is the Forth bridge, of which Sir John Fowler and himself were the engineers. He was consulting engineer of the Nile reservoir, and to the Chinese Govt. Among his writings, are "Long Span Iron Bridges"; "The Strength of Beams"; "On Timber and Metal Arches"; "Suspension *versus* Cantilever Bridges."

Baker, Edward Dickinson, 1811-61; American lawyer; b. London; emigrated to the U. S. in youth; member of Congress from Springfield, Ill., 1844-46, 1849-51; removed to California, 1852, and became a popular Republican orator; in 1860 was elected U. S. Senator for Oregon; obtained command of a brigade of the Union Army; killed at Ball's Bluff, Va.

Baker, Sir Samuel White, 1821-93; English explorer; b. London; organized an agricultural

colony at Newerra Ellia, Ceylon, 1847, which became a place of importance; went to Africa 1861; explored the W. arm of the Nile, and discovered the Albert Nyanza Lake; suppressed the slave trade and spread the cultivation of cotton in Egypt; wrote "The Rifle and Hound in Ceylon"; "Eight Years' Wanderings in Ceylon"; "The Albert Nyanza"; "The Nile Tributaries of Abyssinia"; "Ismaila"; "Cyprus, as I Saw It"; "Wild Beasts and their Ways."

Baker, Mount, volcano in Cascade range, NW. part of Washington state; height, 11,100 ft.; frequently in eruption; very active in 1880.

Baker's Creek, Bat'tle of. See CHAMPION HILLS.

Bake'well, Robert, 1725-95; English agriculturist; b. Dishley, Leicester; gained distinction by his improvement of domestic animals, especially sheep and horned cattle; originated a breed of sheep formerly called by his name, but now known as the Leicester breed.

Bakhtchisarai (bäk-shë-sä-rí'), Tartar town of Russia; government of Taurida (Crimea); 15 m. SW. of Simferopol; formerly the capital of the Tartar khans, whose palace is a remarkable Oriental edifice.

Bak'ing Pow'ders, substances prepared for use in bread-making in place of yeast. In the fermentation caused by yeast, carbon dioxide is given off, and this makes the bread rise. Baking powders are made of substances that give off carbon dioxide when they are brought together, and the effect thus produced is the same as that produced by yeast. But slight changes are caused by the yeast that may be of importance in determining the quality of the bread. Most baking powders are made of tartaric acid and bicarbonate of soda mixed with starch. As substitutes for the somewhat expensive tartaric acid other substances are often used. Among these alum is perhaps the most prominent, but its use should be avoided.

Baku (bä-kó'), a seaport of Asiatic Russia; capital of a government of the same name; on W. shore of the Caspian Sea, and on S. side of the peninsula of Apsheron; 550 m. from Batum on the Black Sea. In the neighborhood are some 500 oil wells which, with the refineries, give employment to over 5,000 persons. The spacious harbor is strongly fortified. The city and vicinity were scenes of serious disturbance in the revolutionary outbreaks following the close of the Russo-Japanese War. Pop. (1900) 179,133.

Bakunin (bä-kü'nën), Michael, 1814-76; Russian agitator and earliest advocate of Nihilism; b. Torschok, government of Tver; ensign in the artillery, but resigned and devoted himself to science; in 1841 went to Berlin, later to Dresden, and finally (1843) to Paris; advocated a Russian republic; on demand of Russia expelled from France; took part in all the revolutions of Europe; sentenced to death in Austria, delivered up to Russia and exiled to

Siberia; escaped through Japan and the U. S. to England; organized (1869) the social democratic alliance, which was absorbed in the international; was expelled from the latter (1872) by the Marx faction.

Balaam (bä'läm), heathen prophet; son of Beor, prophet of Pethor, in Aram, by the Euphrates; hired by Balak, King of Moab, to curse Israel, but instead blessed them; later advised the Moabites to invite the Israelites to the licentious worship of their god Baal Peor. In punishment of their transgression God sent a plague which slew 24,000 Israelites. When the plague was stayed Israel fought Moab, and in the general overthrow Balaam fell. The narrative is found in Num. xxii-xxv, xxxi.

Balaguer (bä-lä-gär'), Victor, 1824-1901; Spanish poet and historian; b. Barcelona; known for his investigations of the early literature and history of Catalonia; in 1854 archivist of Barcelona, and professor of history in the university. As poet he treated mainly subjects drawn from his native province.

Balakireff (bä-lä-ki-rëff'), Mily Alexejevitch, 1836- ; Russian musician; b. Novgorod; conductor of the opera in Prague, and of the imperial concerts in St. Petersburg; compositions include overtures and symphonies for full orchestra, and much piano music. His fantasia "Islamey" has the reputation of being the most difficult piano composition ever written.

Balaklava (bäl-ä-klä'vä), or Balacla'va, small port and town of Russia, in the Crimea, on Black Sea, abt. 7 m. S. from Sevastopol; separated from the harbor of Sevastopol by a rocky peninsula. Here occurred the battle between the British and Russians, October 25, 1854, ending in the repulse of the Russians. The famous "Charge of the Light Brigade" occurred during this battle.

Balamban (bä-läm'bän), town of the Philippines, on W. coast of Cebu and on Taon Strait; taken from the Filipino insurgents by American troops after sharp engagement, January, 1900.

Bal'ance, a lever of the first kind, the fulcrum being between the power and the weight; used to ascertain the weight of bodies in standard units. The ordinary balance consists essentially of a metallic bar or lever, called the beam, suspended or supported on a stand by the intervention of a wedge-shaped prism, technically termed a knife-edge, exactly at its middle point. An index is fixed at right angles to the beam, and travels over a graduated arc, so as to show when the beam is horizontal. A scale pan is suspended from each end of the lever. Since the arms of the balance are equal, there cannot be equilibrium unless the weights placed in each scale are also equal. When this is the case, the beam is perfectly horizontal and the index vertical. The sensibility of a balance becomes greater, first, as the length of the arms is increased, which renders the movement about the fulcrum more obvious;

and secondly, as the weight of the beam is diminished, for when the beam is displaced by the inequality of the weights, its own weight gives it a tendency to return to its first position. But this displacement is less for a given inequality in the weights as the weight of the beam is increased; so that the less the beam weighs, the more sensitive the balance becomes. The sensitiveness of the balance also depends on the distance between the point of suspension and the center of gravity, the sensitiveness increasing as the distance diminishes.

Balance of Pow'er, a phrase used in modern European diplomacy to express a state of political equilibrium among neighboring powers, or a political system so arranged and counterpoised that no nation or monarch may be so powerful as to endanger the independence of other states. Such a balance was aimed at in the political combinations in behalf of Greece; in those of Italy just before the Reformation; in the policy of Europe under the lead of France against Austria and Spain; in the alliances against Louis XIV, against Napoleon I, and more recently against Russia in order to preserve the independence of Turkey. It was the characteristic justification of the foreign policy of William III of Great Britain, who shaped it into a European principle. Its object is to prevent *political aggrandizement* only. There were in Europe, after the overthrow of Napoleon in 1815, five monarchies recognized as the great powers—namely: France, Austria, Great Britain, Russia, and Prussia, to which, in 1859, the kingdom of Italy was added. The victories of the Prussians in 1866 and 1870 established the German empire, and for a time prostrated the armies of France and Austria. But now the military and political reestablishment of these two powers has given rise to a fresh application of the balance of power principle. This is seen in the Tripartite alliance—a defensive treaty of alliance whereby Germany, Austria, and Italy on the one hand are balanced against France and Russia on the other.

Balance of Trade, the difference in value between the exports and imports of a country. If the country's exports exceed the imports in value, the balance of trade is said to be in its favor, and it is assumed that such a country is growing rich, just as a man grows rich when he produces more than he consumes. In point of fact, a fall in imports does not denote prosperity to the extent which is often assumed. In one sense the true advantage of foreign trade to a country is found in the imports. By its means people obtain those things which they cannot themselves produce, except at great sacrifice. The customhouse statistics are fallacious at this point, because they represent the value of the goods in the exporting country, not their value to the importing country. In this sense both nations may gain by international trade.

The balance of trade does not consist of the simple difference between exports and imports. Many other elements enter into a nation's accounts. Some of the chief items are as follows:

INCOME	EXPENSE
Exports.	Imports.
Payments by foreigners to home shipowners.	Payments to foreign shipowners.
Interest from foreign investments.	Interest on securities owned abroad.
Receipts from foreign travelers and immigrants.	The expenses of travelers abroad.

The difference between these two is the balance of trade, properly speaking; but as this balance may be settled either in cash or by securities, another important factor is brought in. It will quite generally be found that the years when our balance of trade appears most favorable are those when Europe is sending our securities home to us in large numbers; and that the apparent favorable result means a loss, rather than a gain, in the productive resources of the country, because of the unwillingness of foreign investors to continue to aid us with their capital.

Bal'anus, a genus of barnacles, distinguished by the absence of a flexible stalk and the possession of a symmetrical shell; commonly known as "acorn-barnacles"; are found in nearly all seas, attached to stones, shells and other objects; some are used as food.

Balasore (bäl-ä-sör'), district and city of the Orissa division, Bengal, British India; a strip of alluvial coast land, near the head of the Bay of Bengal; area, 2,066 sq. m.; pop. abt. 950,000. The city and capital of the district is 8 m. from the seacoast, on the Buralang River. A British settlement was made here 1642, and became one of the seats from which the British Indian Empire took its rise. Pop. of city abt. 20,000.

Balaton (bäl-lö-töñ'), Lake, largest lake in Hungary; 55 m. SW. of Pesth; 51 m. long and 7 m. wide; area estimated at 450 sq. m.

Balbi (bäl'bē), Gasparo, Venetian merchant of the sixteenth century; made a trip to India, the published account of which, 1590, was the first description of India beyond the Ganges.

Balbo (bäl'bö), Cesare, 1789-1853; Italian statesman and author; b. Turin. He was in government service 1807-21; advocated the independence of Italy in "Speranze d'Italia" ("Hopes of Italy"), which extended his reputation. As a moderate and liberal patriot took a prominent part in the revolution of 1848. Among his works is a "History of Italy from the Beginning to 1814."

Balboa (bäl-bö'ä), Vasco Nuñez de, 1475-1517; Spanish navigator and explorer; b. Xeres de los Caballeros, Estremadura; emigrated to Haiti abt. 1500, and, 1510, accompanied Enciso in an expedition to Darien; obtained chief command, and September 25, 1513, discovered the Pacific Ocean from the top of a mountain. He descended to the shore and took possession in the name of the sovereign; was superseded by Pedrarias Dávila, who accused Balboa of treasonable designs, and put him to death.

Bal'bus, L. Cornelius, surnamed MAJOR, Roman officer; b. Gades (Cadiz); became an intimate friend of Cæsar, whom he accompanied to Spain, 61 B.C.; in 40 B.C. chosen consul, being the first adopted citizen who received that honor; wrote a diary of the events of his own life and Cæsar's.

Baldachin (bäl'dä-kin), canopy raised over a throne, couch, pulpit, or altar. The baldachin is used in processions of the Roman Catholic Church, one of silk supported on four poles being carried over the pope.

Bald Ea'gle. See EAGLE.

Balderic (bäl'dér-ik), or **Baudry** (bō'drē), French chronicler, Bishop of Dol; b. about the middle of the eleventh century; took part in all the Church councils, and made efforts to restore monastic discipline; wrote a chronicle of the first crusade, entitled "Historiæ Hierosolomytanæ."

Bald'ness, or **Alope'cia**, the loss or absence of hair of the scalp. There are few cases of congenital baldness. Accidental baldness is caused by atrophy of the hair follicles. Baldness in the young may occur from wearing unventilated headgear, which, by preventing evaporation, occasions an unhealthy state of the skin. It may be complete or partial, occurring in patches (*alopecia areata*). Senile baldness (*calvitias*) also arises from atrophy of the hair follicles. It generally commences on the crown of the head. Women are not so frequently bald as men. The causes of baldness are defective nutrition, a hereditary tendency, dissipation, but especially old age. Too much shampooing, and the use of so-called hair tonics, also tend to destroy the hair. The hair falls off after severe illnesses or after other causes of general debility. Following fevers, baldness is always temporary, though it may be severe. The treatment consists in cleanliness and in exciting the circulation of the scalp by massage or brushing, and the application of stimulants, such as cantharides ointment. But if the falling is due to inflammation of the hair follicles stimulating applications will aggravate the condition. Any course of debility should be remedied. Shaving the head is often useful. Favus permanently destroys the hair.

Bald'pate, or **American Wid'geon** (*Mareca americana*), duck found throughout N. America, breeding to the southward, and prized for the delicacy of its flesh; takes its name from its white crown.

Baldr, **Bal'der**, or **Bal'dur**, often called BALDR THE GOOD; second son of Odin, in the N. mythology; was supposed to make all things bright and cheerful, and is identified by some scholars with the bright summer sun; hence termed the Apollo of the North; slain through the machinations of Loki, the god of evil, and forced to remain in the realms of death.

Bald'win, name of several kings of Jerusalem, of whom the most important were: BALDWIN I, 1058-1118; brother of Godfrey of Bouillon; joined the first crusade, 1096; chosen Count of Edessa by the Christian inhabitants

of that city; on the death of Godfrey, 1100, succeeded him as King of Jerusalem; defeated the Saracens in several battles, and captured Acre, Cæsarea, and Sidon. BALDWIN II (Baldwin du Bourg), d. 1131; cousin of Baldwin I, whom he succeeded, 1118; waged war against the Saracens. During his reign the military order of Templars was instituted for the defense of the Holy Land; left the throne to his son-in-law, Foulques of Anjou.

Baldwin I, 1171-1206; first Latin emperor of Constantinople; b. Valenciennes; was Baldwin IX, Count of Flanders; joined the fourth crusade, 1200, and cooperated with the Venetians against Constantinople, which was occupied by Alexis, an usurper. The crusaders captured the city, and elected Baldwin emperor, 1204. He was defeated and taken prisoner by the Bulgarians, 1205, and died in captivity, leaving the throne to his brother Henry.

Baldwin II, 1217-73; emperor of Constantinople; son of Peter de Courtenay; nephew of Baldwin I; succeeded to the throne, 1228, and was placed under the guardianship of John de Brienne; began to reign 1237. In 1261 his capital was taken by Michael Palæologus, and Baldwin fled to Italy.

Baldwin, Robert, 1804-58; Canadian statesman; b. Toronto; elected to the upper Canada assembly, 1829; executive councilor, 1836; solicitor-general, 1840; premier and attorney-general of upper Canada, 1842-43; resumed office in the Baldwin-Lafontaine government, 1848; retired from official life, 1851; regarded as the father of the reform party in Canada.

Bale (bäl), or **Basle**, French form of Basel (*q.v.*).

Balearic (bäl-ē-är'ik) **Isles**, group of five islands in the Mediterranean, forming a Spanish province; the area 1,935 sq. m.; pop. (1900) 311,650. Capital, Palma. Their names are Majorca, Minorca, Iviça, Formentera, and Cabrera. The soil is mostly fertile, though badly cultivated. The climate is excellent. The kings of Spain long retained the title of "King of the Balearic Islands," as one of their secondary honors.

Baleen (bä-lēn'), substance commercially known as whale-fin and whalebone; procured from the mouth of the whale; consists of horny plates, which take the place of teeth.

Balen (bä'lēn), or **Bal'en**, **Hendrik van**, 1560-1632; Flemish painter; b. Antwerp; the first instructor of Vandyck; best known works, scriptural and ecclesiastical pieces.

Balestra (bä-lēs'trā), **Antonio**, 1666-1740; Italian painter; b. Verona; among his famous pictures are, "Defeat of the Giants"; "Saint Theresa" at Bergamo; "Life of Saints Cosmas and Damian" at Padua, and his own portrait at Florence; one of the last able artists of the Venetian school.

Balfe (bälf), **Michael William**, 1808-70; Irish composer; b. Dublin; became, while young, one of the most popular stage composers of the period; his operas include "The Siege

of Rochelle"; "The Bohemian Girl"; "The Daughter of St. Mark"; "The Enchantress"; "The Rose of Castile"; "Satanella"; "The Armorer of Nantes"; "Blanche de Nevers"; "The Knight of the Leopard," produced in Italian as "Il Talismano"; also composer of "Come into the Garden, Maud," and other favorite songs, cantatas, and concert choruses.

Balfour (bäl'föor), **Arthur James**, 1848–; British statesman; b. Whittinghams, Scotland; private secretary to his uncle, the Marquis of Salisbury, 1878–80, as such attended the Berlin Congress; member of Parliament for Hertford, 1874–85; for E. division of Manchester, 1885–1905; for city of London, 1906; privy counselor, 1885; president Local Governing Board, 1885–86; secretary for Scotland with seat in cabinet, 1886; and lord rector St. Andrew's Univ., 1886. As chief secretary for Ireland, 1887–91, he carried the Crimes Act through Parliament; lord rector Glasgow Univ., 1890; chancellor Edinburgh Univ. since 1891; leader House of Commons and First Lord of the Treasury, 1891–92, 1895–1905; leader of opposition, 1892–95. As Prime Minister, 1902–5, he introduced the Education Bill; author of "Defense of Philosophic Doubt," "Essays and Addresses," "The Foundations of Belief," "Economic Notes on Insular Free Trade," etc.

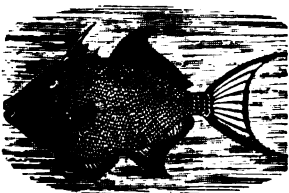
Bali (bä'le), or **Bal'y**, Dutch dependency; island of the Malay Archipelago; about 3 m. E. of Java; area, 1,999 sq. m.; nearly 70 m. long; is divided into several small states, of which Badong is the chief. Pop. 500,000.

Baliol (bä'li-öl), or **Bal'liol**, **Edward**, d. 1367; King of Scotland; son of King John Baliol; invaded Scotland, 1332, at the head of discontented barons; having gained several victories over the Scottish army, was crowned king at Scone in September of that year; about three months later was surprised in his camp at Annan by Archibald Douglas, and compelled to give up his crown.

Baliol, or **Bal'liol**, **John**, abt. 1249–1315; Lord of Galloway and King of Scotland; became the rival of Robert Bruce, and claimed the crown as a grandson of David, brother of William the Lion. Edward I of England, as arbiter, decided that Baliol was the rightful heir. He was crowned, 1292, and swore fealty to Edward, but soon renounced his allegiance. Edward invaded Scotland and compelled him to resign the crown, 1296.

Baliol Col'lege. See OXFORD, UNIVERSITY OF.

Balistidæ (bäl-is'ti-dæ), trigger fishes; family of scleroderm fishes with the pelvic bone well developed and without ventral spines, and with the spinous dorsal represented by three spines; mostly found in tropical or subtropical seas; typical species (*Balisti-*



TRIGGER-FISH: BALISTES.

dæ) have a curious provision for fixing the first dorsal spine in an erect position or lowering it at will. For this reason they are sometimes called trigger fishes.

Balistraria (bäl-is-trä'r'i-ä), **Arbalestria** (är-bäl-ës'tri-ä), or **Arbalisteria**, narrow apertures in the walls of a fortress for the discharge of arrows from the crossbow; often cruciform.

Balkan (bäl-kän'), ancient *Hæmus*, mountain chain of Europe; extends from Sofia eastward to Cape Emineh on the Black Sea, and forms the S. boundary of the basin of the Danube. Some peaks of this range are over 5,000 ft.; connected with the mountains of middle Europe by the ranges of Montenegro and Herzegovina.

Balkan Penin'sula, extreme E. of the S. peninsulas of Europe, so named from the Balkan Mountains within it; lies between the Black and *Ægean* seas on the E., and the Adriatic and Ionian on the W.; N. boundary not well defined, but may be taken as the Danube and its tributaries, the Save and the Una; thus defined, it is almost entirely surrounded by water, and includes Bosnia, Herzegovina, Montenegro, Servia, Bulgaria, Rumelia, Turkey in Europe, and Greece. The Balkan Peninsula has played an important part in history. The Greeks, the Macedonians, the Byzantines, and the Turks have alternately advanced or retarded civilization within its borders. The Turks formerly controlled the whole peninsula. Successive revolts and, invasions, especially in recent years, have given a more or less complete autonomy to its various races. Servia, Montenegro, and Greece are independent; Bosnia and Herzegovina were annexed in 1908 by Austria-Hungary; Bulgaria in the same year became independent of Turkey; the remainder of the peninsula is Turkish, but the Albanians are practically independent.

Balkash (bäl-käsh'), lake of Asiatic Russia having no visible outlet; between the provinces of Semipalatinsk and Semiryetshensk; length 390 m.; greatest breadth 50 m.; area, 7,120 sq. m.; elevation above sea level, 781 ft.

Ball, **John**, d. 1381; English priest, repeatedly excommunicated for false teaching; a leader in Wat Tyler's rebellion; was hanged, drawn, and quartered; considered a precursor of Wyclif.

Ball, **Sir Robert Stawell**, 1840–; British astronomer; b. Dublin; Prof. of Astronomy at Dublin and Astronomer Royal for Ireland, 1874; Prof. of Astronomy, Cambridge, and Director of the Observatory, 1892; president Royal Astronomical Society, 1897; knighted, 1886; author of "Experimental Mechanics"; "Elements of Astronomy"; "The Story of the Heavens," etc.

Ball, **Game of**, a favorite gymnastic exercise among the ancient Greeks and Romans, the latter of whom called it *pila*. At Rome it was played by persons of all ages and by

men of high rank. The Greeks prized the game as the means of giving grace and elasticity to their figures and motions. In the sixteenth century this game was fashionable in the courts of French and Italian princes. The French *jeu de paume* and English *tennis* were modifications of the game of ball. The ball was struck with a mallet (French *mail* or *maille*; English *mall*), sometimes called pall-mall or pell-mell, from the Italian *palla*, a ball. A form of this game, called *cricket*, is much played by the English. The popular game of the U. S. is baseball.

Bal'lad, narrative song; short tale in lyric verse, which sense it has come to have, probably through the English, in some other languages; word means, by derivation, a dance song, but though dancing was formerly, and in some places still is, performed to song instead of instrumental music, the application of the word in English is quite accidental. The popular ballad, for which our language has no unequivocal name, is a distinct species of poetry. Its historical and natural place is anterior to the appearance of the poetry of art, to which it has formed a step.

Ballade (bā-lād'), the earlier and modern French spelling of "ballad" but now limited in its use to a distinct verse form introduced into English literature of late years from the French, and chiefly used by writers of *vers de société*. It consists of three stanzas of eight lines each, with an "envoy," or closing stanza, of four lines. The rhymes, which are not more than three, follow each other in the stanzas thus: a, b, a, b; b, c, b, c; and in the envoy, b, c, b, c; and the same line serves as a refrain to each of the stanzas and to the envoy. There are other varieties, but this may be regarded as the strictest.

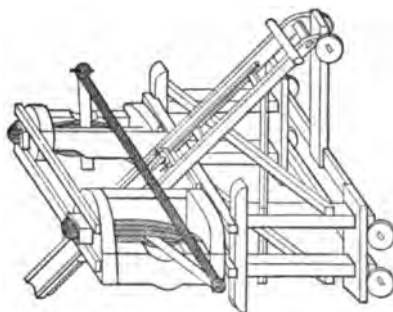
Ballarat (bāl-lā-rāt'), Australian city and gold field in Victoria; 75 m. WNW. of Melbourne; gold mines, opened in 1851, among the richest in the world. Pop. (1907) 48,607.

Bal'last, material carried by a ship or other vessel to increase its stability; in railroad engineering, material placed below and around the cross-ties of a track, such as gravel, cinders, furnace slag, or broken stone to make a solid roadway over which trains may pass smoothly, to secure quick and thorough drainage, and to prevent the formation of dust.

Ballet (bāl-lā'), a dramatic or theatrical exhibition of dancing and pantomime, with music; a species of dance usually forming an interlude in theatrical performances, but confined principally to operas. The ballet has resemblance to the pantomimic sacrificial dances of the ancient Greeks, among whom were dancers who expressed actions and passions by rhythm applied to gesture. The ballet was introduced into France under the auspices of Catherine de Medici abt. 1580. Noverre abt. 1770 made improvements in it, to which he gave an independent dramatic form.

Bal'liol. See BALIOL.

Ballista (bāl-lis'tā), or *Balis'ta*, military engine used to propel large stones or other heavy



BALLISTA.

missiles; probably originated with the ancient Romans, who used it in the siege and defense of fortified places.

Ballis'tic Galvanom'eter, galvanometer which measures electrical quantity by means of its first oscillation, instead of measuring electric current by its permanent deflection; term refers rather to the method of using a galvanometer than to the type of instrument employed.

Ballistics, that branch of dynamics which treats of the circumstances of motion of projectiles from the instant of ignition of the powder charge to that at which the projectile comes to rest. *Interior ballistics* attempts to determine the intensity of the pressure of the powder gases in the bore of the gun, and the law of variation in this arising from differences in the quantity, composition, density, size of grain and density of loading of the powder, and the weight and frictional resistances of the projectile. It also attempts to determine the law of variation in the motion of the projectile and its velocity at any point of the bore of the gun, under the varying pressure of the powder gas, the friction of the projectile, and the resistances of inertia arising from its acceleration in motion of translation and rotation. *Exterior ballistics* deals with the circumstances of the motion of the projectile between the instant at which it leaves the muzzle of the gun and that at which it comes to rest; also the amount of and law of variation in the resistance of the atmosphere, and its effect in retarding projectiles of different weight and form, moving with different velocities; as well as in producing "drift" or lateral deviation in rifled projectiles. See ELECTRO-BALLISTICS, PROJECTILES.

Balloon', a baglike receptacle filled with some gas lighter than air, and with a car attached for aerial navigation. Balloons depend for their success upon the fact of their being lighter than air, thus differing from flying machines, which are heavier than air. One great difficulty in ballooning is that of supporting in midair a sufficient weight of machinery to provide the necessary power for propelling and steering purposes. The navigation of the air by means of the balloon dates

only from nearly the close of the eighteenth century. In 1766 Henry Cavendish showed that hydrogen gas was at least seven times lighter than ordinary air, and it at once occurred to Dr. Black, of Edinburgh, that a thin bag filled with this gas would rise in the air, but his experiments were for some reason unsuccessful. Some years afterwards Tiberius Cavallo found that a bladder was too heavy and paper too porous, but in 1782 he succeeded in elevating soap bubbles by inflating them with hydrogen gas. In this and the following year two Frenchmen, the brothers Stephen and Joseph Montgolfier, acting on the observation of the suspension of clouds in the atmosphere and the ascent of smoke, were able to cause several bags to ascend by rarefying the air within them by means of a fire below. These experiments roused much attention at Paris; and, soon after, a balloon was constructed under the superintendence of Prof. Charles, which, being inflated with hydrogen gas, rose over 3,000 ft. in two minutes, disappeared in the clouds, and fell after three quarters of an hour about 15 m. from Paris. These Montgolfier and Charles balloons already represented the two distinct principles in respect to the source of elevating power for balloons, the one being inflated with common air, and thus rendered permanently buoyant. Both forms were used for a considerable time, but the greater safety and convenience of the gaseous inflation finally prevailed. After the use of coal gas had been introduced, it superseded hydrogen gas, as being much less expensive, though having a far less elevating power. The first person who made an ascent in a balloon was Pilatre de Rozier, who ascended 50 ft. at Paris in 1783 in one of Montgolfier's. A short time afterwards M. Charles and M. Robert ascended in a balloon inflated with hydrogen gas, and traveled a distance of 27 m. from the Tuileries; M. Charles by himself also ascended to a height of about 2 m. Since then a multitude of ascents and aerial voyages have been made, with, strange to say, comparatively few disastrous results. Among the names of the earlier balloonists we may mention Lunardi, who first made an ascent in Great Britain (September, 1784), unless we assign this honor to J. Tytler ("Balloon" Tytler), who seems to have made two short ascents from Edinburgh in the preceding month; Blanchard, who, along with the American, Dr. Jeffries, first crossed the Channel from Dover to Calais, in January, 1785; Garnerin, who first descended by a parachute from a balloon in October, 1797; and Gay Lussac, who reached the height of 23,000 ft. in September, 1804. In 1836 a balloon carrying Messrs. Green, Holland, and Mason traversed the 500 m. between London and Weilburg in Nassau in eighteen hours. In 1859 Mr. J. Wise, chief of American aeronauts, accompanied by several others, rose from New York, and landed, after a flight of 1,150 m., in twenty hours. In September, 1862, the renowned aeronaut, Mr. Glaisher, accompanied by Mr. Coxwell, made an ascent from Wolverhampton, and reached the estimated elevation of 37,000 ft., or 7 m., a height far greater than any other yet attained, if it can be de-

pended on as exactly ascertained. But the aeronauts were for a time in great peril, Mr. Glaisher having become insensible, and Mr. Coxwell having his hands so severely frozen that he was unable to pull the valve for descent, and was compelled to use his teeth. It is claimed that the greatest really authentic height—35,000 ft.—was attained by two German aeronauts at Berlin in 1901. The most daring attempt at an aerial voyage was that of the Swede, Andrée, who, with two companions, in 1897 ascended from Spitzbergen in hopes of reaching the North Pole, their fate remaining unknown.

All the features of the ordinary balloon as now used are more or less due to Prof. Charles, already mentioned. The balloon is usually a large pear-shaped bag, made of pliable silk cloth, covered with a varnish of caoutchouc dissolved in oil of turpentine to render it air tight. The ordinary size may range from 20 to 30 ft. in equatorial diameter, with a proportionate height, but balloons of far greater dimensions have been constructed. A car, generally of wicker work, supported by a network which extends over the balloon, contains the aeronaut; and a valve, usually placed near the top, and to which is attached a string reaching the car, gives him the power of allowing the gas to escape, whereby the balloon is lowered at pleasure. A quantity of sand ballast in small bags is usually taken, and, when the balloon tends to descend too far, sand is thrown out and it rises again. The "guide rope," a long and heavy rope trailing over the ground, is sometimes used when the country is such that no serious damage will result from its trailing. The principle of this device is that as the balloon tends to rise it must lift more of the rope off the ground, while when the balloon sinks it is relieved of so much weight, and thus it will tend to float at one level above the ground. A parachute, a contrivance resembling a huge umbrella, is often used in ballooning, and by its means an aeronaut can leave a balloon and descend slowly to the ground.

The problem of how to steer or propel a balloon in a desired horizontal direction can scarcely be said to have been satisfactorily solved, though numerous attempts at producing navigable balloons have lately been made. In a navigable balloon to be propelled through the air by some kind of motor—against the wind if necessary—the familiar balloon shape is departed from as quite unsuitable, and the "air ship" is usually of an elongated form and more or less cylindrical or cigar-shaped. Balloons of a fish or cigar shape, floated by gas and propelled by a screw driven by a dynamo-electric machine, and steered by a large rudder, made several ascents in Paris in 1884 and 1885, and being generally able to return to the starting point, at the time it was claimed for them that they had settled the question of balloon steerage, but this did not prove to be the case. The names of Count Zeppelin and M. Santos Dumont have recently become well known in connection with such balloons. In 1897-1900 the former constructed a huge cylindrical air ship of great length,

with paraboloid ends, divided into a number of separate chambers filled with hydrogen gas and these enclosed in an outer air balloon, the whole being braced and made rigid by an aluminium framework, and the means of propulsion being screws driven by Daimler petroleum motors and fixed to the longitudinal axis of the air ship. The success of this great structure, even after various improvements were introduced, appears to have been only partial, and want of sufficient funds brought operations to a stop, at least for the time being. M. Santos Dumont has constructed several navigable balloons, and one of them was so successful at Paris in 1901 as to gain a prize of 100,000 francs. On this occasion his airship made the journey from St. Cloud to the Eiffel Tower and back again, a distance of about 9½ m., in half an hour. MM. Lebaudy, of Paris, have also made some very successful trips with a dirigible balloon; that is, one that can be steered or directed—to some extent, at least. In 1903-4 a large air ship was constructed by Dr. F. A. Barton at Alexandra Park, London. This structure had a bamboo framework suspended below it, connected with which was the propelling machinery, two engines, each of 4.7 indicated horse power, driving a series of fans, there being a large square sail serving as a rudder. So far no better results seem to have been attained with this than with some other air ships. In 1905 an improved form of this air ship was experimented with, the name Barton-Rawson air ship being now given to it. In this form it consisted of a silk balloon 180 ft. long and 40 ft. in diameter, with a bamboo car 127 ft. long and 18 ft. high, carrying a 50-horsepower motor at either end driving four propellers 7 ft. in diameter and revolving at a high speed, the total weight being about 14,000 lbs. The longest distance balloon flight was made in 1900 by Count de la Vaulx, who went from Paris to Kovostyeff, Russia, about 1,200 m. In 1905 Mr. Paul Tissandier and Count de la Vaulx made a journey of 630 m. in twenty hours. Count Zeppelin, in 1909, with his dirigible balloon made an 850-m. flight in thirty-seven hours. This is conceded to be a great triumph in the construction of navigable balloons. See FLYING MACHINES.

Balloon Fish, name of various fishes of the families *Tetraodontidæ*, *Diodontidæ*, and *Triodontidæ*; so named from the power which they possess of inflating their stomachs with air, and thus floating, belly upward, on the surface of the water for the purpose of evading pursuit.

Ballot, originally a little ball used in secret voting. In modern times it is applied to the ticket or printed paper which the voter uses at an election, and the practice of secret voting is called voting by ballot. The tickets are deposited in a wooden box called the ballot box. The other mode of voting, common in ordinary business meetings, is called *à viva voce*, by the living voice. In the election of members of social clubs ballots or balls are commonly used. A person who is rejected on such occasions is said to be blackballed, black balls

being used by those who vote in the negative. The ancient Greeks elected their magistrates or decided political questions by secret vote, for which purpose they used shells of different colors. In Athens, those who voted to ostracize a citizen presented his name written on an earthen tablet; in Syracuse, an olive leaf was used. Elections in Great Britain were conducted *à viva voce* until 1872, when a ballot act was passed by Parliament, and now all the elected members of that body are elected by ballot. In all of the elections in the U. S., and in many foreign countries, it has been the custom for the candidate, or his party, to provide printed slips of paper containing the names of the candidates to be presented to the voters. The voter, after making his selection among the tickets, folds his ballot and presents it to the election officers, or himself places it in the ballot box without revealing its purport. The importance of the interests at stake, however, and the consequent influence that was brought to bear upon the voters, led in very many cases to intimidation and fraud. Further, the expense involved in the printing of tickets by political parties and by candidates led to the practice of raising large sums of money, ostensibly for the purpose of paying these legitimate expenses, but was really for purchasing votes. Another form of fraud, at times practiced, was the voting of ballots printed on light but stiff tissue paper, a large number of which might be folded inside of one printed upon ordinary paper without detection. The practice of repeating, or of casting a vote in several districts in the same city, was another common method of fraud. The most efficient safeguard yet attempted is the Australian ballot system, the essential features of which are the arrangement and control of the polling places, the inclosed polling booth, and the official ballot. It is in use in all Australasia, where it was first used. Canada and nearly all the U. S. have adopted the system or some modification of it, while Europe, Belgium, Italy, Greece, Norway, Great Britain, and Luxembourg have similar systems. The expenses of preparing, printing, and distributing the official ballots are all borne by the state or the local government. The system at its best permits the use of no ballots except the official ones; and these, prepared and printed under the direction of election officers, are given out only within the polling places, one to each voter, as needed. The election districts are as a rule made small, so that the voters in each may be readily known and may all vote in one day without undue haste. The voter prepares his ballot in a booth screened from observation. Ballot machines are used to some extent. By means of these a man votes by pushing a knob or knobs, voting a straight or a split ticket without possibility of a mistake. An act for the prevention of corrupt practices in elections was passed by the British Parliament, 1854, and has since been supplemented by others. Canada profits by the same, and similar acts have been passed in several states of the American Union. See ELECTION, VOTING MACHINE.

Ball's Bluff, in Loudon Co., Va.; on the right bank of the Potomac; about 33 m. NW. of Washington; scene of a disastrous defeat of a Union force under Col. E. D. Baker by a Confederate force under Gen. Evans, October 21, 1861, and of the death of the Union commander.

Bal'y, prefix signifying town, entering into the names of a great number of places in Ireland and Scotland.

Balm (*Melissa officinalis*), perennial herbaceous plant of the family *Labiatae*; native of the S. of Europe; cultivated in American gardens, and prized for its lemon-scented leaves; stem and leaves occasionally used in medicine as a gentle aromatic, stimulant, and tonic.

Balm of Gilead (gíl'ē-ād), either of several quite distinct plants; in Great Britain a small shrub (*Cedronella triphylla*) of the mint family, and native of Canary Islands; in the U. S. a species of poplar (*Populus balsamifera*, variety *condicans*); in Arabia *Commiphora opobalsamum*, variety *gileadensis*, a small tree of the family *Burseraceæ*.

Balmaceda (bäl-mä-thä'dä), **José Manuel**, 1840-91; Chilean statesman; b. Santiago; educated for the priesthood, but adopted politics; as senator, advocated separation of Church and State; as prime minister, introduced civil marriage; president of republic from 1886 till his death by suicide, after fomenting civil war.

Balmoral (bäl-mör'al) **Castle**, favorite autumnal residence of the late Queen Victoria; in a beautiful valley in Aberdeenshire, Scotland, on the river Dee, 48 m. WSW. of Aberdeen; commands a magnificent prospect, and comprises 40,000 acres of beautiful grounds.

Balnaves (bäl-näv'ez), **Henry**, abt. 1520-79; Scottish reformer; b. Kirkcaldy, Fifeshire; secretary of state, 1540; declared a traitor, 1546; captured by the French, who took him, with Knox, to Rouen as prisoners; while in prison wrote a "Confession of Faith"; returned to Scotland, 1556.

Balolo (bä-lö'lö), Bantu nation in equatorial province, Congo Free State; inhabiting forests along the Chuapa, Bussera, and Lomami rivers; chief tribes, Boruki, Bangombe, Dulingo, Imballa, and Kimoma; mingling with their settlements are villages of Batwa dwarfs.

Bal'sam (*Impatiens balsamina*), well-known herbaceous annual belonging to the geranium family, and closely related to the touch-me-not; a native of India.

Balsam, Can'ada, thick, terebinthine sap of *Abies balsamea*; gathered as an article of commerce; used in medicines, for varnishes, for mounting microscopic objects, etc., because of its transparency and refractive powers. *A. grandis* of the W. coast of N. America furnishes a similar fluid.

Balti (bäl'të), **Baltistan** (bäl-të-stän'), or **Little Tibet**, upper end of the Indus valley, subject to Kashmir; having Chinese Tartary on the N., Afghanistan on the W., and Kashmir on the S.; chief town, Iskardi; area, 19,000 sq. m.

Baltic Provinces (in Russia), a term generally given to the five Russian governments of Courland, Livonia, Esthonia, Petersburg, and Finland; in a restricted sense applied only to the first three. Once belonged to Sweden and Poland; came into possession of Russia in the eighteenth century. They have been a frequent cause of trouble between Germany and Russia. Great effort has been made to Russianize them.

Baltic Sea, inland sea or gulf of N. Europe; between Russia, Sweden, Germany, and Denmark; connecting with the German Ocean and the Cattegat by the Sound and the Great and Little Belts; 830 m. long; greatest width 420 m.; area 154,570 sq. m.; on account of the small proportion of salt it contains freezes more easily and earlier than the ocean; is not affected by the tide; numerous sand banks and islands, and violent storms with sudden changes of wind, render navigation dangerous; receives several large rivers—namely, the Oder, Vistula, Niemen, Düna, Narva, Neva, Torneå, Dal, etc.; chief ports, St. Petersburg, Riga, Dantzig, Stralsund, Königsberg, Stockholm, and Copenhagen; connected with the North Sea through the Elbe by a ship canal.

Baltimore (bäl'ti-mör), **Lord**, a title of the Calvert family in the Irish peerage; created in 1625 by James I. Sir George Calvert was born at Kipling, York, England, in 1582; held several important public trusts; was knighted in 1617; and made first Lord Baltimore 1625. By grant of James I he became proprietary of Avalon in Newfoundland, endeavored to plant a colony there, and went thither himself in 1625. Owing chiefly to the unfavorable soil and climate, the colony was a failure. He then (1628) visited Virginia, met an ungracious reception, and returned to England. He seems then to have petitioned Charles I for a charter for founding a new colony, and to have met with favor; but before the charter was issued he d. in London, April 15, 1632. The charter which he had secured was reissued in June, 1632, to his son Cecil, who became the second Lord Baltimore, and real founder of the colony of Maryland. The territory granted by the charter included the whole of the present state of Maryland. Cecil never visited it, but sent out an expedition in November, 1633, under the charge of his brother, Leonard Calvert, as governor. The Calverts have been much praised for their liberal and tolerant spirit, and their wise and equitable legislation in the colony.



GARDEN BALSAM.

Baltimore, chief city of Maryland; at head of tide water and navigation on Patapsco River, about 14 m. from Chesapeake Bay, and nearly 200 m. from the ocean; 40 m. N.E. of Washington. The harbor is spacious and secure. The principal industries are clothing, cotton duck, foundry and machine-shop products, tobacco, flour, liquors, bricks, steel, shoes, ship building, and the packing of oysters, meat, and fruits. There are lines of steamers to Havana as well as to European and U. S. ports. A ship canal across Delaware gives the city a direct outlet for trade with Philadelphia. The chief exports are grain, cotton, naval goods, foodstuffs, and ores. Baltimore, popularly called "Monumental City" from its many monuments, covers an area of some 20,000 acres; has beautiful parks, and an unusual number of handsome cathedrals, churches, and public buildings. Among the buildings are the city hall, courthouse, federal building, Maryland Institute, Johns Hopkins Univ., Peabody Institute, Johns Hopkins Hospital, Masonic Temple, Enoch Pratt Free Library, Maryland Institute for the Blind, Walters Art Gallery, and Maryland Art Institute. Other educational institutions are the Univ. of Maryland, Baltimore Univ., Woman's College, Loyola College, Seminary of St. Sulpice, Baltimore Dental College, College of Physicians and Surgeons, Baltimore Medical College, Woman's Medical College, Southern Homœopathic College, Maryland Medical School, Maryland College of Pharmacy, and Baltimore Law School. The first settlement here was in 1682. In 1730 a town was created and named after Cecil Calvert, Lord Baltimore; became a city, 1797. The Continental Congress sat here, 1776. An attack of the British, 1814, was repelled by the citizens. Federal troops passing through, April, 1861, were assaulted. The business section was destroyed by fire February, 1904, causing a loss of \$80,000,000. Pop. (1907) 533,669.

Baltimore Oriole, also called Gold'en Rob'in, well-known and conspicuously beautiful bird (*Icterus galbula*) of the New-World family *Icteridæ*. This family, closely allied in structure and habits with the weaving birds (*Ploceidæ*) of Africa and Asia, displays a wonderful skill in the construction of its nest, which is a pendulous, cylindrical pouch suspended from the extremity of a hanging branch. Both are also distinguished by the brilliant contrast in the colors of their plumage. Black and yellow, the two colors of the coat of arms of Lord Baltimore, suggested the name of this species, which is the best known of the group. Besides the Baltimore oriole there are four other orioles common in the U. S.—Bullock's oriole of the Pacific coast, the orchard oriole of the Eastern states, and the hooded and Scott's orioles of Texas and Arizona.

Baluchi (bāl-ō'chī), language spoken in Baluchistan, a branch of the Iranian division of languages, which closely resembles modern Persian. Two dialectic groups are recognized: first, the N.E. or N. Baluchi; second, the S.W., the Makrāni or S. Baluchi. The dialectic division is made by the interposed wedge of the

Brāhūi tribes, a people of Dravidian stock and speech.

Baluchistan (bāl-ō-chis-tān'), maritime country of Asia; with Afghanistan on the N., British India on the E., the Arabian Sea on the S., and Persia on the W.; seacoast runs E. and W. for about 600 m., but has no good harbor; area about 130,000 sq. m.; pop. (1901) 810,811. The surface rugged and elevated, generally barren, and deficient in water; Herbie or Hala Mountains run N. and S., separating the country from India; and there are several parallel ranges in E. Baluchistan. The climate is usually dry, and the soil sterile, though there are regions where most of the crops of India can be produced: chief pursuit is camel raising. Two distinct races occupy the country, the Baluch or Baluchi and the Brahūi; distinguished from each other in language and appearance, and each divided into many tribes. The country was ruled by Hindu khans from the beginning of the fifteenth century to the end of the seventeenth century, when the Brahūi khans of Khelat gained sovereign power. Since 1879 parts of the country have come under British rule; the greater part, composed of a confederation of chiefs under the Khan of Khelat, is administered by the British.

Balzac (bāl-zāk'), Honoré de, 1799-1850; French novelist; b. Tours; removed to Paris 1819; published half a dozen romances before the age of twenty-three; brought out "Dernier Chouan," his first novel to show real power; "Physiologie du Mariage," 1829, and "Peau de Chagrin," which made his fortune, 1831. From this time till his death Balzac produced an enormous number of works; the list of his books, 1827-48, including ninety-seven titles. He elaborated a new theory of novel writing—that it should consist in giving documents from the life of the society in which the writer lives. His total work he called the "Comédie Humaine," in contrast to the Dantesque "Divina Commedia." He divided his stories into lesser groups—"Contes Philosophiques," "Scènes de la Vie Privée," "Scènes de la Vie de Province," etc. Of single novels, besides those named above, the most famous are perhaps "Eugénie Grandet," "Séraphita," "Le Père Goriot," "La Recherche de l'Absolu," "Le Lys dans la Vallée," "César Birotteau," "Béatrix," "Modeste Mignon." Most of the prevailing French theories about novel writing—so-called realism, naturalism, etc.—go back to Balzac.

Balzac, Jean Louis Guez de (Seigneur), 1597-1654; French writer; b. Angoulême; patronized by Cardinal Richelieu, and admitted into the French Academy, 1634; he did for French prose what Malherbe did for verse, i.e., purified it from the pedantries of the sixteenth century and the obscurities of a still earlier time; reputation mainly rests on his "Lettres"; other chief works, "Prince," "Socrate Chrétien," "Entretiens," "Aristippe."

Bambarra (bām-bār'rā), large district in the W. Sudan, on both sides of the upper Niger or Joliba, which flows through the middle of

this state; lies entirely in the area claimed by the French; soil well watered and fertile.

Bamberg (bām'bĕrg), city of Bavaria, in upper Franconia; on the river Regnitz, 30 m. N. of Nuremberg and 3 m. from the river Main; has a cathedral in the Byzantine style, founded, 1004, by Henry II; the old palace of the bishops of Bamberg; and the Jesuit church of St. Martin's; contains a museum of natural history and a royal library; has manufactories of porcelain, jewelry, musical instruments, gloves, etc.; also numerous breweries. Pop. (1900) 41,823.

Bambino (bām-bĕ'nō), Italian, "an infant," the figure of Jesus represented as an infant in swaddling clothes. The "Santissimo Bambino" in the church of Ara Cœli at Rome, a richly decorated figure carved in wood, is believed to have a miraculous virtue in curing diseases. Bambinos are set up for the adoration of the faithful in many places in Catholic countries.

Bamboo', the common name of the arborescent grasses of the genus *Bambusa*, numbering forty-six species; natives of the tropical and warm parts of Asia and America, and grow to a large size. Some of the species are a foot in diameter and 120 ft. in height. The bam-



BAMBOO. LEAVES, FLOWER, AND FRUIT.

boo is a plant of great utility and importance. It has a jointed and hollow stem, which is very hard and light, and is externally coated with silex. It has been called the national plant of China, and the natives of the Eastern countries make from it a great variety of articles, furniture, weapons, paper, etc. It is sometimes used for building houses and bridges and for water pipes. The smaller stems are converted into walking sticks, and are employed in wickerwork and the seats of chairs.

Bam'borough (or Bam'brough) Cas'tle, one of the oldest castles in Great Britain; on the coast of Northumberland, 16 m. SE. of Berwick; stands on a basaltic rock 150 ft. high, and accessible only on the SE. side. Connected

with this castle is an extensive public library, a dispensary, lifeboats, and other charitable institutions.

Bambuk (bām-bōk'), district in French Senegal, W. Africa; on the upper Senegal River, between it and its tributary, the Faleme; surface hilly, and the valleys fertile; celebrated for its gold mines.

Bamian (bā-mĕ-ān'), valley and pass of Afghanistan; on the route from Kabul to Turkestan, and between the central and W. ranges of the Hindu Kush Mountains; at an elevation of 8,496 ft., and important as the only known pass over the Hindu Kush Mountains that is practicable for artillery.

Bamp'ton Lectures, series of eight annual lectures or sermons preached before Oxford since 1780, according to the will of Rev. John Bampton, 1689-1751, who left an endowment for the purpose.

Ban, word which occurs in many modern languages, signifying an edict; a public order or prohibition; an interdiction; a curse or excommunication. In the former German empire to put a prince under the ban of the empire was to divest him of his dignities, and pronounce him an outlaw. In Croatia and Slavonia, the title of the governor; formerly also of other governors under the Hungarian crown.

Ban and **Arrière Ban**, military terms in France under the feudal system. When the barons were summoned to the service of the king in time of war, they were called the *ban*. Their tenants or inferior vassals formed the second levy, or *arrière ban*.

Bana'na (*Musa sapientium*), tropical fruit-tree (and fruit) of great importance in both hemispheres; herbaceous plant with a strong rhizome, from which sprouts or suckers arise



BANANA.

and propagate the species, for the fruit is nearly always seedless. The plant grows to a height of 10 to 20 ft., bearing enormous entire ascending leaves, and clusters contain-

ing from 50 to 150 fruits. A year or two after a banana plant becomes established it begins to flower, the fruit maturing in from ninety to one hundred and twenty days thereafter. After the fruit is ripe, the plant dies to the ground and the younger shoots take its place.

Banana-quit, one of a group of very small birds of the honey-creeper family (*Certhiidae*), found in tropical America. One species (*Certhiola bahamensis*) is found in Florida.

Banat (bā-nāt'), district or territory under a ban; especially the name of a territory of Hungary, embracing the counties of Temesvár, Torontál, and Krasso; principal town, Temesvár.

Banbury (bān'bār-ī), small town of Oxford, England; 78 m. NW. of London; famous in Ben Jonson's day and at present for its cakes and ale.

Banc, in law, term used in the phrases trial in banc, sitting in banc, meaning a trial or sitting at which the full number of judges is present. See *NISI PRÆUS*.

Banca (bānk'ā), or **Bang'ka**, island in the Malay Archipelago; belonging to Holland; about 10 m. E. of Sumatra, from which it is separated by the Strait of Banca; about 100 m. long; area 4,446 sq. m.; is celebrated for its tin mines. Pop. (1905) 115,189.

Bancroft (bāng'krōft), Edward, 1744-1820; American naturalist; b. Westfield, Mass.; ran away from home in youth; practiced medicine in Guiana; resided long in England; was a friend of Franklin and professed to labor in behalf of the American colonies, but is believed to have been a spy of the British Govt.; published political works and "Natural History of Guiana," 1769, and "Researches Concerning the Philosophy of Permanent Colors."

Bancroft, George, 1800-91; American historian and diplomat; b. Worcester, Mass.; son of Aaron Bancroft; educated at Harvard and Göttingen; published a volume of poems and a translation of Heeren's "Reflections on the Politics of Ancient Greece"; in 1834 produced the first volume of his "History of the United States" (final revised edition 1885); appointed Secretary of the Navy by President Polk, 1845; founded the U. S. Naval Academy; resigned office, 1846, and was sent as minister plenipotentiary to England; returned, 1849, retired from the public service; minister to the court of Berlin, 1867; negotiated a treaty by which Germans emigrating to the U. S. are released from their allegiance to Germany; in 1871-74 was minister plenipotentiary to the German empire, and rendered important services in settling the San Juan boundary question.

Bancroft, Richard, 1544-1610; Archbishop of Canterbury; b. Farnworth, England; Bishop of London, 1597; attended Queen Elizabeth during her last illness; Archbishop of Canterbury, 1604; Chancellor of the Univ. of Oxford 1608; bitterly opposed the Puritans; proclaimed the divine origin and prerogative of bishops; de-

prived forty-nine ministers of their livings for disobedience; chief overseer of the commission which produced the King James version of the Bible.

Band'age, band used to arrest hemorrhage, support injured parts and render them immovable, or to retain dressings. The most common form is a strip of muslin, rolled longitudinally into a cylinder. It is applied circularly to a part in a spiral manner, each turn overlapping one third of the last, and where the limb is conical the bandage is folded back or reversed, so as to exercise pressure equably. Pressure must be carefully regulated, lest the circulation be obstructed, and gangrene result. Special forms of bandages are used for different parts. A handkerchief may often be used to advantage, and a large triangular piece of Esmarch's bandage is useful. A spica bandage is one wound like a figure 8 between an extremity and the trunk. Sometimes bandages are made by first being soaked in plaster of Paris. One of the most useful bandages for emergencies is the "Spanish windlass," to check bleeding from an extremity. It is a strip of muslin, or a pocket handkerchief, passed around the upper part of the limb, tied and then twisted by a stick passed under it, so as to press with enough force to stop the blood flow. It must not be left on too long, but its use has often saved life. Free bleeding from a scalp wound may also be controlled by a compress and bandage tightly applied.

Ban'da Isles, group of ten small islands, about 50 m. S. of Ceram, forming part of the Molucca Archipelago; belonging to the Dutch; discovered, 1511; form the presidency of Banda, with an area of 7,150 sq. m. and a pop. of 111,000, of whom 6,000 are in Neira, the seat of government. They are lofty and volcanic; one of them rises 7,880 ft. above the sea.

Banda Orient'al, i.e., "the Eastern Shore"; name often employed for Uruguay.

Bandai-San (bān-dī-sān'), volcano of Japan; about 140 m. N. of Tokyo; summit includes several peaks, of which the highest rises 6,035 ft. above the ocean and about 4,000 ft. above the adjacent plain. A great eruption occurred in 1888.

Ban-de-la-Roche (bān-dè-lā-rōsh'). See *OBERLIN*, JEAN FREDERIC.

Bandello (bān-dèl'lo), Matteo, abt. 1480-1562; Italian story-writer; b. Castelnuovo, Piedmont; became a Dominican; after the battle of Pavia had to flee to France, where Henry II made him Bishop of Agen. His "Novelle" or tales were famous over all Europe. They were used by Shakespeare in "Romeo and Juliet," "Twelfth Night," and "Much Ado About Nothing," and by Beaumont and Fletcher in "The Maid of the Mill" and the "Triumph of Death."

Bande Noire (bān-dè nwār'), German foot-soldiers, part of the Grand Companies employed by Louis XII in his Italian wars; they carried a black ensign when a favorite general

died. The name was similarly borne by other soldiers, both French and Italians; it was given also in the first French Revolution to some societies which bought confiscated property of the Church, of emigrants, etc.

Band'fish, the *Cepola rubescens* or any allied fish having the body much elongated and compressed; name has also been given sometimes to other elongated and much compressed fishes. The red bandfish (*rubescens*) is about 15 in. long, and is found in the Mediterranean.

Ban'dicoot, species of *Peramelida*, a family of marsupial quadrupeds, a kind of rat; natives of Australia and Tasmania, having a long head and a pointed muzzle. They devour grain and potatoes.

Bandiera (bän-dë-ä'rä), **Atilio** and **Emilio**, brothers and Italian patriots; b. respectively, 1817 and 1819; sons of a vice-admiral in the Austrian service. In 1842 they opened a correspondence with Mazzini, and formed a design to liberate Italy by a conspiracy. They failed, and escaped to Corfu, but hearing of a revolt in Naples they returned with a few friends and landed in Calabria. They were executed in the public square of Cosenza, July 25, 1844, their letters to Mazzini having been opened by the British postmaster-general, and the contents communicated to the Austrian Govt.

Ban'dits, or **Bandit'ti**, bands of robbers in the mountainous parts of Italy and Greece, who fall upon travelers and hold them captive for a ransom. In former times there existed in the larger towns of Italy organized associations of banditti, whose stilettoes were ready for hire to accomplish any deadly scheme.

Banér (bä-när'), written also **Bannier'**, or **Bannér'**, **Johan**, 1596-1641; Swedish general; b. Djursholm, near Stockholm; commanded the right wing under Gustavus Adolphus at the battle of Leipzig, 1631; on the death of Gustavus became commander in chief of the Swedish army; gained a brilliant victory near Wittstock 1636, and again defeated the imperial army near Chemnitz 1639, after which he overran a large part of Germany, and nearly captured the emperor and diet at Ratisbon, 1641.

Banff (bänf), ancient seaport of Scotland; capital of Banffshire; at mouth of the river Deveron; on Moray Frith; about 40 m. NNW. of Aberdeen.

Banff, national park and village in Alberta, Canada, on Bow River and Canadian Pacific Railway, 560 m. E. of Vancouver. It is a summer resort in the midst of some of the grandest scenery of the Canadian Rockies, and is noted for its hot sulphur waters. Elevation 4,500 ft.

Bangalore (bän-gä-lör'), strongly fortified town of India; capital of Mysore; on a high table-land; 71 m. NE. of Seringapatam; chief British military station in Mysore, and much frequented by Europeans; has manufactories of cotton and silk. Pop. (1901) 159,046.

Bangkok (bän'kök), large commercial city; capital of Siam; on the river Meinam, about

20 m. from its entrance into the Gulf of Siam; mostly built of wood, but has some brick and stone houses; many houses built on movable bamboo rafts on the river. The Chinese constitute a large part of the population, which is estimated at 400,000 to 600,000. Bangkok contains a large royal palace and numerous Buddhist temples. The river is navigable for vessels of 250 tons from its mouth to Bangkok. The chief exports are sugar, pepper, rice, ivory, cardamoms, hides, tin, etc. Iron mines and forests of teak occur in the vicinity.

Bangor, capital of Penobscot Co., Me.; at the head of navigation on the Penobscot River and at the mouth of the Kenduskeag, 60 m. from the ocean, 140 m. NE. of Portland; one of the greatest lumber depots on the continent; is bisected by the Kenduskeag; and is supplied with power from the Penobscot. The French erected a fort on the site of the city and called it Norombega, 1656; a permanent settlement was made under its old Indian name, Kenduskeag, 1769; became a town, 1791, and a city, 1834. Pop. (1906) 23,500.

Bangor (bän'gör), episcopal city and seaport of N. Wales, county Caernarvon; on the SE. shore of Menai Strait; 9 m. NE. of Caernarvon; in a narrow, romantic valley. The cathedral, originally founded, 525, has been twice destroyed, 1071 and in 1402. Pop. (1901) 11,269.

Bangweolo (bäng-wë-ö'lo), or **Bem'ba**, large lake in S. Africa; latitude 10° to 13° S., longitude 30° E.; about 150 m. long from N. to S., and half as broad; about 4,000 ft. above the sea; discovered by Livingstone, 1868; is fed by several large streams, the principal being the Chambezi from the NE.; empties at its SW. extremity into the Luapula, and this, probably, through Lake Moero, into the Kongo.

Banialuka (bän-yä-lö'kä), fortified town of Bosnia; on the river Verbas, 94 m. NW. of Bosna-Serai; has forty mosques, many bazaars, hot springs, and Roman antiquities.

Ban'ister, **John**, d. 1787; American patriot; b. Virginia, educated in England, and studied law there; became colonel in the Virginia line; prominent in the patriotic conventions of the Revolution; member of the Virginia Assembly; delegate from Virginia to the Continental Congress, 1778-79, and signed the Articles of Confederation.

Banjarmassin (bän-jër-mäs'in), or **Benjar-Mas'sen** ("the river of plenty"), town on the river Banjar, 15 m. from its mouth, on the S. coast of Borneo; owing to the inundations of the river, is mostly built on piles; trades in gold dust, precious stones, birds' nests, wax, resin, rubber, rattan, pepper, and steel of native manufacture and excellent quality; many of the inhabitants are Chinese, and most of the trade is with China; name is also given to the former sultanate, which comprises about 6,000 sq. m., with 300,000 inhabitants, mostly Mohammedans; tributary to the Dutch since 1787; annexed by them, 1857.

Ban'jo, original American musical instrument, formerly a favorite among the negroes of the South. Its popularity has spread all over the country, and instead of its being confined to the purpose of accompaniment, it is now used for solos, duets, etc., where quick and lively music is desired. Its head and neck are shaped like the guitar, while the body is a circular frame like the head of a drum, over which parchment is stretched in place of a sounding board. Five strings, of which the fifth is shorter than the others, pass over this parchment, and are played with the fingers.

Bank, a company or other concern that deals in money and credit, receiving money for safe keeping, lending it out at interest, transmitting credit by drafts on other banks, and sometimes issuing its own notes. When a bank discounts a note the loan is placed to the credit of the borrower, payable on demand, but rarely drawn out in money. Loans and discounts can thus be extended without limit, unless one is fixed by law, as in the case of the national banks of the U. S. Nine tenths of the loans are repaid to the banks with checks and over nine tenths of the deposits are checks. The system of loans and deposits multiplies the loanable capital of banks and affords to merchants the credit by which they can turn their money quickly and extend their business where opportunity offers. The bulk of the specie and currency is held as a reserve in bank vaults. With daily settlement of checks through clearing houses (*q.v.*) the banks restrain one another from unsound extension of credit.

Besides its capital a bank has the money of its depositors to lend out within the margin of safety. A customer offers at a bank a note, a written promise to pay on a fixed date at that or another bank a certain sum of money. It may be his own promissory note or it may be that of one of his customers. It may be unsecured commercial paper given in exchange for goods sold on credit or it may be guaranteed by one or more endorsers who assume contingent liability, or by other securities given in pledge. If the security is deemed sufficient the note is assigned to the bank and credit is extended to the customer for the sum stipulated in the note less interest for the time it has to run, which interest is called discount. The bank discount affords a profit over legal or customary interest, inasmuch as interest is charged not on the amount advanced, but on the amount payable at maturity of the note. Another form of credit from which banks may derive a profit is the bank-note. The issue of uncovered notes is in many countries limited by law, and in some, these debts have preference over deposits.

The Bank of England was established in 1694. About 18,000,000 sterling of the notes are protected by government securities held by the issue department; all notes above that amount can be issued only against gold. The Bank of France, authorized in 1800, has the exclusive privilege of issuing notes. It has borne the government through dire emergen-

cies, notably after the Prussian War. The charter lapsing in 1897 was renewed till 1920, subject to forfeiture in 1912 by decision of the chambers. The Reichsbank of Germany, founded in 1875, has, like the Bank of France, the privilege of issuing a certain large amount of notes in excess of its cash reserve.

The first U. S. bank was established in 1791, the second in 1816, the Government subscribing one fifth of the capital of each. Congress refused to renew the latter's charter in 1836. State banks sprang up, often enjoying only local credit for their note issues. The New York Free Bank Act of 1838 required a deposit of approved securities with public officers to secure banknotes. When in the stress of the Civil War national banks were authorized, the same feature was adopted. Under the Act of 1864, any five persons or more can organize a bank with a capital fully paid up of \$200,000 in cities of over 50,000 inhabitants; \$100,000 in smaller ones, and \$50,000 in places with fewer than 6,000, one third or more to be invested in U. S. bonds, on which, up to ninety per cent of the market value, unless above par, banknotes could be issued, the comptroller of currency having custody of the bonds and power to liquidate insolvent banks. State-bank currency was taxed out of existence. The national banknotes enjoy full credit everywhere, yet the banks, except in country districts where currency is in greater demand, are inclined to reduce their circulation. Under a late act national banks may be formed in country towns with \$25,000 capital, and under another all banks can issue notes up to the par value of the bonds.

The national banks in 23 large cities must keep a reserve amounting to 25 per cent of their deposits. New York, Chicago, and St. Louis are special reserve cities, and one half of the reserves of the rest may consist of bank deposits in them. Outside of the larger cities the required reserve is only 15 per cent, three fifths of which may consist of balances in the larger cities. There were 6,043 national banks in 1907, with \$842,685,939 of capital; \$522,382,747 of surplus, which consists of undivided earnings practically added to capital; a circulation of \$551,949,461; individual deposits amounting to \$4,319,035,402; a cash reserve of \$531,107,750 in specie and \$170,515,752 in currency; U. S. bonds to secure currency amounting to \$557,277,950; and \$4,678,583,968 of loans and discounts. The loans and discounts of loan and trust companies and state, savings, and private banks aggregated \$3,048,000,906. See SAVINGS BANKS.

Bank'rupt, originally a merchant whose bench or counter had been broken by reason of inability to pay his debts. In its popular sense the word is now nearly synonymous with insolvent, and denotes any person unable to meet his liabilities. It is against the policy of the bankrupt law to allow the debtor, in contemplation of bankruptcy, to give preference to one creditor over another. All such preferences are void, and an attempt to make them is of itself an act of bankruptcy. In the U. S. Congress possesses the power, under the Con-

stitution, to establish uniform laws on the subject of bankruptcies. The various states also possess the power to pass bankrupt laws, but no state bankrupt or insolvent law can impair the obligations of contracts. Hence they cannot release a debtor from obligations incurred before the passage of such law, nor act upon the rights of citizens of other states; but when Congress passes a federal bankruptcy law, the state laws on the subject are suspended. The judicial business in bankruptcy is in the main transacted by the district court of the U. S., with officers called registers to conduct the administrative or noncontested business. The estate is managed by an assignee, who acts as a trustee, and is accountable to the court referred to. Congress passed the first bankrupt law, 1800; second, 1841; third, 1867, and fourth and present one, 1898.

Banks, Sir Joseph, 1743-1820; English naturalist; b. London; sailed with Capt. Cook in his voyage round the world, 1768, returning, 1771, with rich collections of plants, animals, etc.; president of the Royal Society, 1777-1819; contributed memoirs to the "Philosophical Transactions" and other publications; aided most of the scientific enterprises of his time, and bequeathed his immense library and scientific collections to the British Museum.

Banks, Nathaniel Prentiss, 1816-94; American military officer; b. Waltham, Mass.; was a "bobbin boy"; learned the machinist's trade; studied law; entered political life as a Democrat, 1849; speaker Massachusetts House of Representatives, 1851; Republican member of Congress, 1852; speaker, 1856; governor of Massachusetts, 1857, 1858, 1859; appointed major-general, U. S. V., 1861; served with the Army of the Potomac, at New Orleans, and in the Red River Campaign; relieved of command, 1864; member of Congress, except one term, 1864-78, and reelected 1888.

Banks Land, island in W. part of Arctic America; discovered by Parry, 1819; separated by Banks Strait from Melville Island on the NW. and Prince of Wales Strait from Prince Albert Land on the S.

Banks, Sa'vings. See SAVINGS BANKS.

Bank'sia, genus of Australian plants of the *Proteaceæ*; have hard, dry leaves, and an umbellate arrangement of branches bearing, near the extremities, oblong heads of numerous flowers, which secrete much honey. They are called honeysuckle trees. One species grows to a height of 50 ft.

Bannatyne (băn'nă-tin) Club, literary club deriving its name from George Bannatyne, in Scotland, who compiled a collection of manuscripts called "Corpus Poeticum Scotorum"; club founded at Edinburgh, 1823, by Sir Walter Scott, its design being to promote the knowledge of Scottish history and antiquities, and to print rare works which tend to illustrate those subjects; membership limited to 100.

Ban'ner, a flag or standard; a piece of cloth attached to a spear or staff, usually bearing

some warlike or heraldic device or national emblem, and serving to denote the nationality of a company of soldiers, the character and purpose of a society, or the rank of a prince or chief. The modern use of the term for a flag which hangs from a crossbar is not the original or proper meaning. In the Middle Ages the term denoted the square flag carried before a knight banneret. In literature the term is used as synonymous with flag, but in a somewhat lofty or poetical sense. See FLAG.

Ban'neret. See KNIGHT.

Bannockburn (băn'nók-bérn), village of Scotland; county of Stirling, on the Bannock rivulet, 3 m. S. of Stirling; was the scene of a famous victory gained by Robert Bruce over the English army led by Edward II, June 24, 1314. The English lost about 30,000 men.

Ban'nocks, members of a tribe of N. American Indians belonging to the Shoshone family, supposed to have been of a different race and affiliated with other Shoshones by intermarriage, as language is wholly distinct; now number about 500 and live at Fort Hall and Lemhi agencies, Ida.

Banns of Mar'riage, public notice of an intended marriage, given in a church or other place prescribed by law. The law of England requires that all banns of matrimony shall be published in an audible manner, according to the rubric prefixed to the marriage service in the Book of Common Prayer, after the second lesson at matins or evensong, upon three Sundays preceding the ceremony. The bidding of banns has fallen into disuse in the U. S., though it is still occasionally heard. The practice was first directed in the times of the Fathers, was enacted afterwards by Odo, Bishop of Paris, about 1176, placed in the canon law, 1200, by the Synod of Westminster, and prescribed for the whole Latin Church by the Lateran Council, 1215.

Banquo (băn'kwō), Scottish thane, progenitor of the house of Stuart, and an accomplice of Macbeth, who assassinated him, 1066. Shakespeare does not represent him as an accomplice, but merely as a victim.

Ban'shee, invisible being, supposed to announce the approaching death of members of ancient houses in Ireland and Scotland.

Bantam (băn-tăm'), old town of Java, on the N. coast, 44 m. W. of Batavia; formerly a large city and entrepôt of trade, but on account of the unhealthful climate is now almost deserted; in the fifteenth century it was the chief town of a powerful Mohammedan empire of the same name, which at one time even comprised the S. part of Sumatra and the W. coast of Borneo. In 1683 the Sultan of Bantam became a vassal of the Netherlands, and in the beginning of the nineteenth century the Dutch took possession.

Ban'tingism, regimen for the reduction of corpulence; so called after a London undertaker, William Banting, 1797-1878, who introduced it, 1863, as the result of his own experience; consists in the avoidance of fatty

food, and of materials which may make fat in the body, as starch and sugar. Lean meat predominates in this diet; vegetables are almost excluded; butter, milk, sugar, and malt liquors are prohibited.

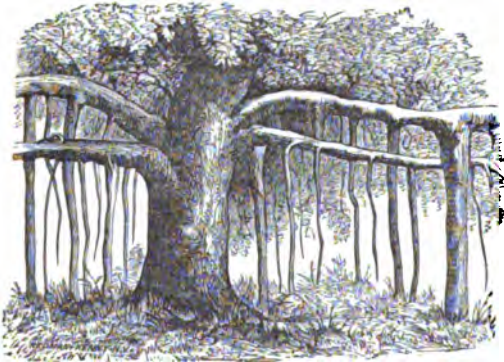
Ban'try Bay, deep inlet in the S. of Ireland, in Cork Co., 25 m. long and from 3 to 5 m. wide; is one of the finest harbors in Europe, affording safe and commodious anchorage for ships of all sizes. The coast exhibits some of the finest scenery in the island. Near the entrance of this bay occurred a naval action between the English and French, 1689.

Bantu (bän'tó), in ethnology, the name of a group of African races, including the Kafirs, Zulus, and Bechuanas, occupying the greater part of the vast region between Kamerun, Zanzibar, and the Cape of Good Hope, and speaking a great variety of dialects, believed to have sprung from a common root.

Ban'ring, an insectivorous quadruped, of the *Tupaia*; native of India, Borneo, etc.; climbs with agility, like lemurs and squirrels, and has an elongated muzzle and a long bushy tail.

Ban'yan, Ban'ian, or, in Bengalese form, **BANIYA**, Hindu shopkeeper or merchant; especially one of the wholesale dealers and importers of Bombay, Surat, Cambay, etc., who carry on a trade with the interior of Asia by caravans and with Africa by ships. They usually belong to the caste called Vaisayas, and strictly abstain from animal food.

Banyan, or Banian, E. Indian tree (*Ficus indica*), remarkable for its mode of propagation by aerial roots, which, on descending to the ground and penetrating it, become stems or trunks. These roots at first hang like loose



BANYAN TREE.

records, but after they take hold they are gradually tightened, till they become almost as firm as a rod of iron. In this manner a single tree spreads over a large extent of ground, and endures for many centuries. A famous banyan on the bank of the Nerbudda, India, has a circumference of 2,000 ft. and 320 columns formed by the roots, and can shelter 7,000 men.

Banz, name of one of the finest Benedictine abbeys known in history; in Bavaria, 3 m. from

Lichtenfels, on the Main; its monks were noted for their learning and humane spirit; founded, 1058; convent abolished, 1802; building now the summer residence of the princes of Bavaria; has a museum especially rich in petrifications.

Ba'obab. See ADANSONIA.

Baour-Lormian (bä-ür'-lör-mi-än'), **Pierre Marie François Louis**, 1770-1854; French poet of the first empire; b. Toulouse; translator of Tasso, 1795, and Ossian, 1801, and author of many tragedies in the severely classic style, which were greatly admired in their time; but before his death he saw himself one of the most despised of poets, the butt of numberless epigrams, and the special detestation of the Romanticists. He had been made a member of the French Academy, 1815, however, and when he died this body, still a stronghold of the classicists, manifested their respect for him by unusual signs. Nisard pronounced the funeral oration.

Baphomet (bäf'ö-mët), or **Baffomet**, mysterious symbol of the Knights Templars; alleged by their enemies to designate Mohammed; specimens found in Imperial Museum of Vienna, 1818, are of stone, and represent a female figure with two male faces.

Baptism, sacrament and initiatory rite of the Christian Church. By whatever other ceremonies one may be advanced to full membership, it is universally held in Christendom, except among sects repudiating sacraments altogether, that a baptized person was by that rite incorporated into the Church which Christ and the apostles founded, or into the mystical body of Christ. The authority for this rite rests upon the New Testament. (See Matt. xxviii, 18-20; Mark xvi, 16; Acts ii, 38, x, 44; Rom. vi, 4; Col. ii, 12, etc.) From these and similar texts a doctrine of baptism has been developed, although it has been modified by differing religious bodies. In the early Church elaborate ceremonies were observed, and anointing with oil preceded and sometimes also followed the baptism itself. Water is still variously applied: in immersion the person is submerged backward in the water; in pouring or affusion, water is poured from a vessel or a shell over the head; in aspersion or sprinkling the water is dropped from the hand upon the head. In primitive immersions the catechumen, or candidate for the rite, was submerged face downward. In the Church of England infant immersion, or dipping, was practiced until after the Reformation. In the Greek churches a form of immersion is still observed. In these two and in the Anglican communions the application of water is followed by the minister's making a sign of the cross upon the forehead of the baptized.

Baptistery, originally a swimming bath; later, in ecclesiastical usage, a place set apart for performing the rite of baptism. At first the baptistery was an exedra, or structure outside of the church proper; later the porch, and still later a part of the consecrated edi-

rice, was so employed. The word is also used to designate the tank in which the rite of immersion is performed in Baptist churches.

Baptists, body of Christians who insist that believers are the only proper subjects, and that immersion is the only proper mode of baptism. They insist also on the Bible as the sole and sufficient rule of faith and practice, on the independence of the local church, the separation of the Church from the State, and the widest liberty of conscience. In the U. S. the majority adhere to strict communion at the Lord's table. There are several divisions, but the largest is Calvinistic in its doctrine. They are most numerous in Great Britain and N. America, but are also represented in many other countries. In Great Britain the Baptists, next to the Congregationalists, form the most numerous body of Protestant dissenters. In England the body is divided into General and Particular Baptists, the former taking Arminian and the latter Calvinistic ground. The new connection of General Baptists seceded from the old to exclude Unitarianism. In the U. S. the Baptist, with the sole exception of the Methodist, is now the largest denomination of evangelical Christians. It is divided into the following bodies: Regular (North), Regular (South), Regular (Colored), Six-Principle, Seventh-Day, Freewill, Original Freewill, General, Separate, United, Baptist Church of Christ, Primitive, Old Two-Seed-in-the-Spirit Predestinarian, and Church of God and Saints of Christ. For all these bodies 38,279 ministers, 55,294 churches, and 5,224,305 communicants are reported.

Bar (bär), town of Russia, government of Podolia, where, 1768, the Confederation of Bar was formed by the nobility of Poland, to counteract the influence of Russia on King Stanislas Augustus; Bar was taken by the Russians the same year, and the confederates were compelled to go to Wallachia, where they declared the king dethroned, had him carried off from Warsaw, 1771, and were only suppressed by Russia after four years' hard fighting.

Bar, a long and narrow piece of wood, metal, or other solid substance, generally round, quadrangular, and other uniform section. Bar, in hydrography, is an accumulation of mud or sand in any navigable channel by which navigation is obstructed, but more particularly a similar formation almost universally found across and exterior to the mouths of rivers and harbors, rendering entrance difficult except to vessels of light draught. In music, the word Bar denotes a straight line drawn across the staff to divide the music into small portions of equal duration, and also comprises the musical notes written or played between such lines. Bar, in heraldry, is one of the important charges known as ordinaries. The bar is formed by two horizontal lines passing over the shield; it differs from the fess in size, the bar occupying only one fifth of the shield. Bar sinister, or bend sinister, is a term misused for "baton sinister" to denote illegitimacy; is a heraldic bearing, like

a bend, but reversed, and reaching from the sinister chief to the dexter base. In law Bar denotes: 1. A partition or railing intended to inclose that part of the court room in which prisoners are arraigned or sentenced, and in which the members of the legal profession usually sit; hence this space itself. In Great Britain there are admitted within the bar only solicitors, king's counsel, and some others having precedence, all others, including the great body of barristers (called *utter* or *outer barristers*), being obliged to stand behind it. Hence the word often collectively signifies lawyers, or persons admitted to practice in the courts; and in some cases it refers to or implies the presence of the court itself. A trial at bar is a trial before a full bench of judges, as distinguished from a *nisi prius* trial—that is, a trial before a single judge.

Baraba (bär-ä-bä'), vast steppe of W. Siberia, between Ob and Irtish rivers on the W., and the Altai Mountains on the SE.; area about 55,000 sq. m.; is very level, covered by recent deposits, fertile, with large forests separated by marshes and salt lakes; colonized by the Russians, 1730. Pop. abt. 250,000; only 4,000 aborigines, the rest Russians.

Barabbas (bär-äb'äs), the Jewish prisoner released at the Passover when Christ was condemned to death. It was the custom of the Roman Govt. to conciliate the Jews by releasing one prisoner at the yearly Passover. Pilate desired to release Christ, but the Jews demanded the release of Barabbas.

Baracoa (bä-rä-kö'ä), town of Santiago de Cuba, a province of Cuba, not far from the E. end of the island. The first Spanish settlement in Cuba was founded near this town by Diego Columbus, son of Christopher, 1511. It was near this town that Antonio Maceo and nineteen followers landed, February 25, 1895, and started the revolution that resulted in the liberation of Cuba from Spain. It does some trade with the U. S. in tropical fruits, produces cocoa and cocoa oil, and has caves remarkable for their stalactites and fossil human remains. Pop. (1901) 9,763.

Barada (bä-rä-dä), river of Syria; probably the Abana of the Old Testament; remotest, though not largest, source, a lake, some 300 by 50 yds. in the plain of Zebdany, 3,349 ft. above sea level, in the heart of Anti-Lebanon. The stream flows SE., passing the ruins of the ancient city of Abila, breaking through three ridges of the mountain, and reaching Damascus, 23 m. from its source, after a descent of 1,149 ft. Then it flows E. 18 m., emptying into two marshy lakes, each about 20 m. in circumference. In going through the city and gardens of Damascus it is parted into at least seven streams, which afterwards reunite.

Baranoff (bä-rä-nöf'), Alexander Andreyevitch, 1746-1819; first governor of Russian America; established a colony at Bering Strait, 1796; took possession of the largest of the Sitka Islands, now bearing his name, 1799; built a large factory; opened relations with American and other ports; and was made governor by Alexander I.

Barataria (bā-rā-tā'ri-ā) Bay, inlet of the Gulf of Mexico, in Louisiana; between the Mississippi and the Bayou la Fourche; about 12 m. long from N. to S., and 5 or 6 m. broad, communicating with bayous and lakes of the interior. Grande Terre Island, a ridge of sand which lies across the mouth, was the headquarters of the brothers Lafitte, the so-called pirates. The entrance to the bay was fortified, 1840-50, by the construction of Fort Livingston on the W. end of Grande Terre Island.

Baratier (bā-rā-ti-ā'), Johann Philipp, 1721-40; German prodigy of French ancestry; b. near Nuremberg; when five years old spoke French, German, and Latin; when seven could repeat the Psalms in Hebrew; and when nine compiled a Hebrew dictionary; when thirteen translated the "Itinerary" of Benjamin of Tudela; wrote a reply to Crellius's "Artemonius," called "Antiartemonius," and a "Disquisition on the Succession of the Roman Pontiffs in very Ancient Times"; was a Prot-estant, studied theology and law.

Baratieri (bā-rā-ti-ā'ri), Oreste, 1841-1901; Italian military officer; b. Condino, near Trient; fought under Garibaldi, 1859; captain in the Italian army; sent to Africa, 1886; by his victories made Abyssinia an Italian protectorate; appointed general, and governor-general of Erythraea, 1893; severely defeated by the Abyssinians, 1896, superseded and court-martialed, but acquitted; earlier in life edited at Rome the *Revista Militaire*.

Barb, noted breed of horses cultivated by the Moors of Barbary, and first introduced by them into Spain. The wild horses of America are believed to have descended from Spanish barbs.

Barbacena (bār-bā-sā'nā), Felisberto Caldeira Brant (Marquis of), 1772-1841; Brazilian soldier and diplomat; b. Sabora; was appointed to negotiate concerning the independence of Brazil with Portugal; for his success was created a marquis; afterwards twice minister of finance; introduced steam engines, steamboats, and the printing press into Brazil.

Barbados (bār-bā'dōz), island at extreme E. of the W. India group; one of the Lesser Antilles; 95 m. E. of St. Vincent; area, 166 sq. m.; pop. (1907) 194,518; capital, Bridgetown. The island, previously uninhabited, was settled by the English, 1625, and is now a British colony, the seat of a bishop, and the headquarters of the British forces in the W. Indies. It has a legislative council of nine members, appointed by the king, and an assembly of twenty-four members elected annually by popular vote; supreme court; colonial bank; Codrington College, affiliated with Durham Univ.; educational system under care of the government; imports exceeding £1,000,000 annually and exports £861,000; staple product, sugar; cotton growing recently introduced; fisheries important and growing.

Barbados Leg. See ELEPHANTIASIS.

Barbara, Saint, virgin martyr of the ancient Church; either suffered death at Nicomedia in the reign of Maximinus, 235-38, for having ac-

cepted Christianity from Origen, or beheaded by her father, when all others refused, at Heliopolis, Egypt, 306. The latter legend also says that directly her father had killed her he was stricken dead by lightning; hence she is the patron of sailors in a storm and of artillerymen. The powder magazine on French men of war is still called Sainte Barbe. She is commemorated December 4th.

Barba'rian, term applied by the ancient Greeks to all foreigners and all who could not speak Greek. Plato divided the human family into *Hellenes* (Greeks) and *Barbaroi* (barbarians). After the Persian invasion the Greeks used the word as a term of reproach, implying hostility to their own freedom and civilization. After the Romans had conquered Greece, and had become in some measure Hellenized, the word barbarian was applied to all nations except Greeks and Romans. St. Paul uses the word in this sense in Rom. i, 14.

Barbarossa (bār-bā-rōs'sā), name of two brothers, renegade Greeks and natives of Mitylene, who became Turkish corsairs, and were the scourge of Christendom, 1510-46. The elder, Aruch (Horuk or Ouradjh), made himself master of Algiers, but was defeated by Charles V, captured and beheaded, 1518. He was succeeded as ruler of Algiers by his brother, Hayraddin, a Christian corruption for Khair-ed-Deen, who obtained Tunis by conquest, 1532, and became the chief admiral of Solyman in his war with Charles V.

Barbarossa, EMPEROR. See FREDERICK I OF GERMANY.

Barbaroux (bār-bā-rō'), Charles Jean Marie, 1769-94; French Girondist; b. Marseilles; a deputy to the legislative assembly, 1791, and member of the National Convention, 1792; denounced Robespierre, and on the trial of the king voted for an appeal to the people; being proscribed by the Jacobins, May, 1793, he fled from Paris; guillotined at Bordeaux.

Bar'bary, region of N. Africa, comprising the modern Barca, Tripoli, Tunis, Fezzan, Algeria, and Morocco; extending from Egypt to the Atlantic Ocean; included the ancient Mauritania, Numidia, Africa propria, and Cyrenaica; is divided by the Atlas Mountains; the N. side comprises Tunis, Tripoli, Morocco, and Algeria; the S. side is called Beled-el-Jereed (the country of dates). It was very rich and populous under the Carthaginians and ancient Romans; conquered abt. 430 A.D. by the Vandals, who misgoverned it for one hundred years, and fell under the sway of the Arabs, 647 A.D.

Barbary Ape, **Pig'my Ape**, or **Mag'ot**, a small tailless monkey (*Inuus caudatus*); found in but one place in Europe—the Rock of Gibraltar; also abounds in N. Africa, especially among rocky mountains and forests. It is gregarious, displays great agility in passing from tree to tree, and usually walks on four feet. Bands of these apes often plunder gardens. This species is capable of being trained to many tricks.

Barbauld (bār'bāld), Anna Letitia, 1743-1825; English author; b. Kibworth, Leicester;

published a volume of poems, 1773; married, 1774, to Rochemont Barbauld, a Dissenting minister, with whom she taught at a boarding school for ten years at Palgrave, Suffolk; published, beside other works, "Devotional Pieces" and "Early Lessons for Children," and assisted her brother, Dr. John Aikin, in the composition of a popular work called "Evenings at Home."

Barbé-Marbois (bär-bä' mār-bwä'), François (Marquis de), 1745-1837; French statesman; b. Metz; consul general to the U. S., and intendant of San Domingo, 1785-90, where he introduced many reforms; returned to France, and, 1795, became a member of the council of elders, but was accused of various offenses and exiled; recalled, 1801, director of the treasury under Napoleon; negotiated the sale of Louisiana to the U. S.; made senator, 1813, and minister of justice, 1816; wrote "Complot d'Arnold," 1816, "Histoire de la Louisiane," 1828, etc.

Barbecue (bär-bē-kū), ultimately from Haytian *barbacoa*, a framework of sticks set upon posts, for drying or smoking meat (although *barbe-à-queue*, "from head to tail," is also considered); term originally applied, especially in the Southern States, to the practice of roasting a large animal whole; since applied in the U. S. to a social entertainment on a large scale, generally in the open air, where animals are roasted whole and provisions and drink provided in generous quantities; formerly a favorite means of celebrating political victories.

Barbel, large, coarse fresh-water fish, found in many European rivers; frequents deep, still pools with eddies, in swift-flowing streams; roots in the gravel bottoms like a hog; and feeds on worms and other bottom bait.

Barber, person who shaves others and cuts their hair. This trade or profession is very ancient, and is mentioned by Ezekiel (chap. v, 1). In China and other Oriental countries barbers shave the whole or part of the head. The practice of shaving the beard was common among the ancient Egyptians, Greeks, and Romans. Among the ancient Israelites the removal of the beard by shaving or plucking it out was a sign of mourning. In former times barbers served the public in the capacity of surgeons, and performed the operation of bleeding. The spiral red stripe seen on the barber's pole is said to symbolize the winding of a ribbon round the arm previous to letting blood. The barber's art was practiced in Greece abt. 420 B.C., and is said to have been brought from Sicily to Rome, 299 B.C.

Barberini (bär-bä-rē'nē), Francesco, 1597-1679; Italian cardinal; nephew of Urban VIII; b. Florence; librarian of the Vatican; translated the twelve books of Marcus Aurelius from Greek into Italian; founded the Barberini library.

Barberry, plant of the genus *Berberis* and family *Berberidaceæ*; comprises many species, all shrubs and natives of temperate climates in both hemispheres. Those of our Pacific slope are *Mahonias*. Several fine species

of *Berberis* grow in the central and W. portions of N. America. *B. aquifolium*, with spiny leaves and yellow flowers, is generally cultivated as an ornamental shrub. *B. pinnata* of Oregon bears blue, acid berries, and is sometimes called the *Oregon grape*. *B. canadensis* is a native of the Alleghanies.

Barberry Family (*Berberidaceæ*), herbaceous or shrubby dicotyledons, with the parts of the flower all free from one another, and one or few simple pistils; related to buttercups, magnolias, and moonseeds. There are about 100 species, widely distributed in temperate regions. The barberry and May apple are types of this family.

Barber's Itch, term applied to two distinct diseases. 1. A majority of cases are instances of *syccosis nonparasitica*, or pustular eruptions on the face, from the irritation of too frequent and close shaving. 2. The true barber's itch, *Tinea syccosis*, is contracted by contact of person or by contact with soiled and contaminated razors and brushes of the barber. It is really ringworm in the beard. In either, the *syccosis nonparasitica*, or the true *syccosis*, the inflammation is to be removed by frequent applications of cold water, perfect cleanliness, and soothing lotions, as of glycerin, opium, and acetate of lead. With the first form such methods will suffice. In the second or parasitic form all the infected hairs should be pulled out with the depilation forceps, and the parasites destroyed in the hair follicles by parasiticide lotions or unguents.

Barbet, bird of the genus *Laimodon*; related to the *Picidæ*, or woodpeckers; barbets have a large conical beak surrounded with tufts of bristles; hence the name; inhabit warm countries, particularly tropical Africa, and feed on insects; also the name given to birds of various genera, chiefly S. American and Asiatic, allied to the kingfishers and the trogons.

Barbet, small variety of the poodle dog, remarkable for its activity, intelligence, and fidelity to its master; but equally distinguished for its ill temper and its dislike of all strangers.

Barbey d'Aureville (bär-bä' dār-vël-yē'), Jules Amedée, 1808-89; French novelist; b. St. Sauveur-le-Vicomte; wrote a great number of volumes of a character, on the whole, very brutal and perverse. He, however, attracted the attention of a certain noisy set of writers and readers. The most lauded of his productions are "Une Vieille Maitresse," "L'Ensorcellee," "Les Euvres et les Hommes XIX^e Siècle," "Le Chevalier Destouches," "Memoranda."

Barbou (bär-bō'), name of a celebrated French family of printers, the descendants of John Barbou, of Lyons, who lived in the sixteenth century. His press published, 1539, a beautiful edition of the works of Clement Marot. His son, Hugh Barbou, having removed to Limoges, published his celebrated edition of Cicero's "Letters to Atticus," 1580. Joseph Gérard Barbou, of the same family, settled in Paris, and continued, 1755, a series of Latin classics in duodecimo, begun, 1743, by Cous-

telier. The series rivals the Elzevirs of earlier date, and is much prized for its elegance and correctness.

Barbuda (bär-bö'dä), one of the British W. India islands; 22 m. N. of Antigua; area, 60 sq. m.; is of coral formation, has no harbor, and is partly covered with forests; is a dependency of Antigua, in the colony of the Leeward islands; belongs to the Codrington family, and has a local proprietary government. Pop. abt. 600.

Barcelona (bär-së-lö'nä), most important manufacturing city of Spain; capital of the province of the same name; in Catalonia on the Mediterranean; 113 m. E. of Lerida; next to Cadiz, is the most important seaport of Spain. It is surrounded by a wall, and defended by a citadel and the fort of Montjoi. The city is divided into the old and the new town by a beautiful promenade called La Rambla. The most remarkable public edifices are the Gothic cathedral, about six hundred years old, and the Audiencia, or Palacio de la Deputación, now occupied by the courts of law. It has a university, several public libraries, a theater, an academy of arts and sciences, two museums, and extensive manufactures of silks, woolen stuffs, calicoes or figured cotton stuffs, lace, shoes, and firearms, which, with copper, wine, and brandy, are the principal exports. Barcelona is supposed to have been founded by Hamilcar Barca. The Romans became masters of it at the end of the third Punic war, 146 B.C. It was taken by the Saracens or Moors abt. 714 A.D., and became an independent state, 878. In the twelfth century it was annexed to Aragon. In 1714 it was taken by the Duke of Berwick after a long and heroic defense. Pop. (1900) 533,000.

Barclay, Alexander, abt. 1475-1552; British poet; supposed to have been born in Scotland; became in turn a Benedictine, Franciscan, and rector of All Saints, London; most noted work, "The Ship of Fools," 1509.

Barclay, Robert (Barclay of Ury), 1648-90; Scottish reformer; b. Gordonstown, Moray; member and minister of the Society of Friends, 1667; journeyed in England, Holland, and Germany for the propagation of his doctrines; was several times imprisoned on account of them, and vindicated his sect in "Truth Cleared of Calumnies," "An Apology for the True Christian Divinity, as the Same is Held Forth and Preached by the People Called, in Scorn, Quakers," and "Treatise on Universal Love."

Barclay de Tol'y, Michael Andreas (Prince), 1761-1818; a Russian general of Scottish extraction; b. Luhde-Groshoff, Livonia; fought against the Swedes, 1790, and against the Poles, 1792, 1794; with the rank of major general led Benningsen's advanced guard, 1806; in 1809, with 10,000 men, crossed the frozen Gulf of Bothnia, and advanced as far as Stockholm; in 1810, Minister of War; 1812, commander in chief of the Army of the West, but, having been defeated by the French at

Smolensko, was supplanted by Kutuzof, but after his death, 1813, again obtained the chief command of the army, which he directed at Bautzen, Culm, and Leipzig; raised to the rank of field marshal in Paris, 1814.

Barcokheba (bär-köc'bä), "son of a star," Simon, famous Jewish impostor, claiming to be the Messiah. In the reign of Hadrian, A.D. 132, he incited an insurrection among the Jews, and seized Jerusalem and many fortified places. The city was retaken by the Roman Gen. Julius Severus, and Barcokheba was killed in the fortress of Bethar, tradition says, on the 9th of Ab (August), 135. His disappointed countrymen afterwards changed his name to Bar-coziba, "son of a lie."

Bard'inga, protective trappings of a horse, whether housings made defensive by stuffing and quilting, or chain mail or forged pieces of steel. Such defenses were not used in antiquity; they reached their greatest development at the end of the fifteenth century. A horse thus protected is said to be barded.

Bardin (bär-dän'), Jean, 1732-1809; French painter; b. Montbar; teacher of David and Regnault; director Orleans School of Fine Arts; admitted to the Academy, 1795, for his masterpiece, "Christ Disputing with the Doctors."

Barefooted Friars and Nuns, religious orders in the Roman Catholic Church, which discard shoes and stockings. Of about twenty-five different orders, the most prominent are: the barefooted monks and nuns of St. Augustine; the barefooted Carmelites of Avila, male and female; the barefooted Trinitarians; the nuns of St. Francis of the stricter observance, often called *les Pious*; and the Passionists.

Baregine (bär-ä'zhfn), a mucuslike substance produced by the algae which grow in mineral springs; abounds in the hot springs of Barrèges in France. It is a substance resembling the white of an egg, imparts a flesh-broth flavor and odor to the water, and is prized for that reason.

Bareilly (bä-rä'le), city of British India; in the NW. Provinces; on the river Jua; 151 m. E. of Delhi; principal city of a district of the same name; contains many mosques, a college, and Hindu schools; has manufactories of cutlery, carpets, brazen water pots, tables, and ornamental chairs. Pop. (1901) 131,208.

Barentz (bä'rënts), Willem, d. 1597; Dutch navigator; made repeated attempts to reach China through the Arctic Ocean; got as far as latitude 78° N. on his third expedition; his winter quarters were found undisturbed 1871, and part of his journal was recovered, 1875.

Bar'gain and Sale, conveying and transferring real or personal property for a valuable consideration. The term signifies also the instrument by which the transfer is made. In real estate this form of conveyance is in extensive use. The original mode of conveying corporeal real estate was by means of a ceremony termed Livery of Seisin. The atten-

tion of conveyancers was attracted to other methods more suited to modern necessities. These methods were found in the doctrine of uses.

Barham (bär'am), Richard Harris, 1788-1845; (pen name "Thomas Ingoldsby"), English clergyman and humorist; b. Canterbury; held various church livings, and in 1842 was appointed divinity lecturer at St. Paul's; most noteworthy work the "Ingoldsby Legends," 1840 and 1847, a series of comic tales in grotesque, irregular meters.

Bar Harbor, summer resort of Hancock Co., Me.; on Frenchman's Bay and on E. side of Mt. Desert Island, 46 m. from Bangor; principal points of interest, the summit of Green Mountain, Eagle Lake, Mt. Newport, Kebo, The Ovens, Great and Schooner Heads, Spouting Horn, Thunder Cave, and Eagle Cliff.

Bari (bä'rë), negro tribe of Gondokoro and other places on the White Nile; savage and brutish. Their villages are circular, and each hut is surrounded by an impenetrable hedge of euphorbia. They inhabit a very fertile region, live under patriarchal chieftains, and when not at war with the slave and ivory traders are generally at war among themselves.

Bari (ancient *Barium*), fortified city and seaport of Italy; capital of the province of Bari, on the Adriatic Sea, 58 m. NW. of Brindisi; defended by a massive old castle of Norman origin. Bari is the see of an archbishop, and has fine ecclesiastical buildings, also manufactories of silk, cotton, linen, and glass. Barium was a very ancient city, and was flourishing as early as 200 B.C. Pop. (1901) 77,478.

Barilla, crude, impure carbonate of soda, used in the manufacture of soap and glass; is procured by burning plants of the genus *Sal-sola* or other plants which grow near the sea. Large quantities of it are exported from Spain and the Balearic Isles.

Barinas (bä-rë'näs), or San Carlos, town in the state of Zamora, Venezuela; near the river Santo Domingo; noted for the exportation of the tobacco which bears its name.

Baring (bä'ring), name of one of the greatest financial and commercial families in the world, now known as Baring Brothers & Co. The head of the family was John Baring, a German cloth manufacturer, who left Bremen early in the eighteenth century, and started a small business at Larkbear, near Exeter, England. Two of his sons, Francis and John, 1730-1816, established the banking house in London, 1770. The following are the most conspicuous members of the family: Alexander, Baron Ashburton, 1774-1848; son of Sir Francis. Edward Charles, first Baron Revelstoke, 1828-97, was raised to the peerage, when head of the firm, 1885. Evelyn, first Earl Cromer, created 1901, b. 1841-. Sir Francis, 1740-1810; son of the first John; was deaf from youth; a director in the East India Company; and for supporting Pitt's policy was created a baronet, 1793.

Baring-Gould (bä'ring-göld), Sabine, 1834-; English clergyman and author; b. Exeter; published "Myths of the Middle Ages," "The Origin and Development of Religious Belief," "Legends of the Patriarchs and Prophets," "Lost and Hostile Gospels," "Lives of the Saints," "Tragedy of the Cæsars," and other works to the number of about fifty, chiefly on religious subjects or relating to folklore, legend, and popular superstitions; also a number of novels.

Baritah (bä-rî'tä), large Australian bird belonging to the *Corvidæ*, crow family. The *Gymnorhina tibicen*, piping crow or piping grackle, has a melodious voice, is easily tamed, and learns to whistle tunes.

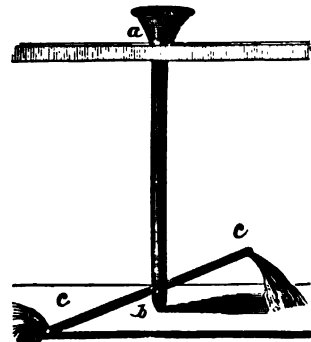
Baritone, or **Barytone**, tone of a man's voice, about halfway between the bass and tenor. It generally extends in compass from low A of the bass clef to high F above the staff, and occupies the same position as the *mezzo soprano* of the female voice. In Greek grammar, words with an unaccented final syllable are called barytones.

Barium (bä'ri-üm), one of the alkaline earthy metals; chemical symbol, *Ba*; atomic weight, 137; occurs in nature chiefly as sulphate, barite, barytes, or heavy spar, as carbonate, witherite, and as silicate, harmotome; is very rarely prepared in the metallic state.

Bark, outer parts of the stem of plants, especially of trees. It is best developed on trees of cool climates, such as conifers, oaks, cottonwoods, maples, etc., but the name is also applied to the outer part of the stem in many herbaceous plants. In the older portions of trees the outer layers of bark, becoming dry and lifeless, are gradually shed or thrown off. The peculiar juices and characteristic properties of a plant are often abundant in the true bark, which is the most important part of many medicinal plants. In making leather, tanners prefer those kinds of bark which contain most tannic acid. Oak bark is chiefly used in the tanneries of Europe. In the U. S. the bark of several species of oak, and also that of the hemlock, is used.

Bark Bee'tle, or **Bark Chaf'er**, any one of several coleopterous insects, belonging to the family *Scolytidæ*. They bore holes in bark, deposit their eggs in the inner bark, and often kill the tree. The U. S. has several destructive species.

Barker's Mill, or **Seg'ner's Wheel**, a hydraulic machine invented by Dr. Barker in the seventeenth century, is a device in which the reaction due to two water jets, *o o* (see cut), is utilized to produce



BARKER'S MILL.

rotary motion. The tube from which the jets issue tends to revolve in the directions opposed to that of the water emitted. The machine is sometimes called the centrifugal mill.

Barking Bird (*Hylactes tarmi*), small bird of the family *Pterotochidae*, found in Chile, remarkable for its cry like the yelping of a small dog.

Barlaam, Italian prelate; d. 1348; b. Seminara, Calabria, near the end of the thirteenth century; was of Greek descent; became a monk of the order of St. Basil; went to Constantinople, 1327, where he joined the Greek Church, and was made Abbot of St. Salvador, 1331; in 1839 sent by the emperor to Avignon to bring about a union between the Greek and Latin Churches; condemned for heresy, returned to Italy and the Roman Church, 1341; made Bishop of Gerace in Calabria, 1342.

Barlaam and Jos'aphat, or **Joas'aph**, Greek religious romance or legend, based on a lost Sanskrit or Pali legendary biography of the Buddha. Josaphat, the son of a heathen king of India, is converted to Christianity and the monastic ideal by Barlaam, an ascetic. The narrative contains a number of parables and an exposition of Christian theology.

Barlet'ta, fortified seaport of Italy; province of Bari; on the Adriatic, and on a rocky island 34 m. WNW. of Bari. Pop. (1901) 40,388.

Barley, cereal of the family *Gramineæ*; said to be more widely distributed than any other grain; has a large climatic range, and is grown from Norway to Algeria; cultivated by the ancient Hebrews, Greeks, and Romans, and an important article of food in remote antiquity (Exodus ix, 31); adapted to both cold and warm climates. Three species are known, the common (*Hordeum vulgare*) two-rowed (*H. distichon*) and the six-rowed (*H. hexastichon*).



BARLEY: HORDEUM
VULGARE.

Barley meal is used for bread in N. Europe, but in many parts of the world this grain is mostly malted for making beer. Is a valuable food for horses. When the pellicle of the grain is removed, it is called pearl barley, and is used as food for invalids. Official reports show production in the U. S., 178,916,484 bushels, from 6,323,757 acres, value \$74,235,997; chief producing states, California, Minnesota, S. Dakota, Wisconsin, N. Dakota, and Iowa—all over 15,000,000. California raises nearly one third of the crop of the U. S.

Barleycorn, John, personification of the spirit of barley or malt liquor; used in humorous poetical composition and in jocular parlance; best known from Burns's humorous poem of that name.

Barlow, Joel, 1778–1812; American poet; b. Redding, Conn.; chaplain in the army in the Revolution, after which he studied law; produced, 1787, "The Vision of Columbus," a poem which was very popular, and which he expanded into an epic, "The Columbiad"; having visited Europe on business, 1788, passed some years in Paris during the French Revolution; amassed a competence by trade or speculation; returned to the U. S., 1805; sent as ambassador to France, 1811; d. near Cracow while on his way to Wilna, whither he had been invited to meet Napoleon; best poem "Hasty Pudding," a mock heroic.

Barmecides (bār'mē-sidēs), singular **Barmecide**, distinguished and powerful Persian family, derived from Barmak or Barmek. His son, Khaled-ben-Barmak, became Prime Minister of the Caliph Al-Mansoor, and also of Al-Mahdi, who appointed him tutor to Harun-al-Rashid. Yahya, the son of Khaled, was vizier under Harun-al-Rashid. Yahya had four sons, who enjoyed the favor of the sovereign. Harun-al-Rashid, who was jealous of their power and popularity, ordered them to be put to death abt. 802 A.D.

Barmecide's Feast, a tale from the "Arabian Nights"; applied to an ostentatious display of worthless bounty; concerns a noble Barmecide in Persia, noted for hospitality and for great humor, who invited a man reduced to poverty to dine with him, and urged him to partake of various courses, all of which were invisible. The guest finally pretended to grow flustered with wine, also imaginary, and boxed his host's ears, for which he apologized. The Barmecide, pleased with his complaisance, ordered a substantial dinner to be served.

Bar'men, town and valley of Rhenish Prussia; on river Wipper, 17 m. ENE. of Düsseldorf. The town is 3 m. E. of Elberfeld, with which it forms one uninterrupted street 6 m. long. Barmen is the principal seat of ribbon manufacture on the Continent. Pop. (1900) 141,944.

Bar'nabas, Saint, early Christian and apostle; originally named Joseph; b. island of Cyprus; a companion and fellow laborer of Paul on his first missionary journey, and appears to have been the founder of the Church of Antioch, to which he was sent by the Church of Jerusalem. His falling out with Paul prevented his going with the latter on his second missionary journey (Acts xv, 39). He returned to Cyprus, and was still active A.D. 57 (cf. I Cor. ix, 6). According to one tradition, he was the first Bishop of Milan.

Barnabas, Epistle of, epistle of twenty-one chapters; supposed to have been written between 107–120 A.D. After having been lost for several centuries, was first published in 1645, but the first four chapters and a part of the

fifth were in Latin only. In 1859 Tischendorf discovered the whole in Greek MS. of the fourth century at Mt. Sinai, and it was published, 1862. Another MS., dated 1056, was discovered at Constantinople by Bryennios, 1875. It was formerly ascribed to the Apostle Barnabas, but it is evidently the work of another and later hand; is chiefly directed against the Judaizing Christians, and its value now is in the light it throws upon the customs and doctrines of the Christians of that time.

Bar'nabites, order of clerics founded by Zaccaria at Milan, 1530, and so called because they preached in the Church of St. Barnabas. Their designation properly is "Regular Clerks of the Congregation of St. Paul."

Bar'nacle, the common name of a family of marine crustaceous animals of the order *Cirripedia*. They are incapable of locomotion, as they are fastened by their head ends to some foreign body. The more common forms encrust rocks, piles, etc., between and below tide marks. As they cannot go in search of their food, they create currents in the water by their feathery feet which bring small organic particles to the mouth. All barnacles are marine; the large parrot barnacle (*Balanus psittacus*) of Peru is used as food, but most forms acquire their economic importance from the fact that they become attached to ships, and there act as a drag upon their progress.

Bar'nard, Frederick Augustus Porter, 1809-89; American scientist and educator; b. Sheffield, Mass.; Prof. Univ. of Alabama, 1837-54; Univ. of Mississippi, 1854-61; president, 1856-58, chancellor, 1858-61; connected with the U. S. Coast Survey at Washington in charge of chart printing and lithography, 1863-64; president Columbia College, New York, 1864-88; president American Association for the Advancement of Science, 1860; and incorporator of the National Academy of Sciences; a persistent advocate of the higher education of women in the old colleges; author of mathematical, astronomical, educational, and other works. Barnard College was named in his honor.

Barnar'do, Thomas John, 1845-1905; British philanthropist; b. Ireland; while a medical student in London, 1866, began to rescue orphan and waif children; established his first home, 1867, and finally nearly 100 institutions in different cities, where the inmates were taught to become self-supporting. More than 60,000 children have been cared for, and 16,000 sent to Canada and the colonies for new homes. He founded a village for girls at Ilford, a hospital, and in Manitoba, an industrial farm.

Barnato (bär-nä'tō), **Barney**, real name BERNARD ISAACS, 1852-97; English speculator; b. London of Jewish parents; went to S. Africa and became a diamond peddler; chief proprietor of the Kimberley mine, which sold for \$27,500,000; at one time the principal rival of Cecil Rhodes, but later associated with him; bought gold mines and promoted mining companies; returned to London to operate, established a

bank, and originated the boom in Kaffirs or shares in Transvaal mines; at one time was worth \$35,000,000; committed suicide at sea.

Barnave (bär-nä'v'), **Antoine Pierre Joseph Marie**, 1761-93; French advocate; b. Grenoble; elected, 1789, to the states-general, and became a leader of the popular party; as a member of the national assembly opposed the absolute veto, and advocated the confiscation of church lands and the abolition of convents; member of the committee appointed to attend the king on his return from Varennes to Paris, 1791, after which he became a more moderate reformer, and even defended the royal cause; retired to private life, 1791; was guillotined in Paris.

Barn'burners, nickname given to that portion of the Democratic Party of the State of New York which opposed the extension of slavery and supported Van Buren against Cass for President, 1848. They were esteemed too radical by their adversaries, one of whom illustrated his meaning by a story of a farmer who was so greatly annoyed by an owl that he shot the bird, and in doing so set fire to his barn, which was destroyed. The barn-burners, led by Samuel Young, Silas Wright, Michael Hoffman, etc., opposed further borrowing for the improvement or extension of their state canals, and were hostile generally to public debts, corporate privileges, etc.

Barn'by, Sir Joseph, 1838-96; English musician; b. York; compositions chiefly of a sacred character; edited "The Hymnary: a Book of Church Song," which contained sixty-three tunes of his composition; cantatas "Rebekah" and "The Lord is King," examples of larger effort; knighted 1892.

Barnegat (bär-nē-gät') Bay, Ocean Co., N. J.; connects with the Atlantic by an inlet over 1 m. wide; bay extends 23 m. N. to the mouth of the Meteteunk River. There is a lighthouse 150 ft. high on the S. side of the inlet; is separated from the ocean by Squam and Island beaches.

Barnes, Albert, 1798-1870; American clergyman and author; b. Rome, N. Y.; pastor of the First Presbyterian Church, Philadelphia, 1830-67. Circulation of his "Notes on the New Testament" is said to have reached more than 1,000,000 volumes; commented also on "Isaiah," "Job," "Daniel," and the "Psalms"; among other works, "The Church and Slavery," "The Atonement in its Relations to Law and Moral Government," "Lectures on the Evidences of Christianity"; was tried for heresy because he maintained an unlimited atonement; was acquitted, but the tension produced resulted in the dismemberment of the Presbyterian Church, 1837, and he became one of the most prominent advocates of the New School doctrines.

Bar'net, or **Chip'ping Barnet**, market town. Hertfordshire, England; 11 m. NNW. of London. Great cattle fairs are held here. The battle of Barnet was fought near here, 1471, between the Yorkists and Lancastrians, in

which the latter were routed. This battle firmly established Edward IV. Pop. (1901) 7,876.

Barnett, John Francis, 1837-; English musician; b. London; Prof. Royal College Music, and Guildhall School of Music; chief works include "The Raising of Lazarus," "The Ancient Mariner," "Lay of the Last Minstrel," "The Building of the Ship," "The Wishing Bell," cantatas; also orchestral and other works.

Barneveldt (bär'nēh-vēlt), John van Olden, 1547-1619; Dutch statesman; b. Amersfoort, Utrecht; member of embassy sent to England, 1585; after his return advocate general of Holland; an adversary of the Earl of Leicester; head of the republican party, while Maurice of Nassau was the chief of its opponents; opposed the designs and warlike policy of Maurice, and, 1609, concluded a truce with Spain for twelve years; for many years grand pensionary of Holland. The animosity between the two parties was aggravated by religious dissension; Barneveldt favored the Arminians or Remonstrants; the Synod of Dort having condemned the Arminians, 1618, Barneveldt was accused of treason, unjustly convicted, and beheaded at The Hague.

Bar'num, Phineas Taylor, 1810-91; American showman; b. Bethel, Conn.; made a museum, which he bought in New York, famous; exhibited the dwarf, Charles S. Stratton (Gen. Tom Thumb), in the U. S., England, and France; engaged Jenny Lind to sing in America, 1849, for 150 nights at \$1,000 a night; acquired a great fortune, but lost it; established, 1871, his "Greatest Show on Earth"; was four times a member of the Connecticut Legislature, and was mayor of Bridgeport.

Baroach'. See BROACH.

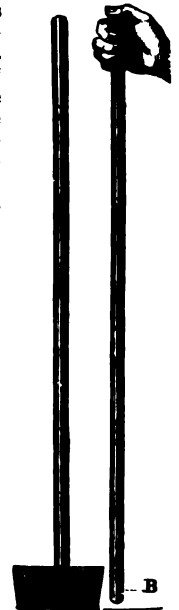
Barocchio (bā-rōt'chīō), or Baroz'zi, GIACOMO, DA VIGNOLA. See BABOZZO.

Barocci (bā-rōt'chē), or Baroc'cio (FIORI FEDERICO D'URBINO), 1528-1612; Italian painter; b. Urbino; best works include a "Descent from the Cross," at Perugia, and a "Holy Family," in the museum at Naples; engraved a number of his pictures.

Baroda (bā-rō'dā), tributary state, Bombay, British India; area, 8,226 sq. m.; pop. (1901) 1,952,692; is under a Mahratta prince called the Gaikwar of Baroda; came into dependence on Great Britain, 1802. In 1874 the ruling gaikwar, Malhar Rao, was tried for attempting to poison the British resident, and, though not convicted, was deposed. The districts of Baroda produce cotton, grain, tobacco, flax, and indigo. Baroda city is the capital. The gaikwar visited the U. S. 1906.

Barometer (bār-ōm'ē-tēr), instrument for measuring the weight or pressure of the atmosphere, invented by Torricelli, of Florence, 1643. In its most common form it consists of a straight glass tube, hermetically sealed at one end, filled with mercury and set in a basin of mercury, the column of mercury having equal weight with the mean pressure of

the atmosphere on an area equal to the base of the column. The fluctuations in the pressure of the atmosphere are measured by the varying heights of the Torricellian column. All that is necessary to form a barometer, therefore, is to connect with the tube and basin of Torricelli some kind of scale suitable to measure these variations. In the barometers commonly used in the U. S. and Great Britain this scale is divided into inches and decimals; in France, and in Continental Europe generally, into millimeters. The divisions directly marked on the scale are made sufficiently large to be read by the unassisted eye. For smaller divisions a vernier must be employed. A form of barometer known as the aneroid barometer, employing no liquid, is the invention of M. Vidi, a physicist of France, consists of a flat cylindrical box formed of thin corrugated metal, from the interior of which the air has been nearly exhausted; the immediate effect being to bring the top and bottom into contact with each other by atmospheric pressure. The touching surfaces are then separated by means of a strong spring attached to the center of the upper surface, while the lower is held down, the whole being placed within a larger box properly adapted to re-



SIMPLE BAROMETER.



ANEROID BAROMETER.

ceive it. With the varying pressure of the atmosphere the separation of the surfaces is greater or less, or the spring is more or less

bent, and the movements thus occasioned are transmitted by proper multiplying apparatus to an index which traverses a dial like that of a watch. Aneroid barometers are very convenient for transportation, and are often graduated to serve as mountain barometers for heights as great as 12,000 or 16,000 ft.

Another form of barometer without liquid, and in external appearance resembling the aneroid, is Bourdon's metallic barometer, improved by M. Richard, of Paris. In this, a broad and nearly flat tube of thin metal, bent into the form of a horseshoe, having been exhausted of air, is secured by the middle part of the box inclosing it, while the ends left free are connected by delicate chains or wires with the apparatus controlling the index. The effect of increased atmospheric pressure upon an exhausted tube of this form is to bring the extremities nearer together, and that of diminished pressure to cause them to recede; and these changes are shown by the index on the dial.

Barometric (bār-ō-mēt'rik) **Light.** See **ELECTRIC DISCHARGE.**

Barometz, sometimes called **Tartar'ian** (or **Scy'thian**) **Lamb**, the prostrate stem (rhizome) of a fern (*Aspidium barometz*) which grows in salt plains near the Caspian Sea. It is covered with a shaggy, silky down, and has some resemblance to an animal. It was anciently believed to be half plant, half animal; also known as **baranetz**.

Bar'on, title of the lowest degree of hereditary peers in Great Britain and Ireland; is the next below that of viscount; formerly used to include the whole English nobility, because all noblemen were barons. The greater barons, who were the king's chief tenants, held their lands directly, or *in capite*, of the crown; while the lesser held of the greater by tenure of military service. The greater barons had a perpetual summons to attend the parliament or great councils of the nation. The practice of conferring the rank of baron by letters patent, and as a mere title of honor apart from the possession of land, originated, 1387. On great occasions a baron wears a coronet adorned with six pearls set at equal distances on the chaplet. He is addressed as "my lord" or "your lordship," and is styled "right honorable." In France and Germany and in many other countries a baron is a nobleman next in rank to a count. Formerly in Scotland a baron was not necessarily a nobleman, but was a holder of land in what was called baronial right. Certain judges of the exchequer courts of England and Ireland are called barons of the exchequer.

Baron', originally **Boy'ron**, **Michael**, 1653-1729; French actor; b. Paris; Molière became his friend and instructor; rose to the first rank and was as eminent in tragedy as in comedy; was with justice called "the honor and the marvel of the French stage"; as a writer of plays was very prolific.

Bar'onet (dimin. of baron), hereditary title of honor. A baronet is next lower than a

baron, compared with whom, however, he is very inferior in rank. Baronets were first created, 1611, by James I. The creation of baronets is limited only by the will of the sovereign, who confers the rank either by patent or by writ. A baronet is entitled to the prefix Sir to his name, and has precedence of all knights except bannerets, knights of the Garter, and privy councilors. Sir William Alexander, Earl of Stirling, was the first American baronet. This process in Nova Scotia stopped, 1629, when the province was sold to France. No baronets of Scotland have been created since 1799.

Baronius (bā-rō'nā-tūs), **Cesare**, 1538-1607; Italian Roman Catholic Church historian; b. Sora, near Naples; cardinal, 1596, and librarian of the Vatican, 1597; wrote the celebrated "Ecclesiastical Annals" from the birth of Christ to 1198 A.D.

Bar'ony, rank, title, or dignity of a baron; the territory or jurisdiction within which a baron exercises his lordship; specifically, the territory over which a court baron has jurisdiction, the court baron originally being a court in which the free tenants, or the freeholders, of a manor were the judges, and the steward of the manor the registrar.

Barozzo (bā-rōt'sō), or **Baroc'hio**, **Giacomo da Vignola**, 1507-73; Italian architect; b. Vignola, near Modena, 1550; architect to Pope Julius III; designed the palace of Cardinal Farnese (Caprarola); upon the death of Michelangelo, 1564, succeeded him as architect of St. Peter's Church; published valuable works on architecture, among which the best known is "Regole de' Cinque Ordini d'Architettura," 1563; one of the designers of the Escorial Palace in Spain.

Barrackpur (bār-rāk-pōr'), town and military cantonment of British India; on the Hugli; about 15 m. above Calcutta; contains the country residence of the governor-general of India, and many mansions of European citizens of Calcutta. Barrackpur was the cradle of the Sepoy mutiny, 1857.

Barrande (bār-rānd'), **Joaquim**, 1799-1883; French palæontologist; b. Saugues, Haute-Loire; chief works include "Système Silurien du Centre de la Bohême," one of the most important single treatises on Palæozoic fossils; his "Theory of Colonies" explained the sporadic occurrence of fossil species in formations older or younger than that of which they are characteristic.

Barranquilla (bār-rān-kē'l'yā), the most important commercial city of Colombia, in the department of Bolivar; capital of a province of its own name, on the left bank of the navigable river, Magdalena, a few miles from its mouth. Pop. (1905) 40,115.

Barras (bā-rā'), **Paul François Jean Nicolas** (Count de), 1755-1829; French Jacobin and regicide; b. Fox Amphoux, Provence; a deputy to the States-General, 1789; member of the National Convention, 1792; voted for the death of the king, and joined the enemies of Robes-

pierre on the 9th Thermidor, 1794, in which crisis he was commander of the National Guard; on the 13th Vendemiaire, 1795, again commander of the troops; with the aid of Bonaparte defeated the royalist insurgents of Paris. He was one of the first five members of the Directory appointed, 1795, and dictator 1797-99.

Bar'ratty, any distinct, unlawful, or dishonest act committed by the master or mariners of a vessel, tending to their own benefit and to the injury of the owner of the vessel.

Barré (bā-rā'), **Isaac**, 1726-1802; British military officer; b. Dublin, Ireland, of French parents; entered the British army, where he served with great distinction, receiving a wound at Wolfe's victory, Quebec, 1759, from which he ultimately became blind; entered the British Parliament, 1761, where he nobly defended the rights of the American colonists. The "Letters of Junius" have been ascribed to him.

Bar'ed Owl, species of owl (*Syrnium nebulosum*) found in eastern N. America; noisiest of our owls, but rather mild in temper.

Bar'el, large wooden vessel for holding liquids or solids; bound with hoops, and formed of staves, which are wider in the middle than at the ends, and have beveled edges, which render the joints tight. Also applied to the quantity contained by a barrel, which varies for different substances. A barrel of flour in the U. S. is 196 lbs., and a barrel of pork or beef contains 200 lbs. In wine measure 31½ gal. make a barrel. A barrel of beer in England is equal to 36½ imperial gal. Cask is the term commonly applied to a barrel whose staves are fitted together closely so as to hold liquids. A hogshead is a large cask or barrel, usually one containing from 100 to 140 gal. See COOPERAGE.

Bar'rett, **Lawrence**, 1838-91; American actor; b. Paterson, N. J.; first appeared in Detroit, 1853, in "The French Spy"; played leading parts at the Boston Museum, 1858; in New York City acted *Othello* to Edwin Booth's *Iago*; was a captain in a Massachusetts regiment during the Civil War; in 1872 played *Cassius* to Booth's *Brutus*; as *Lanciotto* in "Francesca di Rimini" made a great success; in 1884 played in London and was favorably received; wrote a "Life of Edwin Forrest."

Barricade (bār-ri-kād'), military barrier or defensive work employed to obstruct the passage of an enemy through a road or a street of a city, or to protect troops against the fire of the enemy. They have been often used in popular revolts and street fights, especially in Paris, and as late as the Commune, in 1871.

Barrie, **James Matthew**, 1860- ; Scotch novelist; b. Kirriemuir, Forfarshire; journalist in Nottingham and London; first volume, "Better Dead," a satire on London life; subsequent works include "Auld Licht Idylls" and "When a Man's Single," "A Window in Thrums" and "An Edinburgh Eleven," "My Lady Nicotine," "The Little Minister,"

"Sentimental Tommy" and "Margaret Ogilvy," "Tommy and Grizel," "The Little White Bird"; works for the stage include "Walker, London," "The Professor's Love Story," "The Little Minister," "Quality Street," "The Admirable Crichton," "Peter Pan," and "What Every Woman Knows."

Bar'rier Reef, The Great, vast coral reef on the NE. coast of Australia, at a distance varying from 10 m. to over 100 m. from the coast; generally precipitous from a great depth; has a number of breaks or passages.

Barrier Treaties, several treaties between Great Britain and Foreign powers; the first between Great Britain and the Netherlands, negotiated by Lord Townsend, 1709. The Dutch pledged themselves to maintain the Queen of England's title and the Protestant succession, while the British engaged to assist the Dutch in preserving their barrier towns. The second was concluded between the same powers at Utrecht, 1713. The third was signed at Antwerp, 1715, between Great Britain, the Netherlands, and Charles VII.

Bar'rister, in England, a lawyer who has been called to the bar, and who conducts the trial and argument of causes in court, as distinguished from an attorney, whose duty it is to draw the pleadings and prepare the case for trial. See ATTORNEY.

Bar'ron, **James**, 1769-1851; American naval officer; b. Virginia; entered the navy as lieutenant, 1798; promoted captain, 1799; commanded the frigate *Chesapeake* when captured by the British ship *Leopard* after refusal to allow his ship to be searched for deserters, 1807; suspended for five years for surrendering without a fight; held important commands after restoration; killed Com. Decatur in a duel for having opposed his restoration, 1820; became senior officer in the navy, 1831.

Barros (bār'os), **João de**, 1496-1570; Portuguese historian; b. Viseu; governor of the Portuguese possessions in Guinea, 1522; greatest work is "Asia, or the History of the Discoveries and Conquests of the Portuguese in the East Indies," 1552-62; wrote only three decades of this work, which was continued by Diego de Couto to the twelfth decade.

Barrow, **Isaac**, 1630-77; English clergyman; b. London; Prof. of Greek at Cambridge, 1660; Lucasian Prof. of Mathematics, 1663, but resigned in favor of Newton, his pupil, 1669; master of Trinity College, Cambridge, 1672; published, besides other works, "Lectiones Opticæ" and "Lectiones Geometricæ." His reputation as a theologian rests chiefly on his sermons.

Barrow, **Sir John**, 1764-1848; English traveler; b. Lancashire; went to China, 1792, and to the Cape of Good Hope, 1797; was secretary to the Admiralty for nearly forty years, and rendered many services to geographical science by promoting scientific expeditions; chief founder of the Royal Geographical Society. His chief work is, "Voyages of Discovery and Research within the Arctic Regions."

Barrow (bār'rō), river of Ireland; rises in Queen's Co., on the N.E. slope of the Slieve Bloom Mountain; enters the sea through Waterford Harbor; about 100 m. long; next in importance to the Shannon among Irish rivers.

Barrow, artificial mounds found in many countries; erected in ancient times in honor of eminent persons for monumental purposes; formed of earth or stones, and contain in some cases human bones, with armor and utensils. In Great Britain there are numerous barrows, supposed to have been raised before the island was conquered by the Romans. One of the largest in Europe is Silbury Hill, in Wiltshire; vertical height 170 ft., and covers five acres. See MOUND BUILDERS.

Barrow-in-Furness, seaport of Lancashire, England, on the Irish Sea, 18 m. WNW. of Lancaster; on the peninsula of Furness; separated by a narrow channel from Barrow Island; has a good harbor, formed by the island of Walney, 8 m. long. This place, which in 1845 was only a small fishing village, derives its prosperity from rich mines of iron ore (red hematite) and manufactories of iron and steel. The works of Barrow are said to be the largest Bessemer steel works in Great Britain. Pop. (1901) 57,589.

Barrundia (bār-rōn'dē-a), José Francisco, 1779-1854; Central American statesman; b. Guatemala; raised the standard of revolt against the Spanish Govt., and was chosen president of the Central American republic; devoted himself to educational and other reforms; elected president when three of the five states in the old republic again united, 1852; d. in New York while minister to the U. S.

Barry, Sir Charles, 1795-1860; English architect; b. Westminster; Royal Academician, 1841. His design for the new Houses of Parliament was preferred to those of his competitors; buried in Westminster Abbey.

Barry, James, 1741-1806; Irish historical painter; b. Cork; patronized by Edmund Burke; passed five years at Rome; member of the Royal Academy of London, but was expelled, 1797, on account of differences of opinion on methods of art teaching; masterpiece, "The Victors at Olympia."

Barry, John, 1745-1803; American naval officer; b. Tacumshane Co., Wexford, Ireland; emigrated to America abt. 1760; commander of a U. S. frigate, 1776; captured the British vessel *Atlanta*, May, 1781, and after the reorganization of the U. S. Navy was appointed senior officer, and commanded the frigate *United States*.

Barry, Spranger, 1719-77; Irish actor; b. Dublin; first appeared, 1744; became Garrick's chief rival; his supremacy as *Romeo* was generally conceded; buried in Westminster Abbcy.

Barry Cornwall. See PROCTER, BRYAN WALTER.

Bartas (bār-tās'), Guillaume de Salluste du, 1544-90; French poet; b. Montfort; distin-

guished soldier and diplomat, but best remembered as author of "The First Week," an account of the Creation, which had a great circulation, and is said to have influenced Milton when writing "Paradise Lost."

Bart, Jean, 1651-1702; French naval officer; b. Dunkirk; from privateersman became commodore in royal navy; during French wars with Netherlands recaptured at one time 100 grain-laden vessels; during blockade of Dunkirk sailed in fog through English and Dutch fleets, destroyed eighty-six merchantmen, and returned with property worth 500,000 crowns.

Bar'ter, exchange of one commodity for another, as distinguished from the exchange of a commodity for money. A method of trading practiced by barbarous peoples, but inadequate to the needs of the commerce of civilized nations, which demands a standard of value or money. Ships sailing to uncivilized countries often carry weapons or ornaments, to be used in barter with savages.

Barth (bärt), Heinrich, 1821-66; German explorer; b. Hamburg; traveled in N. Africa, 1845, after which he extended his explorations to Palestine, Arabia, and Asia Minor, and published "Wanderings along the Shores of the Mediterranean," 1849. He joined Richardson and Overweg in an expedition to central Africa, but they d., 1851, and he continued alone for about five years. In 1863 Prof. of Geography in Berlin; also published "Travels and Discoveries in Central Africa," a very valuable work.

Barthélemy (bār-tāyl-mé'), Jean Jacques, 1716-95; French antiquary; b. near Aubagne, Provence; learned the Greek, Hebrew, Arabic, and Chaldee languages; keeper of the royal cabinet of medals, 1753; traveled in Italy and collected many medals; wrote treatises on numismatics and ancient inscriptions; most popular work, "Travels of Anacharsis the Younger in Greece."

Barthélemy Saint-Hilaire (-sān-tē-lār'), Jules, 1805-95; French scholar; b. Paris; was an editor of the National and other liberal journals; Prof. of Greek and Latin Philosophy in the College of France, 1838; translated Aristotle; wrote several works, among them "Du Bouddhisme"; was elected to the national assembly, 1848; secretary to Pres. Thiers, 1872-73.

Bartholdi (bār-tōl-dē'), Frédéric Auguste, 1834-1904; French sculptor; b. Colmar, Alsace-Lorraine; studied painting under Ary Scheffer in Paris; afterwards devoted himself to sculpture, and began to exhibit, 1847. Among his best-known works are the busts of Erckmann and Chatrian, the statues "La Malédiction d'Alsace," "Lafayette Arriving in America," and "Liberty Enlightening the World," the colossal figure of the goddess of Liberty at New York, which the people of France presented to the U. S.

Bartholomew (bār-thōl'ō-mū), Saint, one of the twelve apostles; supposed to be the same as the Nathanael in John i, 45-49. There is

no authentic information respecting his labors or his death. According to tradition, he preached the Gospel in India. In Roman Catholic Church his day is August 24th, in the Greek, June 11th.

Bartholomew Fair, English market held annually in W. Smithfield, London, on the festival of St. Bartholomew, from 1133 till 1855, when it was abolished; originally connected with the Church, under whose auspices miracle plays, mysteries, and moralities were represented. Crowds were attracted to it by a variety of amusements and the exhibitions of acrobats, tumblers, mountebanks, mummers, and merry-andrews.

Bartholomew, Saint, Mas'sacre of, a massacre of Huguenots in France, which began in Paris on Saint Bartholomew's day, August 24, 1572, as a result of a long civil war between the Catholics and Huguenots under the regency of Catherine de Médicis. The massacre continued for several days in Paris, and spread to most of the provinces. Estimates of victims have varied from 786 to 100,000.

Bartizan (bār'ti-zān), in architecture, first used by Sir Walter Scott, to mean sometimes a balcony, sometimes a fortified turret or flanking projection. Scott uses the participle "bartizaned" in the sense of embattled, or furnished with battlements. In this sense it has been used by other writers, but the word has no authority and no positive signification.

Bartlett, John, 1820-1905; American compiler; b. Plymouth, Mass.; widely known by his "Familiar Quotations," "Shakespeare Phrase Book," "Shakespeare Index," and "Complete Concordance to Shakespeare's Dramatic Works."

Bartlett, Josiah, 1729-95; American statesman; b. Amesbury, Mass.; signed the Declaration of Independence; was a member of the Continental Congress, 1776-78; became president of New Hampshire, 1790, and governor of that state under the new constitution, 1793.

Bartolini (bār-tō-lē'nē), **Lorenzo**, 1777-1850; Italian sculptor; b. Vernio, Tuscany; patronized by Napoleon, who, 1808, directed him to found a school of sculpture at Carrara; ranked by the Italians as second only to Canova. Among his masterpieces are a colossal bust of Napoleon I, the group of "Hercules and Lichas," "Faith in God," and a group called "Charity."

Bartolommeo (bār-tō-lōm-mā'ō), **Fra**, true name **BACCIO DELLE PORTA**, 1475-1517; Florentine painter; b. Savignano; visited Rome to study the works of Michelangelo; his most celebrated pictures are the "Nativity," "Circumcision," "Virgin on the Throne," the "St. Mark" and the "Descent from the Cross" in Palazzo Pitti, and "Last Judgment" in chapel of Santa Maria Nuova. His "St. Mark" and "St. Sebastian" are considered his best works. He invented the lay figure.

Bartolozzi (bār-tō-lōt'ācē), **Francesco**, 1728-1816; Italian engraver; b. Florence; employed

in England by the Royal Academy; celebrated by his "Death of Chatham" and "Death of Dido."

Barton, Clara, 1821- ; American philanthropist; b. Oxford, Mass.; at outbreak of Civil War devoted herself to the relief of soldiers in hospitals and on battlefields; originated and for some time conducted at her own expense a search for missing soldiers; aided the Grand Duchess of Baden in establishing hospitals in Franco-German War; organized the American Red Cross Society; personally directed relief work at Johnstown flood disaster, Russian famine, Armenian massacres, in Cuba during Spanish-American War, Galveston flood, etc.; was made president of National First Aid Association, 1905.

Barton, Elizabeth. See MAID OF KENT.

Baruch (bā'rōk), Hebrew scribe; friend and companion of Jeremiah, whom he served as amanuensis. The "Book of Baruch," which Catholics admit into the canon, is considered apocryphal by Protestants and Jews, as it forms no part of the Hebrew canon.

Barye (bā-rē'), **Antoine Louis**, 1795-1875; sculptor; b. Paris; began to exhibit his sculptures in 1827; achieved a great reputation, especially by his statuettes and groups of beasts, reptiles, etc., in vigorous action. Copious collections of his works may be seen in Baltimore, in New York, and in the Corcoran Art Gallery in Washington.

Baryta (bār-ī'tū), or **Bary'tes**, oxide of barium; an alkaline earth and a virulent poison; an ingredient in sulphate of baryta, or heavy spar, from which it is obtained; used only for chemical analysis.

Barytone (bār-ī-tōn). See BARITONE.

Bas-Relief (bā-rē-lēf'), in sculpture, applied to figures which do not stand out far from the ground or plane on which they are formed; is distinguished from haut-relief (*alto-relievo*), in which the figures stand sometimes almost entirely free from the ground. Assyrian and Egyptian bas-reliefs were colored. In Egyptian monuments bas-reliefs are common, and some of these are of a peculiar character called cavo-relievo, that is, having the whole figure in relief kept below the general surface. Phidias in the Parthenon brought this style to a high degree of art. The most famous bas-reliefs in the world are those which formed the frieze of the cella wall of the Parthenon at Athens.

Basalt (bā-sālt'), rock of volcanic formation; considered a variety of trap rock, composed of felspar and augite or hornblende; has a compact texture, a dark-green, dark-gray, or black color, and a conchoidal fracture. The most remarkable characteristic of basalt is the columnar structure it often assumes. Its silica percentage is low (45-53). Basalt was formerly applied only to rocks of tertiary age, its coarser varieties being called *dolerite*. According to Von Richthofen's law (see Andesite), basalt, in virtue of its basic

character, is one of the youngest products of volcanic activity. Beautiful specimens are found at the Giants' Causeway in the N. of Ireland, Fingal's Cave in the Scottish island of Staffa, and near Eagle Rock, West Orange, N. J.

Baschi (bäs'kē), **Matteo**, d. 1552; Italian Franciscan; b. Venice; was a Minorite friar and founded the Capuchins after a vision of St. Francis, commanding him to introduce the costume which the saint had worn in life.

Base, in music. See **BASS**.

Base, word having applications in architecture, chemistry, geometry, heraldry, and music. In general signifies the bottom of anything considered as its support, as the base of a mountain. In architecture the lower part of composition, as of a pier, column, or pilaster; also of a whole building or one face of it. **Base**, in chemistry, signifies a substance that has the power to neutralize acids and form salts with them. The terms acid and basic are complementary. The common bases are metals in combination with hydrogen and oxygen. By organic base is meant a compound like aniline, which is related to ammonia. The military base of operations denotes, in contradistinction to line of operations, the usually contiguous and well-guarded (by its own or allied forces) region upon which an army depends for its supplies, reinforcements, etc., to which it sends back its sick and wounded, and upon which it generally would fall back in case of reverse and retreat.

Baseball, national outdoor game of the U. S.; reputed to be a development of the English game of rounders, but it has little about it now to suggest a kinship, except that it is played with bat and ball. A level plot of land 450 ft. square is sufficient for the best games. The bases are placed on the four corners of a square with sides 90 ft. long, and are called respectively going from right to left from home base, first, second, and third base. White chalk lines running through home and first base and home and third base mark the foul lines. A backstop for stopping pitched balls is placed 90 ft. back of home base. Eighteen players in all take part in a game. A recent rule allows a change battery to exchange places with the one already playing. The players are divided into three groups, the pitcher and catcher forming the battery; the first, second, and third baseman and shortstop composing the infield, and the left, center, and right fielder completing the outfield. The pitcher delivers the ball to the batter from a defined box, distant 60 ft. from home base. The catcher stands behind the batsman; he catches unhit balls and returns them to the pitcher, or throws to the baseman when the batsman is running. The infield catches batted or thrown balls, or endeavors to touch therewith the batsman running between bases, or returns the ball to the pitcher. The outfield stops or catches batted or thrown balls and throws them to the basemen or catcher for the purpose of putting out runners, or else returns

them to the pitcher. The aim of each team is to score as many runs as possible. To make a run a player must make a complete circuit of the bases, but not necessarily on one hit. He may advance one or several bases on the second or third batter's hit or he may steal a base while the pitcher is delivering a ball to the next batter. When three men on either side have been put out, one inning is finished. A full game consists of nine innings. A batsman is out when he is touched by the ball between bases, when his batted ball is caught by one of the fielders before it touches the ground; when hit by a batted ball, and when forced to run for a base because all the bases are occupied, and the ball is held by the fielder at the base for which he is making. The batsman must not step out of his box, and must strike at every ball that crosses "the plate" on a level between his knees and shoulders—these are called "fair balls." If he fails to strike at it or hit it, it counts as a "strike" against him, and if he fails three times he is out, providing the third ball is caught by the catcher before it touches the ground. If a pitcher delivers the ball and it does not pass over the plate in the defined zone it is counted as "one ball" in favor of the batsman, and after four such balls he is allowed to take his base. A batter hit by a pitched ball is given his base.

Base Level, level below which a stream cannot erode by reason of the height of its point of discharge. When the degradation of a region has progressed so far that all its slopes are very gentle, running water has but little erosive power, and the region is said to be reduced to base level or to have become a base-level plain.

Base of Operations. See **STRATEGY**.

Basedow (bä'zē-dō), **Johann Bernhard**, originally **Johann Berend Bas'sedau**, 1723-90; German educational reformer, b. Hamburg. He aimed to realize Rousseau's ideas of education, for which he founded at Dessau, 1774, a model school called Philanthropin, and published a schoolbook entitled "Orbis Pictus," 1774, which became very popular. He sought to render science and learning attractive and interesting by pictures and natural objects, instead of filling the memory with abstractions.

Basedow's Disease, called also **GRAVES'S DISEASE** or **EXOPHTHALMIC GOITER**; a disease probably due to oversecretion by the thyroid gland, as its symptoms can be produced by an overdose of thyroid extract. It is more common in women than in men, usually occurs between the twentieth and thirtieth years, and is characterized by protrusion of the eyeballs, rapid heart action, trembling, and enlargement of the thyroid gland, excision of which has been followed by cure.

Basel, or **Bâle** (bä'zēl, or bäl), most important commercial and manufacturing city of Switzerland; on both sides of the Rhine; 65 m. N. of Bern and 3 m. from the Alsace frontier. The Rhine, here crossed by a bridge, divides it into two parts, named Great Basel

and Little Basel. The city has a fine cathedral, built, 1010-19, with towers not completed till 1500; Univ. of Basel, founded 1459; museum of natural history, a botanic garden, university library, museum of art, and manufactories of ribbons, printed cottons, paper, gloves, jewelry, etc. Basel was first mentioned in 372 A.D., destroyed by the Huns, rebuilt by Henry I, 917. The city, with its 14 sq. m., since 1893 has formed a separate part of the canton of the same name, known as Basel Stadt. Pop. (1907) 131,687.

Basel, Coun'cil of, ecumenical council of the Church held in Basel; summoned by Pope Martin V; opened July 23, 1431, under the pontificate of Eugenius IV; was the result of the decree of the Council of Constance, and was a response to the general demand for reform in the Latin Church, and the termination of the Bohemian schism. Its forty-fifth and last formal session was held May 16, 1443, though the council was not technically dissolved till May 7, 1449, when it gave in its adhesion to Nicholas V, the successor to Eugenius IV. The Roman Catholic Church acknowledges only the first twenty-five sessions of the council.

Basel, Treat'y of, treaty of peace signed at Basel, April 5, 1795, between the French republic and Prussia. The latter agreed to abandon the coalition against France, and to give up her possessions on the left bank of the Rhine. July, 1795, another treaty was here concluded between France and Spain.

Bashan (bā'shān), district in Palestine; E. of the Jordan; most of it high table-land, from Mt. Hermon in the N. to Gilead in the S., the Yarmuk (Hieromax), which enters the Jordan just below the Sea of Galilee, being the boundary between Bashan and Gilead. At the time of the Exodus it was occupied by Amorites, whose king, Og, was slain in battle with the Israelites, and the whole territory assigned to the half tribe of Manasseh. After the Captivity, Bashan consisted of four provinces: (1) Golan (modern Jaulan); (2) Argob, or Trachonitis (modern Lejah); (3) Hauran; (4) Batanea (modern Bethanyeh). Iturea, now Jedur, in the NW. was not strictly a part of Bashan, though taken by the Israelites. Remarkable ruins of ancient cities are found there.

Bashaw (bā-shā'). See PASHA.

Bashi-Bazouks (bāsh'ī-bā-zōk'), irregular troopers, ununiformed and generally mounted, in the service of the Turkish Sultan. They serve without pay, except maintenance, are often under the municipal governors, and are wild, turbulent men addicted to plundering.

Bashkirs (bāsh'kērs), Tartar-Finnish race; mixture of Ostyaks and Tartars, inhabiting the slopes of the Ural Mountains and neighboring plains in the governments of Orenburg, Perm, Samara, and Viatka, European Russia. They first appeared in the tenth century, and formed originally a powerful independent state, but in 1556 submitted to Russia; still preserve some elements of independence, and are

governed by their own officials. They are professed Mohammedans; number abt. 760,000.

Bashkirtseff (bāsh-kērt'séf), Marie, 1860-84; Russian artist and diarist; b. Gavoutsi, Poltava; studied art in Paris; exhibited her first painting in the Salon, 1880; sold "The Meeting" to the French Govt.; and is best remembered as the author of a diary, evidently written for future publication, which attained considerable celebrity on its appearance in print.

Basidiomycetes (bā-sīd-ī-ō-mī-cē'tēz), a class of (mostly) saprophytic plants, related to the Ascomycetes, from which they are apparently derived. They produce large end cells, which produce spores by protrusions, finally enlarge, separate as spores, and are known as basidiospores. The large end cells from which they grew are *basidia*. The class is divided into (1) puffballs (*Gasteromycetæes*), and (2) toadstools (*Hymenomycetæes*). Between 9,000 and 10,000 species of the higher fungi are known. The mushroom (*Agaricus campestris*) and the larger puffball (*Calvatia maxima*) are familiar examples.

Basil (bā'sīl), or **Basil'ius**, Saint, surnamed THE GREAT, abt. 329-79; Greek Father of the Church; b. Cæsarea, Cappadocia; succeeded Eusebius as Bishop of Cæsarea, 370; author of monastic rules and a liturgy which bears his name, and is still used in the Russian Church.

Basil I, surnamed THE MACEDONIAN, 820-86; Emperor of the East; b. Macedonia; gained the favor of Michael III, who appointed Basil his own colleague, 866; succeeded Michael as emperor 867; obtained Asia Minor by conquest from the Saracens, whom he also drove out of Italy.

Basil II, 958-1025; Emperor of the East; son of Romanus II; began to reign with his brother Constantine, 975; waged war with success against the Caliph of Bagdad and the Bulgarians; completed the conquest of Bulgaria, 1018.

Basil (bā'sīl), herb or shrub of the genus *Ocimum* and family *Labiata*; natives of tropical and other warm regions; generally have an aromatic smell and taste; also a common name for *Pycnanthemum*, a N. American genus with numerous species, all erect, rigid herbs; also of the *Calamintha clinopodium* of Europe and N. America, and other labiate herbs. Sometimes used to season food.

Basilean (bā-sīl'ē-ān) **Man'uscripts**, name of two valuable MSS. of the Greek New Testament, now in the library of Basel: 1. A nearly complete uncial copy of the Gospels, lacking only Luke iii, 4-15; xxiv, 47-53, known as E in the list of uncials. It is believed to belong to the eighth century, and to have been written at Constantinople. 2. A beautiful cursive MS. of the whole New Testament except the Apocalypse. It dates from the tenth century.

Basil'ian Man'uscript, uncial MS. of the Apocalypse, now in the Vatican, known as B of the

Apocalypse; named from the Basilian monastery at Rome, to which it once belonged; is referred to the eighth century.

Basilian Monks, or **Monks of St. Ba'sil**, monastic order founded by St. Basil the Great, 361 A.D., and the exclusive order of the Greek Church. He composed a system of monastic discipline which was practiced by great numbers of monks both in the churches of the East and the Latin Church. Spain, Italy, Asia Minor and many other countries now contain monasteries of this order.

Basilian Nuns, order founded by Macrina, the sister of St. Basil, and governed by a rule written by him, spread into the Occident, but scarcely exists there now. It is a contemplative order.

Basilica (bä-sil'ī-kä), among the ancient Greeks and Romans, public hall or courthouse in which princes and magistrates administered justice. Among the Romans it attained the greatest importance, and became, besides a court of justice, a market place and exchange. The plan of the basilica was usually a rectangle divided into aisles by rows of columns, with a semicircular apse or termination, in which the tribunal was placed. The ground plan of these buildings was followed in the early Christian churches, which therefore long retained the name of basilica. The first basilica mentioned in Roman history was the Basilica Porcia, built abt. 182 B.C. The word is still applied to the five great patriarchal churches in Rome and to several smaller ones, among them the cathedral in Quebec, Canada.

Basilica, code of laws, the compilation of which was commenced by Basil I, Emperor of the East, 867-86 A.D., and completed by his son Leo. It is considered valuable for the interpretation of the Roman *corpus juris*, but a portion of it is lost.

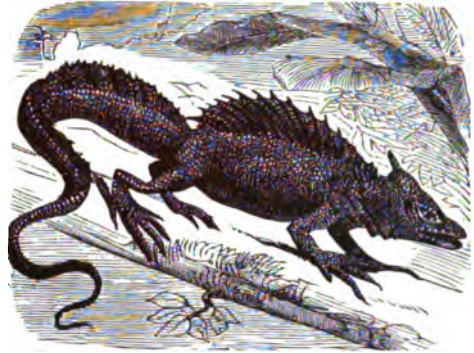
Basilicon (bä-zil'ī-kön) **Do'ron**, a work which James I of England wrote for the instruction of his son Henry, 1599, especially upon the divine right of kings.

Basilicon Oint'ment, or **Basil'icum**, *ceratum resinæ*, five parts of resin, eight of lard, two of wax; used to stimulate ulcers, burns, etc.

Basilides (bä-sil'ī-déz), Gnostic, founder of a sect called Basilidians; lived in Egypt in the reigns of Trajan and Hadrian, abt. 100-140 A.D. Like Zoroaster, he taught the existence of two independent creative principles or powers—good, or light, and evil, or darkness.

Bas'ilisk, lizard of the genus *Basiliscus* and family *Iguanidæ*; natives of tropical America; characterized by a thin triangular fold of skin rising from the occiput and inclined backward; have an elevated crest along the back and tail, capable of being erected or depressed; adapted for swimming and for climbing trees, and are innocuous and inoffensive. The tail is much longer than the body. The word was also applied to a monster by ancient and mediæval

writers, who supposed that it had the form of a snake or lizard, that it infested the des-



BASILISK.

erts of Africa, and was hatched by a toad or serpent from an egg laid by a cock. Sometimes called cockatrice.

Ba'sin, in geography, a natural depression or concavity on the earth's surface, without reference to stratification. The basin of a river is the whole tract of land drained by it and its tributaries. The basin of a lake includes, besides the space occupied by the lake, the land drained by the rivers that flow into it. The highest line between two basins is the water parting or divide. Basin, in geology, is applied to depressions in the strata in which beds of a later age have been deposited; also applied to synclinal depressions of strata, especially in coal fields.

Basingstoke (bä'zing-stök), town in Hampshire, England; 46 m. WSW. of London; has a church built at the time of Henry VIII; has been a market town ever since the Norman Conquest. Pop. (1901) 9,763.

Bas'ket, a vessel made of willows, twigs, or splints interwoven. Baskets have been in use from very early ages. The monuments of ancient Egypt abound in representations of baskets. They are frequently mentioned in the Bible. The ancient Britons were remarkably expert in the manufacture of baskets, which were much prized by the Romans for their neatness and elegance. The process of basket-making is very simple, and appears to be well known among the rudest peoples—even among the aborigines of Van Dieman's Land—and many tribes of American Indians display great skill and taste in making and ornamenting them. Willow, oak, and ash are chiefly made use of in the manufacture of baskets. In the U. S. the rattan, oak, willow, and black ash are employed extensively. The Chinese export many beautiful baskets made of finely split bamboo.

Basket Ball, a gymnasium game popular in the U. S. since its invention in 1891, and offering many opportunities for quickness and presence of mind. The game is played with a round ball like a football about 30 in. in circumference, and each time a team succeeds

in throwing the ball into a basket placed behind the opposing team, a score of two is made. Each team is composed of five; one center, two forwards, and two backs or guards. The ball may be caught, thrown, or struck with the open hand, but may not be carried or kicked. The game is popular with teams of both sexes.

Basket Fish, a group of brittle starfish, genus *Astrophyton*, order *Ophiuroidea*, in which the arms are greatly branched.

Bas'king Shark, the largest of fishes; the type of a peculiar family, *Cetorhinidae*; attains a length of nearly 40 ft.; found in the N. seas, and is often captured by whalers. A large specimen will yield six or more barrels of oil from the liver; also known as bone shark, elephant shark, etc.

Basque (bäsk') **Provinces**, part of Spain comprising the provinces of Alava, Guipuzcoa, and Viscaya, and a portion of Navarra, and coinciding with the ancient Cantabria; area, three entire provinces, 2,739 sq. m.; pop. (1900) 603,596; portion of Navarra not clearly defined; chief towns, Bilboa, Tolosa, and Vittoria.

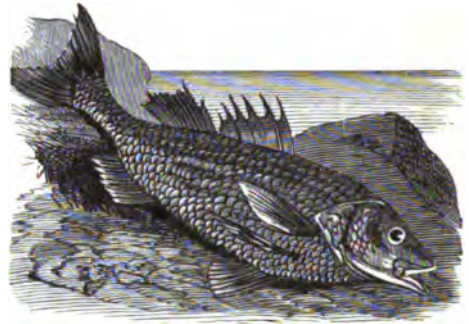
Basques (bäsks), a people speaking a peculiar language and occupying a small territory in and near the Pyrenees, about the bend of the Bay of Biscay, comprising the Basque Provinces in Spain and a small part of SW. France; call themselves Eskalkunac or Euskaldunac, and their language Eskara or Euskara, which have been connected with the *Ausci*, a people of Aquitania. The name Basques is connected with *Vascones*, a Latin form corresponding to Gascons, and applied to a people dwelling in Spain. The Vascones were probably a branch of the Iberian stock which once occupied a large part of Spain and SW. France, and the Basques are probably a remnant of the old Iberians, and their language is the only surviving form of the old Iberian speech.

Bass (bäs), or **Base**, in music, the deepest or lowest part. In respect to harmony the base is the most important part in music, containing more frequently the fundamental notes of the chords, while on it is formed that important and effective figure in music called organ point; also applied to the deepest quality of the male voice, the usual compass of which is from E or F below the bass staff to D or E above it.

Bass, **Bass'wood**, **Lin'den**, or **Lime**, tree, common in the U. S.; has serrate leaves, more or less heartshaped, and bears a woody, globular nut one celled and one or two seeded; wood light, soft, and not of much value for fuel; used in carriage building. The flowers of the basswood abound in honey of excellent quality, and are eagerly sought by bees. The European linden (*Tilia europæa*) is planted as an ornamental tree in many cities of Europe and the U. S. This species yields the bark which is made into Russia matting.

Bass, or **Bars**, the name of many species of fish of various genera, but appropriately belonging to the genus *Labrax*, of the perch

family, and other closely allied genera. The typical species is a European sea fish, prized as food. The striped bass of the E. U. S. (*Roccus lineatus*), often called rockfish, a valuable food fish. It ascends rivers, and is caught in both salt and fresh water, and has been successfully introduced into the waters



STRIPED BASS.

of the Pacific coast. The white bass or perch of the Great Lakes (*Roccus chrysops*), the white perch (*Morone americana*), the yellow bass (*Morone interrupta*) of the Mississippi, are examples of true bass. Equally well known are the two species known as black bass, of the rivers of America (*Micropterus dolomieu* and *Micropterus salmoides*), among our very best game fishes. The grass bass (*Pomoxis sparoides*), the rock bass (*Ambloplites rupestris*), etc., are allied species.

Bassano (bäs-sä'nō), or **Pon'te**, **Jacopo da**, 1510-92; Italian painter; b. Bassano; one of the earliest Italian genre painters; excelled in chiaroscuro, color, and perspective; best work, an altarpiece, in Bassano, of "The Nativity."

Bassano, town of N. Italy; province of Venice; on the river Brenta, 19 m. NE. of Vicenza. Bonaparte here defeated the Austrian general, Wurmser, September 8, 1796. Pop. (1901) 7,896.

Bas'saris, the only genus of the N. American family *Bassarida*, including only two species, and mostly nearly related to the raccoons. The *B. astuto*, civet cat or cacomixtle, is found in Mexico, Texas, California, etc. They are about the size of a cat, and very playful and easily tamed. They live in trees, catching rats, mice, and birds. The tail is bushy and marked with rings like that of the raccoon.

Basselin (bäs-län'), **Olivier**, d. 1450; French poet; b. Vire, Normandy; famous for his drinking songs, first called "Vaux-de-Vire," from the place of their origin, and later corrupted into "Vaudeville."

Bas'set Horn, richest and softest of all wind instruments; invented in Passau, 1770, and afterwards improved; similar to a clarinet in tone and fingering; its compass is two and a half octaves.

Bas'sia, genus of plants of the family *Sapotaceæ*; comprises several species of trees, natives

of tropical or subtropical countries; produces flowers remarkable for their fleshy corolla, and a pulpy fruit inclosing three or four seeds, which contain an abundance of oil or butyric acid, which is used as food and for other purposes.

Bas'so-rilie'vo. See **BAS-RELIEF.**

Bassompierre (bäs-sön-pé-är'), **François, Baron de**, 1579-1646; French general; b. Harnel, Lorraine; gained the favor of Louis XIII, who made him a marshal of France, 1622, and sent him on embassies to Spain and England; fought against the Huguenots at La Rochelle. Having offended Richelieu, he was confined in the Bastile, 1631-42.

Bassoon', wind instrument consisting of a perforated tube of wood in several pieces, fastened together, so as to bring the holes and keys within the reach of the fingers. At the end is attached a small, tapering, crooked brass tube, at the termination of which is a reed to produce the tone. It has a compass of three octaves, from double B flat to B flat in alt.

Bassora (bäs-sö-rä), or **Bas'ra**, a city of Irak-Arabi, Mesopotamia, Asiatic Turkey; on the Euphrates; 70 m. from its mouth; is surrounded by a brick wall nearly 8 m. in circuit, which incloses gardens, rice fields, and groves of the date palm; has an extensive trade, being an entrepôt for the exchange of the products of Turkey and Persia and of India; exports, horses, dates, raw silk, and precious metals; founded by the Caliph Omâr abt. 636 A.D., and was once a rich and populous city. Pop. at the present time abt. 20,000.

Bassora Gum, whitish or yellowish opaque substance resembling gum arabic, but insoluble in water; introduced into commerce from the vicinity of Bassora.

Bass Rock, island rock near the mouth of the Firth of Forth, composed of volcanic material; about 1 m. in circumference; nearly round; 313 ft. high; inaccessible on all sides except the S.; cavern, accessible at low tide, tunnels the rock from E. to W. St. Balthere, or Baldred, d. here in a hermitage, 1756; Charles II purchased it for £4,000, 1671, and in its dungeon many of the most eminent Covenanters were confined during his and the succeeding reign. Four young Jacobite prisoners captured and with twelve more held the rock for King James from June, 1691, till April, 1694, against all the force sent against them by William III, surrendering at last on honorable terms.

Bass Strait, water way separating Australia from Tasmania; is about 140 m. wide; first explored by George Bass, 1798; navigation is obstructed by small islands and coral reefs.

Bast, the fibrous inner bark of dicotyledonous plants (called also *liber* and *endoplæum*), consists mostly of fibers and sieve vessels. It is sometimes valuable for medicinal purposes, and is often used in the fabrication of cloths, ropes, mats, sacks, etc. The Russians apply the name *bast* especially to the inner bark of the linden tree (see **BASS**), which is used

for making ropes, mats, and shoes. The trees are cut down in spring when the sap abounds. This matting is extensively imported, and used in packing furniture and other articles, for covering tender plants in gardens, etc.

Bastard, person born without lawful parentage. Under Roman law marriage of the parents after the birth made the child legitimate. In England, a child born after the marriage of its parents, however shortly after, is legitimate; but the rule of the civil and canon law that the marriage of the parents after the birth of the child renders the child legitimate is not accepted there or generally in the U. S. At common law, a bastard cannot take real or personal estate as the heir or next of kin of either parent, but he may take and dispose of both by will or other conveyance. In most parts of the U. S. a bastard may inherit from the mother, and both the U. S. and England have statutes compelling the father of a bastard to give security for its maintenance.

Bastia (bäs-té'a), fortified seaport of Corsica; on the NE. coast; 75 m. NE. of Ajaccio; founded by the Genoese, 1380, united with France, 1768, and taken by the English, 1745, 1768, and 1794; is the chief commercial city of the island, and the seat of its highest courts. Pop. (1901) 23,659.

Bas'tian, Henry Charlton, 1837- ; English pathologist; b. Truro; noted as advocate of the doctrine of spontaneous generation of living organisms; Prof. of Pathological Anatomy, London Univ., 1867-87, and of Clinical Medicine, University College, 1887-95; publications include "Modes of Origin of Lowest Organisms," "The Beginnings of Life," "Evolution and the Origin of Life."

Bastiat (bäs-té-ä'), **Frédéric**, 1810-50; French political economist; b. Bayonne; wrote against the protective system; during visit to England became acquainted with Cobden, and translated the speeches of British free traders; member of the constituent and legislative assemblies of 1848 and 1849; chief work, "Harmonies Économiques."

Bastien-Lepage (bäs-té-ön'-lé-päh'), **Jules**, 1848-84; French painter; b. Damvilliers; studied with Cabanel; first attracted attention as an impressionist; created a sensation at the Salon of 1874 by the exhibition of the "Portrait of My Grandfather," a picture of an elderly man painted in out-of-doors effect, and following it with such works as "The Haymakers," "Portrait of My Parents," "The Potato Gatherers," and "Jeanne d'Arc"; he was soon recognized as a *chef d'école*; received medals and the Legion of Honor in 1879; but full recognition of his ability did not come until the latter days of his short career.

Bastile (bäs-täl'), a name at first applied to fortified buildings forming part of a system of defense, and once in general use in Paris. In 1369, by order of Charles V, the two towers which flanked the gate of St. Antoine were converted into a fortress of eight towers, connected by thick curtained walls and surrounded by a moat 25 ft. wide. To this fortress the name "bastile" gradually became restrict-

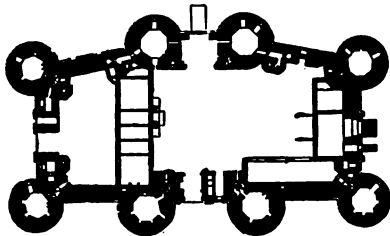
ed. For many years its principal use was for military purposes, although state prisoners were occasionally confined here. The term of incarceration which might elapse before a prisoner was released, either by royal com-



THE BASTILE.

mand or by trial and acquittal, was undetermined, and occasionally some grew old in the cells without learning why they were detained.

It had accommodations for about eighty persons in its cells and dungeons, and it was often overcrowded during the reigns of Louis XIV and XV. The stories of the cruelties practiced here are not well borne out by recent investigation. Among the famous inmates of this prison were the "Man of the Iron Mask," Fouquet, the Marshal Richelieu, De Sacy, Voltaire,



PLAN OF BASTILE.

Labourdonnaix, Cardinal Rohan, and La Chalotais. There were incarcerations of able and upright men under arbitrary rule which were cruel and unjust, and in this way the Bastille became a symbol of despotic government in the year 1789. It was attacked by the Paris insurgents July 14, 1789. Delaunay, the governor, and several officers were killed and the place captured. The next day the demolition of the fortress by the mob began. A bronze column on the site commemorates the destruction, while the day of its fall has become a national fête day.

Bastinado (bās-tē-nā'dō), name given by Europeans to a punishment common in Tur-

key and several Oriental countries; consists of blows inflicted with a stick on the soles of the feet.

Bastion, bulwark; projecting tower erected to defend the wall of a town or fortification. A bastion consists of two flanks, each commanding the adjacent curtain, or that portion of the wall extending from one bastion to another, and two faces making with each other an acute angle, which command the outworks and ground before the fortification. The distance between the two flanks is called the gorge, or entrance to the bastion.

Basutoland (bā-sū'tō-länd), British crown colony near the E. coast of S. Africa; on the NE. of Cape Colony; 160 m. long by 100 broad, on both sides of the Maluti Mountains, inclosing the head waters of the S. branch of the Orange River; bounded by Orange Free State, Natal, and Cape Colony; area, 10,293 sq. m. The country is elevated and rough, has a fine climate; productions, wool, wheat, mealies, and Kaffir corn; annexed to Cape Colony, 1871, but placed directly under the crown, 1884. Pop. (1904) European, 895; native, 347,741. European settlement is prohibited.

Bat, animal of the order *Cheiroptera*, mammals possessing a fold of skin which

commences at the neck and extends on each side between the fore legs or arms and the posterior limbs, serving as wings which enable them to fly. Some of them can spread their wings 5 ft. from tip to tip. The anterior extremities and digits are usually very long, the eyes small, ears large, thumbs short and armed with a hook-like nail, as are each of the toes of the hind feet. Bats fly for the most part only in the night, living by day in hollow trees, caves, and dark buildings. The insectivorous bats are the most numerous, some 300 species being described. The most formidable of these are the vampires, tropical American bats of the genus *Desmodus*. They are famous for their habit of fastening upon sleeping animals and men for the purpose of sucking their blood.



FLYING FOX BAT.



VAMPIRE BAT.



LONG-EARED BAT.

Bataan (bü-tä-än') **Islands**, or **Batan'es**, group of small islands in the Philippine Archipelago, N. of the Babuyan; area, 80 sq. m.; include Bataan, Ithayal, Saptan, etc.; capital, Santo Domingo de Basco, in Bataan. The Americans established control here, 1900, with Teofilo Costillejo as first American governor. Pop. 12,000.

Batangas (bü-tän'gäs), capital of Batangas Province, Luzon, P. I.; on S. coast of bay of same name; rich sugar-growing district. Pop. (1903) 33,131.

Batavi (bü-tä'väs), ancient German tribe or nation who inhabited the country now called Holland, especially an island called Batavia or *Insula Batavorum*; were conquered by Germanicus, and became loyal subjects of the Roman empire.

Batavia (bü-tä'vi-ä), formerly *Jacatra*, city in province of Batavia; seaport of Java; capital of the Dutch possessions in the E. Indies; on the N. coast of the island and on the Java Sea; has a fair harbor, and is the greatest emporium of the Malay Archipelago; has a stadt house, exchange, banks, school of arts and sciences, and a botanic garden. A cable connects it with Singapore, about 600 m. distant. Pop. (1901) 115,887. This city was founded by the Dutch, 1619.

Bata'vian Republic, republic formed out of the Netherlands after that country was conquered by the French, 1795, and the Prince of Orange was deposed; converted into a kingdom, 1806, of which Louis Bonaparte became king.

Bat'fish (*Malthe vespertilio*), fish of the W. Indies and Florida waters, remarkable for its peculiar shape. Its pectoral and ventral fins resemble the legs of a frog.

Bath, capital of Sagadahoc Co., Me.; on the Kennebec; 12 m. from the ocean, 30 m. S. of Augusta; principal business, shipbuilding. There are also manufactories, lumber, oil cloth, cordage factory, foundries, and machine and boiler shops. Pop. (1906) 11,527.

Bath, capital of Somersetshire, England; on the river Avon; 20 m. from its mouth. Its site is an amphitheater, on the declivity of which the finest streets extend in successive terraces. The beauty of the situation, mild climate, and curative efficacy of its hot saline springs render Bath a fashionable place of resort. The Romans erected baths at this place in the first century, and called it *Aquæ Solis*. Pop. (1901) 49,840.

Bath, the application of water, or other liquid, or of spray or vapor, to the body, to cleanse the surface, or to promote health. Hot baths are mentioned by Homer, and the public bath buildings of the ancient Romans were of great splendor. Some of the American Indians practiced bathing in water or steam, even to excess. The ablutions required by Eastern creeds doubtless have a sanitary as well as a religious sanction.

A very cold bath has a temperature below 50° F.; a cold bath, 40°-60°; tepid, 85°-95°; warm, 95°-100°; and hot, 100°-106°. A cold bath produces pallor and roughening of the skin (goose flesh) which should be followed by a reaction, with a feeling of warmth and exhilaration. This will not ensue if the bather is too weak to react, or the bath is too long continued. A cold bath increases the activity of the bodily functions, but should not be indulged in when one is exhausted or perspiring freely. A warm bath produces increased activity of the skin vessels and promotes the elimination of waste products, but if long continued, relaxation, faintness, and muscular languor ensue. In those having diseased arteries apoplexy may be induced by the overuse of hot baths. Sponging with cold or tepid water should follow a warm bath. In fevers, especially typhoid, cold bathing has greatly reduced the mortality, and if the patient is too weak to bear it, tepid sponging or the use of the cold pack (wrapping in wet sheets and then covering with a blanket) will be beneficial.

In Turkish baths, dry heat ranging from 110° to 140° is used to induce profuse perspiration; the skin is then manipulated to loosen the old epidermis, soap and friction are applied, after which the bather takes a shower bath, the temperature of which is quickly reduced, and then after a cold plunge he is dried and a reaction produced by massage. The Russian bath substitutes steam for dry hot air. The habitual use of these baths is very effective to eliminate impurities from the system, and produce an active and healthy condition of the skin, which lessens the liability to colds and kidney trouble, and improves the general health. Local baths, i. e., the hot foot bath, are widely used to break up congestive conditions, such as "colds." Sea bathing has a generally tonic effect, but does harm in certain skin diseases. Various mineral springs have great repute as cures. Mud baths are popular for rheumatism, while the undoubtedly beneficial effects of the Nauheim effervescent salt baths in certain cases of heart disease seem to be due to the stimulating effect of the small bubbles of gas on the skin. Certain sulphur springs have a good effect in some skin diseases; but the direct effect of all such resorts is increased by the influence of a changed environment and regular hygiene.

The Roman baths, or *thermæ*, were essentially structures of the Roman imperial epoch consisting in general of large establishments in which baths of all sorts were provided, including large tanks for swimming, together with grounds for running, ball play, etc., halls for similar exercises, porticoes for promenade and conversation, lecture rooms, libraries, and probably rooms for eating and festivity. Public baths existed before the time of Augustus in Rome and in other cities, but the earliest *thermæ* erected was that of Marcus Agrippa. The service of these gigantic places of resort was performed by slaves in great numbers, and carried on by means of underground passages elaborately planned and systematized. Admission to the *thermæ* was by means

of a small fee, but at times the generosity of the emperor or some public man opened some one thermæ gratuitously for a time. The most famous of these Roman baths were the Baths of Agrippa, the earliest of the thermæ, erected in the reign of Augustus, on the Campus Martius, just behind the Pantheon; the Baths of Caracalla, in the SE. part of Rome, the ruins of which are among the most remarkable in Rome; the Baths of Diocletian, in the NE. part of the city, the most extensive of the thermæ; and the Baths of Titus, on the Esquiline Hill.

Bath Brick. See BRISTOL BRICK.

Bath, Knights of the, military order in Great Britain, deriving its name from the ceremony of bathing which was performed at initiation. The earliest authentic instance of this ceremony was at the coronation of Henry IV, 1399. The last occasion on which the ceremony was used was the coronation of Charles II, 1660, after which the order fell into oblivion until it was revived by George I, 1725. It is second in rank among the orders of England, the order of the Garter being first.

Bathom'eter, apparatus for the measurement of depths of water; in many cases consists of an elaborate system of sounding apparatus, and depths in the Pacific of 4,655 fathoms and over have been determined by such instruments.

Ba'thos. See ANTICLIMAX.

Bathybius (bä-thib'i-üs), name given by Huxley to a granular gelatinous substance of supposed albuminous or protoplasmic nature; was believed to cover large areas of the ocean's bed, and to represent a very low form of animal life; but now regarded as a gelatinous sulphate of lime produced by adding alcohol to the ooze.

Baton Rouge (bät'un-rôzh), capital of Louisiana, and of the parish of E. Baton Rouge; on the Mississippi, 120 m. above New Orleans by river; on a bluff which rises about 25 ft. above the highest inundations. The seat of government was here, 1847-64; then at New Orleans till 1884; since then here again. A convention, which met here January 21, 1861, on the 26th adopted the Ordinance of Secession. The city was taken by Union forces May 7, 1862. Pop. (1900) 11,743.

Batoo' Khan. See BATU.

Batoom (bä-tôm'), or **Batoum'.** See BATUM.

Batrachia (bä-trä'ki-ä), one of the classes of vertebrate animals, including salamanders, frogs, toads, etc. Used in this sense, is synonymous with Amphibia. Batrachians are cold blooded and oviparous, and in most living species are without scales, and the blood is partly aerated through the skin. The young assume a fishlike form, as the tadpole, and finally, when adult, with few exceptions, lose their gills and commence breathing by lungs.

Battalion (bät-täl'yün), a tactical unit of infantry; amounting to nearly 1,000 men. In the American cavalry and artillery service eight (in infantry ten) companies constitute

a battalion. The complement of a British battalion is usually ten companies. In the U. S. A. an infantry regiment has one battalion, while regiments in the other arms of the service have two.

Bat'tel, ancient mode of trial by single combat, usually called "wager of battle"; introduced into England by William I; was used in only three cases—in the court of chivalry, in appeals of felony, and in the issue joined in a writ of right to determine the title to real property. In civil cases the accuser and the accused fought by champions. It was recognized as part of the law of England till 1819.

Bat'tering-ram, engine of war used by the ancient Greeks and Romans to make a breach in the wall of a town or fortress; a heavy beam of wood nearly 100 ft. long, one end of



BATTERING RAM.

which was armed with a mass of iron or bronze in the form of a ram's head; was suspended by a chain or rope from a crane or trivet, and made to swing backward and forward. Sometimes a huge mass of stone, armed with a ram's head and placed on wheels, was driven against the walls. About 100 men were employed in impelling it. They continued to be used in the Middle Ages until superseded by cannon.

Bat'tery, in law. See ASSAULT AND BATTERY.

Bat'tery, military term. A battery employed in the defense of a fortress is a row of heavy guns mounted on an earthwork or other platform; any one of the lines of a fortress which is armed with siege guns. A battery used in attacking a fortified place is a number of siege guns or mortars placed in a line and covered with a parapet. In field operations a battery is a number of guns, with the necessary horses, gun carriages, artillerymen, and officers to manage the guns. The term battery is also applied to the complement of men and officers who serve a set of guns.

Battery, Volta'ic or Galvan'ic, a device for the generation of the electric current by chemical action. The essential parts of the voltaic

cell are: (1) A liquid capable of electrolytic conduction; (2) two metal terminals submerged in the liquid and not in contact with each other below the surface. One of the metals must be acted upon chemically by the liquid; there will then be a difference of potential between the metals, and when they are connected with each other a current will flow through the circuit. In spite of this flow of electricity, the difference of potential between the terminals of the cell will be maintained by the chemical action going on within the cell, the activity of which will continue until the materials are exhausted. When the external circuit of a cell of which zinc and copper in dilute sulphuric acid are the active parts, is closed, the following reactions occur:



The zinc is thus converted into zinc sulphate, and hydrogen is set free at the copper pole. This reaction gives the copper a positive charge, with respect to the zinc, and to send a current through the outside circuit from copper to zinc. In practice it is necessary to modify this reaction; the zinc must be protected from attack during such times as the cell is resting; this is done by amalgamating it. The presence of free hydrogen at the copper pole creates a counter electro-motive force, which soon overcomes the proper voltaic action. To prevent this polarization of the cell, some substance rich in oxygen and capable of giving up its oxygen to the nascent hydrogen is introduced. Nitric and chromic acids are excellent depolarizers. Dioxide of manganese and the black oxide of copper are also used. The depolarizer is frequently placed in a porous cup, with the positive terminal of the cell surrounded by it or submerged in it. Platinum or carbon is substituted for copper whenever the latter metal is liable to be attacked by the depolarizer.

Voltaic cells are divided into: (1) Open-circuit cells, to furnish a current for a moment only at a time, as in ringing electric bells, etc., but which should remain in working condition for a long time; (2) closed circuit cells, to furnish a current continuously for long intervals of time; (3) standard cells, which are not constructed for the generation of appreciable currents, but are used as standards of electro-motive force. Accumulators or storage batteries are secondary voltaic batteries, in which the chemical conditions necessary to the production of current have been obtained by previous electrolytic action within the cell itself. The first form of the constant battery by which it was made possible to maintain a current sensibly constant for a long time was invented by John F. Daniell in 1836. The term battery should not be applied to a single voltaic cell, but to a number of such cells used in combination.

Bathyanzi (böt'yän-yë), one of the most ancient and powerful noble families of Hungary, dating from 884 A.D., when the Magyars invaded Pannonia, derived from lands acquired in the fourteenth century. The most conspicuous members were: Count Casimir, 1807-54;

minister of foreign affairs and military governor during revolution of 1849; fled with Kossuth to Turkey; lived in Paris from 1851 till his death. Count Louis, 1809-49; tried to maintain connection of Hungary with Austria; president of the ministry granted Hungary 1848; member of the Diet; acted with great moderation in political crises, yet when the Austrians entered Budapest he was court-martialed and shot, an act that seemed unjustifiable. His confiscated estates were restored to his family, 1867, and his remains were buried again with much pomp, 1870.

Bat'tle. See TACTICS.

Battle, town of Sussex, England; about 7 m. NW. of Hastings; noted for the manufacture of gunpowder; named from the great battle of Hastings or Senlac, fought October 14, 1066, between William the Conqueror and the Saxon king, Harold. The Normans erected here a large abbey, called Battle Abbey, now in ruins. Pop. (1901) 2,996.

Battle above the Clouds. See CHATTANOOGA.

Battle-ax, weapon used from the earliest times, but not by all peoples or at all epochs. The early Greeks used a double ax (bipennis), which they seem to have borrowed from the Asiatics. Among the N. nations of Europe the battle-ax was a modification of the single-bladed ax used from the earliest times. The battle-ax used by foot soldiers had a long handle of wood and was called poleax; that used by horsemen was shorter and sometimes made entirely of metal.

Battle Creek, city and railroad center; Kalamazoo Co., Mich.; at confluence of the Kalamazoo and Battle Creek rivers, 120 m. W. of Detroit; seat of Battle Creek College (Seventh-day Adventist); has a sanitarium, and manufactories, especially of farm implements, furniture, and cereal foods. Pop. (1904) 22,213.

Bat'tleground, village in Tippecanoe Co., Ind.; 6 m. N. of Lafayette; scene of the battle of Tippecanoe fought between Gen. Harrison and the Indians under Tecumseh and his brother, the "Prophet," November 7, 1811.

Bat'tle-door, or **Bat'tle-dore**, instrument with a handle and a flat board, or piece of leather, network or parchment stretched tightly on a frame, and used to strike a ball or shuttlecock. Battledoor and shuttlecock has been an amusement in Europe since the fourteenth century, or earlier. The game consists of batting the ball to and fro between players.

Bat'tleford, important trading post, Saskatchewan Province, Canada; on the Canadian Northern Railway, at the junction of the Battle River with the Saskatchewan; capital NW. territories, 1876-83. During the Riel Rebellion, in 1885, 300 settlers were besieged in the fort by Indians. Pop. abt. 2,000.

Battle Ships. See NAVY.

Battue (büt-tü'), mode of hunting wild animals or killing game on a large scale; by ar-

ranging a number of men at equal distances, these, by beating the bushes, drive the animals toward a stationary party of hunters. Sometimes the array of beaters is circular and the game is driven to a common center.

Batu', Batou', or Batoo-Khan (bâ-tô'-kân), d. 1255; Mongolian chief and governor in Kipchak; in command, 1235, of the Mongol army ordered to advance into Europe; sacked Riazan, 1237; laid waste Moscow; at Kozelsk, held a "carnival of death"; razed Kieff to the ground; led his troops into Hungary as far as Pest and Gran; defeated the Hungarians near Tokay, 1241.

Batum (bâ-tôm'), or **Batoum'**, fortified seaport of Russia; on SE. coast of the Black Sea; 110 m. NE. of Trebizond, 4 m. N. of the mouth of the Tchoruk; ceded to Russia by Turkey, 1878; terminus of a railway to the Caspian; has the best harbor on the E. coast of the Black Sea; exports much petroleum; scene of insurrectionary excesses, 1905. Pop. (1897) 28,512.

Baudelaire (bôd-lâr'), **Charles Pierre**, 1821-67; French author; b. Paris; works include "Flowers of Evil," whose immorality subjected him to prosecution; "Artificial Paradises, Opium and Hasheesh," "Richard Wagner and Tannhäuser," "Little Poems in Prose"; translated into French the works of Edgar Allan Poe.

Baudry (bô-drô'), **Paul Jacques Aimé**, 1828-86; b. La Rochesur-Yon; greatest decorative works those in the foyer of the Grand Opera House in Paris; painted beautiful pictures of nude figures and compositions, one of the finest of which is "Fortune and the Child," in the Luxembourg Gallery. His ceiling "Glorification of the Law" is in the Palace of Justice, Paris. Baudry was a portrait painter of elegant taste and a technician of wonderful brilliancy.

Bauer (bôw'ër), **Bruno**, 1809-82; German rationalistic theologian; b. Eisenberg, Saxe-Altenberg; Prof. at Bonn, 1839-42; wrote many works, including: "Kritische Darstellung der Religion des Alten Testaments," "Posaune des Jüngsten Gerichts über Hegel, den Atheisten," "Das Entdeckte Christenthum," "Kritik der Paulinischen Briefe."

Bauer, Georg Lorenz, 1755-1806; German theologian and Orientalist; b. near Nuremberg; Prof. of Oriental Languages at Altdorf, 1789, and at Heidelberg, 1805; was a rationalist, and maintained that the Bible should be interpreted by grammatical and historical principles, as the ancient classics are, and not with reference to theological dogma.

Bauernfeld (bôw'ërn-fëld), **Eduard von**, 1802-90; Austrian poet and dramatist; b. Vienna, January 13, 1802; perhaps the most prolific playwright of modern Austria; as a young man took part in the political agitations, culminating in 1848 for a reform of the Austrian administration; works include "Vermischte Gedichte," "Gesammelten Schriften," "Die Verlassenen," a romance.

Baumé (bô-mâ'), **Antoine**, 1728-1804; French chemist; b. Senlis; improved the manufacture of porcelain, made several inventions, and simplified several processes in industrial chemistry. Baumé's hydrometer is in general use among chemists.

Baumgarten (bôwm'gär-tën), **Alexander Gottlieb**, 1714-62; German philosopher; b. in Berlin; Prof. of Philosophy at Frankfort-on-the-Oder, 1740; one of the first of moderns to give scientific form and place to aesthetics; published, besides other works, "Metaphysica" and "Æsthetica."

Baur (bôwr), **Ferdinand Christian**, 1792-1860; German Protestant theologian and historian; b. Schmiden, Württemberg; he created the Tübingen school of distinctive criticism; Prof. of Theology, Blaubeuren Theological Seminary, from 1817; Prof. of Theology, Univ. of Tübingen, from 1826; produced consternation in the conservative ranks by works on New Testament interpretation; applied Hegel's philosophy to church history; works include "Paul," "Church History," "The Christian Doctrine of the Atonement," "Critical Researches Respecting the Canonical Gospels."

Bautzen (bôwt'sën), or **Budissin** (bô'dis-sîn), town of Saxony; on the Spree; 35 m. ENE. of Dresden; scene of a great battle, 1813; between Napoleon and the allies, who finally retreated.

Bavaria (bâ-vâ'ri-ä), kingdom of the German Empire, next to Prussia the largest state; consists of two isolated portions: the E. and larger, bounded N. by Prussia, Saxe-Meiningen, Saxe-Coburg-Gotha, Reuss, and Saxony; E. and S. by Austria; W. by Württemberg, Baden, and Hesse-Darmstadt; the W. and smaller, known as Rhenish Bavaria or the Palatinate, by Prussia, Alsace, Hesse-Darmstadt, and Baden; total area, 29,286 sq. m.; pop. (1905) 6,524,372. The larger portion of the country is mountainous; the Älgäu Alps in the S. reach 9,000 ft. The main rivers are the Danube and the Main in the N. The Rhine forms part of the frontier of the Palatinate. The climate is temperate and healthful; the soil fertile. Principal occupations are agriculture and the breeding of cattle. Among Bavaria's chief products are cereals, fodder, potatoes, hops, tobacco, wine. Bavaria has flourishing manufactories of linen, woolen, paper, iron, china, glass, and wooden ware, beer, tobacco, and cigars, guns, and celebrated melting houses at Oberzell. The crown is hereditary in the male line only. The king exercises the administrative power; the legislative he shares with a legislature consisting of two chambers. The Bavarian army forms two army corps of the imperial army of Germany under the independent military administration of the King of Bavaria. Capital, Munich; the most important towns next to it are Nuremberg, Augsburg, Würzburg, Ratisbon, and Bamberg. Bavaria has universities at Munich, Würzburg, and Erlangen, lyceums, gymnasias, normal schools, polytechnic institutions at Munich and Nuremberg, and about 7,200

public schools; also Latin, technical, and special schools. There are academies of science and of plastic arts in Munich.

Old Bavaria, or Bavaria proper, inhabited by the Boii, a Celtic tribe, constituted under Augustus the Roman province of Noricum. German invading tribes formed the confederacy of the Boioari, dependent on the kings of Austrasia. The Agilolfingians ruled, 556-777. In 777-911 Bavaria belonged to the Franconian empire. In 1180 the von Wittelsbach family (still ruling) was invested with the right to rule Bavaria. From 1255 the country was generally divided between the counts of the Palatinate and the dukes of Bavaria. Maximilian I of Bavaria was made elector, 1623. In 1777 the elector of the Rhenish Palatinate became ruler of Bavaria; 1805 Bavaria joined France against the Emperor of Germany; 1806 the elector assumed the title of king, and joined the Rhenish Confederation, which he left, 1813, to join the allies against Napoleon; 1818 constitutional government was introduced; 1866 Bavaria sided with Austria against Prussia, but in the Franco-Prussian War supported Prussia; concluded a treaty with Germany, 1870, and entered the empire 1871.

Bax'ter, Richard, 1615-91; English Nonconformist theologian; b. Rowton, Shropshire; was neutral or moderate in the civil war, being friendly to the Puritans, but favorable to a monarchy. He took up his residence in London, 1660, just prior to the Restoration; chaplain to Charles II; declined the bishopric of Hereford. In consequence of the passage of the Act of Uniformity, 1662, he seceded from the Anglican Church; continued to preach to the Nonconformists; and was several times persecuted and arrested. He was a voluminous writer, having published 168 treatises. His best-known works are "Saint's Everlasting Rest," "Call to the Unconverted," and "Catholic Theology."

Baxterians (bäks-tě'ri-āns), adherents of Baxter's theological system, the doctrines of which were: 1, that though Christ died in a special sense for the elect, yet he also died in a general sense for all; 2, the rejection of the dogma of reprobation; 3, that it is possible for even saints to fall away from saving grace.

Bay, in geography, an inlet of the sea, or a portion of the sea extending into the land. The terms *bay* and *gulf* are vaguely and promiscuously applied to bodies of water of various forms and dimensions. Hudson Bay might properly be called a gulf. The word *bay* is generally applied to smaller portions than *gulf*.

Bay, or **Bay Tree**, laurel tree (*Laurus nobilis*); sometimes called sweet bay. The *Prunus laurocerasus* is sometimes called bay laurel. Several other trees are popularly called bay. The sweet bay of the U. S. is the *Magnolia glauca*, which has fragrant flowers. The leaves of the bay have long been subjects of popular superstition, and have been used with other evergreens to decorate churches at Christmas.

Bays in the plural signifies an honorary garland or crown, bestowed as a prize for victory or meritorious action. It is not known what kind of tree is meant by the word in the Bible translated bay tree.

Bayadere (bä-yä-dēr'), dancing girls of India. The nautch (pantomimic dance) as an adjunct of social entertainment is of great antiquity. The nautch girls go about in small troupes and their dance consists in slow, legato movements of hands, arms, head, body, and feet, which are said to require great technical skill and suppleness of joint. Their pantomime, and the accompanying songs, portray despondent or exultant love and the like.

Bayamo (bä-yä'mō), chief town in the basin of the Cauto River, Santiago de Cuba, province Cuba, 94 m. NW. of Santiago. A few m. SW. the ten years' war, insurrection of 1868-78, began, and the town figured prominently in Garcia's campaigns in 1895. It is a trading center for the grazing and farm districts around it. Pop. (1899) 3,022.

Bayard (bä'järd), **James Asheton**, 1767-1815; American lawyer; b. Philadelphia; practiced law in Delaware, and in 1796 became a Federalist member of Congress, in which he attained eminence as an orator. The contest between Jefferson and Burr in 1801 was decided in favor of Jefferson by the Federalists under the influence of Mr. Bayard; U. S. Senator from Delaware, 1804-13; one of the commissioners that negotiated the treaty of Ghent, 1814.

Bayard (bä-yär'), **Pierre du Terrail** (Chevalier), 1475-1524; heroic French knight; called *le chevalier sans peur et sans reproche* (the knight without fear and without reproach); b. Castle Bayard, near Grenoble; remarkable for his modesty, piety, magnanimity, and various accomplishments; served under Charles VIII against Naples, 1494, and distinguished himself at the battle of Tornovo. After the accession of Louis XII he performed remarkable exploits in war against the Spaniards and English; in the service of Francis I took Prosper Colonna prisoner, and gained a victory at Marignano, 1515; defended Mézières against the army of Charles V, 1522, and for this service was saluted as the savior of the country; killed in battle at the Sesia River.

Bayard, Thomas Francis, 1828-98; American statesman; b. Wilmington, Del.; U. S. Senator,



CAROLINA RED BAY.

1869, and reflected for a second and a third term; in 1876-77 one of the Electoral Commission to determine who was elected President; president *pro tem.* of the U. S. Senate, 1881; Secretary of State, 1885-89, and one of the commissioners for the settlement of the Canadian fisheries dispute; in 1893 first ambassador to Great Britain.

Bayazid (bā-yā-zēd'), or **Bajazet**, surnamed **ILDERIM** ("the lightning"), 1347-1403; Sultan of the Turks; succeeded to throne, 1389; soon conquered Bulgaria, greater part of Asia Minor, and part of Greece; career of conquest arrested by Tamerlane, who defeated him, 1402, near Angora.

Bayberry, the fruit of the bay tree; also the fruit of the wax myrtle (*Myrica cerifera*), a shrub which produces a kind of wax, sometimes called bayberry tallow, and used in pharmacy; also called candleberry, as it has been employed in making candles. The bayberry grows chiefly along the U. S. Atlantic coast, becoming an evergreen tree in the South; has active medicinal qualities. The wax is found on the outside of the berries, and is obtained by boiling.

Bay City, capital of Bay Co., Mich.; on the Saginaw River; 4 m. from its mouth, and at the head of navigation; principal trade is in lumber and salt. Pop. (1904) 27,644.

Bayeux (bā-yū'), city of France; in department of Calvados; on the river Aure. Here is a majestic cathedral said to be the oldest in Normandy.

Bayeux Tapestry, web of canvas or linen cloth 214 ft. long by 20 in. wide, on which is embroidered, with woolen threads, a representation of the invasion and conquest of England by the Normans. According to tradition,



BATTLE OF HASTINGS. BAYEUX TAPESTRY.

it was embroidered by Matilda, the wife of William I; a valuable historical document, as it gives a correct and minute portraiture of the manners and customs of that age and of the Norman costumes. The tapestry was discovered in the cathedral of Bayeux abt. 1730, and is now preserved in the hôtel de ville of that place.

Bay Lake, large body of water on the island of Luzon, P. I.; S. of Manila; about 30 m. both in length and breadth; connected with

Manila Bay by the Pasig River; made naval headquarters for gunboats and small craft of the U. S., 1899.

Bayle (bāl), **Pierre**, 1647-1706; French philosopher; b. Carlat; in 1675, obtained the chair of Philosophy in the Protestant College of Sedan, which was closed or suppressed by the government, 1681; then Prof. of Philosophy and History at Rotterdam, and commenced, 1684, a critical monthly review called *Nouvelles de la République des Lettres*, which he continued to edit until 1687. The magistrature of Rotterdam deprived him of his professorship, 1693, and even of his right to teach privately. Bayle was a skeptic, an eloquent advocate of religious liberty, and a very independent thinker. His most important work is a "Dictionary, Historical and Critical," 1696, which exercised a great influence over literature and philosophy, and had a European reputation.

Bay of Is'lands, large bay on the W. coast of Newfoundland; contains many islands, and its scenery is very fine; gypsum and marble abundant; has important fisheries.

Bayonet (bā'ō-nēt), thrusting weapon attached to the muzzle of a musket or rifle. The bayonet, first used in France, A.D. 1671, had a solid handle which was inserted in the bore of the gun. This was succeeded by that with a hollow handle fitting over the barrel, and which allowed the gun to be fired without removing it. The introduction of the bayonet led to the abandonment of the pike.

Bayonne (bā-yōn'), fortified city of France (ancient *Lapurdum*); department of Basses-Pyrénées; on the Adour. Pop. (1901) 25,053.

Bayonne, city in Hudson Co., N. J., formed by the consolidation of the villages S. of Jersey City on the peninsula between the Raritan and New York upper bays; has oil refineries on New York Bay, with pipe lines to New York, Philadelphia, Baltimore, Pittsburg, Cleveland, etc. Pop. (1900) 32,722.

Bayou (bī'ō), strictly, a stream which is not fed by springs, but flows from a lake or other stream; very often used in the S. U. S. as synonymous with creek, and for tidal channels.

Bayreuth (bī'roit), city of Bavaria; capital of the circle of upper Franconia; on the Red Main; 126 m. N. of Munich; has a theater built for Wagner, where musical festivals are held in summer; it was opened in August, 1876. Pop. (1900) 29,387.

Bay Rum, fragrant liquid obtained by distilling with rum the leaves of the *Myrcia acris*, and probably of other trees of the genus. These are large trees growing in Jamaica and other W. India islands, and belonging to the *Myrtaceæ*.

Bazaar (bā-zār'), or **Bazar**, Oriental market place, either open or covered with a roof; an Oriental assemblage of shops in which goods of various kinds are exposed to sale; often divided into streets or passages. The term is popularly applied to a sale of miscellaneous

articles, mostly fancy work, and contributed gratuitously in furtherance of some charitable or other purpose.

Bazaine (bä-zän'), François Achille, 1811-88; French military officer; b. Versailles; served in Algeria, Spain, the Crimea, Italy, and Mexico; grand marshal of France, 1864; commander in chief of the Imperial Guard, 1869; during war with Prussia; commander of the Army of the Rhine; defeated at Gravelotte, 1870; retired to Metz, which he surrendered; court-martialed and imprisoned, but escaped and resided in Spain till his death.

Bazard (bä-zär'), Saint-Amand, 1791-1832; founder of French Carbonarism; b. Paris; organized societies of Carbonari abt. 1820; became a disciple of Saint-Simon the socialist, and editor of the *Producteur*; after the death of Saint-Simon, 1825, with *Enfantin* published "Exposition of the Doctrine of Saint-Simon," 1828-30.

Bazigars (bä-zë-gärz'), gypsies of India; usually nomadic, and distinct from the Hindus, with whom they do not intermix; are scattered throughout the whole of India; chief occupation is to amuse the public by juggling, tumbling, and performing acrobatic feats, the men as athletes, the women as dancers.

Bdellium (dél'yüm), gum resin resembling myrrh; esteemed by the ancients for its supposed medicinal virtues; two varieties of bdellium are obtained from the *Amyris commiphora* of India and the *Heudelotia africana*, a tree or shrub of Senegal; used in pharmacy in India, and for incense in temples.

Beach-flea. See SANDHOPPER.

Beach'y Head, highest headland on the S. coast of England; 2½ m. SSW. of Eastbourne, Sussex; perpendicular chalk cliffs 564 ft. high, forming the E. end of the South Downs. Here is a lighthouse 285 ft. high.

Beacon, fire kindled on the top of a mountain or prominent point of the coast, giving warning of the approach of hostile fleets or armies; word (in a special signification) now almost exclusively denotes a sign on coasts for guiding and preserving vessels by night or by day.

Beaconsfield (bëk'öns-fëld), Lord. See DISRAELI.

Beaconsfield, small town in Buckinghamshire; 10 m. N. of Windsor; notable as the home and burial place of the poet Waller and of Edmund Burke, and as having given his earl's title to Benjamin Disraeli. Pop. (1901) 1,570.

Bead, in Old English, a prayer, and hence one of the small perforated balls used for keeping an account of the number of prayers repeated. Beads are small globular bodies worn as ornaments around the neck and on other parts of the person, for which purpose they are arranged on strings. They are made of various materials, as gold, amber, glass, etc.

Beagle, small variety of hound, formerly employed in Great Britain for hunting hares, but now nearly supplanted by the harrier; remarkable for its keenness of scent and perseverance.

Beak, or *Ros'trum*, bill of a bird; the sharp projecting part of the bow of modern ships of war used for ramming, and the similar construction on the prows of ancient war galleys.

Beam, any large piece of timber; principal piece of timber in a building that lies across the walls and supports the rafters; also a collection of luminous rays emitted from the sun or other luminary; the part of a balance from the ends of which the scales are suspended; weaver's beam, a wooden cylinder on which the web is wound; the part of a steam engine to which the piston is attached to transfer motion to the crank shaft; in ships, a great main cross timber or beam of iron extending across the hull, supporting the deck, and preventing the sides from collapsing; word also occurs in the phrase on the starboard beam, applied to the position of an object at sea which is seen toward the right by a person whose face is turned toward the bow.

Bean, plant of the family *Leguminosæ*. The true bean of Europe is the *Vicia faba* (or *Faba vulgaris*); sometimes grown in the U. S. as the English bean. The common garden and field beans of the U. S. belong to the species *Phaseolus vulgaris*; also known as kidney beans or haricots. About 150 varieties of these are grown in the U. S. The lima bean (*Phaseolus lunatus*) is a climbing species which is sparingly cultivated in the northernmost states, but which succeeds well from New Jersey S., and is supposed to be native in S. America. The soy-bean (*Soja hispida*) is the popular bean of China and Japan.

Bear, a quadruped of the genus *Ursus* and order *Carnivora*; the type of the family of *Ursidæ*. Bears walk on the soles of their feet, have five toes on each foot, and claws which are not retractile, but are adapted for digging or climbing. Their tails are short. They have six cutting teeth in each jaw, and one canine tooth on each side in each jaw; found both in warm and cold climates in Europe, Asia, and America, but scarce in Africa. The species that inhabit cold climates are generally more fierce and carnivorous than those of tropical regions. Some species pass the winter in a state of torpidity and hibernation in hollow trees or holes in the ground. The brown bear (*Ursus arctos*) is widely distributed over the continents of Europe and Asia. The black bear (*U. americanus*) is found in all parts of N. America. Its total length is about 5 ft. It prefers vegetable food, but when pressed by hunger will kill and eat small animals. The Rocky Mountains and adjacent parts of N. America are infested by the grizzly bear (*U. horribilis*), which is much larger and more carnivorous than the black bear. It sometimes measures 9 ft. from the nose to the tail. This bear is the most formidable beast of prey on the continent of America. The

Polar, or white bear (*U. maritimus*) found on the extreme N. shores of Greenland, Asia, etc., sometimes measures nearly 10 ft. in length; is strictly marine. The kadiak bear (*U. middendorfi*) of the Alaskan peninsula is the largest of living bears, the cranium being 18 in. long.

Bear and Bull, phrase used in connection with the purchase and sale of stocks; bears are those who wish to depress the value of stocks, and the bulls are those who act in the other direction.

Bear Baiting, custom was formerly prevalent in many countries of baiting bears with dogs. The place in which the bears were kept was called a bear garden; was a favorite popular sport in England.

Bearberry (*Arctostaphylos uva-ursi*), trailing shrub, with elliptical evergreen leaves and red berries, found in N. U. S., Europe, and Asia; a member of the heath family, closely related to the madroña and still more closely to the manzanita of California.

Beard, William Holbrook, 1825-1900; American animal painter; b. Painesville, Ohio; studied and painted in Germany, Italy, and France; work principally of a humorous character representing animals dressed as men and women, and depicted as acting under human impulses.

Beard, the hair which grows upon the lower part of the face of a man (and exceptionally women, or even children). The wearing of the beard is universal in the East, where it has long been regarded as a mark of honor and dignity. Some races of men, like the American Indians, carefully pluck out the beard, which with them and others, such as the Mongolians and Bedouins, is scanty.

Bear Riv'er, river of the U. S.; rises in the N. part of Utah, flows into Idaho, and changes its course abruptly toward the S. Having again crossed the S. boundary of Idaho into Utah, it flows SW., and enters Great Salt Lake about 25 m. NW. of Ogden; length about 400 m.

Beatification (bē-āt-īf-ī-kā'shūn), in the Roman Catholic Church, the act by which the pope declares "blessed" a deceased person who lived and died in the odor of sanctity as proved by the testimony for his virtues, or by his martyrdom, and confirmed by miracles wrought after his death through his intercession. Beatification is a step toward canonization (*q.v.*).

Beatific (bē-ā-tīf'ik) **Vi'sion**, direct vision of God; a doctrine founded on Scriptures (I Cor. xiii, 12; I John iii, 2; Rev. xxii, 3, 4), and universally accepted. The Greek Church puts the time after the day of judgment, and among Protestants this view is adopted; but it was condemned by the Council of Florence, 1439, which determined that "the souls of those who have remained pure and spotless after baptism, and of those whose sins after baptism have been pardoned, either in this life or in the next, are immediately received into

heaven, and behold plainly the triune God as He is"; which decision was confirmed by the Council of Trent.

Beat'ing the Bounds, phrase used in England to denote the periodical survey by which the boundaries of parishes are preserved. It is the custom that the clergyman with the parochial officers and the boys of the parish school, should march to the boundaries, which the boys strike with willow rods. The boys themselves were sometimes whipped in proximity to an important landmark, to impress the subject on their memories.

Beattie (bē'tī), **James**, 1735-1803; Scottish educator; b. Laurencekirk, Kincardine; in 1760 Prof. of Moral Philosophy in Marischal College, Aberdeen; to refute doctrines of Hume he published "Essay on Truth," which was extremely successful; most popular poem, "The Minstrel."

Beauchamp (bē'chām), **Richard**, abt. 1380-1439; Earl of Warwick; general of the English army in France under Henry V, and succeeded the Duke of Bedford as regent in France.

Beaufort (bō-fōr'), **François de Vendôme** (Duc de), 1616-69; b. Paris; grandson of Henry IV of France; a leader of the malcontents or opponents of the court in the civil war of the Fronde; having returned to his allegiance, was appointed commander of the fleet by Louis XIV abt. 1662; killed at the siege of Candia.

Beauharnais (bō-ār-nā'), **Alexandre** (Vicomte de), 1760-94; French soldier; b. Martinique; fought under Rochambeau in America; married, 1779, Josephine Tascher de la Pagerie, afterwards wife of Napoleon I; member of the National Assembly, 1789, and twice its president; general in the Army of the North, 1791; general of the Army of the Rhine, 1793; accused of participation in the surrender of Mainz; executed in Paris.

Beauharnais, Eugène de, 1781-1824; son of Vicomte Alexandre de Beauharnais; b. Paris; his mother, Josephine, married Bonaparte, whom he accompanied to Egypt, 1798; rapidly promoted in the army; Viceroy of Italy, 1805; and he married Princess Amalie Augusta, daughter of the King of Bavaria, 1806; displayed talent in the campaign against Austria, 1809, and in the invasion of Russia, 1812. Having obtained command of the army in Russia after it had suffered great disasters, he acted with decision, and made a masterly retreat. After the battle of Lützen, May, 1813, went to Italy, which he defended against the Austrians until the deposition of Napoleon; obtained from the King of Bavaria the title and estate of Duke of Leuchtenberg.

Beauharnais, Hortense. See HORTENSE.

Beauharnais, Josephine. See JOSEPHINE.

Beaumarchais (bō-mār-shā'), **Pierre Augustine** (Baron de), 1732-99; French dramatist; b. Paris; took up his father's watch-making trade; gained admission into court circles by

his musical skill; made a fortune in banking; at beginning of American Revolution became a contractor for supplies of arms and ammunition, as secret agent of the French Govt. He is best remembered as author of "The Barber of Seville" and "The Marriage of Figaro."

Beaumont (bō-mōnt'), Francis, 1584-1616; English dramatic poet; b. Grace Dieu, Leicester; in partnership with John Fletcher wrote about a third of the fifty-two plays which pass under their joint names, among which are the tragedies and tragi-comedies, "Philaster," "The Maid's Tragedy," and "A King and No King"; buried in Westminster Abbey.

Beaumont, capital of Jefferson Co., Tex.; at head of navigation on Neches River; 83 m. NE. of Houston; center of a noted petroleum field and shipping point for lumber.

Beauregard (bō-rēh-gārd'), Pierre Gustave Toutant, 1818-93; American army officer; b. near New Orleans, La.; graduated at West Point, 1838; distinguished in engineer corps; wounded in the Mexican War; resigned from U. S. A. on secession of Louisiana; entered the C. S. A.; directed the operations against Fort Sumter, which opened the Civil War; commanded force which defeated McDowell at Bull Run; defeated Union army on first day at Shiloh and was defeated on the second; retired from active duty till June, 1863, when he took charge of the defense of Charleston against the combined land and sea forces under Gen. Gillmore and Admiral Dahlgren; 1864 repelled Butler's advance on Petersburg, but failed to prevent Sherman's march to the sea. After the war he declined offers to command the Roumanian and Egyptian armies.

Beauvais (bō-vā'), anc. *Bellovacum*, city of France; capital of department of Oise; on the river Thérain; 64 m. NNW. of Paris; the chief town of the Bellovacii in Cæsar's time. In 1443 it was besieged in vain by the English. The citizens of Beauvais repulsed Charles the Bold, Duke of Burgundy, who besieged the city, 1472, with 80,000 men. Pop. (1901) 17,262.

Beaver, quadruped (*Castor fiber*) of the order *Rodentia*; a native of Europe, Asia, and N. America; characterized by industry, sagacity, and skill in building dams and houses; have strong incisors or cutting teeth, in which a sharp, chisel-like edge is always preserved by the unequal abrasion of the hard enamel and the other part, which is softer; body about 2 ft. long. Among its characteristics is an oval tail about 10 in. long, horizontally flattened, and about 3 in. wide, covered with horny scales, but the body is clothed with a fine and valuable fur. The food of the beaver consists of bark of trees, leaves, roots, and berries. Its favorite haunts are rivers and lakes which are bordered by forests. "Their work is all performed in the night," says Dr. Godman. When they find a stream not deep enough for their purpose, they build a dam across it with ingenuity and industry. The dam, which is formed of sticks, roots, stones,

and mud strangely combined, is water-tight, and presents a convex surface toward the current. To obtain material for it they cut down the trees growing on the margin of the stream above the dam, and float them down. It is stated that they have built dams nearly 300 yards long. They pass the winter in houses or lodges which are 2 to 3 ft. high, are built on the edge of the water, and afford them protection from wolves and other wild beasts. They also have holes or burrows in the ground adjacent to their lodges, with entrances under the water, in which they take refuge if their lodges are destroyed or become untenable.

Beaver Rat. See WATER RAT.

Beccafico (bēk-kā-fē'kō), any one of several small European birds which feed, or are supposed to feed, on figs, as the bluetthroat and especially *Curruca hortensis*; a small bird of the family of *Sylviidæ* or warblers, sometimes called the garden warbler.

Beccaria (bēk-kā-rē'ā), Cesare Bonesana (Marquis di), 1738-94; Italian economist and writer on penal laws; b. Milan. His principles were formed by the influence of Montesquieu; most important work is a "Treatise on Crimes and Punishments" in which he argued against the severities and abuses of criminal law. It obtained great popularity. Voltaire admired it, and wrote a commentary on it. He was appointed Prof. of Political Philosophy at Milan, 1768.

Bêche-de-Mer (bāsh-dē-mār'), also called Tre'pang, a name given to the dried bodies of several species of *Holothuria*, or sea cucumber, which are abundant in shallow lagoons and on reefs between Australia, the Fiji islands, and the SE. coasts of Asia. They are esteemed as an article of food by the Chinese. The Malay divers catch them and prepare them in large quantities for the Chinese market. This animal is usually about 9 in. long, but sometimes measures 2 ft. It is stated that 8,000 cwt. of the trepang are annually exported from Macassar to China.

Bechuana (bēk-ō-ā'nā), African race occupying the interior of S. Africa, between the parallels 22° S. and 28° S., and the meridians 22° E. and 29° E., a nearly treeless area, including a large part of the Kalahari desert; numbers abt. 200,000; not nomadic, but live in towns; industrious and bright, alive to whatever will increase their property or comfort, and many migrate for a time to Cape Colony, where they are prized as servants. While not exactly warlike, they are inured to warfare, but they have been unable to withstand the more savage Kaffirs, Zulus, and Matabele on the E. The language is copious, and, like the Kaffir and Zulu, belongs to the Bantu family.

Bechuanaland, British protectorate in S. Africa, between the Molopo River on the S. and the Zambezi on the N., extending from the S. African Republic and Matabeleland on the E. to German SW. Africa; area about 386,200 sq. m.; pop. (1904) 119,772. The

British crown colony of the same name, which lies S. of the Molopo River, was annexed to Cape Colony, 1895.

Beck'er, Georges, 1845- ; French figure painter; b. Paris; pupil of Gérôme; Legion of Honor, 1889; known in the U. S. as the painter of a picture, "Rizpah Protecting the Bodies of her Sons," exhibited at the Centennial Exhibition, 1876.

Becker, Wilhelm Adolf, 1796-1846; German author; b. Dresden; attempted to reproduce the social life of ancient Rome in "Gallus," and of ancient Greece in his "Charicles," both of which have been translated into English; chief work, "Handbuch der röm. Alterthümer."

Becket (bêk'êt), Thomas à, 1118-70; English prelate; b. London; high chancellor of England, 1155, and Archbishop of Canterbury, 1162. Immediately becoming an extreme ascetic, he entered into a conflict with Henry II, who was engaged in the task of initiating the rule of law in England, the one doing his best to extend the authority of the pope and the other his utmost to subject the Church to his own will as king. Thomas was constrained to swear to observe the Constitutions of Clarendon; later recanted his oath, appealed to the pope, and fled to France, the pope advocating his cause. The king, 1170, arranged for an interview with Thomas, but failed to meet him, and broke every engagement. Becket returned to Canterbury, and in retaliation excommunicated the Archbishop of York and the bishops of London and Salisbury, who had officiated at the coronation of the king's son. When informed of this and of the splendid reception of Becket at Canterbury, Henry impatiently demanded: "Will no one free me from this meddling priest?" Four knights took this as a royal order, and put Thomas to death at the foot of the altar of his own cathedral. Thomas was proclaimed a martyr by the popular voice, canonized by the pope, 1173, and his bones deposited in a shrine at Canterbury, which became the object of one of the pilgrimages of Christendom. Henry VIII destroyed the shrine and scattered Becket's ashes.

Beck'ford, William, 1759-1844; English author; b. Fonthill, Wiltshire; his principal work, "Vathek," an Eastern tale, written in French, 1784, was highly commended by Lord Byron; elected to Parliament, 1790; expended an enormous sum in the erection of Fonthill Abbey, which he filled with rare and expensive works of art; published "Italy, with Sketches of Spain and Portugal" and "Memoirs of Extraordinary Painters."

Beck'with, James Carroll, 1852- ; American portrait and genre painter; b. Hannibal, Mo.; member of the Society of American Artists, 1881, and American Water-color Society. He began his studies in the Academy of Design in Chicago abt. 1869, studied two years in New York in the academy schools, and went to Paris, 1873; pupil of Carolus-Duran; returned to New York, 1878, and has since been a regular exhibitor.

Becquerel (bêk-rêl'), **Alexandre Edmond**, 1820-91; French physicist; b. Paris; son of Antoine César Becquerel; Prof. of Applied Physics in the Conservatoire des Arts et Métiers, 1853; aided his father in his scientific investigations; independently made discoveries on the nature of light, phosphorescence, and the conductivity and magnetic properties of various substances; and, among other works, wrote "La Lumière, ses Causes et ses Effets."

Becquerel, Antoine César, 1788-1878; French savant; b. Chatillon-sur-Loing, Loiret; served in the army as officer of engineers, 1810-15; then gave attention to the study of electricity, and made discoveries in electro-chemistry; refuted and exploded Volta's theory of contact, and constructed the first constant pile. In 1837 he received the Copley medal of the Royal Society of London. He obtained by electric action the metals aluminum, silicon, and glucinum, and invented a method of electrotyping. He published, besides other works, "Traité Expérimental de l'Électricité et du Magnétisme." He became a member of the Academy of Sciences, 1829.

Besquerel, Antoine Henri, 1852-1908; French physicist; b. Paris; son of Alexandre E. Becquerel; Prof. in the Polytechnic School; took the place of his father in the Conservatoire des Arts et Métiers; member Academy of Sciences, 1880; wrote, among other works, "Recherches sur l'Absorption de la Lumière," and discovered what is popularly called the "Becquerel Ray."

Becquerel Rays, or Uranium Rays, the rays emitted by radioactive bodies. These names are not now so frequently used as in the early days of the discovery. In 1896 the announcements were made in France, in quick succession, first, by Henry, that phosphorescence from zinc sulphide would affect a photographic plate through cardboard or aluminum; second, by Niewenglowski, that calcium sulphide acted similarly; third, by Henri Becquerel, that this property was shared by other phosphorescent bodies, particularly by the salts of uranium. Further investigation was at first due chiefly to the last-named physicist, hence the name of the rays. Becquerel soon discovered that stimulation of the active substances by light was not necessary and that salts freshly prepared in the dark began at once to radiate. He thought that he had succeeded in reflecting, refracting, and polarizing the rays, and hence regarded them as ultra-violet light rays. Rutherford, in 1899, was unable to repeat these results, and it was found that the rays differed from ultra-violet light in discharging all electrified bodies, as Röntgen rays do, whereas ultra-violet light will discharge negative rays only. It was then supposed for some time that they were practically identical with Röntgen rays; that is, that they consisted of impulses in the ether. It is now recognized that the rays are compound, consisting of a combination of projected particles of two different sizes, together with Röntgen rays, or something very similar. The discovery of more and more powerful sources of these rays, and the effort to isolate others, resulted finally in the separation of radium,

the most intense source of the Becquerel rays yet found.

N-Rays.—A form of radiation, which, if it exists, may be similar to the Becquerel rays, has been announced by Blondlot, a French physicist, but his results have not been confirmed outside of France. According to him, these rays may be detected by allowing them to fall upon a phosphorescent surface whose brilliancy they enhance. They are, he says, emitted by a variety of bodies, including living plants and animals. Dr. Charpentier has investigated their emission by the human brain, and says that he has been able to tell what part of the brain is particularly active at the time of experimentation, by the increased radiation from this part. If these results are accepted they would seem to furnish a basis for a physiological theory of telepathy, hitherto regarded by most scientific men as beyond the pale of legitimate scientific experiment. But the results are regarded by German and English authorities generally, and by some in France, as purely imaginary, and due to self-deception. The good faith of the French observers has not been questioned.

Bed, geology, a stratum, or layer or stratified sedimentary rock; often consists of numerous thin laminae or plates, resulting from intermissions in the supply of materials, as the ebb and flow of the tide, and variable degrees of the turbidness of the water under which they were deposited. A thin bed, if different in kind from its neighbors, is sometimes called a seam. For an aggregate of several beds of the same kind of rock the term formation is used.

Bed of Jus'tice, term applied to the seat or throne occupied by the King of France when he was present at a session of Parliament; also to such a session, or the conference of the Parliament with the king, who came to overrule the decisions of Parliament and enforce edicts or ordinances to which that body was opposed. Decrees promulgated at such a session were more authoritative than the ordinary decisions of Parliament. The ceremony became synonymous with an act of arbitrary power. The last bed of justice was held by Louis XVI, 1787.

Beddoes (béd'öz), **Thomas**, 1760–1808; English physician; b. Shifnal, Shropshire; in 1788 chemical lecturer at Oxford, and in 1798 opened in Clifton a hospital for the cure of disease by medicated gases, in which Humphry Davy was his assistant.

Bede, surnamed **THE VENERABLE**, 673–735; English scholar; b. Wearmouth, Durham; priest at the age of thirty, devoted much time to study. His name is regarded as the greatest in the ancient literature of Britain; wrote on astronomy, grammar, music, etc.; most important work: "Ecclesiastical History of the English Nation," which King Alfred translated into Anglo-Saxon, and which has often been reprinted.

Bedell (bê-dél'), **William**, 1571–1642; prelate of the Church of Ireland; b. Essex, England;

in 1627 elected provost of Trinity College, Dublin; 1629, Bishop of Kilmore and Ardagh. He reformed abuses in his diocese, and acquired much influence by his acts of charity and other virtues. He procured the translation of the Old Testament into Irish.

Bed'ford, John Plantagenet (Duke of), 1389–1435; third son of Henry IV of England; created duke, 1414; commander in chief of the forces in England during the absence of his brother, Henry V, after whose death he was regent of France, and waged war with success against the French dauphin; gained a victory over the French at Verneuil, 1424, but his conquests were checked by Joan of Arc.

Bedford, old market town of England; capital of Bedfordshire; on the river Ouse, 48 m. NNW. of London; has more charitable institutions and public endowments, in proportion to its size, than any town in England. John Bunyan wrote "Pilgrim's Progress" in Bedford jail.

Bedford Lev'el, or **The Fens**, a tract of flat land in the E. of England; bounded on the E. by the German Ocean. Its inland boundary is a range of highlands in the form of a horse-shoe. Nearly all the marshy district called The Fens is included in the Bedford Level, which is intersected by the Cam, Ouse, Nene, and Welland rivers. It was formerly a vast morass, and was named in honor of Francis, Duke of Bedford, who in 1634 expended £100,000 in draining it. This tract now produces good crops of grain and flax, and grass for pasture. Its drainage has been improved in the present century.

Bed'lam, or **Beth'lehem** (of which *bedlam* is a corruption), a hospital for the insane in London, originally the priory of St. Mary of Bethlehem. When Henry VIII suppressed the religious houses, this one was converted, 1547, into an asylum for the insane. In 1814 the patients were removed to a new asylum in St. George's Fields, Southwark. Bedlam is sometimes used as synonymous with a madhouse, or place of uproar.

Bedloe (béd'lō) **Is'land**, in New York harbor; 1½ m. SW. of the Battery; named from a former owner; ceded to the U. S. Govt., 1800, and Fort Wood, mounting 77 guns, was erected on it, 1841. Bartholdi's colossal statue of "Liberty Enlightening the World," presented to the U. S. by the French people, is here.

Bedmar (béd-mär'), **Alfonso de la Cueva** (Marquis de), 1572–1655; Spanish diplomatist; sent as ambassador to Venice by Philip II, 1607; formed a plot to betray the city and state into the power of the King of Spain. The plot was detected one day before that appointed for its execution, and Bedmar was expelled from Venice; became a cardinal, 1622. His conspiracy is the subject of Otway's "Venice Preserved."

Bedouins (béd'ō-ēns), nomadic Arabs; according to tradition, descendants of Ishmael, and aborigines of Arabia; are pastoral, hav-

ing no houses but tents and no permanent places of residence. They form the greater portion of the population of Arabia, but are also distributed over N. Africa, Syria, etc. Though not united by a national organization, they have never been entirely subjugated by any foreign conqueror, as the desert into which they can retreat forms an insuperable obstacle to invasion.

Bee, insect of the order of *Hymenoptera*, which feeds its larvæ on pollen, honey, or food secreted by the adult. There are two large families of bees: *Andrenidæ* or solitary, tunneling "miner bees," and the *Apidæ* or social bees whose tongues are greatly elongated. The genus *Apis* is a native of Europe, but has become almost cosmopolitan. These honey-producing bees live in colonies in holes in the ground, hollow trees, etc.

There are three classes in each colony, the queen or fertile female, the drones or males, and the workers or sterile females. The sole purpose of the drones is to fertilize the queen. This is done on the wing outside the hive and results in the death of the male. When the supplies of the colony get low or just before winter sets in and the colony is satisfied with its queen, the workers kill off the drones. The eggs which produce drones are unimpregnated, and are laid in cells larger than those in which workers are reared. Drones cannot sting.

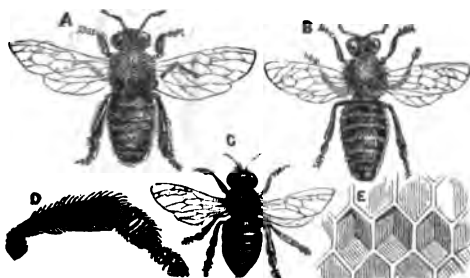
During the summer or honey season a queen may lay over 3,000 eggs in a day, or over 1,000,000 during a lifetime of from two to four years. Queens are developed only from impregnated eggs, and in cells specially prepared for them. It usually takes from ten to twelve days to produce a queen from a worker larva. Three to six days later, if the day be sunny, she goes forth on her marriage flight, which, if unsatisfactory, may be repeated, but if impregnation does not take place before the fifteenth day she is likely to remain a virgin queen, and will lay eggs which will produce only drones. After her marriage flight the queen never leaves the hive except with a swarm. If the queen ceases to lay fertile eggs, the workers, before all the worker eggs are gone, prepare to raise a new queen and then destroy the old one. If by accident the colony loses its queen and has no worker larvæ of the proper age, it will dwindle and die out unless a queen is introduced by man.

The workers are the most numerous class of the hive, a good colony having from 15,000 to 40,000. They are developed only from impregnated eggs. Upon the workers fall all the labors of the colony. The young workers do not go forth for about a week after birth, but build the comb, feed the larvæ, drones, and queen, and ventilate the hive by the motion of their wings. The old workers collect honey, pollen, and propolis, defend the hive, destroy drones and worthless queens and lead the bees when they swarm.

The nectar taken by the bee from a flower is mixed with saliva and then carried to the honey stomach. When the bee reaches the hive the muscles of the honey stomach are contracted and the honey is poured into the honey

cells. Bees also collect pollen, which they work into little pellets stuck on their hind legs. In the hive this pollen is kneaded into a paste called bee bread, and packed into cells as food for the young larvæ or maggots. Propolis or bee glue, collected from resinous buds, is used to glue the combs, to fill cracks, etc.

Swarming is nature's method of increasing the number of colonies, and usually takes place during the honey harvest, but exactly what motives induce the bees to swarm have not been satisfactorily determined. The queen begins to make preparations by laying drone eggs. When the drone brood is well under way queen cells are started, the number usually varying from three to fifteen. When the young queens begin to mature they are guarded by the workers, as the old queen would otherwise destroy them. On some sunny day there is an uproar in the hive, the workers gorge



A. DRONE. B. QUEEN. C. WORKER. D. LEG OF WORKER, SHOWING CAVITY FOR PROPOLIS. E. CELLS FOR HONEY.

their honey sacs, and then queen, mature workers, and drones come out with a rush. The swarm usually clusters upon the limb of a tree, where it remains a short time, and then if it is not hived it sends out bees to locate a suitable place, and upon their return the swarm will go to its new quarters. If the swarm, after leaving the hive, misses the queen, the bees will return, so the queen's wings are often clipped to prevent the swarm absconding. In about a week a new queen will emerge in the old hive, and in two or three days she may lead a new swarm.

As soon as a hive is occupied by a new colony the making of cells begins. The bees form a cluster which remains immovable for about twenty-four hours, while they secrete wax, thin plates of which appear under the scales of their abdomens. This wax is chewed and kneaded and attached to the top of the hive so as to form the end of the layer of cells which will be built down on each side of it. The bees build at first a small-celled comb in which the queen can lay worker eggs. But when sufficient space has been provided for the brood they build a comb with larger cells, thus economizing both wax and labor. These larger cells are primarily for honey, but if the queen lays in them, the eggs develop into drones. Over 20 lbs. of honey are consumed to produce 1 lb. of wax comb. To avoid this loss bee keepers now supply thin sheets of

natural wax as a foundation for the cells, but no process is known by which the delicate building of the comb can be superseded.

The rearing of bees, or apiculture, is represented in the U. S. alone by over 300,000 bee keepers. Some apiarists own from 300 to 3,000 colonies. The greatest improvement in bee keeping was the invention, in 1852, by Rev. L. L. Langstroth, of the first practical movable frame hive, which made it possible to take out and put back the combs, so that the condition of the colony could be ascertained. When a colony is frightened, as by smoke or by shaking the hive, the bees gorge with honey, so that, should the impending danger require them to abandon their hive, they will carry supplies enough to start cell building elsewhere. As they are very docile when in this gorged condition the combs may be moved or the bees handled with comparative safety. If the apiarist's movements are quiet there will be practically no stinging, but quick, jerky motions about the hive will be promptly punished. Bees are more inclined to sting dark objects than light. Many races of bees are bred in this country, but the Italians are the best honey producers and are more easily handled than the common or black bees. Carniolan bees are mild in disposition, while Cyprians are quick stingers. Attempts to introduce the stingless bees of the tropics have not, so far, been successful. Endeavors are made to breed queens whose progeny will have long tongues, so as to be able to gather nectar from such deep blossoms as red clover, and "clover queens" command a high price. The artificial rearing of queens is a fascinating as well as profitable branch of apiculture. See HONEY.

Beech, tree of the genus *Fagus*, and family *Cupuliferæ*; natives of Europe, America, and Australasia; comprises several species of beautiful forest trees, with a close and smooth ash-gray bark and a light horizontal spray. The *F. sylvatica*, or common beech of Europe, forms whole forests in many parts of that continent. It grows to about 100 ft., and sometimes has a diameter of 4 ft.; is an ornamental tree, especially when it stands alone. The *F. ferruginea* (American beech) is abundant in the N. U. S., sometimes growing gregariously in forests which contain few other trees. It is an ornamental tree, which sometimes attains a height of 100 ft.; and surpasses most trees in the depth of

shade produced by its rich green and shining foliage. The wood is hard and valuable for fuel, and being durable under water is used in the erection of mills.



BEECH LEAVES, FLOWERS,
AND FRUIT.

Beech'er, Harriet Elizabeth. See STOWE, HARRIET BEECHER.

Beecher, Henry Ward, 1813-87; American clergyman; b. Litchfield, Conn. son of Lyman Beecher; studied theology at Lane Seminary under his father, then president; pastor at Lawrenceburg, Del., 1837-39; then at Indianapolis, Ind., until 1847, when he was installed pastor of Plymouth Congregational Church in Brooklyn, where his genius and eloquence continued to attract one of the largest congregations in the U. S. till his last sickness. He was equally successful as a lecturer and a popular orator; was editor of the *Independent*, 1861-63, and of the *Christian Union*, 1870-81. His addresses on the subject of the Civil War appear to have had considerable influence in turning the current of public opinion in Great Britain in favor of the Union cause. Mr. Beecher was also long an advocate of anti-slavery and of temperance reform, and at a later period of the rights of women. In 1875 he was tried on charges affecting his moral character preferred by Theodore Tilton, and a six months' sensational hearing resulted in the jury's disagreement. Among his published works are "Lectures to Young Men," "Star Papers," "Life Thoughts," "Royal Truths," a novel, "Norwood," "Life of Christ," "Evolution and Revolution," "Sermons on Evolution and Religion," and many volumes of sermons and addresses.

Beecher, Lyman, 1775-1863; American theologian; b. New Haven, Conn.; licensed to preach, 1798; 1799 pastor Presbyterian Church, E. Hampton, L. I., till 1810, when he went to Litchfield, Conn. He removed to Boston abt. 1826; president of Lane Seminary at Cincinnati, 1832-51; tried for heresy, and, although he was not condemned, the event was a great factor in the separation of the New from the Old Presbyterians, 1837. He published "Views in Theology" and "Sermons on Temperance," which had a great circulation.

Beech'ey, Frederick William, 1796-1856; English navigator; b. London; accompanied Sir Edward Parry on an Arctic expedition, 1819; explored the N. coasts of Africa, 1821; commanded an expedition to the Polar Sea via Bering Strait; discovered Port Clarence and Port Grantley; returned, 1828; published a narrative of his voyage, 1831.

Beef'eater, jocularly, one of certain British functionaries belonging to the Yeomen of the Guard, who form part of the train of royalty, and attend the sovereign at royal banquets, coronations, etc. The warders of the Tower of London who wear a similar uniform are also so called.

Beefeater, bird of the genus *Buphagus*, belonging to the family of starlings; sometimes called oxpecker; exclusively African, and has a habit of running over the backs of oxen, buffaloes, camels, etc., to feed on the larvæ of flies which it finds in their hides, and which is said to be its principal food. This genus includes the S. African buffalo bird.

Beefwoods (*Casuarinaceæ*), family of trees numbering twenty-three species, all of one genus (*Casuarina*); mostly Australasian. Treub's recent studies of the ovules of *C. suberosa* appear to indicate that beefwoods are related to the gymnosperms, although they have usually been associated with the oaks, gallworts, etc.

Beelzebub (bē-ēl'zē-būb), properly **Baal'zebub**, god worshiped by the people of Ekron, in Philistia (2 Kings i, 3). The name came to be applied to a prince or chief of evil spirits, and in this sense it is employed in the Gospels (Matt. x, 25, xii, 24, 27; Mark iii, 22; Luke xi, 15, 18, 19). This name is found only in the New Testament. See APOLLYON; DEVIL; SATAN.

Bee Moth. See HONEYCOMB MOTH.

Beer, fermented liquor made from malted grain; includes ale, porter, lager, and small beer. Hops and other bitter substances are added to improve the flavor and to impart their peculiar qualities. The drink was probably known to the Egyptians; and Tacitus speaks of it as being in common use among the Germans. A distinction is made by the German brewers between ale and beer, on account of the different modes of fermentation, ale being produced by rapid fermentation, in which the yeast rises to the surface, while beer is fermented in cool cellars by a slow process, in which the yeast settles to the bottom of the vessels. Porter is made from a mixture of black and lighter colored malt; stout is a stronger kind of porter. The U. S. census of 1900 reported capital invested in manufacture of malt liquors, \$515,636,792; value of product, \$298,358,732.

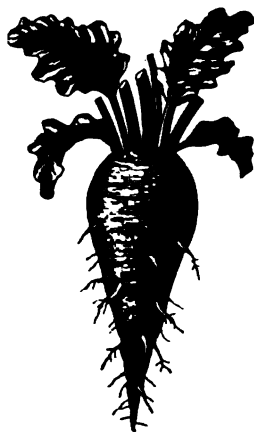
Beersheba (bē'er-shē-bā), "the well of the oath, or well of the seven"; ancient frontier place of Palestine, 50 m. SSW. of Jerusalem, near the border of the desert. Abraham, Isaac, and Jacob often dwelt there. The phrase "from Dan to Beersheba" was used proverbially to express the whole extent of the land of Israel. Now a heap of ruins near the wells.

Bees'wax, substance secreted by the honey-bee; the material of which its combs are constructed, and an article of commerce. Purified beeswax is tasteless, odorless, and colorless; used for candles and tapers, and for other purposes.

Beet, genus of plants of the order *Chenopodiaceæ*, cultivated for their esculent roots, which are large and succulent. The common beet (*Beta vulgaris*) is indigenous on the shores of the Mediterranean, and is cultivated in gardens and fields. The boiled roots are used for food in Europe and N. America. The variety chiefly cultivated in gardens is the red beet, so called from the color of the root, which is sometimes conical. A coarser variety, *mange-wurzel*, is a food for cattle.

Beet sugar, extracted from the roots in large quantities in France, Germany, and U. S., contains ten to twenty per cent of saccharine mat-

ter; is chemically the same as cane sugar. Sugar in the beet was discovered about the middle of the eighteenth century by the Persian chemist, Andreas Marggraf, but it was first extracted on a commercial scale in the early part of the nineteenth century by a student of Marggraf, named Franz Achard. The annual production of all Europe is about 6,700 long tons; Canada, 11,500 long tons, and the U. S., 433,000 long tons. It is produced extensively in the Northern and Western states of this country.

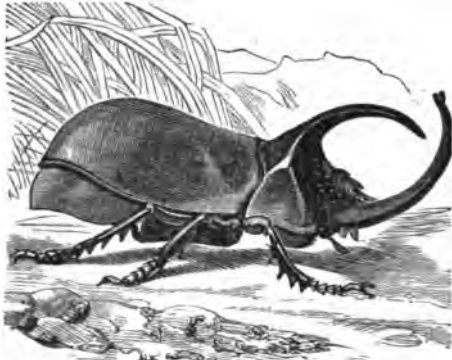


LONG BLOOD BEET.

Beethoven (bā'tō-vēn), Ludwig van, 1770-1827; German musical composer; b. Bonn, of Dutch descent. When but fourteen he was assistant court organist; sent to Vienna, at the elector's expense three years later to pursue his studies under Mozart; also studied with Haydn and Albrechtsberger, making himself perfect master of the science of musical composition. His favorite instrument at this time was the pianoforte, on which he soon rivaled the best performers. Before he was thirty he had published twenty sonatas for the pianoforte, nine for piano and instruments, two concertos for piano and orchestra, trios, quartettes, quintettes, septettes, a ballet, "The Men of Prometheus," and two orchestral symphonies. In less than five years were produced the "Heroic Symphony" "Fidelio," "Fourth, Fifth, and Sixth Symphonies" with the grand mass in C. In 1813 came the "Seventh Symphony," three years later the "Eighth," 1824 the "Ninth" or "Choral Symphony," which is regarded as the most wonderful of his works. These nine symphonies and the grand sonatas for the pianoforte are monuments of genius which alone would give immortality to their creator. A defect in his hearing, first noticed in 1800, increased so that soon he became totally deaf. This affliction clouded his inner life and made him suspicious and unsocial. Thenceforward he lived in his work, which increased in power and depth from year to year. His life was solitary. He never married. His strongest natural attachment was for a nephew who proved unworthy of his uncle's devotion.

Beetle, the name of an insect of the order *Coleoptera*; is often used synonymous with the term *Coleoptera*. Beetles have mouth parts fitted for biting, and wings, the hinder part of which are of use in flight (except in degenerate forms), while the anterior pair are hardened into protective covers which sheathe the other pair when at rest. Beetles pass through a metamorphosis, there being distinct

larval, pupal, and adult stages. The larvæ of many feed upon vegetable matter; the larvæ of the "June bugs" feed upon the roots of the grass, of the spring beetles on various crops, while those of the so-called long-horn beetles (*Cerambycidae*) form the borers of various



BEETLE: SCARABEUS-ENEMA.

orchard and forest trees. The bacon beetles will eat hides or other animal matter; the carpet beetles (buffalo bugs) show great fondness for any woolen or silk material. The beneficial beetles aid man by destroying the injurious forms or by acting as scavengers in removing decaying animal or vegetable matter. The number of species of Coleoptera (*q.v.*) is enormous.

Beg. See **BEY**.

Beg'gar, one who solicits charitable aid from the public at large. In all ages and countries various arts have been practiced to enlist the sympathies of the benevolent. By a law of Richard II, 1388, able-bodied beggars were punished and compelled to labor, and provision was made for the helpless. By an act of Henry VIII, 1530, licenses were given to poor persons to beg within fixed limits, but unlicensed beggars were whipped, and all persons giving alms to such forfeited ten times the amount given. By an act of Elizabeth (repealed in 1593) beggars were whipped, burned through the ear with a hot iron, and for the third offense put to death. The best method of suppressing begging is discussed under **Charity Organization**.

Beg'hards, semimonastic societies of men, originating in the Netherlands, dating from the early thirteenth century, or not very long after similar societies of women (the *Béguines*) had been formed, and spreading over Germany, France, and Italy. At first distinguished for piety and works of beneficence, they degenerated into mere pious beggars.

Bego'nia, a genus of herbaceous ornamental plants, comprising between 300 and 400 species, of the family *Bergoniaceae*. The garden begonias are usually classified as "foliage" begonias and "tuberous" begonias. The rex or foliage class comprises some of the choicest of ornamental-leaved plants. The species are

adapted for both indoor and outdoor cultivation, but demand a shaded location. The flowers are very variable in size, shape, and color, sometimes attaining a diameter of over 4 in. Some of the Mexican species are used as drastic purgatives.

Béguines (*bā-gēns'*), semimonastic societies of women originating in Belgium, perhaps at Liège, abt. 1180 A.D.; grew in part out of the numerical inequality between the sexes caused by the crusades.

Begum', title of honor given in the E. Indies to princesses and the sultanas of seraglios.

Behar (*bē-hār'*), province of Bengal, British India; S. of Nepal and E. of the united provinces of Agra and Oudh; area, 44,170 sq. m.; pop. (1901) 24,241,305. Behar is the cradle of Buddhism. From the fourth century before our era to the fifth after, it was a part of the kingdom of Magadha. In 1202 it fell into the hands of the Mohammedans. In 1765 it was acquired by the East India Company. It is now divided into twelve districts, and contains many important cities, as Patna and Chapra. The commercial staples are oil, seeds, opium, indigo, sugar, cotton, and saltpeter, the opium being a government monopoly.

Behead'ing. See **CAPITAL PUNISHMENT**.

Behemoth (*bē-hē'mōth*), huge animal described in Job (xl, 15-24). Some consider the Hebrew term a plural noun for cattle in general. Others think some extinct species of animal or the elephant is referred to; most writers say the hippopotamus.

Behistun (*bē-hīs-tōn'*), ancient and ruined town of Persia; in Irak-Ajemi, 21 m. E. of Kermanshah. Here is a limestone mountain, which rises 1,700 ft., and is almost perpendicular on one side. According to Diodorus, Semiramis, on her march from Babylon to Ecbatana, encamped here and prepared a residence, and having cut away the lower part of the rock caused her portrait to be sculptured there. A peculiar interest attaches to the rock of Behistun on account of its cuneiform inscriptions, which were made by order of Darius I, King of Persia, abt. 515 B.C., and have been deciphered by Sir H. Rawlinson. Close to these inscriptions are thirteen human figures, one of which represents Darius.

Beh'ring. See **BERING**.

Behring, Emil von, 1854-; German bacteriologist; b. W. Persia; became army surgeon, Prof. Univs. of Marburg and Berlin, associate of Robert Koch and expert of the Pasteur Institute, Paris; awarded the Nobel prize for his method of rendering cattle immune from tuberculosis, 1901; discovered the diphtheria serum; and announced discovery of a serum—"tulase"—for consumption in humans, 1905.

Beirut (*bā'rōt*), seaport of Syria; on the Mediterranean, at the foot of Mt. Lebanon; 58 m. WNW. of Damascus; harbor admits only small vessels, but in the bay 3 m. from the city there is good anchorage for large ships.

The chief exports are madder, silk, wool, olive oil, and gums. Beirut was besieged and taken by Baldwin, King of Jerusalem, abt. 1110, and retaken by the Saracens, 1187. American missionaries have been here since 1823. The Protestant Syrian College was opened 1866. Pop. (1900) 118,800.

Beit (bit), Alfred, S. African financier, 1853-1906; b. Hamburg, Germany; went to Kimberley, 1875; became a diamond broker; with Cecil Rhodes secured control of the Kimberley diamond mines. He assisted in founding the British S. Africa Company; resigned on being accused of financing Dr. Jameson's raid upon the Transvaal. At his death left about \$12,000,000; bequeathed \$8,000,000 for the development of means of communication in Rhodesia and elsewhere in Africa; \$1,000,000 to the Univ. of Johannesburg; \$500,000 to found a university in Hamburg.

Be'jan, name of the freshman class in universities of St. Andrews and Aberdeen, Scotland, and in earlier times in many of the Continental universities.

Bel and the Dra'gon, His'tory of, apocryphal book of the Bible; regarded as a fable by St. Jerome and many eminent theologians. It is canonical in the Roman Catholic Church, being part of the fourteenth chapter of Daniel in the Vulgate. By the Anglican Church it is recommended to be read for edification.

Bela (bá'lá), name of four Hungarian kings of the Arpad dynasty, the most important of whom were BELA I (1061-63), who regulated the systems of measures, weights, and coinage, and introduced the representative system into the Diet; and BELA IV (1235-70), son of Andreas II, who fled before the Mongols to Austria, 1241, and afterwards fostered the development of the country by the encouragement of colonists.

Beled-el-Jereed (bél'éd-él-jér-éd'), extensive region of N. Africa; bordering on the Desert of Sahara; bounded on the N. by Algeria and on the W. by Morocco. The soil is mostly acid and sterile, except some oases which produce the date palm, which affords the inhabitants their principal and often their only food.

Belfast, seaport of Ulster, Ireland; on Belfast Lough, an arm of the sea, at the mouth of the Lagan River, 101 m. N. of Dublin. The site is low and level, but is partly inclosed by the ridge of Divis and Cave Hill, the former of which rises to 1,567 ft. Belfast is the chief seat of the Irish manufactories of linen and cotton and the great depot of the linen trade. Linen manufacture was established here, 1837. Pop. (1901) 348,965.

Belfort (bél-för'), fortified town of France; at foot of the Vosges and on the river Savoureuse; 60 m. NE. of Besançon; pop. (1900) 32,567; has a citadel constructed by Vauban; ceded to France by Austria, 1648; 1870-71 besieged by the Germans, capitulated February 16th, but afterwards evacuated by the Germans; once belonged to the department of Haut-Rhin; is now in the small territory of Belfort; area, 235 sq. m.; pop. (1901) 92,304.

Bel'gæ, name given by Cæsar to the tribes which occupied one of the three divisions of Gaul. Their country, bounded on the NW. by the ocean and on the E. by the Rhine, comprised the modern Belgium, part of Holland, and the NE. part of France. This region was separated from the territory of the Celtæ by the river *Sequana* (Seine) and its affluent the *Matrona* (Marne). Cæsar represents the Belgæ as distinct from the Celtæ proper and the Aquitani in language, usages, and political institutions. A part of the Belgæ were probably Germans or of German origin, and a part are believed to have been Cymric Celts. Some of the Belgæ had crossed the Channel and settled in the S. maritime parts of Britain, and were found there by Cæsar when he invaded the island.

Belgiojoso (bél-jō-yō'sō), Cristina (Princess of), 1808-71; Italian patriot; b. Milan; daughter of Marquis Geronimo Isidoro Trivulzio; married Prince Emilio Barbian e Belgiojoso; embraced the Italian cause with enthusiasm; expelled from Italy by the Austrian Govt. 1830, settled in Paris; returned to Italy 1848; equipped a corps of volunteers at her own expense, and took part actively in the revolution in Milan and Rome; was once more exiled, 1850, but continued working for her country; returned to Italy, 1861; wrote "Essay on the Growth of Dogmatic Cults," "Recollections of Exile," "Emina: Turco-Asiatic Stories," "Asia Minor and Syria," "Scenes of Turkish Life," "History of the House of Savoy," "Reflections on the Present State of Italy," etc.

Bel'gium, kingdom of Europe, on the German Sea between Holland, Prussia, and France; area, 11,373 sq. m.; pop. (1906) 7,238,622. It is the most densely peopled country of Europe. The soil is partly fertile, partly (in the E.) sandy and marshy. The only mountains are some offshoots of the Ardennes in the S. The coast has a length of 46 m., and is flat and undiversified. The country is watered by the Meuse and the Scheldt, and their affluents, the Sambre, Ourthe, Werze, Lys, Dender, and Rupel. There are no lakes of importance, but many canals. Among the chief products are cattle, fish, corn, fruit, wood, iron, and coal. A coal region covering 476 sq. m. traverses all Belgium, and embraces two large basins, one of which extends into France and the other into Prussia. The people belong, in almost equal proportion, to two different nationalities, the Flemish (German) and the Walloon (French). The Flemish language prevails in the provinces of E. Flanders, Antwerp, Limburg, W. Flanders, and Brabant, while the Walloon predominates in Liège, Hainaut, Namur, and Luxemburg. With the exception of abt. 15,000 Protestants and 3,000 Jews, the entire population belongs to the Roman Catholic Church. There are four universities at Ghent, Liège, Louvain, and Brussels. Agriculture and mining are the most important industries. The great coal centers are at Mons, Charleroi, and Liège, which produced, 1906, 23,569,000 tons. The most important ports are Antwerp and Ostend; most impor-

tant centers of the commerce of the interior, Brussels, Ghent, Bruges, Liège, Namur, Courtray. According to the constitution of 1831 Belgium is a constitutional, representative, and hereditary monarchy, whose neutrality was guaranteed, 1831, by Great Britain, Austria, Prussia, and Russia. In the time of the Romans, the present Belgium, which was then inhabited by Celtic and Germanic tribes, formed, under the name of Gallia Belgica, a part of Gaul. The treaty of Verdun, 843, united the S. districts with France, and the N. with Germany. From 1598 to 1621 Belgium constituted an independent state under the rule of Isabel, daughter of Philip II, and her husband, the Archduke Albert. The peace of Utrecht, 1713, gave Belgium to Austria. After the battle of Jemappes (November 7, 1792), Belgium was occupied by the French, and, 1794, the country was ceded by Austria to France. In 1814 the first treaty of Paris united Belgium with Holland into the kingdom of the Netherlands. The union lasted until August, 1830, when the country rose against the Dutch Govt. September 20th a provisional government was formed, which, on October 4th, after the evacuation of the capital by the Dutch, proclaimed the independence of Belgium. June 4, 1831, Prince Leopold of Saxe-Coburg was elected king. The subsequent history of Belgium under Leopold I and his son Leopold II has been one of quiet and steady development. In 1889 Leopold II bequeathed all his rights in the Kongo Free State to the Belgian nation, and in 1900 gave to his people his vast tracts of real estate in Belgium for public parks.

Belgrade (bél-gräd'), capital of Serbia, on the Danube at the mouth of the Save; 42 m. SE. of Peterwardein; has a good port and an active trade, being the entrepôt of the commerce between Austria and Turkey. The citadel, which is very strong, is on a point of land between the rivers, behind which rises the city with antique edifices, a cathedral, and a palace. Here are manufactories of arms, cutlery, silk goods, saddlery, and carpets. In consequence of its strategical importance, Belgrade has been the scene of many sieges and battles. It was besieged without success by the Turks, 1456; taken by the Sultan Solymann, 1522; stormed and captured by the Elector of Bavaria, 1688; recovered by the Turks, 1690. Prince Eugene here defeated 200,000 Turks, 1717, after which it changed owners several times; taken by Austria, 1789; given up to Turkey, 1891; held by insurgent Servians, 1806-12; bombarded by Turks, 1862; made capital of Serbia same year; principality became independent July 13, 1878. Pop. (1905) 77,816.

Belial (bē'li-äl), term used in the Bible; frequently occurring in the phrase, "a son of Belial," which, by a common Hebrew idiom, signifies merely a worthless or very bad person; but in II Cor. vi, 15, the only New Testament occurrence, it is used as a proper name of Satan. According to Westcott and Hort and other critical texts the reading is Beliar.

Belief' and Faith, the consciousness of the personal indorsement of something thought of as being real. It is held (1) that belief is a sentiment, an emotion of conviction, aroused by a complex interplay of presentations and ideas; or a feeling of vividness and intensity in ideas; (2) it is an intellectual fact, an irresistible or inseparable association; (3) it is an active determination, either voluntary or spontaneous, of a personal attitude toward the play of presentations, either taking the form of the postulate of an ultimate principle of assent, or of making the attitude of belief the result of an assimilation of new elements into the group of motor processes which constitute or express the activity of the personal self. "Conviction" is a loose term whose connotation, so far as exact, is near to that here given to belief. "Making up one's mind," "being convinced," "weighing evidence," etc., are phrases describing the complex play of ideas preparatory to belief. As compared with the term "judgment," we may say that belief is the psychological and judgment the logical side of the same state of mind, called succinctly by Stout the "yes-no" consciousness.

What we mean by faith in relation to belief is a much-discussed matter. Faith properly attaches to statements, thoughts, etc., which are taken to be worthy of belief on the authoritative assurance of some one else, or on the basis of some general belief which guarantees the lesser matter of faith. Faith, therefore, seems to be belief of the kind which acknowledges its inability to secure personal conviction or knowledge, but rests in a condition of trust. It is evident that the room for emotional and voluntary determination is great in faith, since it comes into play in a region where logic is not exclusively invoked. This is especially evident in religious thought, where the attitude of faith is contrasted with the "rational" attitude.

Belisarius (bél-i-sá'ri-ús), abt. 505-65 A.D.; celebrated general to whom Justinian was chiefly indebted for the military glory of his reign; b. Germania, Illyria; appointed general in chief of the army of the East; defeated the Persians at Dara, 530; suppressed a formidable rising of the Green or antiroyal faction at Constantinople, 532; gained two victories over the Vandals in Africa, and took their king, Gelimer, a prisoner, 534, for which he obtained a triumphal procession, the first accorded to a subject since the reign of Tiberius; made consul, 535; commanded the army of Justinian in a long war against the Ostrogoths, who had made themselves masters of Italy; occupied Rome, 536; recalled, 540; was again sent to Italy to oppose the Gothic King Totila, 544; and reoccupied Rome; resigned the command, 548; served with success against the Bulgarians, 559. The tradition that he died poor and blind is without conclusive support.

Bell, Alexander Graham, 1847- ; Scottish-American inventor; son of Alexander Melville Bell; b. Edinburgh; removed to the U. S., 1872, and introduced his father's invention of visible speech in institutions for deaf-mutes;

later regent Smithsonian Institution; granted patent for a telephone, February, 1876; inventor of the photophone; joint inventor of the graphophone.

Bell, Alexander Melville, 1819-1905; Scottish-American educator; b. Edinburgh; educated under his father Alexander Bell; held classes in Edinburgh colleges, 1843-66; lecturer in Univ. College, 1865-70; removed to Canada, 1870; became register in Queen's College, Kingston; settled in Washington, D. C., 1881; invented visible speech, a system of universal alphabets, successfully used for teaching the deaf and dumb.

Bell, Andrew, 1753-1832; Scottish educator; b. St. Andrews; took orders in the Anglican Church; held eight army chaplainships in India; superintendent Madras Orphan Asylum, 1789; founded the monitorial system of education; rector Swanage, Dorset, England, 1801; master Sherburne Hospital, Durham, 1809; prebendary Hereford and of Westminster; first superintendent National Society for Promoting the Education of the Poor in the Principles of the Established Church.

Bell, Sir Charles, 1774-1842; British anatomist and physiologist; the youngest brother of Andrew Bell; b. Edinburgh; removed, 1804, to London, where he lectured on anatomy and surgery, and published a "System of Operative Surgery"; discovered that the nerves of sensation are distinct from those of motion, which is expounded in his "Anatomy of the Brain" and "Nervous Systems"; Prof. of Surgery in the Univ. of Edinburgh, 1836.

Bell, Henry, 1767-1830; Scottish engineer; b. Linlithgow; the first who obtained success in steam navigation in Europe; worked in London under Rennie. A small vessel, with an engine constructed by himself, was launched on the Clyde, 1812.

Bell, John, 1797-1869; American statesman; b. near Nashville, Tenn.; member of Congress, 1827-41; joined the Whig Party, 1833; speaker of the House of Representatives, 1834. He advocated a protective tariff. In March, 1841, appointed Secretary of War by Pres. Harrison; resigned with the most of the Cabinet in September following, because he disapproved the policy of Mr. Tyler. Sat in the Senate 1847-59 and 1860. He opposed the repeal of the Missouri Compromise and the Kansas Lecompton constitution; nominated, 1860, for President of the U. S. by the Constitutional Union Party, received thirty-nine electoral votes.

Bell, hollow percussion instrument, usually metallic, and cuplike in form; so constructed as to yield a single dominant note. In the time of Moses bells of gold were used, and Layard discovered small bronze bells in the ruins of Nineveh. The Hindu and Burmese priests, as well as the Greeks and Romans, made use of bells in their temples. The large bells used in churches are supposed to have been invented by Paulinus, Bishop of Nola, abt. 400 A.D. Bells were introduced into England soon after, as they are mentioned by Bede

in the seventh century. In the twelfth century bell founding flourished in the monasteries. In the fourteenth century bells first began to reach a large size. The famous bell at Rouen, cast 1501, weighed 36,364 lbs., and one at Toulouse, cast a little later, weighed 66,000 lbs. The largest bell in the world was cast, 1734, at Moscow, and weighs 448,000 lbs. Bells cast in the U. S. are usually shorter than those of the same weight cast in Europe. In the American bell the dominant overtone is a major sixth above the tenor note instead of the minor sixth, as is usually the case in Europe. The major sixth gives to the bell a louder and more penetrating tone, but it generally lacks the softness and sweetness so noticeable in the best bells of Europe. To get



TSAR KOLOKOL AT MOSCOW.

a clear tone in bell ringing and a vibration that shall be resonant and reveal the tone qualities, the hammer must remain in contact with the bell for only the shortest space of time, and drop away, or be lifted, instantly after a sharp blow is given, so as not to interfere with the vibrations. A carillon consists of from twelve to forty bells arranged in the diatonic scale. It reached its highest development in the eighteenth century, in Belgium, (still the home of the best bells) and probably the best carillon performer was Matthias van den Gheyn. His original music rivals in subtlety that of Bach and Mozart, and no one has since his death been able to play it upon bells.

Changes (or change ringing) consist of striking a set of bells in every possible order. Thus three bells may be struck in six ways without any repetition. Four bells may be struck in twenty-four ways without repetition; five bells in 120 ways, and so on until with ten bells we have 3,628,800 changes. The most common of these changes are known as "plain bobs," "bob triples," "bob majors," "bob minors," "grandsire triples," "grandsire bob caters," and so on. To ring all these changes at the usual rate of speed would require one year and one hundred and five days of constant performance. With twelve bells in the peal, to

ring all the possible changes would require thirty-seven years. In the U. S. and Great Britain the clavicin method of ringing bells is now used, with electricity as the striking power.

In a chime the fundamental, or keynote bell, must be true to itself—that is, the note that results from striking it on the rim must be exactly an octave lower than the note obtained by striking it at the top at the center of the curve. The third and fifth octave tones, found by striking the bell along its length, must be true also, and the drone note, or hum, of the bell, a tone one third lower usually than the keynote, must be in harmony with the dominant note of the bell. Each of the other bells must be in harmony with the keynote bell.

Belladon'na, sometimes called **Dead'ly Nightshade**; herbaceous perennial plant (*Atropa belladonna*) of the natural order *Solanaceae*; is a native of Europe, has berries which when ripe are black, shining, and sweetish in taste. All parts of the plant are narcotic and very poisonous, and contain an alkaloid called *atropia* or *atropine*, on which its active properties depend. The belladonna is considered a valuable medicine and a powerful remedy for certain nervous diseases, neuralgia, paralysis, etc.



BELLADONNA.

Bellamy (bél'ä-mí), **Edward**, 1830-98; American journalist; b. Chicopee Falls, Mass. Among his romances, which are psychological and somewhat resemble Hawthorne's, are "Dr. Heidenhoff's Process," "Miss Ludington's Sister," "Looking Backward," a kind of socialistic Utopia, which had a sale of some 500,000 copies and has been translated into many languages.

Bellay (bél-ä'), **Joachim du**, 1525-60; French poet; b. Lyré, near Angers; known as the French Ovid; chief member of the Pléiade, a poetical society, the object of which was to bring the French language on a level with the classical tongues. He became canon of the cathedral of Notre Dame, Paris, 1555; published "La Defense et Illustration de la Langue Francoyse," "Recueil de Poésies," "Premier Livre des Antiquités de Rome," "Regrets," satiric sonnets, 1558, "Jeux Rustiques," etc.

Bell'bird, bird of the genus *Chasmorhynchus*, family *Cotingidæ*; native to the W. Indies and S. America; allied to the flycatchers. Their voice has a metallic sound, resembling the tolling of a bell, and can be heard, it is said, at a distance of 3 m.

Bell, Book, and Can'dle, form of greater excommunication; first recorded abt. 1190; formerly used in the Western Church. The priest or ordinary read from a book the anathema, largely founded on Deut. xviii, 15, *seq.* The book being closed, attendants threw lighted candles to the ground, thus extinguishing them, to denote the going out of grace in the soul, and bells were jangled as a token of the disorder fallen upon the excommunicated. The practice has long been discontinued as a customary mode of discipline.

Belleau (bél-lö'), **Remi**, 1528-77; French poet of the school of Ronsard; one of the Pléiade; b. Nogent-le-Rotrou; tutor of Charles, son of Remi de Lorraine; when his pupil became Duc d'Elbeuf and grand equerry, continued to live with him. He wrote "Petites Inventions," "Bergerie," "Amours et Nouveaux Echanges des Pierres Precieuses, Vertus et Propriétés d'Icelles," a comedy; "La Reconnue," etc.

Belle-Isle (bél-äl'), **Charles Louis Auguste Fouquet** (Duke of), 1684-1761; marshal of France; b. Villefranche, Aveyron; conducted the retreat of the French from Bohemia, 1742; commanded the Army of Italy, 1748; Minister of War, 1757; negotiated, 1735, the treaty by which Lorraine was united to France.

Belle Isle (bél-il'), fertile island, 9 m. long and 3 broad, in Conception Bay, Newfoundland; has considerable fishing interests. **BELLE ISLE, NORTH**, an island in the strait of the same name, between Newfoundland and Labrador; 21 m. in circuit; has a small harbor. **BELLE ISLE, SOUTH**, an island at the entrance of White Bay, on the NE. side of Newfoundland; is a fishing station.

Belle Isle, Strait of, between Labrador and Newfoundland; 80 m. long, 12 m. wide; dangerous to navigation.

Bellerophon (bé-lër'ö-fön), originally called *Hipponous*; Greek mythology; son of Glaucus, King of Corinth. Mounted on the winged Pegasus, he slew the monster Chimera in mid-air, defeated the Amazons, and destroyed an ambuscade of Lycians, thus escaping three plotted snares; attempted to ascend to Olympus, but fell to earth, blinded.

Belleville (bél'vil), capital of St. Clair Co., Ill.; 14 m. SE. of St. Louis; contains numerous manufactories and a large rolling mill. Pop. (1906) 18,756.

Belleville, a Canadian city on the Bay of Quinte, an arm of Lake Ontario, 113 m. E. of Toronto. Has manufactures of locks and cement. Pop. 13,500.

Belligerency (bél-líj'ér-ën-sí), state of being actually engaged in war. As regards its recognition by neutral states, no question will arise in case of war between two sovereign powers; but when rebellion breaks out within a country, or a colony revolts against its mother country, every other power which regards the interests and trade of its subjects must define the new state of things, which is indefinite. For this is a contest between a sovereign state, a friend of the neutral, and a revo-

lutionary body which is not yet a state, but trying to become one and with no international standing. Now the first duty of the neutral is to his own trade; it next owes the duties which humanity prescribes to both combatants. The recognition of belligerency gives rights to both combatants. To the insurgent, it grants the rights of belligerents, the recognition of its flag, a right to raise loans, a quasi-political status without diplomatic standing. The parent state, on the other hand, can no longer be held responsible for the acts of its rebellious subjects. It can employ the rights of blockade, of capture for carrying contraband, of search against its enemy, thus affecting neutral commerce. See NEUTRALITY.

Bellini (bəl-lō'nē), **Gentile**, 1421-1507; Italian painter; b. Venice; elder son of Jacopo; was employed by the Venetian Govt. in company with his brother. He went to Constantinople in 1479 on the invitation of the sultan, Mohammed II, and at the wish of the Venetian authorities he returned to Venice bringing pictures of men and scenes in the Turkish empire of great, and at that time unique, interest. Some of these remain in tolerable preservation. Costume, splendid architecture, and stately ceremonies had great attractions for him. Perspective drawing, too, then a newly invented process, he had excelled in. His paintings are less lofty in character than his brother's, and marked with some of the stiffness of drawing of an immature style. His most noted picture was "The Preaching of St. Mark," in the duomo of Venice.

Bellini, Giovanni, painter; b. in Venice abt. 1428; d. 1516; was especially a student of the art of oil painting on canvas, which he was of the first to master completely, and a painter of religious subjects of the statelier and more monumental kind, in which he preserved a gentle and refined feeling, while combining it with splendor of color and grace of composition beyond his time. He was in this way the true forerunner of Titian, Paul Veronese, and Giorgione, and yet he kept much of the simple and frank religious concentration of earlier work, which those great men nearly abandoned.

Bellini, Jacopo, 1395-1470; Italian painter; b. Venice; pupil of Gentile du Fabriano; went to Florence, 1422. During the first half of the fifteenth century the art of painting was backward in Venice, and Bellini was a powerful aid in its advance from abt. 1430 until his old age.

Bellini, Vincenzo, 1802-35; Italian composer; b. Catania, Sicily; in 1827, produced "Il Pirata," an opera; widely extended his fame by "La Straniera," "La Sonnambula," and "La Norma"; afterwards went to Paris and London, and composed "I Puritani."

Bell'man, Karl Michael, 1740-95; b. Stockholm; vacillated for several years between business and literature; received in 1775 a small office in the state lottery from Gustavus III, but hired another to perform its duties, and gave himself up to his passion for gay

company and poetry. His works consist for the most part of songs, many of them set to music by Bellman himself. In some of these he gives a burlesque representation of the companions of his nightly revelries, and of their exploits, drawn with the most exquisite elegance, and remarkable for its joyous melody, in which, however, there is a peculiar undertone of romantic sadness. His songs have made his name one of the most celebrated within the Scandinavian countries. They have been printed over and over again, and are sung at the courts and by the peasants. In Sweden they have given rise to a very rich song literature of considerable merit, both poetically and musically. July 26th is celebrated in Stockholm with an annual festival in his honor.

Bell Met'al, hard, dense, brittle, and sonorous alloy of copper with tin, zinc, or some other metal. The proportion varies from 75 per cent of copper and 25 of tin to 80 of copper and 20 of tin.

Bello y Lopez (bəl'yō ē lō'pēth), **Andres**, 1781-1865; Spanish-American poet and writer; b. Caracas, Venezuela; shared several of Humboldt's expeditions; secretary and interpreter for the governor and council of Venezuela, 1808. In 1810 he took part in the revolt of Venezuela from Spain. He lived in Europe, 1810-20, as secretary of legation, etc.; took office under the government of Chile, 1829; first rector of Univ. of Chile, 1843. His numerous works include "Grammatica Castellana," "Principios de Derecho de Gentes," "Principios de la Ortológia y Métrica de la Lengua Castellana," "Filosofía del Entendimiento," and poems of high order. He practically wrote the "Código Civil," adopted by Chile, 1855. He wrote extensively and on many different subjects, yet valuably upon all, and was a lover and defender of the use of pure Castilian. He has left a considerable body of work pure in style, full of a certain American spirit very distinct from anything to be found in the poets of Spain. When Bello died the whole Chilean people mourned for him. In 1872 the Chilean congress voted the publication of an edition of his works at the national expense.

Bello'na, goddess of war in Roman mythology; represented as the companion and sister or wife of Mars; described by poets as armed with a scourge and holding a torch in her hand. Her priests were called *Bellonarii*.

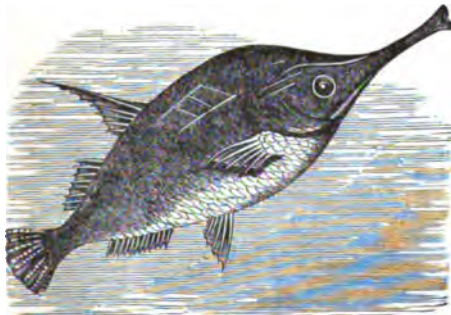
Bellot (bəl-lō'), **Joseph René**, 1826-53; Arctic explorer; b. Paris; lieutenant in the French navy; joined expedition in search of Sir John Franklin, 1851; afterwards joined Inglefield's expedition, and perished in a storm near Cape Bowden; discovered Bellot Strait on the N. coast of N. America, 1852.

Bell'ows, Henry Whitney, 1814-82; American clergyman; b. Walpole, N. H. He gained distinction as an eloquent public speaker and lecturer, especially on social, educational, and patriotic enterprises. In 1846 he was one of the founders of the *Christian Inquirer*, and was one of its editors for many years. Among

his works are "Lectures on the Treatment of Social Diseases" and "The Old World in its New Face." He was the principal promoter and first president of the U. S. Sanitary Commission, established in 1862; was the prime mover in the organization of the "National Conference of Unitarian and other Christian Churches" in 1865, and later of the Unitarian Ministers' Institute.

Bellows, a very ancient contrivance for producing a blast of air. Representations of bellows have been found in some of the earliest Egyptian sculptures, and Sir Gardiner Wilkinson believes he has found a valve as early as the time of Moses. The natives of India and China have employed the bellows from time immemorial. Rude forms of the bellows are found in many of the lowest tribes of Africa. The blacksmith's bellows supplies a continuous current. It consists of a top, center, and lower boards, the two latter being pierced with valves. The lower board is weighted, and automatically takes in air as it falls. The lever is attached to the lower board, and as it is raised the air is forced into the upper chamber, and the delivery continues while the lower chamber is again being replenished. See BLOWING MACHINES.

Bellows Fish, or **Trumpet Fish** (*Macrorhamphosus scolopax*), a spiny-finned fish of the family *Centriscidae*; chiefly found in the Med-



BELLOWS FISH.

iterranean and on the W. coasts of Europe; feeds upon small animals found at the bottom of the sea. It is good eating, though small, seldom exceeding 5 in. in length.

Bells, in nautical terms having a peculiar meaning, and used to indicate the hour. The sailor's day or night is divided into watches or periods, each of four hours' duration, except the two dog watches, which are two hours each, viz., from 4 to 6 and from 6 to 8 P.M., and the bell is struck once at the expiration of each half hour. The number of strokes denotes the number of half hours that have elapsed in that particular watch. If the watch commences at 8 P.M., eight bells would be a signal for the end of the watch at midnight.

Bel Merodach. See MERODACH.

Bel'mont, village of Mississippi Co., Mo., on the Mississippi, opposite Columbus, Ky.; scene of a fierce combat, November 7, 1861—an at-

tack upon a Confederate camp by Federal troops under Grant, being repulsed by the Confederates under Polk.

Beloo'chistan. See BALUCHISTAN.

Belot (bā-lō'), **Adolphe**, 1829-89; French dramatist and novelist; b. Ponte à Pitre. Among his very numerous novels may be mentioned: "Mademoiselle Giraud, ma Femme," "La Reine de Beauté," "La Princesse Sophie," "Alphonsine." Of his plays, "Le Testament de César Girodot" has been one of the most successful of modern plays.

Belahazzar (bēl-shāz'zār), son of Nabonidus (Labynetus), the sixth and last king of the second Babylonian period. His mother was a daughter of Nebuchadnezzar. He was associated with his father on the throne, and in the Book of Daniel is therefore called king. At the fall of Babylon, 538 B.C., he was slain.

Beltane (bēl'tān), or **Bel'tein**, heathen festival once common to all Celtic nations, traces of which have survived to the present day. The great ceremonies of this cult were held in the beginning of May, and apparently early in November, that is, at the beginning and end of summer. The ceremony was marked by the extinguishing of all the fires in the district, after which the "need fire" was kindled with great solemnity, and from it the domestic fires were relighted. Two fires were lighted side by side. Men and cattle then passed between the fires, which were supposed to give them protection from accident and disease. This worship of Beil is connected with similar worship among the Slavs, Scandinavians, and Teutons. Indeed, worship of the personification of the sun and light by kindling fires in similar ways was universal over all Europe in heathen times. The survival of this fire worship is seen in the periodical lighting of bonfires.

Belts, **Great** and **Little**, straits which connect the Baltic with the Cattegat. The former separates the island of Fünen from Seeland, is 36 m. long, width about 18 m. The navigation of both Belts is dangerous. The Little Belt separates Fünen from Jutland. It is 32 m. long. The widest part of it is about 10 m. From these Belts the Baltic Sea is supposed to take its name.

Belus (bē'lūs), in classic mythology, a king of Phœnicia; son of Neptune, a brother of Agenor, and the father of Egyptus; considered by some as identical with Baal.

Belus, **Tem'ple of**, enormous temple in Babylon; rebuilt by Nebuchadnezzar after 604 B.C.; supposed to have been destroyed by Xerxes, King of Persia. Some identify its ruins with Birs-Nimrud, a huge mound 6 m. SW. of Hillah; others, with Babil, another mound some 6 m. N. of Hillah.

Belvedere (bēl-vē-dēr'), an Italian word applied to a pavilion on the top of a house, or a structure designed to afford a fine prospect of the surrounding country; also an artificial eminence in a garden if so arranged as to command a prospect. In France and other

countries of Europe the term is often used as the name of a palace, villa, or summer house, but always with the general idea of something which commands a fine view. The famous statue called the Apollo Belvedere, also the Belvedere Torso, and other works of sculpture, derived their appellative from a court in the Vatican surrounded by galleries and bearing that name.

Belzoni (bĕl-zō'nĕ), **Giovanni Battista**, 1778-1823; Italian traveler; b. Padua; emigrated to England, 1803, and gained a subsistence as an athlete; in 1815 visited Egypt; soon directed his attention to the exploration of Egyptian antiquities; removed to England the colossal bust called "Young Memnon," now in the British Museum; opened the temple of Ipsambol and the pyramid of Cephren; published, 1821, "Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, etc., in Egypt and Nubia"; undertook a journey to Timbuctoo, but died near Benin.

Bem, Joseph, 1795-1850; Polish general; b. Tarnov, Galicia; served in the Polish army in the revolution of 1830; in 1848 joined the Hungarian patriots, and obtained command of the army of Transylvania; defeated the Austrians in several actions, and took part in the battle of Temesvár, 1849, which was disastrous to Hungary; having fled to Turkey and conformed to Islamism, was raised to the rank of pasha.

Bem'bo, Pietro, 1470-1547; Italian scholar and cardinal; b. Venice; removed to Rome, 1512, and became secretary to Leo X; in 1539, was raised to the dignity of cardinal; was made Bishop of Gubbio, 1541, and of Bergamo, but did not leave Rome; wrote, besides other works, a Latin "History of Venice," 1551; as a humanist, famed for his pure Latinity.

Bemis (bĕ'mis), or **Be'mus Heights**, village of Saratoga Co., N. Y.; on the Champlain Canal, and near the Hudson; the scene of the first battle of Stillwater with Burgoyne, September 19, 1777.

Ben, Hebrew word signifying "son"; equivalent to the Arabic *Ibn*; forms the first syllable of many scriptural names, as Ben-hadad, Benjamin, etc. *Beni*, the plural of *Ben*, occurs in the names of many Arabian tribes.

Ben, term derived from Gaelic *beann*, peak, prefixed to the names of many mountains of Scotland, most important of which are: **BEN LAWYERS** in Perthshire; flanking the NW. shore of Loch Tay; 3,984 ft.—**BEN LEDI** in Perthshire; 4½ m. NW. of Callender; celebrated in Scott's "Lady of the Lake"; 2,875 ft.—**BEN LOMOND** in the NW. of Stirling; on the E. side of Loch Lomond; the most famous of the Scotch mountains; 3,192 ft.—**BEN MACDHUI**; one of the Cairngorms, in the SW. of Aberdeen; 4,296 ft.—**BEN NEVIS**; highest point in Great Britain; in the county of Inverness; 4,406 ft.

Benares (bĕn-ā'rĕz), ancient *Varanashi* and *Kasi*, city of Hindustan; capital of a division and district of the same name, and the most

populous city in the united provinces of Agra and Oudh; on the Ganges; about 428 m. by rail NW. of Calcutta. It is the holy city of the Brahmans, the chief seat of their science, and may be called the Hindu capital of India. The minarets of about 300 mosques and the pinnacles of nearly 1,000 pagodas render the city imposing as seen from the river. Among the public edifices are the great mosque of Aurungzebe, many Hindu temples, a vast astronomical observatory, and the Hindu Sanskrit College, the chief seat of native learning in India. Benares attracts to certain festivals pilgrims, estimated at 100,000. It is a wealthy and industrious city, having manufactories of silk, cotton, and woolen stuffs. It is a great emporium for shawls and diamonds. Pop. (1901) 209,330.

Benbow (bĕn'bō), **John**, 1653-1702; English admiral; b. Shrewsbury; on August 19, 1702, encountered a superior force under the French admiral Du Casse, near Jamaica; maintained a running fight for four days with his own ship alone, the captains of the rest of the squadron refusing to support him; was mortally wounded, and died at Port Royal, Jamaica.

Bench, court or tribunal for the administration of justice; originally meant the seat occupied by the judges in court. In England two of the leading courts are termed the king's or queen's bench and common bench. The latter tribunal is also called the court of common pleas. The word is also used to designate the judges as contrasted with the practitioners in their court, as the bench and the bar.

Bench War'rant, order issued by or from a bench for the arrest of a person, either in case of contempt or after an indictment has been found, or from a judge to apprehend a person charged with an offense.

Bench'ers, principal officers of the English inns of court, intrusted with their government and with the power of admitting persons to the bar, and of disbaring practitioners, though the exercise of these powers is subject to the supervision of the judges of the higher courts.

Bend Sin'ister. See **BAR**.

Ben'der, or **Ben'dery**, fortified town of Russia; in Bessarabia; on the Dniester; 65 m. NW. of Odessa; has paper mills, forges, and tanneries. It was captured, 1770, by the Russians, who massacred the population; restored to the Turks, 1774; stormed again and again by the Russians, into whose possession it permanently passed with Bessarabia, 1812. Pop. (1900) 33,740.

Bends, or **Cais'son Disease**, affection first observed in the U. S. among workers in the caissons of the great St. Louis bridge, and brought into prominence by its prevalence among the "sand hogs," or workers in the tunnels beneath the East and North rivers, New York, 1906; is caused by physical exertion under high atmospheric pressure, and attacks

the worker after he has emerged into the outer world. The disease is treated by hypodermic injections of morphine, hot compresses on spine and feet, and, best of all, by recompression, by returning the victim to a compressed-air tank, where high pressure is gradually reduced to equality with normal air.

Benedek (bā'nē-dēk), Ludwig von, 1804-86; Austrian general; b. Ódenburg, Hungary; fought against the Italians, 1848; became major general, 1849; served with distinction against the Hungarian patriots; directed a corps in the Italian campaign of 1859 and at Solferino; in June, 1866, commanded the operations of the Austrian army in Bohemia, and was defeated by the Prussians at Sadowa.

Benedetti (bā-nā-dēt'ti), Vincent (Count), 1817-1900; French diplomatist; b. Bastia, Corsica; sent as ambassador to Italy, 1861, and to Berlin, 1864; in 1870 was employed by Napoleon III in secret negotiations with the court of Prussia, and it was an alleged affront from William I of Prussia, offered him at Ems, which Napoleon made a pretext for declaring war.

Benedicite (bēn-ē-dīs't-tē), Latin title of the hymn in the Septuagint version of the Book of Daniel and also in the Apocrypha, and said to have been sung by Shadrach, Meshach, and Abednego when they were cast into the furnace of fire. The Benedicite bears a close resemblance to the 148th Psalm, and is considered by some to be its expansion; probably used in Jewish worship, and so passed into use in the early Church; it was liturgically used in the days of St. Athanasius A.D. 325-60. It is found in the "Book of Common Prayer" of 1549. In the second prayer book of King Edward VI, 1552, it was changed to its present form.

Ben'edict, Saint, 480-543; Italian ascetic; the founder of monachism in the West; b. Nursia, Umbria; renounced the world in early youth, 494, passed three years in solitude in a cave, hence called the Holy Grotto, near Subiaco; undertook the spiritual direction of hundreds, whom he organized into separate societies of twelve, each with an abbot; in 515, composed as a substitute for the Oriental rule of Basil a system of monastic rules, which was largely adopted by the Western monks, and was known as the Rule of St. Benedict. Under this system the monks were employed in manual labor and in the instruction of the young. In 529 he founded the monastery of Monte Cassino, near Naples, where he died.

Ben'edict, the name of fourteen popes, the first of the name succeeding to the papal chair on the death of John III, in 574. The most famous were, **BENEDICT IX**, sometimes called the "boy pope," chosen pope in 1033 and deposed by Emperor Henry III abt. 1048; **BENEDICT X**, called "the stupid," chosen pope in 1058, and died in prison the next year; **BENEDICT XII**, who did much to promote the peace of Europe; **BENEDICT XIV**, distinguished for his moderation, enlightened piety, and classical learning.

Benedictine (bēn-ē-dīk'tīn), liqueur prepared since 1510 by Benedictine monks in abbey of Fécamp, Normandy, without alteration of formula; consists of fine brandy and an infusion of certain plant juices; is considered an aid to digestion and to have other valuable properties.

Benedictines, monks who observe the rule of St. Benedict; one of the most ancient and learned religious orders of W. Europe; first founded by St. Benedict on Monte Cassino, near Naples, 529 A.D. The order spread rapidly in Europe, and it is said had at one period 37,000 monasteries. The Benedictines boasted that their order had produced twenty-four popes, 200 cardinals, 4,000 bishops, 1,500 saints. To them we are indebted for the preservation and transmission of many of the classics through the Dark Ages. The Cistercians, Carthusians, Camaldules, Clunians, Celestines, and Trappists were branches of the Benedictine order. There are also Benedictine nuns, with twelve convents, in the U. S.

Benedic'tion, solemn invocation of the divine blessing upon men or things. The custom was sanctioned by Christ, and in the primitive Church was greatly developed. In Protestant churches some form of benediction usually closes religious services. In the Roman Catholic Church the ceremony is generally accompanied with the sprinkling of holy water, use of incense, and the sign of the cross. On Easter Sunday in Rome the pope pronounces after mass a solemn benediction *urbi et orbi* (on the city and the world). The papal benediction conveyed to a dying person carries with it a plenary indulgence.

Benefice (bēn'ē-fīs), originally a bounty in land given to a meritorious Roman soldier; in mediæval history an estate in land conferred by a superior by way of recompense for service. In the canon law benefice designates a right inhering in a clergyman of sharing the income of church property in return for the performance of spiritual duties. The Roman Catholic Church includes all clerical offices, even the papal, among benefices; but the Church of England, which long made the term include all preferments except bishoprics, now excludes also all cathedral preferments, such as deaneries, canonries, archdeaconries, etc. The term dignity is applied to bishoprics, deaneries, archdeaconries, and prebends; the term benefice to parsonages, vicarages, and donatives.

Ben'efit of Clergy, in English criminal law, the privilege of the clergy, a clerk's privilege. During the Middle Ages benefit of clergy in various European countries extended to a total exemption in favor of clergymen from the process of a secular judge in criminal cases. In England, however, it was not carried beyond an exemption from capital punishment in felony and petit treason. It was never granted in cases of high treason or offenses below felonies. Whenever Parliament desired to make an offense strictly capital, the words "without benefit of clergy" were introduced into the enactment. By statute of 7 Geo. IV, c. 28, s. 6, benefit of clergy was abolished.

Beneke (bā'nē-kē), Friedrich Eduard, 1798-1854; German philosopher; b. Berlin; Prof. of Philosophy in the Univ. of Berlin, 1832. Among his works are "Psychological Sketches," "System of Logic," and "Pragmatic Psychology." His system of psychology is called empirical.

Benevento (bēn-ā-vēn'tō), walled city of S. Italy; capital of province of same name; on a hill or declivity by the Calore; 33 m. NE. of Naples; pop. (1901) 24,647. It has a citadel, a fine old cathedral, several palaces, and churches; is the see of an archbishop, and has several fairs. Here is a magnificent Arch of Trajan, erected 114 A.D. Benevento became a Roman town as early as 274 B.C., and was an important city during the Roman empire. In 1806 it was erected into a principality by Napoleon, who gave Talleyrand the title of Prince of Benevento.

Bengal (bēn-gāl'), largest and most populous of the local governments of British India; bounded N. by Nepal and Bhutan, E. by Assam and Burma, S. by the Bay of Bengal and Madras, and W. by central India and the united provinces of Agra and Oudh; area, 151,185 sq. m.; pop. (1901) 74,744,866. The greater part of Bengal consists of the plain or valley of the Ganges and Brahmaputra. The combined delta of these rivers commences 280 m. from the sea. Farther N. the country is prolific of rice, cotton, opium, sugar, indigo, and a great variety of tropical fruits. The chief exports are opium, saltpeter, rice, hides, and indigo. The climate is subject to great extremes of heat, and is very destructive to health. Among the most important cities of Bengal are Calcutta, the capital, Delhi, Benares, Patna, Agra, and Murshidābād. The people are Hindoos, Mohammedans, Sikhs, and various wild tribes in the hill country. The English first established themselves in Bengal, 1656. The Bengalese language has a basis of Sanskrit, but is modified by words of Arabic, Malay, and Persian origin.

Bengal, Bay of, part of the Indian Ocean extending between Hindustan and Farther India; chief affluents, the Ganges, the Brahmaputra, and the Irawadi. There are no good harbors on the W. coast, but several safe ports occur on the E. side. The tide sometimes rises 70 ft. In this bay are the Andaman and Nicobar islands.

Bengal Light, or Blue Light, brilliant signal light used at sea during shipwreck, and in pyrotechny; produced by the combustion of a mixture of niter, sulphur, and trisulphide of antimony.

Bengel (bēng'el), Johann Albrecht, 1687-1752; German Lutheran theologian; b. Winnenden, Württemberg; probably the first Protestant who treated the exegesis of the New Testament in a thoroughly critical spirit; his edition of the Greek Testament, 1734, is the foundation of modern criticism of the text; wrote the "Gnomon Novi Testamenti" and an "Exposition of the Revelation of St. John."

Benguella (bēn-gā'lā), district of the Portuguese W. African province of Angola; bounded on the N. by the Coanza, which separates it from Angola proper, S. by Mossamedes, and W. by the Atlantic; watered by numerous small rivers. The surface is mountainous; the soil fertile. Capital, Benguella, formerly an important center of the slave trade.

Beni (bā'nē), river of S. America; in Bolivia; rises on the E. slope of the Andes; formed by the junction of the Chuqueapo and Mapiri; flows N. into the Madeira or Mamore after a course of 650 m.

Beni-Hassan (bā'nē-hās'sān), village of central Egypt; on the Nile; 23 m. SSE. of Minieh. Here are twenty-two grottoes or catacombs excavated in a calcareous bank or hill. These tombs are among the most remarkable in Egypt. The earliest bears the date of the forty-third year of Ositarsen I, not far from 1800 B.C.

Beni-Is'rael (sons of Israel), people, apparently of Jewish origin, in the W. of India, chiefly in Bombay and some coast towns; acknowledge the law of Moses and retain many Jewish customs, although conforming to some of the practices of the Hindus.

Benin (bēn-ēn'), maritime district of W. Africa; in Upper Guinea; W. of the river Niger, NE. of the Bay of Benin; interior elevated and hilly; soil fertile, and supports a dense population. Pop. abt. 15,000.

Benin, Bight of, portion of the Gulf of Guinea lying W. of the mouth of the Niger River.

Ben'jamin, youngest son of the patriarch Jacob and of Rachel (who called him Benoni); his father's favorite child, and the head of one of the twelve tribes of Israel; its territory was bounded on the N. by that of Ephraim, on the E. by the Jordan, on the S. by the land of Judah, and on the W. by that of Dan. The first King of Israel, Saul, was a Benjamite. After the death of Solomon the tribes of Benjamin and Judah remained loyal to his dynasty when the other ten tribes revolted.

Benjamin, Judah Philip, 1811-84; American jurist of Jewish extraction; b. St. Croix, W. Indies; practiced law in New Orleans; U. S. Senator, 1853-61; Secretary of War, 1861, and Secretary of State of the Confederate States, 1862-65; at the close of the Civil War went to England and practiced law in London. His "Law of Sale," 1883, is an authority.

Benjamin, Marcus, 1857- ; American editor; b. San Francisco. He was educated at the College of the City of New York and at Columbia Univ., graduating Ph.B., 1878. Became, in 1882, editor of the *American Pharmacist*, and later of its successor, the *Weekly Drug News*; chemist in U. S. laboratory appraiser's store, 1883; sanitary engineer, New York City Board of Health, 1885; lecturer on chemistry, New York Woman's Medical College, 1886. Translated Bertholet's "Explosive Materials," 1883. Contributed to

"Mineral Resources of the United States," 1882-85; to "Appleton's Annual Cyclopædia," 1883-1902; on editorial staffs, "Cyclopædia of American Biography," 1886-88; "Standard Dictionary," 1891-94; "Johnson's Universal Cyclopædia," 1895; "Encyclopedic Dictionary," 1896; "American Educator," 1897; "International Year Book," 1899-1902; "New International Encyclopædia," 1900-3. Editor "Appleton's Dictionary of New York," 1890; also of "General Guide of the U. S.," 1891-97, and several other guide books, gazetteers, etc.

Since 1896, editor of "Proceedings, Bulletins, and Annual Reports, U. S. National Museum"; member U. S. Assay Commission, 1896, 1899, 1904, and 1906. Contributor to *Scientific American*, *Popular Science Monthly*, *The Chautauquan*, and other magazines. Member Jury of Awards of the following expositions: World's Columbian, 1893; Tennessee Centennial, 1897; Trans-Mississippi, 1898; Pan-American, 1901; South Carolina Interstate, 1902; Louisiana Purchase, 1904, and Jamestown, 1907; secretary of the Section of Technical Chemistry, International Congress of Arts and Sciences, St. Louis, 1904; Life Fellow, London Chemical Society and American Association for the Advancement of Science; member American Chemical Society; Society Chemical Industry, National Geographic Society, etc. Published several memoirs and miscellaneous works. Member and officer of patriotic societies. Has received honorary degrees from Lafayette College, Univ. of Nashville, and Univ. of Pittsburg.

Benjamin-Constant (băn-zhâ-mên'-kôn-stân'), Jean Joseph, 1845-1902; French painter; b. Paris; visited the U. S. several times, and painted portraits. "The Cherifas," 1885, is one of the best of his pictures of life in the East, and is in the museum at Carcassonne. He painted three panels for the New Sorbonne in Paris, "Littérature," "The Academy of Paris," and "Science."

Benjamin Gum. See BENZOIN.

Benjamin of Tudela (tû-dâ'lâ), d. 1173; Jewish rabbi and traveler; commenced abt. 1159 a journey through Palestine, Persia, and Egypt, in which he passed fourteen years; wrote an account of his travels, which was translated into Latin, English, and French.

Benne (bên'nê) Plant. See SESAME.

Bennett, James Gordon, 1795-1872; American journalist; b. near Keith, Scotland; educated for the priesthood; emigrated to the U. S., 1819; connected with several journals published in New York City; editor, 1833, of the *Pennsylvanian*, daily paper of Philadelphia; in 1835, founded the *New York Herald*. His only son, of the same name, b. New York City, 1841, is distinguished for fitting out the Jeanette polar expedition, for sending H. M. Stanley to search Africa for Livingstone, and for establishing, in connection with J. W. Mackay, a line of submarine cable between Europe and the U. S., and for his promotion of ocean yacht racing and automobile contests.

Bennigsen (bên'ig-sên), or Ben'ningsen, Levin August Theopil (Count), 1745-1826; Russian field marshal; b. Brunswick, Lüneburg; obtained a commission in the Russian army, 1773; joined the conspiracy against Paul I, and actually strangled him; distinguished himself at Pultusk, 1806; commanded the army opposing Napoleon, and served with distinction at Eylau, 1807. He fought as a subordinate commander at Friedland and Borodino; beat Murat at Tarutino, 1812; commanded the Russian army of reserve at Leipzig, and was made a count on the field.

Ben'nington, capital of Bennington Co., Vt.; 55 m. SW. of Rutland. Gen. Stark, at the head of a column of Green Mountain Boys (New Hampshire and Massachusetts troops) defeated a British detachment in force, commanded by Lieut.-col. Baum, sent from Burgoyne's army to capture the public stores near N. Bennington, August 16, 1777; 600 British prisoners were captured. Pop. (1900) 21,705.

Benoit (bâ-nwâ'), Pierre Leopold Leonard, 1824-1901; Belgian composer; b. Harelbeke, W. Flanders; director Flemish School of Music in Antwerp, 1867-1901; wrote works both sacred and operatic, including "Lucifer," "L'Escaut," "Drama Christi," "La Guerre."

Benoit de Sainte-More (dê sânt-môr'), or **Sainte-Maure'**, French poet; attached himself to the court of Henry II of England; wrote "La Chronique des ducs de Normandie," versified history in 43,000 lines; "Roman de Troie," one of the most popular poems of the Middle Ages.

Benozzo Gozzoli (bê-nôtz'ô gôt'sô-lê). See GOZZOLI.

Bent Grass, any grass of the genus *Agrostis*, which comprises numerous species, natives of Europe, the U. S., and many other countries. The *Agrostis vulgaris* or *A. alba* is called florin or redtop in the U. S., where it is an important meadow grass.

Bentham (bên'tâm), George, 1800-84; English botanist; nephew of Jeremy; b. Portsmouth; wrote a "New System of Logic," in which he anticipated Hamilton's doctrine of the qualification of the predicate; catalogued the flora of the Pyrenees, of Hongkong, of Australia; gave his collections to the Kew Gardens, and passed his later days there. The "Genera Plantarum" was the joint work of Bentham and Sir Joseph Hooker.

Bentham, Jeremy, 1748-1832; English philosopher and reformer; apostle of utilitarianism; b. London; was called to the bar, 1772, but never practiced; published, 1776, "Fragment on Government" and "Defense of Usury." His next important work was his "Introduction to the Principles of Morals and Legislation." He adopted the theory that utility is the test and measure of virtue, and that laws should promote the greatest happiness of the greatest number. He devoted his time and talents chiefly to the reform of legislation and government; and advocated universal suffrage, the vote by ballot, etc.

Bentinck (bĕn'tĭngk), English noble family; the most notable members were: WILLIAM CHARLES CAVENDISH, 1774-1839; served with distinction as an army officer in Flanders, Egypt, Italy, Portugal, and Sicily; was made governor general of India, and served till 1835; distinguished in India for suppressing suttees and thuggism, for developing systems of internal transportation, and for engaging natives in government service.—WILLIAM GEORGE FREDERICK CAVENDISH, 1802-72; nephew of the preceding; member of Parliament, 1826; was made the leader of the protectionists on the repeal agitation (1845) of the Corn Laws, and suddenly assumed great importance. Contributed materially to Peel's overthrow in 1846. In religious politics he advocated the removal of disabilities from Jews, and an endowment of the Irish Catholic Church.

Bent'ley, Richard, 1662-1742; English critic and classical scholar; b. Oulton, Yorkshire; ordained priest, 1690; master of Trinity College, Cambridge, 1700; Regius Prof. of Divinity, 1717; published "Dissertation on the Epistles of Phalaris," "Boyle Lectures," etc..

Bent'on, James Gilchrist, 1820-81; U. S. army officer; b. Lebanon, N. H.; graduated at West Point, 1842; improved the Springfield rifle, seacoast gun carriages, and the system of loading barrette guns under cover; also invented the electro-ballistic pendulum, a velocimeter, a spring dynamometer, and minor devices in the use of arms.

Benton, Thomas Hart, 1782-1858; American legislator; b. near Hillsboro, N. C.; practiced law at Nashville, Tenn., 1810-15; removed to St. Louis, 1815; in U. S. Senate, 1821-51, and in House of Representatives, 1853-55; opposed the U. S. Bank, and advocated a gold and silver currency, for which he was called "Old Bullion"; opposed the extreme State Rights policy of Calhoun, and the repeal of the Missouri Compromise; promoted surveying and exploring expeditions in the West, foreseeing a great empire on the Pacific; father-in-law of John C. Frémont; published "Thirty Years' View, or a History of the Working of the American Government," 1854-56.

Bent'onville, village of Johnston Co., N. C., 17 m. W. of Goldsboro; scene of a battle March 19-20, 1865, between Federals, under Sherman, and Confederates, under Johnston; followed by the retreat of Johnston. Federal loss upward of 1,600; Confederate, 2,696.

Benue (bĕn-ŭ-ē'), "the mother of waters"; river of central Africa; principal tributary of the Niger; rises in the mountains of Adamawa and flows nearly W., making the S. boundary of Sokoto, and enters the Niger at Lokoya, about 300 m. from its mouth.

Ben'zene, or **Ben'zol**, first member of an important series of compounds containing carbon and hydrogen (hydrocarbons), other members being toluene, xylene, mesitylene, etc.; first found in iron vessels in which coal gas was kept under pressure; afterwards made by distilling benzoic acid with lime, but now

obtained from coal tar. When coal tar is distilled, the oil that first passes over floats on water, and hence is called light oil. It is from that that benzene is obtained. Benzene is a colorless liquid, boils at 85° C. When cooled to about the freezing point of water it solidifies, forming crystals. It burns with a bright flame; is a solvent for caoutchouc, gutta-percha, wax, and fatty substances. With nitric acid it forms nitrobenzene, from which aniline is made.

Ben'zidine, base made by heating nitrobenzene with caustic soda and zinc dust. The nitrobenzene is converted into hydrazobenzene. When this is treated with strong hydrochloric acid it is transformed into benzidine.

Benzidine Dyes, products of the action of various phenols and amido compounds on the diazo compounds obtained from benzidine and toluidine. The first important dye of this class known was Congo red, prepared by the action of diazotized benzidine on naphthionic acid. Another is benzopurpurin, formed from diazotized toluidine.

Ben'zine. See PETROLEUM.

Benzo'ic Ac'id, first obtained from gum benzoin; occurs in a number of natural resins, and in some sweet-smelling flowers; is now prepared from gum benzoin, from the urine of the cow or horse, and from toluene; is used in medicine, the natural product from gum benzoin being alone suitable for this purpose.

Benzoin', or **Gum Ben'jamin**, fragrant resinous substance; the concrete juice of a tree called *Styrax benzoin*, a native of Sumatra, Siam, and Borneo, order *Styracaceæ*. The resin is obtained by making incisions in the bark of trees; used as incense in some churches; in perfumery, and in medicine as a stimulant, emetic, and styptic.

Benzoin odoriferum, shrub more correctly called *Lindera benzoin*, of the family *Lauraceæ*, a native of the U. S., popularly called benjamin tree, spice bush, etc. Its bark is aromatic, stimulant, and tonic.

Beowulf (bā'ŭ-wŭlf), title of an Anglo-Saxon poem, written not later than the eighth century, and having for its subject a semi-fabulous hero of Denmark. There is only one MS. of it in existence; this belongs to the tenth century, and is in the British Museum.

Béranger (bā-rān-zhā'), Jean Pierre de, 1780-1857; French lyric poet; b. Paris; early in life a printer's apprentice; clerk in the Univ. of Paris, 1804-21; member of the assembly, 1848; published "Chansons Morales et Autres" and other volumes; because of his satirical attacks on the royalists, the party in power, was twice prosecuted and imprisoned; exerted a remarkable influence by his songs.

Berar (bā-rār'), or **Hydera'bad Assigned Dis'tricts**, commissionerhip of central India; bounded on the N. and E. by the Central Provinces, S. by Haiderabad, W. by Haiderabad and Bombay Presidency; area, 17,710 sq. m.;

pop. (1901) 2,754,418. Cotton is the chief crop, and is of fine quality; millet, wheat, rice, linseed, the castor plant, and the sugar cane are also cultivated. There is little manufacturing. The principal towns are Elichpur, a former capital, Amraoti, Akat, Akola, and Karinja.

Béraud (bā-rō'), **Jean**, 1845- ; French painter; b. St. Petersburg of French parents; latest works, chiefly modernized conceptions of the life of Christ, include "The Magdalen" and "The Descent from the Cross."

Berbera (bēr-bēr-ā), seaport of E. Africa, in Somali; on the Gulf of Aden, 160 m. ESE. of Zeyla. Here is held an annual fair, which is attended by 10,000 to 20,000 persons from foreign countries. It has an excellent and capacious harbor. Pop. abt. 25,000.

Berbers, uncivilized, nomadic tribes of aborigines who inhabit the mountainous regions of Barbary and the N. part of the Sahara; include the Kabyles, Tuaregs, and other Saharan peoples; descendants of the aboriginal or ancient inhabitants of N. Africa, and they are the most numerous part of the present population. Language, customs, and physical type seem to indicate affiliation with the Semitic races of Asia and E. Africa. They are warlike, cruel, and tenacious of their independence. In religion they are bigoted Mohammedans.

Berchta (bērkh'tā), name given in S. of Germany and Switzerland to a spiritual being apparently the same as the Hulda of N. Germany. She has the oversight of spinners. The last day of the year is sacred to her. She is represented as having a long iron nose and an immensely large foot. She is the original of all the myths of the White Lady.

Berchtesgaden (bērkh'tēs-gā-dēn), capital of a county of the same name in the Salzburg Alps in the SE. of Bavaria; is much visited by travelers; has a royal chateau, salt mines, and manufactories of toys and articles of wood, iron, and ivory; famous as Berchtesgaden wares. Pop. abt. 2,600.

Bereans (bē-rē'āns), obscure sect seceding from the Established Church in Scotland; founded by the Rev. John Barclay, 1773; take their name from Acts xvii, 11; deny natural theology; make all the Psalms Messianic; hold assurance to be the essence of faith, and unbelief the unpardonable sin.

Berenger de Tours (bā-rōn-zhā' dē tōr'), abt. 1000-88; French ecclesiastic; b. Tours; Archdeacon of Angers, 1040; impugned the doctrine of transubstantiation, and ascribed to the mass only the character of a commemorative act; condemned by the synods of Rome and Vercelli, 1050, and imprisoned; retracted his views, 1059; again advocated them; retracted, 1079; recalled his recantation; finally recanted, 1080; retired to the island of St. Cosmos.

Berenice (bēr-ē-nī'sē), d. 222 B.C.; daughter of Magas, King of Cyrene; wife of Ptolemy Euergetes, King of Egypt. During his ab-

sence on a military expedition she made a vow to sacrifice her hair to Venus for his safe return, which vow she performed. The hair having disappeared over night, the astronomer Conon reported that Jupiter had transformed it into the constellation now called *Coma Berenices* (Berenice's Hair). She was put to death by her son, Ptolemy Philopator.

Berenice (called **BERNICE** in the New Testament); b. 28 A.D.; daughter of Agrippa I, King of Judea; married to her uncle, Herod, King of Chalcis, and, after his death, to Polemon, King of Cilicia; during a visit to Rome she captivated Titus, the son of the Emperor Vespasian, as she had done Vespasian himself; was a sister of King Agrippa, before whom St. Paul spoke in his own defense.

Berenice, ancient city of Egypt; on the Red Sea; 20 m. SW. of Ras Bernass; founded by Ptolemy Philadelphus, who named it after his mother; was a great emporium for the trade with India. The modern name is Sakayt-el Kublee.

Berezina (bēr-ē-zē'nā), or **Beresina**, river of Russia; rises in the govt. of Minsk, flows S., and enters the Dnieper above Rechitza; length about 325 m.; navigable, and connected with the Dūna by a canal which connects the Baltic and Black seas. The French army, retreating from Moscow, November, 1812, suffered a great disaster here, being attacked by the Russians, who took about 16,000 prisoners. The French loss, besides the prisoners, amounted to nearly 12,000.

Bergama (bēr'gā-mā), ancient *Pergamum* or *Pergamus*; ruined city of Asia Minor; in Anatolia; on the Caicus River; 46 m. NNW. of Smyrna. The ancient city was the capital of Pergamus, and the seat of one of the seven churches of the Apocalypse.

Bergamo (bēr'gā-mō), ancient *Bergomum*; capital of Italian province of same name; 39 m. NE. of Milan. Pop. (1901) 47,772.

Bergamot, or **Mellaro'sa**, also called **BERGAMOT ORANGE**, fruit of a tree, genus *Citrus*; a variety of the orange; cultivated in the S. of Europe. From its rind is obtained by distillation the oil of bergamot, used in perfumery.

Bergen (bērg'ēn), seaport of Norway; capital of province of Bergen; at the head of a deep bay of the Atlantic; 184 m. WNW. of Christiania; is probably the most commercial town of Norway; fleets of vessels bring the produce of the N. fisheries to this town; founded 1070; pop. (1900) 72,250.

Bergen-op-Zoom (-ōp-sōm'), or **Berg-op-Zoom**, strongly fortified town of Holland; in N. Brabant; on the river Zoom, at its junction with the E. Scheldt; 27 m. by rail WSW. of Breda; important as a military position, and has often been besieged. Pop. (1899) 13,668.

Bergerac (bērhz-rāk'), **Savinien Cyrano de**, abt. 1620-55; French dramatist; b. Périgord; served in the army; a famous duelist; wrote

"Agrippina," a tragedy; "Le Pédant Joué," a comedy; and other works; hero of a poetical drama by Edmond Rostand, first performed in Paris with Coquelin in the title rôle, December 28, 1897; and in the U. S. with Mansfield in the same rôle, October 3, 1898.

Bergh, Henry, 1823-88; American philanthropist; b. New York City; secretary of legation to Russia, and acted as vice consul there, 1863-64; founder and first president of the American Society for the Prevention of Cruelty to Animals; established the Society for the Prevention of Cruelty to Children.

Bergmann (bërg'män), Ernst von, 1836-1907; German surgeon; b. Riga; served in armies of Prussia and Baden in wars of 1866 and 1870; Prof. of Surgery Univ. of Würzburg, 1878-82, and in Univ. of Berlin from 1882 till his death; correctly diagnosed the case of Emperor Frederick III as cancer, 1887; attended the sultan and his daughter, 1900, and the Shah of Persia, 1907; a great authority on gunshot wounds.

Bergmann, Torbern Olof, 1735-84; Swedish chemist; b. Catherinberg, W. Gothland; held the chair of chemistry at Upsal, 1767; discovered sulphureted hydrogen, obtained important results from the use of the blowpipe, and laid the foundation of crystallography.

Bergmehl (bërg'mäl), fine powder found in strata of recent (eocene) formation; composed of frustules of microscopic plants of the class *Algæ*; found in Europe and the U. S., sometimes mixed with flour and used as food in Sweden and Norway; used in making water glass, and the floating bricks of S. Europe, etc.

Bering (bë'ring), Vitus, 1680-1741; Danish navigator; b. Jutland; entered the Russian navy at an early age, and fought against the Swedes; 1725, commander of an expedition to explore the Sea of Kamtchatka; during this voyage discovered Bering Strait, and ascertained that Asia was not joined to America; in a subsequent voyage was wrecked on Bering Island, where he died.

Bering Sea, also called Sea of Kamtchatka, extreme N. part of the Pacific, extending between the peninsulas of Alaska and Kamtchatka; connected by Bering Strait with the Arctic Ocean.

Bering Sea Con'troversy, controversy between the U. S. and Great Britain concerning the claim of the former to the exclusive right to seal fishing in Bering Sea. Jurisdiction over all the mainland islands and waters ceded by Russia had been declared by special act of Congress, and the claim of the U. S. to the right of protecting its property in waters that would ordinarily be regarded as a part of the open sea was asserted, 1887. Depredations by Canadian fishers so reduced the number of seals that their extermination was threatened, but protests by Canada frustrated attempts to prevent it. The dispute was referred to a court of arbitration, which sat

in Paris, 1893. The award denied the exclusive claims of the U. S., and prescribed rules to be binding on and enforced by both nations which limit in time, place, and method, the pelagic seal fishing.

Bering Strait, connects the Pacific Ocean with the Arctic, and separates Asia from America; width about 45 m. at the narrowest part, between East Cape (Asia) and Cape Prince of Wales (America); depth near the middle about thirty fathoms.

Berkeley (bërk'li), George, 1684-1753; Irish philosopher and prelate; b. Killerin; removed to London, 1713; returned to Ireland, 1721; dean of Derry, 1724; obtained a patent for a college in Bermuda, and was named its president, but failed to establish the institution; emigrated to Rhode Island, 1728, lived at what is now Middletown; officiated in Trinity Church, Newport; gave to Yale 1,000 volumes; returned to London, 1732; Bishop of Cloyne, 1734. He propounded his theory of idealism in a "Treatise Concerning the Principles of Human Knowledge," 1710, in which he affirmed that there is no proof of the existence of a material world. The objects of which we are conscious in perception he called ideas. Their presence he held to be due to the constant agency of the Almighty, who causes them to pass in a real and orderly succession before the mind. His views are the result of the application of rigid logic to the principles which Locke and his school had adopted from Descartes. His method was allied to that of Malebranche, though his conclusions were drawn with a boldness from which the French philosopher recoiled. As distinguished from the egoistic system of Fichte, Berkeley's views have been called theistic idealism. His object was to undermine materialism and counteract skepticism, and he laid the basis of that intuitional philosophy which has ever since been the basis from which Christian metaphysics have opposed the reasoning of inductive skepticism. Other works are: "Essays Toward a New Theory of Vision," "Alciphron, or the Minute Philosopher," "The Analyst," "Word to the Wise," and several books on the virtues of tar water, in whose curative qualities he had great faith.

Berkeley, Sir William, abt. 1610-77; colonial governor and proprietor; b. near London; Governor of Virginia, 1642-51 and 1660-76; rendered himself unpopular by putting to death the adherents of Nathaniel Bacon; d. in England. See BACON'S REBELLION.

Berkshire Hills, a name applied to the hilly district of Berkshire Co., Mass.; a popular summer and autumn resort. This region lies along the Upper Hoosac River, between the Green and Hoosac mountains. It is broken up into a number of small valleys interspersed with isolated hills; many small lakes and brooks add to the attractiveness of the hills and mountains. Lenox, Pittsfield, Stockbridge, and Great Barrington are the most important villages of this region.

Berlichingen (bär'lich-ing-ën), Götz or Gottfried von, 1480-1562; German knight; sur-

named OF THE IRON HAND; b. Fasthausen, Württemberg; lost a hand at the siege of Landshut, and supplied its place by an iron one; a daring and turbulent subject; fought for the insurgent peasants against the nobles in the Peasants' War. For this he was placed under the ban of the empire by Maximilian I. His exploits form the subject of Goethe's drama of "Götz von Berlichingen."

Berlin (bér'lin), capital of the Prussian monarchy and of the German Empire; the third largest city of Europe; on the Spree; during the Middle Ages the capital of the Mark of Brandenburg, and chief city of the consolidated territory of Brandenburg and Prussia. The city received an impulse from its connection with the Hanseatic League, and from the political and military activity of the Great Elector. Originally but a fishing village, it became in consequence of the Franco-Prussian War the capital of the new German Empire. Old Berlin, on the right bank of the Spree, and old Cologne, on an island, are its oldest parts. The principal streets are the Unter den Linden, with its four rows of lime trees and stately Brandenburg gate, the Wilhelmstrasse, the Königstrasse, and the Leipzigerstrasse. The city abounds in public places of interest, among which may be mentioned the Old Palace (the *Schloss*), the Thiergarten, the Charlottenburg Mausoleum, the old and the new museums, the University, and the Polytechnicum, one of the most elaborate and imposing educational structures in the world. The sewage of the city is carried, by means of pumping stations and tunnels, into receiving and subsidence tanks located on tracts of land purchased as sewage farms. A scientific agriculture is practiced upon these farms, and by a system of irrigation the soil swallows up and disinfests without offense the entire sewage product of the great city.

The trade and commerce are extensive. The iron casting and the china manufactories of Berlin have a world-wide reputation. The increase of railroad connection has given a powerful impulse to the development of industry, and large numbers of the laboring classes have made Berlin their home. The industries include wool weaving, calico printing, and the manufacture of engines and other machinery, iron, steel, and bronze ware, German silver ware, scientific instruments, clothing, furniture, drapery goods, and beer. Pop. (1905) 2,040,148.

Berlin, a prosperous manufacturing town in Waterloo Co., Ontario, Canada. Settled largely by people of German descent. Manufactures rubber goods, felt, furniture, leather, and flour. Pop. 14,000.

Berlin, Treaty of, compact signed at Berlin, July 13, 1878, by representatives of Great Britain, Germany, Russia, Austria, Italy, and Turkey, after a congress to discuss the stipulations of the preliminary treaty concluded between Russia and Turkey at San Stefano at the close of the Russo-Turkish War. The new treaty resulted in the division of Bulgaria into two parts, Bulgaria proper and E. Rumelia, the cession of parts of Armenia to Russia and

Persia, the independence of Roumania, Servia, and Montenegro, the transfer of Bosnia and Herzegovina to Austrian administration, the retrocession of Bessarabia to Russia, and an increase of Greek territory.

Berlin, University of, second youngest but largest and most famous of the German universities; founded 1810, when Prussia was apparently crushed by Napoleon; organized by Wilhelm von Humboldt, then minister of education, who also put into shape the national school system, of which this university was designed to be the head. It now has faculties of theology, jurisprudence, medicine, and philosophy, over 450 professors and teachers, and a student enrollment exceeding 7,770.

Berlioz (bër-lë-öz'), Hector, 1803-69; French composer; b. La Côte-Saint André, Isère; composed "Symphonie fantastique"; overtures to "Waverley" and "King Lear"; "Harold" and "Romeo et Juliette," symphonies; "Benvenuto Cellini," an opera; "Symphonie Funèbre et Triumphale," "Damnation de Faust," a symphony; "Enfance de Christ," a trilogy; and "Les Troyens," opera, and published a valuable work on instrumentation, in which he was a master.

Bermu'da Grass (*Cynodon dactylon*), a grass extensively cultivated in India (where it is called *dhab*), and which has been introduced into the W. Indies, Europe, the U. S., and the Sandwich Islands. It is valuable both for pasture grass and for hay, and is especially prized in warm climates, where the grass crop is generally poor; but in light soils, especially northward, its perennial roots cause great trouble to the farmer.

Bermuda Hun'dred, a neck of land, formed by the junction of the Appomattox and James rivers, in Chesterfield Co., Va. Gen. Butler occupied and fortified this place May 6, 1864, and from here was to cooperate with Gen. Grant by menacing Richmond and Petersburg. On May 16th Gen. Butler, who had moved out of his works, was fiercely attacked by the Confederate force under Beauregard, and driven back into his intrenchments with severe loss. Beauregard erected a line of works across the peninsula in front of Butler's. Subsequent expeditions were made from these works, and the line finally formed a part of the investment lines of the combined armies against Petersburg.

Bermuda Islands, or Bermudas, also called So'mers's Islands, a group of small low islands in the Atlantic Ocean, belonging to Great Britain. They take their name from Juan Bermudez, who discovered them in 1522. They are about 624 m. ESE. of Cape Hatteras, which is the nearest land. The extent of the group is only 19 m. by 6 m., although the number of islets is nearly 400. Area, 20 sq. m.; pop. (1901) 17,535. They derive importance from the commanding position which they occupy between the W. Indies and the other parts of British America. They are inclosed on several sides by formidable coral reefs. The climate is so mild that these islands are covered with perpetual verdure.

The chief articles of export are potatoes, onions, lily bulbs, and arrowroot. The largest of these islands are Bermuda, 15 m. long; St. George's 3½ m.; Somerset, 3 m.; and Ireland, 3 m. Capital of the group is Hamilton, on Bermuda. St. George's Isle has a good, land-locked harbor, which is defended by strong batteries.

Bern, a city of Switzerland, capital of the canton of Bern; on the river Aar, which incloses it on three sides; 65 m. S. of Basel. Bern is the seat of the federal government of the republic; was founded in 1191, and became a free town of the empire in 1218. It joined the Swiss Confederation in 1352. In 1849 it became the permanent capital of the whole republic. Pop. (1907) 73,185.

Bernadotte (bër-nâ-düt'), **Jean Baptiste Jules**, 1764-1844; King of Sweden; b. Pau, France; entered French army as a private; was general of division under Kléber and Jourdan in Flanders, 1794, and under Napoleon, 1797; marshal of France, 1804, and Prince of Pontecorvo, 1806; fought at Austerlitz, Halle, and Wagram; elected crown prince of Sweden, 1810; joined the coalition of allies against Napoleon, 1813, and led an army into Germany; led his army back to Sweden and conquered Norway, 1814; succeeded Charles XIII as king, under the title of Charles XIV, 1818.

Bernard' of Cluny (klü-né'), b. at Morlaix, in Brittany, of English parents, abt. 1100. He was a monk at Cluny under Peter the Venerable, who was abbot there, 1122-56. He wrote a poem, "De Contemptu Mundi," which Dr. Neale pronounces "the most lovely, in the same way that the 'Dies Iræ' is the most sublime, and the 'Stabat Mater' the most pathetic, of mediæval poems." Hymns taken from this poem, such as "The World is Very Evil," "Brief Life is Here Our Portion," and "Jerusalem the Golden," are among the finest gems in recent English and American collections.

Bernard, Saint, 1091-1153; French mediæval theologian; b. Fontaines; became an inmate of the monastery of Cîteaux, 1133; founded a community of the Cistercian order at Clairvaux, in Champagne, 1115, of which he was its first abbot; founded a large number of monasteries; and was an implacable adversary of Abelard. In 1128 drew up the rule for the new order of Knights Templars; promoted the crusade, 1146, which failed disastrously, and chagrin hastened his death; was canonized, 1174.

Bernard, Simon, 1779-1839; French engineer; b. Dôle; aide-de-camp to Napoleon I. He was invited to the U. S. by Pres. Madison in 1816 to assist in the organization of a system of seacoast defense by fortification. Bernard also had part in the inauguration of some of our earlier works of civil engineering, e.g., the Chesapeake and Ohio Canal, the Delaware Breakwater, etc. He resigned in 1831, and returned to France; became aide-de-camp to Louis Philippe, and subsequently Minister of War of France.

Bernard, Great St., mountain pass of the Pennine Alps; upward of 8,000 ft. in height; between the canton of Vaud and the valley of Aosta. Near the summit is the hospice, said to have been founded, 962, by St. Bernard of Menthon in Savoy for the succor of travelers crossing the mountain. In the humane efforts of the monks of this hospice the St. Bernard breed of dogs, noted for their size and sagacity, were assistants. In 1800, Napoleon crossed the Alps here with an army of 30,000 men, with cavalry and artillery.

Bernardo del Carpio (bër-nâr'dô dël kär-pë-ô), Spanish hero of the ninth century; nephew of Alfonso the Chaste; displayed courage in the war against the Moors; according to tradition, defeated Roland at Roncesvalles; and the hero of several dramas by Lope de Vega and of many Spanish ballads.

Ber'ne. See **BERN**.

Berne-Bellecour (bër'n-bël-kör'), **Étienne Prosper**, 1838- ; French genre and military painter; b. Boulogne. His pictures of episodes in the Franco-Prussian War gained him a reputation, second only to De Neuville and Detaille.

Bernhard (bër'nhârt), Duke of Saxe-Weimar, 1604-39; German military officer; b. Weimar; fought for the Protestants in the Thirty Years' War; distinguished at Wimpfen, 1622; became a colonel in the army of Denmark; joined the standard of Gustavus Adolphus, 1631. The victory which the Swedes gained at Lützen, 1632, is attributed to the skill and energy of Bernhard, who, 1633, was in command of the Swedish army. Having made a personal treaty of alliance with France, 1635, he commanded a French army and defeated the imperialists.

Bernhardt, Rosine, better known as **Sarah**, 1844- ; French actress; b. Paris, of Jewish parents; made her début, 1862, as *Iphigénie* in Racine's tragedy at the Théâtre Français, and acted the leading rôle in Scribe's "Valérie." She has exhibited pictures and statues by her own hand in the Paris salon; and wrote a play, "L'Aveu." She has impersonated the title rôles of Racine's plays; acted Shakespearean characters; and plays have been written to elicit her highest powers. She was appointed to a professorship in the Conservatory of Music and Declamation in Paris, in 1907.

Bernina (bër-né'nâ), imposing mountain group in the Swiss canton of Grisons; rises 13,407 ft. above sea level, and has a remarkable glacier. The Pass of Bernina, altitude 6,671 ft., affords a communication between the Upper Engadine and the Valtelline.

Bernini (bër-né'në), **Giovanni Lorenzo**, 1598-1680; Italian architect; b. Naples; best works include the colonnade to St. Peter's Church, the Scala Regia of the Vatican, and the Barberini Palace at Venice.

Berœa (bër-œ'ä), or **Bere'a**, large and ancient city of Macedonia; at the foot of Mt. Bermi-

us; 30 m. from Pella. St. Paul visited Bercea, and preached there. (See Acts xvii, 10.) Its site is occupied by Veria, 35 m. W. of Salonica.

Berosus (bër-ò'süs), historian; priest of Bel in Babylon; b. under Alexander the Great; dedicated his history of Chaldea to Antiochus Soter, who reigned 280-61 B.C. His accounts have been largely confirmed by the cuneiform inscriptions.

Berquin (bër-kän'), Louis de, abt. 1490-1529; French martyr; b. Passy, France; was a counselor of Francis I; accused of Lutheranism and imprisoned, 1523, 1526, and 1529; condemned first to imprisonment for life, but was burned alive, being the first Protestant martyr in France.

Bersaglieri (bër-säl-yä'rë), Italian name of the riflemen or sharpshooters who served in the army of Victor Emmanuel when he was King of Sardinia. They took part in the Crimean War, 1854-55, and fought against Austria, 1859.

Berserker (bër'serk-ër), hero of Scandinavian mythology, who fought without coat of mail. The name has also been given to a class of warriors who fought naked and performed extraordinary feats under the influence of a kind of demoniac possession.

Bert (bër), Paul, 1833-86; French scientist; b. Auxerre; Prof. of Sciences at Bordeaux, 1866; Prof. of Physiology in College de France, 1869; achieved a great reputation by his physiological researches, and experiments for ascertaining the conditions of human existence at different altitudes.

Berthelot (bër-të-lö'), Eugène Marcelius Pierre, 1827-1907; French chemist; b. Paris; Prof. Organic Chemistry in Superior School of Pharmacy, 1859, of the same in College of France, 1865; president of committee which introduced smokeless powder; discovered means of extracting dyes from coal tar; permanent secretary of Academy of Sciences, 1889; French Academy, 1900; voluminous writer.

Berthier (bër-të-ä'), Louis Alexandre (Prince of Wagram), 1753-1815; French military officer; b. Versailles; served under LaFayette in the U. S., 1778-82; general of division and chief of staff of Bonaparte's army of Italy, 1796; accompanied Bonaparte to Egypt, 1798; Minister of War, 1799; marshal of France, 1804; served in the campaign against Austria, 1805.

Berthollet (bër-tö-lä'), Claude Louis, 1748-1822; French chemist; b. Talloire, Savoy; discovered the composition of ammonia, and invented the process of bleaching by chlorine, that of filtration through charcoal, and several fulminating powders; associated with Lavoisier in forming a new chemical nomenclature.

Bertillon (bär-të-yön'), Sys'tem, method of measurements devised by Alphonse Bertillon (1853-) of the police service of Paris, to insure identification of criminals. In use

throughout Europe and to some extent in the U. S. The measurements taken are: (1) head, length and width; (2) body, standing barefoot; (3) reach (span from finger tips to finger tips with arms extended); (4) trunk (height, sitting); (5) length and width of right ear; (6) length and width of left ear; (7) length and width of middle finger; (8) length and width of little finger; (9) length and width of forearm. The last four measures are taken on the left side, as less liable to vary than the right. These measurements, together with the color of the iris of the eye and of the hair, arrangement of lines on finger tips and any marks and scars, are noted on cards.

The cards are first sorted, as the length of the head is; short (under 187 mm.), medium (187-194 mm.), or long (194 mm. and over), then subdivided into narrow, medium, and broad heads, and classified in accordance with the other measurements until each group includes only a few cards which can readily be examined in detail, and special characteristics compared.

Ber'wick, fortified seaport town of Northumberland, England; on the Tweed, at its entrance into the North Sea; 58 m. ESE. of Edinburgh; has large manufactories of steam engines, mill machinery, etc. It was one of the chief seaports of Scotland in the Middle Ages; often taken and retaken by the English and Scotch in the border wars; finally ceded to England, 1502, and became by a treaty a free town. These privileges were confirmed on the accession of James I to the English throne. Pop. (1900) 13,437.

Beryl, a mineral (silicate of beryllia) which crystallizes in six-sided prisms, generally green, varying to blue, yellow, or even colorless. The hardness is 7.5 to 8. Those that have clear tints of sky-blue or sea-green form, when transparent, beautiful gems, called by jewelers aqua marine. The clear yellow ones are also used as gems, under the name of golden beryl. The deep rich green variety is the emerald. Beryls are not uncommon in regions of metamorphic rock (gneiss, mica slate, etc.), such as New England. Beryls of fine quality occur in Brazil, the Urals, N. Carolina, Maine, Colorado, China, and Siberia.

Ber'yx, name of the oldest genera of living fishes, of which few species are living in the present seas, while a large number are found fossil. It begins with the first of the teleosts in the chalk. Three species are found in the chalk of England, and several in the tertiary, especially in the fish beds of Monte Bolca, near Verona in Italy.

Be'sa, ancient city of Egypt, on the Nile, on the site of which Antinópolis was built by Hadrian in honor of Antinous.

Besançon (bä-sän-sön'), a city of France, capital of the department of Doubs; on the river Doubs; 58 m. E. of Dijon. It is well built and strongly fortified, having a citadel which is considered impregnable. It was formerly the capital of Franche-Comté. It has

manufactories of watches, jewelry, porcelain, carpets, etc.; was an important town in the time of Cæsar, who in 58 B.C. expelled the Sequani from it. It has Roman antiquities and the remains of an amphitheater and aqueduct. Pop. (1901) 55,362.

Besant (bĕ-sănt'), **Annie**, 1847- ; English theosophist; b. London; married a brother of Sir Walter Besant; active in social and political movements; with Charles Bradlaugh was prosecuted, 1877, for the publication of "Fruits of Philosophy," a Malthusian pamphlet, but the prosecution failed; became a socialist, 1883; several years a member of the London school board; lectured in Great Britain and the U. S. on theosophy; author of several works on that and kindred subjects.

Bessant, Walter (Sir), 1838-1901; novelist; b. Portsmouth, England; was chosen to a professorship in the Royal College of Mauritius, and afterwards served as secretary to the Palestine Exploration Fund. In conjunction with James Rice he published between 1871 and 1882 some dozen novels. After the death of his collaborator in 1882 he published a number of books. Among the most popular are "All Sorts and Conditions of Men," 1882, which dealt with the social problems of cities and led to the establishment of a public hall in the East End of London; "Dorothy Foster," 1884; "Children of Gibeon," 1886; "The World Went Very Well Then," 1887; "Herr Paulus," 1888; "For Faith and Freedom," 1889; "Armored of Lyonesse," 1890; "A History of London," 1893; "Beyond the Dreams of Avarice," 1894; "The City of Refuge," 1896; "The Story of King Arthur," 1901. He was founder and first president of the Society of Authors. He was knighted May 24, 1895.

Bessarabia (bĕs-să-ră'bi-ă), province of Russia; bounded N. by Podolia, E. by Podolia, Cherson, and the Black Sea, SW. and W. by Roumania and Galicia; area, 17,143 sq. m.; pop. (1906) 2,262,400. By the Treaty of Paris (1856) the part adjacent to the Black Sea was ceded to Turkey, but by the Treaty of Berlin (1878), it was ceded to Russia again. The population is composed of Russians, Germans, Bulgarians, Moldavians, Greeks, Jews, Poles, etc. Capital, Kishineff; scene of a massacre of Jews April 19, 1903.

Bessa'ron, John, 1403-72; Greek cardinal; b. Trebizond; he favored the union of the Latin and Greek Churches; accompanied the Greek Emperor, John II, to the Council of Ferrara, 1438-39; appointed cardinal, 1439, by Eugenius IV, and Bishop of Frascati by Nicholas V; received in 1463 the title of patriarch of Constantinople *in partibus*; wrote several works in defense of the philosophy of Plato, translated the "Metaphysics of Aristotle" into Latin; and was an efficient promoter of Greek learning in Italy.

Bes'semer, Sir Henry, 1813-98; English inventor; b. Hertford. At eighteen, improved the method of stamping deeds, which was adopted by the English Stamp Office without compensation to Bessemer. Then devised ma-

chinery for making figured Utrecht velvet, for casting type, and for making bronze powder, the latter proving a great commercial success. An invention in relation to projectiles turned his attention to the making of steel, and in 1856 he announced the pneumatic process now coupled with his name, but met with skepticism and ridicule. After a series of laborious investigations had perfected the process and he had become an active competitor, other steel makers soon adopted the process. From 1866 on, Bessemer derived £100,000 a year income from it. In 1869 he aimed to check seasickness by a swinging saloon, but after a few trials the plan was abandoned. Later he devoted himself to the improvement of telescopes.

Be'tel, or Pawn, a narcotic stimulant used as a masticatory by Oriental peoples, especially by the Malays. It is a portion of the nut of the *Areca catechu* (called the betel nut or *pinang*), rolled up with lime in the leaf of



PIPER BETEL.

the *Piper betel* or other species of pepper. This practice appears to be very ancient, having prevailed before the Christian era. The betel causes dizziness in those not accustomed to its use; but is said to be a tonic, antacid, and carminative.

Beth, a Hebrew noun meaning "house" or "habitation"; employed some fifty times in the Scriptures as a prefix in naming places, such as Bethel, Bethlehem, and Bethany.

Beth'am-Ed'wards, Matilda, 1836- ; English author; b. Suffolk; contributor to English magazines; made an officer of public instruction in France, 1891; author of novels, poems, and sketches of French rural life.

Bethany (bĕth'ă-nĭ), village of Palestine; on the E. slope of the Mount of Olives, nearly 2 m. E. of Jerusalem. As the home of Mary, Martha, and Lazarus, it was the scene of interesting events in biblical history. From some point near the village Christ ascended into heaven. (Luke xxiv, 50.) Here is a cave or excavation in a rock, said to be the grave of Lazarus. The modern village contains about forty families of Moslems.

Beth'el, ancient town of Palestine; the scene of the dream of the patriarch Jacob; was 10 or 12 m. N. of Jerusalem; near the boundary between Judea and Samaria. Here are ruins of ancient churches and other buildings.

Bethesda (bĕ-thĕs'ĕdĕ), pool or tank at Jerusalem where the lame man was healed. (John v, 1-9). Some identify it with Birket Israil, a large reservoir inside the city walls, near St. Stephen's Gate; others with the Fountain of the Virgin (intermittent), about 300 yards S. of the Temple area; and others with the pool of Siloam, about 300 yards farther S.

Beth'lehem, town frequently mentioned in both the Old and New Testaments as the birthplace of Jesus, as well as of his ancestor, King David. Anciently called Bethlehem Judah, to distinguish it from another Beth'lehem in the N. of Palestine. It is mentioned as existing in the time of Jacob, but was probably never large or important. It has at present abt. 5,000 inhabitants, all Christians.

Bethlehem. See BEDLAM.

Beth'lehmites, order of monks established at Cambridge, England, 1257; also an order of monks and nuns instituted at Guatemala abt. 1665. They are found in Central and S. America and the Canary Islands.

Bethsaida (bĕth-sā'ĭ-dā), ancient town in Palestine; on the W. shore of Lake Galilee, the home of Andrew, Peter, and Philip; identified with Ain-et-Tabigbah, in a little bay or cove between Khan Minyeh (Capernaum?) and Tell Hum (Chorazin?). Another Bethsaida, afterwards called Julias, was near the head of the lake, on the E. side of the Jordan, about 2 m. from its mouth. It was near this Bethsaida that Christ fed the 5,000.

Bethshemesh (bĕth-shĕmĕsh), the name of four places in the Scriptures, the most important of which was a sacerdotal city of Judah, 15 m. WSW. of Jerusalem, and 2 m. from the great Philistine plain. It was here the ark rested on its way home from Ekron. It was here that Amaziah, King of Judah, was taken prisoner by Jehoash. In the reign of Ahaz it was captured by the Philistines, and is not again mentioned in sacred history. Only ruins now mark the spot, which bears the name of Ain-Shems ("fountain of the sun"). Most of Samson's exploits were in its neighborhood.

Bĕton (bā'tōn), artificial stone made by mixing sand and hydraulic cement; invented by François Coignet, hence often called Bĕton-Coignet; sometimes used as synonymous with concrete.

Bet'terments, improvements put on real estate which enhance its value more than mere repairs. According to the common law, if a bona fide holder of real estate under a defeasible title made improvements while in possession of the land, they became a part of the realty, and could not be removed without the consent of the lawful owner, neither could any compensation be had therefor. In some states

statutes have been passed under which the disseizor is now allowed to bring an original action to recover the value of his improvements, after recovery in ejectment, if the improvements were made in good faith, the defendant is entitled to recover of the plaintiff the value of the same; but the plaintiff is given the right to elect to have the value of the land without the improvements assessed, and the defendant must then purchase the same at the price assessed within a given time or lose his claim for improvements.

Bet'terton, Thomas, 1635-1710; English actor; performed with success the parts of *Hamlet*, *Macbeth*, and *Othello*; was the chief ornament of the English stage for nearly fifty years.

Beust (boist), Friedrich Ferdinand (Count von), 1809-86; Austrian statesman; b. Dresden; entered the diplomatic service of Saxony, 1831; minister of foreign affairs, 1840; chancellor of the Austrian Empire, 1867. Following his advice Austria canceled the concordat with the pope in spite of the protest of the Curia, removed Jewish disabilities, and authorized civil marriages; ambassador in London, 1871-76; in Paris, 1876-82.

Bev'erley, town of York, England; 10 m. NNW. of Hull; has a minster, the Church of St. John, which exhibits several styles of Gothic architecture, and ranks next to York Minster among the ecclesiastical structures of England. The oldest part of this was erected in the thirteenth century. A priory was founded here abt. 700 A.D. Pop. (1901) 13,183.

Bewick (bū'ĭk), Thomas, 1753-1828; English engraver; b. near Newcastle-on-Tyne; founder of the modern English school of wood engraving. Among his best works are "*Æsop's Fables*" and a "*History of British Birds*."

Bey, or **Beg**, title of the Turkish Empire. The ruling officers of Tripoli and Tunis are beys; the title is given to some local magistrates, colonels and generals of the army, and to sons of pashas. In other cases a merely honorary title.

Beyrout (bā'rōt). See BEIRUT.

Beza (bĕzā), Theodore, 1519-1605; Calvinistic theologian; b. Vezelay, Burgundy; went to Geneva and avowed himself a Protestant; became Prof. of Greek at Lausanne; published "*De Hæreticis a Civili Magistratu Punien-dis*," in which he defended the burning of Servetus; translated the New Testament into Latin; removed to Geneva, 1559; succeeded Calvin as Prof. of Theology, 1564; afterwards ruled the Genevan Church with energy for forty years.

Bezant', or **Besant'**, or **Byzan'tine**, gold coin struck at Byzantium, or a circular piece of gold or silver without any impression; supposed to be a part of the old coinage of Byzantium. Some of these were brought home by the crusaders, and were current in England. Their value was 10s. sterling, but some gold bezants were worth £15 sterling. They

occur in heraldic charges, especially Cornish coat armor, and in the arms of banks or bankers (hence the three balls of the pawnbroker). Bezant in heraldry is a gold globe or a silver circle.

Béziers (bā-zē-ā'), a city of France, in the department of Hérault; on the river Orb and the Canal du Midi; 27 m. by rail ESE. of Cette. It is on the railway which connects Montpellier with Toulouse, and has a delightful situation, with a mild climate. It has manufactories of silk, hosiery, gloves, etc. Béziers was the scene of a massacre of the Albigenses in 1209. Pop. (1901) 49,214.

Bezique (bā-zēk'), game of cards, played by two persons with a double pack, containing only the cards above the sixes. Eight cards are dealt each player, and after each trick each player draws one from the top of the stock, the winner of the trick, *i.e.*, the one playing the highest card, drawing first. Certain cards and combinations of cards, played, taken in a trick, or declared, *i.e.*, placed upon the table, although still forming a part of the hand, count certain points in the score, which is usually 1,000 points.

Bhagalpur (bhāg-āl-pōr'), capital of a district and division of British India; on the Ganges, 265 m. NW. of Calcutta. Pop. (1901) 75,760.

Bhagavad-Gīta (bhā'gā-vād-gē'tā), song of the Exalted One; a Sanskrit theosophic poem, very celebrated in India. Its authorship is unknown; its date is perhaps not very far either way from the time of Christ. It teaches the unity of the Supreme Spirit, and inculcates devotion thereto by renunciation of all worldly attachments and diversions, but is in nowise a coherent system. Its correspondences with the New Testament are striking, but of no necessary significance.

Bhartihari (bhār-trī-hā'ri), Hindu poet of the first century; said to have been brother of King Vikramaditya; principal work, "The Centuries"; Sanskrit apothegms on love, wise conduct of life, and renunciation of the world; they concern respectively youth, manhood, and old age.

Bhopal (bō'pāl), native state and its capital; Central India; N. of the Nerbudda River; area of state, 6,902 sq. m.; pop. (1901) 665,690, including many of an aboriginal tribe called the Gouds.

Bhuj (bōj), fortified town of Hindustan; capital of Cutch; 170 m. SE. of Haiderabad; contains a beautiful mausoleum of Rao Lakka, a former ruler of Cutch. Pop. abt. 25,000.

Bhutan (bō-tān'), independent state in the E. Himalayas; bounded NE. and W. by Tibet and S. by British India; area, 16,800 sq. m.; capital, Punakha, a place of great natural strength. The original inhabitants, Tephus, were subjugated about two centuries ago by colonists from Tibet; repeated outrages on British subjects by Bhutan hillmen since 1774, led the British to send a punitive expe-

dition into their country, 1865; treaty of peace gave Indian Govt. control over the state, and provided for a subsidy to be paid the rulers of Bhutan on condition of their good behavior. Pop. abt. 200,000.

Biafra (bē-āf'rā), Bight of, bay of the Atlantic Ocean; on the W. coast of Africa; is the E. portion of the Gulf of Guinea, between capes Formosa and Lopez.

Bialystok (byā'lē-stōk), fortified town of Russia, government of Grodno; on the Bialy River and the Lithuanian and Polish borders; 52 m. SW. of Grodno; became a city of horrors in June, 1906, when a mob, including soldiers and police, attacked the Jews, who constituted about one half of the population, massacred many, plundered their shops, and fired the city. Pop. (1897) 63,927.

Biarritz (bē-ār-rēts'), village and fashionable watering place of Basses-Pyrénées, France; on the Bay of Biscay; 5 m. SW. of Bayonne; contains curious grottoes and was the periodical residence of Napoleon III. Pop. (1901) 12,812.

Bias (bī'ās), abt. 570-50 B.C., one of the seven sages of Greece; native of Priene and contemporary of Cræsus, King of Lydia; distinguished for eloquence as well as wisdom.

Bib, called also **Pout**, or **Whit'ing Pout**, a fish allied to the cod and haddock; is found on many parts of the British coasts and farther N. It is seldom more than a foot long, and is remarkable for the depth of its body, which equals one fourth of its length. It is esteemed for food.

Bibaud (bē-bō'), François Marie Uncas Maximilien, 1824-; Canadian author; b. Montreal; son of Michel Bibaud, the historian; was for many years Prof. of Law in the Jesuit College of Montreal; works include "Discours Historique Sur les Races Sauvages de l'Amérique," "Dictionnaire Historique des Hommes Illustres du Canada et de l'Amérique," and "Panthéon Canadien."

Bi'ble, **The Ho'ly Bible**, **Holy Scriptures**, collection of ancient writings from the age of Moses down to the death of the Apostle John at the close of the first century; divided into the Old and New Testaments; the first is regarded by the Jewish Church, and both are regarded by the Christian Church, as the inspired record of divine revelation. The Greek and Roman Catholic churches coördinate ecclesiastical tradition with the Bible as a rule of faith and conduct. Protestant churches make the Bible the only rule of faith. As to inspiration, the confessions of faith teach or imply the fact, but do not define the mode or the degrees. The theory of verbal or literal inspiration prevalent in the seventeenth century is now abandoned by the majority of Protestants.

The Old Testament was originally written in Hebrew, some portions in Aramaic. After the return of the Jews from captivity the history of the written codex begins. Hebrew

was already a dead language, the popular dialect was Aramaic, so it was necessary to translate and expound the writings. Hence schools arose, beginning 180 B.C., and produced the Talmud. After the art of printing was invented some books of the Old Testament were printed separately. In 1488 the first edition of the whole Hebrew Bible was printed at Soncino; the second was printed at Brescia, 1494. The Hebrew Bibles in use are scarcely more than reproductions of these editions.

The Hebrew Bible, as we now possess it, is divided into; (1) The Torah, *i.e.*, Law-Pentateuch; (2) the Nebiim, Prophets, including Joshua, Judges, First and Second Samuel, First and Second Kings; (3) the Chetubim, Writings, Hagiographa, including the poetical and all the other books in the English version of the Old Testament. The addition of the third part cannot be historically accounted for. The translators of the Septuagint included books which do not appear in the Hebrew collection; they form the Apocrypha of the English Bible. Of late the Apocrypha has been omitted from the popular editions. The first and most important of the versions of the Old Testament is the Greek, called the Septuagint (LXX), translated by Alexandrian Jews, *abt.* 285 B.C. It became authoritative in the Christian Church. The Vulgate, a translation in Latin for the common people, made 400 A.D., is the standard Bible of the Roman Catholic Church. The first printed text was in the "Complutensian Polyglot," published at Alcalá, Spain, 1520. The dialect of Greek in which the New Testament is written is what is called the Hellenistic. It was based upon the Attic, and was spoken by the Jews with a strong infusion of Hebrew spirit and Hebrew modes of speech. Hence the Hebraistic character of the Septuagint and the Greek Testament.

The earliest English version of the Bible is the *Mæso-Gothic* of Ulphilas, made from the Greek in the fourth century. The most memorable is the version, completed but not published, by John Wyclif, 1382. The first English translation from the Greek, and the basis of all subsequent ones, was the New Testament of William Tyndale (martyred 1536). In 1535 the first complete English Bible, by Miles Coverdale, was printed, probably at Antwerp. In 1611 the Authorized, or King James's Version, appeared. Among the most notable of recent versions are the revised version of the New Testament and the whole Bible, 1885, the work of British and American scholars.

The division into chapters was made by Cardinal Hugo de Sancto Caro, 1250; into verses, by Robert Stevens, a printer of Paris, *abt.* 1530. The Bible has been translated into about 180 languages, or 345 languages and dialects. Bibles with popular titles include the "Bishops' Bible," 1568, under Queen Elizabeth's license, and in part made by bishops; "Breeches Bible," same as the "Genevan Bible," so called because the word "aprons" (Gen. iii, 7) is rendered "breeches"; "Bug Bible," applied to several versions, the word "terror" (Psalm xci, 5) being rendered

"bug"; "Chained Bible," same as "Great Bible," chained in churches for public reading; "Great Bible," printed by Richard Taverner, 1539, so called on account of its size, and sometimes called "Cranmer's Bible"; "He and She Bibles," the first two editions of King James's version, which give different renderings of Ruth iii, 15; "Rosin Bible," the Douay version, in which "balm" (Jeremiah viii, 22) reads "rosin"; "Treceale Bible," name for some editions of the "Bishops' Bible," in which "balm" in the verse just mentioned is rendered "treceale"; "Vinegar Bible," name for various editions in which "Vineyard" in the page heading at Luke xx is misprinted "vinegar"; "Wicked Bible," edition which omitted the "not" in the Seventh Commandment.

Bible statistics, as found in a compilation by Dr. T. H. Horne, an English author, and contained in his "Introduction to the Critical Study and Knowledge of the Holy Scriptures," 1818, give the total number of books in the Bible as 66; chapters, 1,189; verses, 31,173; words, 773,746; letters, 3,566,480. The Old Testament contains 39 books, 929 chapters, 23,144 verses; the New Testament, 27 books, 260 chapters, 7,957 verses. The shortest book in the Old Testament is Obadiah; the longest, Psalms, 150 in number; the shortest book in the New Testament is John II; the longest are St. Matthew and the Acts, 28 chapters each. The longest chapter in the Bible is Psalm cxix; the shortest verse in the Old Testament is I Chron. i, 25; in the Bible, St. John xi, 35. The Book of Esther does not contain the words God and Lord. The word Bible does not occur in the text of the Scriptures. The word paradise, of Persian origin, occurs but three times in the New Testament. Nearly 30 books that are mentioned in the Bible are lost. See APOCRYPHA; CODEX; COMPLUTENSIAN BIBLE.

Bible Christians, or Bry'anites, Christian sect, followers of William O'Bryan, of Cornwall, England, a Wesleyan local preacher, who seceded *abt.* 1815. The first conference was held 1819. Their doctrines are identical with the Wesleyans; their government and methods are similar to the Primitive Methodists, and, like them, they license women to preach. Its members in Great Britain and its colonies number about 8,000. There are a few churches in the U. S.

Bible Revision. See BIBLE.

Bible Societies, societies for the dissemination of the Bible. The first was the Canstein Bible Institute, in the Orphan's Home in Halle, founded in 1710 for the purpose of putting the Bible into the hands of the poor at a low price; and during the first century of its existence over 3,000,000 copies of the Scriptures, in different languages, were distributed. The British and Foreign Bible Society was established in London, 1804. The first American society was founded at Philadelphia in 1808. The work of Bible societies has constantly encountered difficulties growing out of differences of opinion concerning

the principles which should govern translations into foreign tongues, the determination of the canon of the Scripture, etc. The American Bible Society, founded in New York City, 1816, announced as its sole object, "a wider circulation of the Scriptures without note or comment." In general, Bible societies are voluntary, nonsectarian, Protestant associations, being neither close corporations nor under ecclesiastical direction. They publish, not for profit, but at prices as low as possible, and make large grants for the supply of the destitute.

Bib'lia Pau'perum ("the Bible of the poor"), one of the earliest block books; printed before the use of movable type, abt. 1420; consists of thirty-four to fifty cuts illustrating the history of Christ, each with representations of those Old Testament events which were considered to have been their types. The descriptive text is in abbreviated Latin.

Bibliog'raphy, science which treats of books in all their aspects; the science of booksellers and librarians. Pure bibliography concerns itself with the external features of books; applied bibliography takes cognizance of their contents. A bibliography is also a classified list of the works in some particular department of knowledge, as a bibliography of political economy. See **BIBLIOMANIA**; **BOOKS**.

Bib'liomancy, mode of divination by opening the Bible and observing the first passage which occurred, or by entering a church and taking note of the first words of the Bible heard after entering. It seems to have originated with the pagans, who employed Homer or Vergil in like manner.

Biblioma'nia, the passion for acquiring and possessing books. Bibliomaniacs are governed in their selection by all sorts of curious fancies, for books of a certain binder, of a certain press, early and rare *éditions de luxe*, uncut copies, illustrated copies, etc. Bernard Quaritch paid £4,950 for the "Psalmorum Codex." Over \$10,000 was paid for a copy of the first dated "Decameron." In 1884 a Mazarin Bible (one of the twenty-five copies of the first printed Bible, date 1450, known to have belonged to Cardinal Mazarin) brought £3,900. High prices are often paid for books containing certain faults or misprints. The bibliomaniac is governed often by trifling considerations; whereas the bibliophile, or book lover, collects books with some specific literary or scientific purpose, seeking to bring together everything pertaining to a given subject. See **BIBLIOGRAPHY**; **BOOKS**.

Bice, two blue and green pigments; native carbonates of copper, used by painters from very early times. The blue bice is sometimes called mountain blue and ongaro. The synonyms of green bice are Hungarian green, verdetto, malachite green, mountain green, etc.

Bi'ceps, large round muscle lying upon the front of the arm. Above, it consists of two portions or heads. They unite to form a fleshy belly, which terminates in a rounded

tendon inserted into the radius. The action of the biceps is to bend the forearm. (See



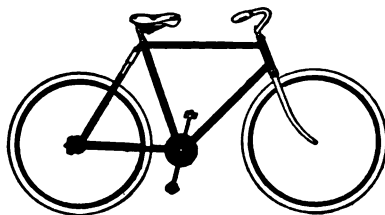
BICEPS.

ARM.) Another biceps is found on the outer and posterior aspect of the thigh.

Bichat (bē-shā'), **Marie François Xavier**, 1771-1802; French anatomist and physiologist; b. Thoirette, in Jura; in 1797 he began to lecture on anatomy, surgery, etc., in Paris; published "Researches on Life and Death" and "General Anatomy Applied to Physiology and Medicine"; he simplified anatomy and physiology by reducing the complex structures of the organs to the simple or elementary tissues, and he was the first to recognize the importance of the distinction between the organic functions and the animal or vital functions.

Bick'erstaff, Isaac, Irish dramatist; abt. 1735-89; produced comedies and comic operas, among which are "The Maid of the Mill," "The Padlock," "Love in a Village. Steele's "Tatler" was published under the assumed name of Isaac Bickerstaff.

Bicycle (bi'si-k'l), a machine consisting of two tandem wheels connected by a frame upon which is a seat. It is propelled by the feet of the rider by means of cranks attached to, or connected with, the driving wheel, and, in the motor bicycle of the present time, by a

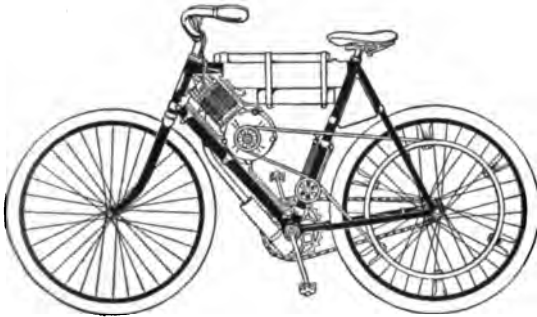


CHAINLESS-GEAR SAFETY.

gasoline explosion motor. The tricycle is a similar machine with three wheels. Cycling was first practiced in the eighteenth century upon the hobby, or dandy, horse. This was a bicycle with wheels attached to a bar of wood rudely shaped like the body of a horse. The rider sat astride upon it and propelled

it with his feet upon the ground. In 1840-41 Kirkpatrick McMillan, a Scotchman, made a wooden bicycle with cranks, side levers, connecting rods, and pedals. It was used successfully for years, and to him belongs the honor of making the first bicycle with cranks.

The first modern bicycle was built in England in 1867. This type is known as the ordinary. Iron and steel took the place of wood in the frame and wheels. Abt. 1884 the present safety came into use. The drop-frame bicycle was invented and made by Herbert S. Owen, of Washington, D. C., in 1887, and is peculiarly adapted for women. The adoption of the safety as the permanent form of the bicycle, and of the pneumatic as its only suit-



GASOLINE MOTOR BICYCLE.

able tire equipment, made possible a steady development in the construction of both. Weights were gradually reduced from above 40 lbs. to 20 lbs. for road, and even less; the ball-bearing principle was introduced at every point of friction, forgings were substituted for castings; and every part became, as far as possible, easily attachable and detachable. The pneumatic tire was perfected with equal rapidity. Meanwhile, to the single safety was added the tandem, "triple," "quadruplet," "sextuplet," and, in 1896, the "decaplet," carrying two, three, four, six, and ten riders respectively.

Bicycles with bevel-gear power transmission, in place of the usual chain transmission, were introduced commercially in 1897. The cushion-frame device and coaster brake were brought out about the same time. Cycling is practiced throughout the world for pastime, for health, for business, and for military purposes; in the last case, not so much in actual warfare as for the rapid movement of troops, for messenger service, and for skirmishing. Bicycles propelled by gasoline engines were brought out by American manufacturers in 1900 and have since nearly supplanted the other bicycles, especially for long-distance runs. See VELOCIPED.

Bidassoa (bē-dā-sō'ā), small river forming part of the boundary between France and Spain; rises in Spain, and enters the Bay of Biscay at Fuentarabia. In August, 1813, Wellington defeated Soult at San Marcial on the Bidassoa.

Bid'deford, city of York Co., Me.; on the Saco, 9 m. from its mouth. The first settle-

ment was made at the Pool (at the mouth of the river) by Richard Vines, 1616-17. Its granite ranks among the best in the world, and is largely exported; has manufactories of cotton cloth and lumber. Pop. (1906) 17,165.

Bid'ding Pray'er, formula of public prayer found in ancient Greek liturgies, in the Gallikan liturgy, and in the English service books, in which the priest recites in detail what the people are to pray for, and closes with the Lord's Prayer, in which all the previous petitions are considered to be summed up.

Bid'dle, John, 1615-62; English theologian, "father of English Unitarianism"; b. Wotton-under-Edge, Gloucester; master of the Free School of Gloucester, 1641; was imprisoned five years after trial by Parliament for heterodox expressions about the personality of the Holy Spirit; persecuted and imprisoned twice during the Commonwealth and again at the Restoration; d. in prison in London. He denied original sin and the atonement.

Bidpai (bīd'pī). See PILPAY; PANCHATANTRA.

Biel (bēl). See BIENNE.

Bie'la's Com'et, a comet of short period (six and two third years); discovered by Baron von Biela, 1826. It was observed apparently unchanged at various returns, but in 1845-46 it separated into two parts, both of which were observed in 1852. It was due in 1865, and again in 1872, but no trace of it could be found; in November, 1872, the earth crossed its path, and a shower of meteors was observed, supposed to be fragments of the lost comet.

Bielefeld (bē'lē-fēlt), town of Prussia; in Westphalia; 20 m. SW. of Minden. Its principal industry is linen weaving. Pop. (1900) 63,050.

Bienne (bē-ēn'), a town of Switzerland; in the canton of Berne; at the NE. extremity of the Lake of Bienna. It is beautifully situated at the foot of the Jura Mountains and is inclosed by old walls. Here are manufactories of watches, cotton goods, etc. Many Roman coins have been found at Bienna, which is a place of great antiquity. Pop. (1907) 27,026. The Lake of Bienna is 10 m. long, 3 m. wide, and 250 ft. deep, and has an elevation of 1,419 ft. above the sea. It incloses the island of St. Pierre, which was the residence of J. J. Rousseau in 1765.

Biennial (bī-ēn'nī-āl) **Plants**, plants which live longer than annuals, and not so long as perennials. They grow the first season without flowering, and produce flowers in the second season, at the end of which they die. Such are the turnip, parsnip, beet, and many other plants. Many biennials, if sown early in the spring, will flower in the summer or autumn of that year, and become annuals. See ANNUAL; PERENNIAL.

Bienville (bē-ān-vēl'), Jean Baptiste Lemoine de, 1680-1768; French pioneer; b. Montreal, Canada; a brother of Lemoine d'Iberville, whom he accompanied in an expedition to the

mouth of the Mississippi, 1699; three times colonial governor of Louisiana; founded New Orleans, 1718.

Bierstadt (bär'stät'), Albert, 1830-1902; German-American painter; b. Düsseldorf, Germany; brought to this country in infancy; studied at Düsseldorf; painted chiefly pictures of large size, often panoramic in style; many of them are of Rocky Mountain scenery. His "Discovery of the Hudson River" is in the Capitol at Washington.

Bies-Bosch (bēs-bōsk'), marshy lake of the Netherlands; between the provinces of N. Brabant and S. Holland, formed, 1421, by an inundation which destroyed seventy-two villages and 100,000 people; now part of the estuary of the Maas called Holland's Dip, and contains a number of islands.

Bifrost, Scandinavian mythology, the trembling way; the beautiful many-colored bridge which the asas built between heaven and earth. It is the rainbow. The red in it, says the Younger Edda, is fire, which keeps the frost giants away from it.

Biga (bī'gā), ancient Roman vehicle drawn by two horses abreast; a two-horse chariot used in processions and games. Like the Greek war chariot, it had two wheels, was low and open behind, and higher and closed in front.

Bigamy, offense of contracting a marriage while a former marriage is still subsisting. The proper term for this offense is polygamy. It is governed by statute. If the parties marry in one state and cohabit in another, the crime is committed solely in the place of the marriage, and can only be prosecuted there; but the state laws differ on this point. In a prosecution for bigamy, an actual marriage must be established. See DIVORCE; MARRIAGE.

Big Beth'el, locality in York Co., Va., about 10 m. from Fort Monroe, where, June 10, 1861, Federal forces under Gen. Pierce attacked Confederate breastworks, defended by troops under Col. J. B. Magruder, but failed to capture them.

Big Black, river of Mississippi; rises in Choctaw Co.; flows SW. and enters the Mississippi at Grand Gulf; length, about 200 m.; navigable for steamboats for 50 m. Grant's army, moving to the siege of Vicksburg, defeated the Confederates on the Big Black, nearly 15 m. E. of Vicksburg, May 12, 1863. The morning after the battle of Champion Hills, May 17, 1863, found the Confederates under Pemberton strongly posted on both banks of the Big Black. The works were successfully assaulted, and all the troops on the E. bank, with pieces of artillery, captured, the remainder of Pemberton's army retreating to Vicksburg.

Big Bone Lick, salt "lick" or spring in Boone Co., Ky., named from the fossil bones of the mastodon and other animals thought to have resorted here to "lick" the salt

earth, and to have perished in the marshy soil.

Big'elow, John, 1817- ; American author and diplomat; b. Malden, N. Y.; an editor of the New York *Evening Post*, 1850-61; U. S. consul at Paris, 1861-64; minister plenipotentiary, 1865-67; secretary of state for New York, 1867-68; edited "Autobiography of Benjamin Franklin," 1868; "Writings and Speeches of Samuel J. Tilden," "Complete Works of Benjamin Franklin"; wrote works including "France and Hereditary Monarchy," "France and the Confederate Navy," "Molinos the Quietist," "The Mystery of Sleep," "The Useful Life, a Crown to the Simple Life."

Big Horn, river of the U. S.; the largest affluent of the Yellowstone; rises in Wyoming, among the Wind River Mountains; flows in a generally N. direction; crosses the S. boundary of Montana; enters the Yellowstone at Big Horn City, Mon.; length, estimated at 450 or 500 m. The upper part or head stream of it is called Wind River.

Big Horn Moun'tains, a range beginning near the center of Wyoming and running N. into Montana, containing heights of from 8,000 to 12,000 ft., and covering 7,500 sq. m.

Big Horn, or **Rock'y Mountain Sheep**, a species of sheep regarded by Cuvier as identical with the argali of the Old World; also resembles the wild sheep of the Mediterranean islands and of the Atlas Mountains. It is very large and extremely wild, and is found in the W. and NW. mountains of N. America. It has coarse hair and horns about 4 ft. long and 18 to 20 in. in circumference.

Bigno'nia, a genus of plants, family *Bignoniaceae*, natives of the tropical and subtropical America. Many are climbers, with compound leaves terminating in a tendril, and handsome trumpet-shaped or bell-shaped flowers, which are two lipped. They are probably the handsomest twining plants known. The trumpet creeper or trumpet flower of the U. S. is the *B. radicans*. It has a large and showy orange and scarlet corolla, funnel shaped and five lobed, with four stamens.

Big Sand'y Riv'er, affluent of the Ohio; the boundary between W. Virginia and Kentucky; is navigable for more than 100 m. for steamboats; main stream, or Tug Fork, rises in the S. of W. Virginia; its W. fork flows through E. Kentucky.

Big Trees. See SEQUOIA.

Bikanir (bīk-ā'nēr), capital of the native state of same name in Rajputana, India; 240 m. WSW. of Delhi; surrounded by a battlemented wall 3½ m. in circuit, and has a citadel, rajah's palace, several temples, and manufactories of blankets and pottery. Pop. (1901) 53,100.

Bilaspur (bē-lās-pōr'), district Central Provinces, British India; traversed by the Mahanadi; area, 7,798 sq. m.; pop. 1,000,000; is so productive that it is popularly called "the land of plenty." The shoe-making and weav-

ing castes form separate religious bodies, and have customs that distinguish them from the Hindus.

Bilbao (bil-bā'ō), often written **Bilbo'a**, seaport of Spain; capital of province of Biscay; on the Nervion, near the Bay of Biscay, 28 m. NW. of Vittoria; has manufactories of hardware, hats, leather, paper, and earthenware; chief exports, grain and flour, iron, oil, and fruits. Bilboa was founded, 1300, and first called Belyao, and abt. 1500 was the seat of a famous commercial tribunal. Pop. (1900) 83,306.

Bil'berry, or **Whor'tleberry**, fruit of various small shrubs of the genera *Vaccinium* and *Gaylussacia* (*Ericaceæ*), natives of N. America and N. Europe; also called huckleberries and blueberries.

Bilderdijk (bil'dér-dék), **Willem**, 1756-1831; Dutch poet; b. Amsterdam; author of many poems, tragedies, and prose works; reached the highest point of his lyric genius in miscellaneous and patriotic poems, notably "Willem Frederik" and "The True Love of Fatherland." His epic, "Destruction of the First World," a work not unworthy of his genius, was left uncompleted.

Bile, secretion of the liver in animals. In all vertebrates it is formed chiefly from the blood of the portal vein, mingled, to some extent, with that of the hepatic artery. It is secreted slowly during the intervals of digestion, attaining its maximum (according to Dalton) about an hour after eating. It is in man a golden red, viscid fluid, with a bitter taste and a peculiar smell. From 20 to 50 oz. of it are secreted daily in a man. A portion is detained in the gall bladder, where it becomes more dense by the loss of water and the addition of mucus. Entering by the common biliary duct into the duodenum, it aids in the digestion of food, especially of fat, and the greater part of it is then reabsorbed from the small intestine. A portion is excreted with the fecal discharge. Bile stimulates the peristaltic muscular action of the bowels, being the natural laxative. It acts also as an antiseptic to the almost putrescent contents of the large intestine. Solidification of the components of the bile causes gallstones.

Bill, a formal statement or declaration in writing. It is commonly used in connection with some descriptive word, as bill in equity, bill of exchange, bill of rights, bill of sale, etc. The principal uses of the word without other words of description are as applied to (1) A draft of a proposed law pending before a legislature, as bills for raising revenue. After it becomes a law, it is termed an act or statute. (2) One of the forms of pleadings by which a common-law action was anciently commenced, answering to the modern declaration or complaint. Also the statement of facts and prayer for relief in a suit in equity, called a bill in equity. (3) An itemized statement of the claims of a creditor.

Bill in Equity, statement of the plaintiff's case in a suit in court of equity, correspond-

ing to the declaration or complaint in the common law. The defendant's reply is called the answer. An original bill initiates the suit; a bill not original, as a cross bill, a supplementary bill, etc., is used to controvert or suspend or revise a proceeding in the cause, as a decree or order, or for cross litigation. In particular suits the bill receives special names, such as bill of peace, bill of interpleader, bill of discovery, cross bill, etc.

Bill of Attain'der. See **ATTAINDER**.

Bill of Cred'it, paper designed to circulate as money, issued by the authority and on the faith of the state. By the U. S. Constitution the states are prohibited from issuing bills of credit.

Bill of Excep'tions, formal statement in writing of exceptions taken to the judge's opinion, decision, or direction upon matters of law during a trial. Its object is to bring the alleged error of the judge before the proper court for review.

Bill of Exchange', open letter of request, whereby one person requests another to pay a third or his order, or to bearer, a sum of money, absolutely and at all events. The person who writes the letter is called the drawer; the one to whom it is addressed is termed the drawee; and the person who is to receive the money is the payee. A bill of exchange is either inland or foreign. Where the parties are in the same state it is inland; where the drawee resides in a state or country different from that of the drawer, or in any case where the bill is drawn in one state upon a person in another, it is foreign.

Bill of Lad'ing, written evidence of a contract for the carriage of goods by water; usually signed by the master of the vessel, acknowledges the receipt of the goods from the consignor, and undertakes to deliver them to the consignee or his assigns at a specified place, for the compensation and on the conditions therein specified. An indorsement of the bill of lading transfers the title to the goods, and, if made in good faith and for a valuable consideration, cuts off the right of stoppage *in transitu*. For most purposes a bill of lading is assignable, and an assignee takes it subject to any defense existing between the original parties.

Bill of Pains and Pen'alities, special act of a legislature declaring a person guilty of some offense, without any conviction in the regular course of judicial proceedings, and inflicting upon him some punishment less than death. Bills of pains and penalties are within the provision of the U. S. Constitution that neither Congress nor a state shall pass a bill of attainder or an *ex post facto* law.

Bill of Partic'ulars, written statement of the particulars of the demand for which an action at law is brought, or of a defendant's set-off against such a demand.

Bill of Peace, bill in equity by which a person seeks to prevent a multiplicity of suits

involving the same point, brought by a numerous class insisting upon the same right or by an individual attempting to establish an unsuccessful claim. An injunction is granted on the principle that equity will grant relief to prevent useless or oppressive litigation or irreparable mischief.

Bill of Rights, English statute enacted at the accession of William and Mary; declared, among other things, the right of the subject to petition the king, freedom in the election of members of Parliament, and freedom of speech in Parliament. It affirmed that standing armies without the consent of Parliament are illegal, that the king had no power of suspending or dispensing with laws, nor of levying taxes without the consent of Parliament. A number of the provisions of this state are inserted literally among the amendments to the U. S. Constitution, and are also found in state constitutions.

Bill of Sale, writing under seal conveying the title to goods and chattels. The seal by the common law is conclusive evidence of consideration. Accordingly, a bill of sale formally executed passes the title without any consideration or delivery of the property. Where there is no seal there must be a consideration or delivery. In a more popular sense, a bill of sale is any written instrument, though not under seal, executed as evidence of a sale.

Billeting, the practice of feeding and lodging soldiers, when they are not in camp or barracks, by quartering them on the inhabitants of a town. It is done chiefly in war time, during the movement of the troops, or when there is not sufficient barrack accommodation. Billeting on private householders is prohibited in the U. S. except in times of war.

Billfish, any one of several species with jaws elongated into a bill or beak. Among these are species of the genus *Tylosurus*, known also as garfish and needlefish, common along the Atlantic coast of America, and the spearfish, *Tetrapturus albidus*, allied to the common swordfish.

Billiards, indoor game played with ivory balls propelled by a cue or tapering wand on an oblong level table with a raised rim lined with an elastic cushion. The tables are divided into three classes, four pocket, six pocket, and no pocket, or carom. The pockets are little bags at each corner on four-pocket tables, and one also at each side on six-pocket ones. The game was known in England in the Middle Ages, having been introduced by the Knights Templars on their return from the Second Crusade, and it was common in the monasteries of Europe. It was introduced into France during the reign of Louis XI (1461), and into America by the Spaniards who settled in St. Augustine, Fla., 1565. The earliest authentic mention of the game appears in Reilly's English translation of the Abbé McGeoghegan's "History of Ireland," in which is given the substance of the will of Cathire More, a subking of Ireland, who ruled the district of Leinster in the early part of the second century

A.D. The following is a quotation from his will: "To Drimoth I bequeath fifty billiard balls of brass, with the pools and cues of the same material."

Many variations are played but the three-ball carom game is most generally known.

RULE 1. The Three-Ball Carom Game is played with two white balls and one red ball.

2. The lead and choice of balls are determined by stringing or banking; and the player whose ball stops nearest the cushion at the

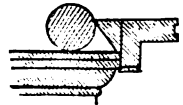


CAROM TABLE.

head of the table has the choice of the two white balls, and has the option of leading or requiring his opponent to lead.

Should the two white balls come in contact when stringing for lead, the player whose ball is clearly out of its true course, or whose ball strikes the red ball when on its proper spot, forfeits the lead. When the contact of the balls is equally the fault of both players, or when the balls come to rest at an equal distance from the head cushion, the players shall string again. In the opening shot, or whenever the balls are spotted after a "freeze," the striker is "in hand."

3. The red ball is placed on the spot at the foot of the table, and the white ball of the player not in hand, as already determined by the



The player leading must place his ball inside the string and within six inches to the right or left of the other white ball, and must strike the red ball first in order to effect a count. On any other than the opening shot, and excepting when the balls are for any reason spotted, the striker may play upon either ball.

4. A carom counts one, and consists in hitting both object balls with the cue ball. Failure to hit either of the object balls constitutes a miss, and counts one for the opposing player. In a "discount" game a point so forfeited shall not be deducted from the score of the player giving odds.

5. When a player's ball jumps from the table after counting, the stroke counts, the ball is placed on its proper spot, and the striker plays from the spot upon either object ball. The cue ball, when forced off the table by either a counting or noncounting stroke, is to be placed on the string spot if vacant; if the string spot is occupied the ball is placed on the red spot, and if both the other spots are occupied the ball is placed on the center spot.

The nonstriker's ball when forced off belongs on the string spot or, if this is occupied, on the red ball spot or, if both these spots

are occupied, on the center spot. When forced off the table the red ball, if its own spot be occupied, goes first to the white spot or, if that spot be occupied, to the center spot.

Should both white balls be forced off by a noncounting stroke, the ball of the incoming striker shall go on the white spot, and the other white ball on the red spot; or, if that is occupied, on the center spot; and the incoming striker may play upon any ball. In such case, should a player pick up and play with the wrong ball the stroke is valid and he counts whatever is made; but at the conclusion of the run the white balls should be reversed in position.

6. If in the act of playing the player disturbs any ball other than his own he cannot make a counting stroke, and cannot play for safety. Should he disturb a ball after having played a counting stroke the count is void, his hand is out and the ball so disturbed is replaced. Should he touch his own ball previous to playing it is foul, his opponent scores one as for a miss, and the player cannot play for safety.

7. If the balls are disturbed by any agency other than the player himself, they must be replaced and the player allowed to proceed.

8. If after having touched his ball the striker commits a foul by giving a second touch the balls remain where they stop, or are replaced in their previous positions as nearly as possible, at the option of his opponent.

9. When the cue ball is in contact with another ("frozen" is the common term) the player may either play to a cushion or spot the balls.

10. When the cue ball is very near another, the player shall warn his opponent that they do not touch, and give him time to satisfy himself on that point.

11. The object balls shall be considered crotched whenever the centers of both lie within a four and a half inch square at either corner of the table, and when so crotched but three counts are allowed unless one or both object balls be forced out of the crotch. In case of failure the player's hand is out and his opponent plays with the balls as he finds them.

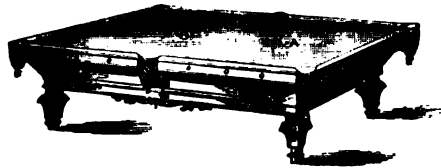
Pool is a game played on a billiard table with pockets. The game of American Pyramid Pool is played with fifteen balls, numbered from 1 to 15 respectively, and a white cue ball. The player opening the game plays from any point inside the string, and after the opening shot plays with the cue ball as he finds it. Each ball counts one point, and in match or two-hand games the player first scoring eight balls wins game.

1. In the opening stroke the cue ball, aimed direct or as the result of a bank shot, must strike the pyramid with force sufficient to cause at least two object balls to touch a cushion, or at least one object ball to go into a pocket. Failure to do either forfeits the stroke and one ball to the table. In case of a forfeit by a player having no ball to his credit, the first ball scored by him shall be placed on the deep-red spot, or as near thereto as possible. All balls pocketed on the open-

ing stroke count, and need not be called. In match or tournament games, when the player on the opening stroke fails to drive at least two balls to a cushion or one ball to a pocket, the balls are set up again, and the player forfeits one ball from his score, and must continue to play until he shall have made a legal leading stroke.

2. After the opening stroke the player must call the number of the ball he intends to pocket, but need not call the pocket. Should the called ball not be pocketed, no ball pocketed on that stroke is counted, but must be placed on the deep-red spot, or as near as possible on a line below it; the player's hand is out, but he incurs no penalty. Should more than one ball be called, and one or more thus called should not be pocketed, none can be counted. Failure to hit a called ball involves no penalty, provided any other ball be hit.

3. One ball is forfeited if after the opening stroke the player fail to pocket a ball, or fail to make at least one object ball, or the cue ball, after hitting an object ball, strike a cushion. Should the player also pocket the cue ball



SIX-POCKET TABLE.

after failure as above described, he forfeits but one ball on the stroke.

4. When one or more balls, in addition to the ball called, are pocketed, the player is entitled to all pocketed.

5. When more than two players are engaged, the game is ended when the balls remaining on the table are not sufficient to tie the next lowest score; and all that may be depending upon the game shall be decided in accordance with the standing of each player when pool is called.

6. A player forfeits one ball for making a miss, pocketing the cue ball, forcing the cue ball off the table, for failing as described in Rule 3, and for striking the cue ball twice.

7. It is a stroke, and one ball is forfeited, if the striker touch the cue ball with his cue and make a miss, or touch it with his clothing, or any other object.

8. A stroke made when any ball is in motion is foul, one ball is forfeited, and the incoming striker may either have the balls replaced or play as he finds them.

9. When the cue ball is struck twice, the balls disturbed in consequence of the second stroke shall be replaced, or the incoming striker, if he choose, may play as he finds them; the striker forfeits one ball.

10. The Rules of Continuous Pool for the Championship, and of the Three-ball Carom Game, except as above specified, govern this game also.

Bil'lings, Josh. See SHAW, HENRY WHEELER.

Billingsgate, wharf and fish market of London; below London bridge; made a free and open market for all sorts of fish, 1699; is the only wholesale fish market in London, and all fish, fresh or cured, if imported in British vessels, are admitted free of duty. The women who vended fish here were formerly notorious for ribaldry and vituperative personalities, so that Billingsgate became a synonym for vulgar and foul expressions.

Bil'ion, in the French system of enumeration, in use in the U. S., a thousand millions; in Great Britain a billion is a million millions—1,000,000,000,000.

Bil'liton, Dutch island in the E. Indies; between Borneo and the SE. end of Sumatra; separated from Banca by Clement (or Gaspar) Strait; area, estimated at 1,860 sq. m. Tre-pang, birds' nests, and tortoise shells are exported. It is noted for its production of grain tin from alluvial deposits, and the peculiar white iron called "pamar" is found only here and in Celebes. Pop. abt. 35,000.

Bil'ney, Thomas, abt. 1495-1531; English martyr; ordained, 1519; was a fellow of Trinity Hall, Cambridge, and preached there, in London, and elsewhere; opposed the Schoolmen's formal good works and the worship of saints and relics, and converted Hugh Latimer and others to these views. Arraigned, 1527, he recanted and escaped with a year's imprisonment in the Tower; but having begun to preach again in the fields of Norfolk, was condemned and burned at Norwich.

Biloxi (bi-ló'xí), city, summer and winter resort, Harrison Co., Miss.; 75 m. ENE. of New Orleans; is a manufacturing and shipping point; has fruit and vegetable canning industries, and an oyster-packing business second only to Baltimore. The first settlement made upon the Mississippi by white men was here, 1699, by Pierre Lemoyne d'Iberville. Pop. (1900) 5,467.

Bil'son, Thomas, 1536-1616; English prelate; b. Winchester; was bishop successively of Worcester and Winchester; published a vindication of the supremacy of Queen Elizabeth; was, with Miles Smith, the final reviser of the Authorized Version of the Bible.

Bimet'allism. See MONETARY STANDARDS.

Bi'nary Arith'metic. See ARITHMETIC.

Binary System, pair of stars revolving around a common center of gravity. The only distinction between an ordinary double star and a binary system is that motion has been detected in the latter, whereas in the former the relative position of the two bodies appears to remain invariable. The most remarkable binary systems are those which are discovered by the spectroscope, in cases where the motion is too small to be detected by any other means. Thus it is found that the star Algol has an invisible companion revolving around it, which partially eclipses it at every revolution.

Binary The'ory. See CHEMISTRY.

Bin'drabund. See BRINDABAN.

Bind'weed Fam'ly (*Convolvulaceæ*), herbaceous, shrubby, or rarely arboreous dicotyledons, gamopetalous, with superior ovaries; are related to the nightshades, borages, phloxes, etc. There are 800 species, mostly natives of warm climates. *Ipomœa*, the morning-glories, and *Convolvulus*, the bindweeds, are representative genera. *Cuscuta*, the dodders, is a genus of degraded parasitic species.

Bingen (bing'ën), ancient *Vincum* or *Bingium*; town of Germany; in Hesse; on the Rhine; at the mouth of the Nahe; 20 m. W. of Mentz. The Nahe is here crossed by an old bridge supposed to have been built by the Romans. Near Bingen the Rhine passes through a narrow channel called Bingerloch (the hole of Bingen), in which the rocks and rapid current once rendered navigation dangerous. Bingen has manufactories of flannel, fustian, and leather. Here are ruins of an old castle, Klopp, originally founded by Drusus, and of the chapel of St. Roch on the Rochusberg. A little farther to the S., between Bingen and Bingerloch, a high rock, the so-called tower of Bishop Hatto, rises in the middle of the stream. An heroic statue of Germania here commemorates the German victories of 1870-71. Pop. (1900) 9,670.

Bing'ham, John Armor, 1815-1900; American diplomat; b. Mercer, Pa.; admitted to the bar in Ohio, 1840; member Congress, 1855-63 and 1865-73; chairman of House managers in impeachment of Judge Humphreys, 1862; special judge advocate in trial of Lincoln's assassins; one of the House managers in impeachment of President Johnson; U. S. minister to Japan, 1873-85.

Bing'hamton, capital of Broome Co., N. Y.; at junction of the Susquehanna and Chenango rivers; 50 m. E. of Elmira; 850 ft. above tide water. The city is especially noted for its cigar industries; annual value of all manufactures (1905) \$13,907,400. Pop. (1905) 42,036.

Bin'ney, Hibbert, 1819-87; Anglican clergyman; b. Nova Scotia, consecrated, 1851, Bishop of Nova Scotia and Prince Edward Island, the first bishopric founded by England in her colonial dependencies, originally including also New Brunswick and parts of lower Canada.

Binney, Horace, 1780-1875; American lawyer; b. Philadelphia; admitted to the bar, 1800, and rose in a few years to the highest rank in his profession; a most noted case being his defense of the city of Philadelphia against the executors of Stephen Girard. He wrote many valuable papers, and was author of "The Leaders of the Old Bar of Philadelphia," "The Privilege of the Writ of Habeas Corpus Under the Constitution," and "An Inquiry into the Formation of Washington's Farewell Address."

Binoc'ular Tel'escope, a combination of two telescopes the distance between whose parallel central axes is equal to that between the eyes, so that both eyes may be applied at once. An object may then be observed with both eyes at the same time, one looking through each tube. There are also binocular microscopes,

having two tubes, one for each eye. In some kinds of work they possess superior defining power. See TELESCOPE.

Bino'mial, in algebra, an expression having two terms joined by + or -. The binomial theorem expresses the law for the formation of any power of a binomial. By it any power of $x + a$ can be at once written down without going through the actual multiplication. The older mathematicians were acquainted with this method, but Newton first demonstrated the universality of its application. This is one of his greatest discoveries, and the formula was placed upon his tomb. It is usually written thus:

$$(x + a)^m = x^m + \frac{m x^{m-1}}{1} + \frac{m(m-1)}{1.2} a^2 x^{m-2} + \frac{m(m-1)(m-2)}{1.2.3} \times a^3 x^{m-3}, \text{ etc.}$$

Binomial coefficients: the coefficients of the powers of quantities which occur in the binomial theorem, as

$$\frac{m(m-1)}{1.2}, \frac{m(m-1)(m-2)}{1.2.3}, \text{ etc.}$$

Binomial No'menclature, the system of naming animals and plants introduced by Linnæus, now in universal use. The species of different kinds of animals or plants are gathered together in larger groups or genera. The name of the genus is a Latin substantive, that of the species is adjective or a noun having the force of an adjective.

The genus may contain one or many species, and with the progress of exact knowledge of species the tendency has been to split the genera into smaller groups by more rigorous definition. Examples are *Quercus alba*, the white oak; *Felis leo*, the lion; *Sparisoma abildgaardii*, Abildgaard's parrot fish; *Abies pectinata*, the balsam fir of E. N. America.

Bio-Bio (bē-ō-bē'ō), largest river of Chile; rises in the Andes, and enters the sea at Concepcion, after a course of 200 m.

Biogen'esis, origin of living organisms from living organisms by some form of reproduction either asexual or sexual; used in opposition to abiogenesis, or the origination of living things from nonliving matter. See GENERATION, SPONTANEOUS; REPRODUCTION.

Bi'ograph. See MOVING PICTURES and CHRONOPHOTOGRAPHY.

Biog'raphy, literature which treats of the lives of individual persons. Anciently, the leading incidents of a man's life were narrated in their historical sequence, without elaborate attempts to analyze character. Ancient biography was possessed of a stately dignity, with but little eulogy or censure. Modern biography, on the other hand, like modern history, is often full of criticism and disquisition. Of strictly biographical works the most valuable that have come to us from the ancient Greeks are the "Memorabilia" of Xenophon and the "Lives" of Plutarch. Roman literature also possesses an admirable "Life of Agricola," by

his son-in-law, Tacitus. Besides these may be mentioned the "Lives" ascribed to Cornelius Nepos, the writings of Suetonius, the "Life of Alexander the Great" by Curtius, "Lives of the Sophists" by Philostratus, and a "Life of Plato" by Olympiodorus, and later encounter the "Lives of the Fathers" by St. Jerome and others, while biographies of saints, martyrs, etc., are scattered profusely through ecclesiastical literature.

Biol'ogy, the science which treats of living or organized beings. Biology includes the great divisions of the old "natural history," i.e., botany and zoölogy, with, between these, the study of the large groups of low forms of life, such as bacteria, which lie about the borderline between animals and plants. Biology includes such sciences as histology, the study of living cells; paleontology, which treats of the fossil remains of plants and animals; ichthyology, the science of fishes; herpetology, of snakes; embryology, the study of the development of living forms from the egg or germ; morphology, the study of living form and structure.

Biology as a science dates from the nineteenth century. Before that time many particular discoveries were made, but the knowledge of living forms as a whole consisted of crude collections of isolated facts and reposed on generalizations based not upon observation, but upon myth or fancy. With the invention of the microscope, however, and its application to the lower forms of life, came the beginnings of modern biology, while Linnæus and Ray made general classifications and collected many authentic facts about plants and animals. Cuvier's constructions of extinct forms from the most partial fragments was the beginning of comparative anatomy. But biology, as the science of life, had no logical basis till the cell theory was demonstrated by the microscope, and all living forms were shown to be aggregations of similar tiny units, each possessing a nucleus, and going through its own cycle of being. With the discovery of protoplasm, and the generalized study of vital phenomena in such simple forms as the amœba, biology took its place among the sciences. The amœba, the biological type of the simple life, is composed of a complex substance called protoplasm. It has the power to move from place to place, to expand or contract so as to approach or withdraw from any near object, to throw itself around any particle and absorb it as a food, and to throw out the unabsorbed residue. Finally, it has the power to divide itself into two amœbæ like itself, which go on living as their ancestor did. Higher in the scale of being the structure becomes more complicated. A stony coat may be secreted around the soft protoplasm and the cell becomes a diatom. Various parts, by a division of labor, become better adapted for particular functions, muscle cells develop the power of contractility, bone cells develop unyielding hardness, the nerve tissue becomes adapted to transmit impressions.

The main practical difference between plants and animals is that plants can take up inor-

ganic matter as food, whereas animals can assimilate only organic matter, i.e., previously existing plants or animals. The amount and kinds of food required by living organisms varies greatly. Some plants, such as cacti, are specially fitted for growth in arid soils; reptiles gorge occasionally and then relapse into long periods of abstinence. Some forms can live for a surprisingly long period without food, as, for instance, the common bedbug, which has been sealed up without food for over a year and yet continued to live. According as their food is animal or vegetable, animals are divided into carnivora and herbivora, while the quantity of food is determined by their size and activity. Water is an essential part of the food of all living forms. All animals require a constant supply of oxygen to keep up life, and are provided with lungs or gills to absorb it from the surrounding air or water. Plants absorb and decompose carbon dioxide—the principal waste product thrown off by the lungs of animals. Many animals, such as insects and fish, may be frozen in blocks of ice at 15° C., and certain snails have endured a temperature of 120° C. without dying. Experiments with the amoeba show that although it becomes contracted and still at 35° C., it is not killed till 40°–45° C. is reached. The temperature range of plants is from 32° to 122° F. The pressure to which animals are subjected has an influence upon their distribution. At sea level the atmospheric pressure is about 14.7 lbs. to the sq. in. Man is accustomed to this, and any lessening of pressure, by climbing high mountains or ascending in a balloon, produces serious disturbances, as does also an increase of pressure such as is found in deep mines and in tunneling. Where the sea is several miles in depth, animals living in the abyss bear a pressure equal to many hundred atmospheres, and when they are dredged to the surface, and this pressure is removed, often the body bursts or the scales fall off through the expansion of the skin.

Living forms multiply by simple division of their body substance, or the coming together of two sexual forms may be necessary. When the full growth has been attained, the organs of reproduction become developed, and provision for the perpetuation of the race is made. In plants the female element is termed a seed; in animals, an ovum or egg. The male and female elements may be united in the same individual, as in most plants and many animals. But in the highest animals the sexes are differentiated in distinct individuals. The number of the young of animals varies greatly. Elephants, for instance, are born singly, while a codfish has been found to contain about 8,000,000 eggs. The disparity seems to be due to the fact that the eggs and young of some species are at the mercy of many foes and that in the usual course but few can hope to survive. With higher animals, who can care for their young, such wasteful procreation is not necessary. After a certain period, if the individual has escaped all the liabilities to death that occur from enemies, accidents, and disease, there is a decline in the activity of

the functions, the system becomes disordered, and death ensues. The period, like those of growth and development of the reproductive power, is within certain limits a constant term, and all reports of extreme longevity—such as the reputed ages of H. Jenkins (169 years), T. Parr (150 years), the Countess Desmond (140 years), and others—are either based on unsatisfactory evidence or demonstrably false. The oldest known living animals are certain large turtles, which bear evidences of having existed several centuries, while among plants the giant trees of California may be regarded as among the oldest of living things.

The adaptation of an animal or plant to its surroundings or environment affords many interesting studies. Protective colorings is the adaptation of the exterior of an animal to conform to its environment so that it will not be readily seen by its foes. Many insects are almost perfect imitations of the color scheme and shape of the plants and twigs on which they live. Among animals the hare, which is white in winter when the snow covers the ground, becomes gray and brown when the snow melts and rocks and withered leaves are its natural background. The senses of animals show great diversity of development. Vision may vary from the degenerated eyes of cave-dwelling animals to the keen sight of the condor or of man. Feeling may vary from the cultivated touch of the human specialist to the callous carapace of the turtle. Some animals seem to have peculiar developments of the five senses known to man, or perhaps senses of which man knows nothing; of these may be mentioned the scent instinct of dogs and the homing sense of pigeons, while ants seem to have a means of communication with each other of which we know nothing, and organs of sense the functions of which we do not understand. See BOTANY; PHYSIOLOGY; ZOOLOGY.

Bi'on, of Smyrna, Greek bucolic poet of the third century B.C.; contemporary and imitator of Theocritus. The longest and most admired of his poems is the "Lament for Adonis." The language is beautiful, the tone tender. Reflexes of it are to be seen in the "Adonais" of Shelley.

Biondo (bè-ôn'dō), Flavio, 1388–1463; greatest archæologist of the Italian Renaissance; author of "Roma Instaurata," "Roma Triumphans," and "Italia Illustrata," three bulky encyclopedias of archæological information which have constituted the basis of all later dictionaries of Roman antiquities.

Birch, tree or shrub of the genus *Betula*, family *Cupuliferæ*; native of temperate and cold regions in Asia, Europe, and America. The genus is distinguished by ten to twelve stamens and winged seeds (achenia); has alternate, simple leaves, and flowers in scaly catkins. The common birch of Europe and Asia (*Betula alba*) is a handsome tree with triangular leaves, which are doubly serrate. The bark is smooth and chalky white, and separable in thin sheets or layers. This bark

is very durable, and is used for tanning, dyeing yellow, and other purposes. The American white birch (*B. populifolia*) is a small, graceful tree with tremulous, shining leaves, but is not valuable for timber. Among the other species indigenous in the U. S. are the *B. lenta* (sweet or black birch), and *B. lutea* (yellow birch) and *B. papyracea* (canoe or paper birch). Besides the above and several less important species, the U. S. have the *B. nigra*, or river birch, which grows on the banks of streams and has remarkably tough wood.



LEAVES AND CATKIN OF
WHITE BIRCH.

Bird, Isabel'la. See BISHOP, ISABELLA BIRD.

Bird, Robert Montgomery, 1805-54; American novelist; b. Newcastle, Del.; wrote dramas "Oraloosa," "The Broker of Bogota," and "The Gladiator," in which Edwin Forrest won distinction; novels, "Calavar," "The Infidel," and "Nick of the Woods," a tale of frontier Kentucky.

Bird, one of a class of air-breathing, vertebrate animals specifically characterized by a coating of feathers; with the two anterior limbs or wings adapted for flying or swimming and two legs for swimming or walking. There are some 12,000 living and 400 to 500 fossil species. Birds are biologically a connecting link between reptiles and mammals, the earliest known fossil bird, the *Archaeopteryx*, being a combination of bird and lizard. This and some other fossil forms had reptilelike teeth—organs not possessed by any living birds.

The feathers, developed essentially like hair, not only form a layer impervious to heat, but by their peculiar construction and broad expanse are essential aids in the mechanism of flight. The under plumage is made up of small feathers or down. The feathers are preened by spreading on them the secretion of the oil-gland situated near the tail, and the necks of all birds are so arranged that this gland can be reached by the bill. The feathers are shed or moulted periodically, usually in the fall when the care of the young is over, the winter plumage differing in color, etc., from that borne during the summer and mating seasons. The color and form of the plumage is often modified to protect the bird by harmonizing it to its surroundings (as the ptarmigan, which bears a white plumage in winter, making it invisible against the snow) or of brighter tints to make the male more attractive during the mating season.

The heart of birds is proportionately larger, the pulsation quicker, and the circulation more

efficient than in other animals. Their blood is 4° to 12° F. warmer than that of mammals. The lungs, attached to the ribs along the back, permit habitual deep breathing and communicate with large air spaces between the various organs, and even into the bones, where air replaces the marrow found in other animals. A bird can, by pumping itself full of air, reduce its specific gravity to only 1.05. The beak or bill is hard and horny, shaped according to the food the species subsists upon—hooked in the hawk, long and slender in the stork, modified into a fishing bag in the pelican. The sense of taste of birds is dull, though smell is often delicate. The eyes are marvelously keen, and have a third translucent lid or "nictitating membrane" which can be drawn over the eye to protect it from too strong light. Only a few night birds have external ears, but the sense of hearing in all is acute. The voice organ or syrinx of singing birds is capable of producing tones several octaves shriller than the tones used in human music. As a rule only the males can sing, and brightly plumed birds are usually poor singers. Parrots and some other species are capable of imitative sound making; and crows give a special meaning to certain of their cries.

The bones of birds are light, and mostly filled with air. The sternum or breastbone is particularly large and strong. It has been taken as a basis for classifying birds—according as it has a keel for the attachment of the great pectoral or flight muscles, or is smooth, as in the ostriches, etc., which have by degeneration lost the power of sustained flight. The wishbone or merry thought is formed by the union of the clavicles or collar bones. Birds have three stomachs—the crop, a pouch attached to the gullet; the *ventriculus succenturiatus*, a slight dilatation of the gullet with glandular walls; and the gizzard, a strong muscular cavity whose grinding action is assisted by the small stones which birds swallow. The food of birds is varied, and growing birds are only satiated after a daily meal equal to from one to three times their own weight.

Birds are propagated by eggs fertilized within the body, and hatched externally either by incubation or by exposure to the heat of the sun. The shell is hard, calcareous, and brittle, and often delicately marked or colored. Two to several dozen eggs may be laid, the number being greater according to the danger to which they will be exposed. Incubation may be eleven to fourteen days for small birds, or seven to eight weeks, as with the ostrich. Some young birds at birth are open-eyed, plumed, and capable of taking care of themselves—they are known as *precoces*; other species need to be matured in the nest, being meanwhile fed by their parents—these are *altrices*. The utility of birds as destroyers of insects is increased by the fact that the time of year when they are feeding their young is also the season when grubs and larvae are most abundant. The nests of birds are treated in a separate article. See BIRDS' NESTS.

The homing and migratory instincts are characteristic of many birds. Pigeons are trained so that if taken even hundreds of miles

from their home they will unhesitatingly return. Many species seek warmer climes as the cold weather draws near, but return to the same N. locality the following spring.

In size, birds vary from the tiny humming birds up to the massive fossil *Epiornis maximus*, supposed to have been 12 ft. high.

Many classifications of birds have been suggested depending upon the characters of their bill and feet, the arrangement of feathers, etc. The following classification is fairly clear and useful:

1. *Raptores* or *Accipitres*, including birds of prey, such as the vultures, falcons, hawks, and owls. Beak strong and curved, sharp at the edges; feet adapted for seizing and destroying other animals. Claws hooked, sharp, and retractile. Wings well developed.

2. *Insectores Passeres*, or perching birds, the most numerous order. It includes all the singing birds, and most birds that live among trees. Feet formed for grasping and perching, claws moderately curved and not retractile. This order is further divided into the cone-billed, the tooth billed, the slender billed, and the cleft billed.

3. *Scansores Zygodactyli*, or climbing birds, as the parrots, woodpeckers, cuckoos, etc. Two toes directed forward and two backward; bill variously shaped, and powers of flight usually not great.

4. *Rasores* or *Gallinæ*. Domestic fowls, pheasants, pigeons, etc. Legs large and strong, feet with hind toe above the heel, suitable for scratching. Bill short, thick, and arched above.

5. *Cursores* or *Struthionidæ*, running birds, as the ostrich, cassowary, emu, etc. Wings rudimentary and useless for flight; legs long and strong; hind toe wanting or rudimentary; breastbone without a keel or ridge.

6. *Grallatores* or *Grallæ*. Waders, as the cranes, herons, snipes, etc. Legs long, bare of feathers from above the knee; toes often half webbed; bill, in general, long and slender.

7. *Natatores* or *Palmipedes*. Swimmers; web-footed birds, as ducks, geese, gulls, etc.; feet formed for swimming, in general webbed, and hind toe raised above the others; bills various, mostly flattened.

8. *Saururæ*, including the archæopteryx (*q.v.*).

Bird of Paradise, any one of several species of birds of the genus *Paradisea* and kindred genera, order *Passeres*; native of Papua and the neighboring islands, remarkable for the beautiful form and splendor of their plumage. The value of these birds arises chiefly from the development and light and beautiful structure of the plumes which grow from the scapular and lateral portions of the body. The plumage of the males is remarkable not only for brightness of tints, but also for a velvety texture and brilliant metallic reflections. Tufts of feathers growing from the shoulders are so prolonged that they extend even beyond the tail, and they constitute the most beautiful part of the plumes of the bird of paradise.

The best known and most elegant of the species is the emerald bird of paradise, a na-

tive of the Aru islands. It receives its systematic name *Paradisea apoda*, or the "footless" bird of paradise, from the old fable that the bird of paradise has no feet, but always flies without resting.

Other species are the royal bird of paradise (*Cicinnurus regius*), the red bird of paradise



EMERALD BIRD OF PARADISE.

(*Paradisea rubra*), the magnificent bird of paradise (*Diphylodes magnifica* or *speciosa*), and the six-threaded (or golden) bird of paradise (*Parotia sexfilata*), from the head of which grow six long and threadlike feathers, each ornamented with an ovate black racket, three on each side.

Bird's-eye Limestone, compact, dove-colored stone, with whitish crystalline points, belonging to the lower division of the Trenton group of the lower Silurian strata of N. America, apparently corresponding to the Llandeilo flags of Wales. It contains many orthoceratites of enormous size, and fossil brachiopods. See LIMESTONE.

Bird's-eye View, a picture or view arranged according to the laws of perspective, in which the point of sight or situation of the eye is placed at a considerable height above the object. If the eye is considered as looking perpendicularly down while it sweeps over each point of the scene in succession, we have an exact ground plan, no object covering another, and horizontal angles being exactly delineated. This is a convenient method of representing battles, or of depicting a large city or a small tract of country. In sketching a locality for military purposes this kind of perspective is used. The common bird's-eye view differs from ordinary perspective only in that the horizontal line is placed considerably above the picture.

Birds' Nests, constructions designed to furnish birds a safe place where the eggs can be kept together in small compass, so that they can be covered by the parent, and where the young will be secure from accident until old enough to shift for themselves. Attempts have been made to group birds according to the structure or location of their nests, but such systems have failed; we may, however, divide

birds roughly into two groups—tree builders and ground builders. The ground-building birds, including all that occupy its surface or penetrate within it, and those that resort to high cliffs and islands, comprise about one half of all the species, including all the diving birds, nearly all the swimmers, shore birds, and waders. The ground-breeding birds that build within the earth are separated into a group known as miners, which include both those which dig out their own burrow and those that make use of natural cavities or of holes made by other animals. A marked group of birds which occupy the ground are those which usually construct no nest. In this may be included birds of very different forms and habits. The whip-poor-will and all the kindred genera, so far as is known, deposit their eggs on dry beds of leaves in the dark recesses of the forests; the more common night hawk usually leaves its eggs, that resemble pebble-stones, on the bare rock, to which in color they are closely assimilated. Certain birds build platform nests. These are found among only a few families, and their character varies very essentially, some being large structures, others of a frail description. Of the one kind are the huge platform structures of eagles; of the other, the slight nests of the doves and the American cuckoos. A large group of nest makers is classed as basket makers; not always distinguishable from other groups known as weavers, tailors, and felt makers, but it includes birds which, like the common mocking bird of the U. S., the cedar bird, the Bohemian chatterer, the European bullfinch, and others, construct a rude basketwork of sticks, resembling the common baskets of osier. The weaving birds construct nests, for the most part, somewhat pendent, but of various styles and shapes. Among the most familiar of these are the orchard and Baltimore orioles of E. N. America, and Bullock's oriole of the Pacific Coast. The group of felt makers is distinguished by changes in the character of the materials used. The group includes the true felt makers, who make a composite felt, and those that use only a single material. Professor Rennie recognizes what he calls dome builders; they consist of many species and a variety of families, and either occasionally or uniformly construct covered nests entered by holes in their sides. With many species the domed cover of their nest is not a uniform feature. A peculiarity, found only in species belonging to a few genera, is the use of cementlike secretions in the construction of their nests, and these are grouped together as cementers in certain systems. Several species belonging to different genera have been grouped as masons, because they knead, in the manner of the house builder, a rude mortar of earth or clay. The weaving grosbeaks (*Loxia socia* of Linnaeus) greatly excel the remainder of the family, at least in the extent of their workmanship. They build an enormous structure, in shape resembling an open umbrella, wrought like a thatched roof, of Bushman grass without any intermixture, and impervious to rain. Under this canopy each pair builds its nest under the eaves.

Birds' Nests, Ed'ible, nest of the sea-swift (*Collocalia esculenta*), of the Malaysia, a bird the size of a common martin. It builds its nest of a glutinous substance derived from seaweed, which is swallowed and partly digested, and then disgorged and fashioned into a nest as large as a coffee cup. When fresh these nests are of a waxy white color, and are said to be worth twice their weight in silver in the markets of China, where alone they are sold.

Birds of Ill O'men, those believed by the ancients to be indicative of bad luck; included the owl, crow, and raven. As the owl screeches on the approach of bad weather and as bad weather often precedes sickness, the owl was regarded as a funeral bird. Crows and ravens, more especially the latter, by their acute sense of smell were said to discern the savor of dying bodies, and as they fluttered about sick rooms, were regarded as omens of death.

Birds of Pas'sage, birds which are migratory, passing instinctively and habitually from one country or latitude to another, following the change of the seasons, in general along N. and S. lines. Spending the summer in the temperate or polar regions, they leave on the approach of cold weather for the south, where they pass the winter. Migratory birds which breed in the U. S. are called summer birds of passage with reference to those states. They return in autumn to warmer regions, and are winter birds of passage in the countries where they pass the winter.

Biren (bē'rēn), **Bi'ron**, or **Bü'ren**, **Ernest John**, 1690–1772 (Duke of Courland); b. Kalnzeeem; gained the favor of Anna, niece of Peter the Great, who became Empress of Russia, 1730, and gave him the title of duke; abused his power during her reign by the execution of many innocent persons; on the death of Anna, 1740, he became regent, but was exiled to Siberia, 1741. When Elizabeth ascended the throne, 1741, she permitted him to return to Russia, and, 1763, the duchy of Courland was restored to him.

Biret'ta, cap worn by some Western ecclesiastics. The ordinary Roman biretta is a square, stiff-sided cap with curved ridges and a tassel at the top, commonly made of the same material as the cassock, usually black for priests, violet for bishops, and scarlet for cardinals. There are also academic forms of it, popularly called "mortar boards."

Birgit'ta. See BRIDGET, SAINT.

Birk'enhead, a seaport of Cheshire, England, near the mouth of the Mersey; opposite Liverpool; is the residence of many Liverpool merchants. Steamers cross the river between these places every few minutes, and a railway tunnel, 1,230 yards long, connecting them was opened in 1886. Birkenhead was only a small fishing village as recently as 1824; it has since increased rapidly in consequence of the construction of extensive docks, one of which covers 120 acres. Extensive shipbuilding is carried on; here the Confederate cruiser *Alabama* was built. There are works here for

making iron and steel bridges and other heavy constructions for engineers. Pop. (1901) 110,916.

Birmingham, capital of Jefferson Co., Ala.; important manufacturing city of the "New South"; at the foot of Red Mountain, a formation holding, besides vast limestone deposits, an extensive and accessible iron hematite ore vein. It almost touches the Great Warrior coal field of 7,800 sq. m., and the Cahaba and the Coosa coal fields, each about 400 sq. m. Nine trunk railway lines cross each other in this city. Coal, iron and steel, cotton, and lumber industries are the foundation of Birmingham's prosperity. In 1904 there were 325 establishments, employing 7,250 hands and \$31,000,000 capital, producing goods valued at \$13,200,000. Of this output, the iron and steel manufactories employed 4,000 hands and turned out goods valued at \$8,200,000, to which the foundries and machine shops added \$2,000,000. Pop. (1906) 45,869.

Birmingham, city of England, in Warwick Co., on the river Rea, 79 m. S.E. of Liverpool. It is the chief town of Great Britain for the manufacture of hardware and metallic products. From a very early period Birmingham has been a seat of manufactures in metal, and from the close of the seventeenth century it became one of the principal centers of that industry, partly on account of its easy access to cheap coal and iron, and partly on account of its freedom, there being no guilds or companies, or restrictions of any kind. The manufacturing of jewelry, small arms, and articles from brass are the most important industries. Further specialties are buttons, hooks and eyes, pins, and other articles of dress; screws and nails, of which trade Birmingham has a kind of monopoly. Here are also extensive manufactures of glass and papier-mâché. Pop. (1901) 522,204.

Birney, James Gillespie, 1792-1857; American abolitionist; b. Danville, Ky.; studied law, but became a planter in Huntsville, Ala.; emancipated his inherited slaves; endeavored to obtain constitutional enactments in the Kentucky and Alabama legislatures restricting slave trade and providing for emancipation; returned to Danville and started *The Philanthropist*, an antislavery paper; he later had to publish it in Cincinnati; secretary of the American Antislavery Society; and was supported for the presidency by the Liberal Party, 1840 and 1844.

Biron (bê-rôn'), **Armand de Gontaut**, Baron de, 1524-92; French military officer; served in the Catholic army at the battles of Dreux, St. Denis, and Moncontour; in the Netherlands against the Duke of Parma; negotiated the peace of St. Germain; marshal of France, 1577; was one of the first to recognize Henry IV as king; killed at the siege of Epemay.

Birrell (bîr-rêl'), **Augustine**, 1850- ; British legislator and author; b. Wavertree, near Liverpool; admitted to the bar, 1875; bencher, Inner Temple, 1903; Prof. of Law, University College, London, 1896-99; president Board of

Education, 1905; Member of Parliament, 1889-1900; re-elected, 1906, and had charge of an education bill which provided that no denominational religious teaching should be inculcated in the public schools at the cost of unwilling taxpayers; works include "Obiter Dicta," "Res Judicata," "Life of Charlotte Brontë," "Men, Women, and Books."

Birthmarks. See **NÆVUS**.

Biscay, or **Biscaya (bis-ki'ā)**, one of the three Basque provinces of Spain; area, 849 sq. m.; pop. (1900) 311,361.

Biscay, Bay of, portion of the Atlantic bordering on France and Spain; extends from the French island of Ushant to Cape Ortegal; depth greatest near the coast of Spain, varies from 20 to 200 fathoms. The S. or Spanish coast is bold and rocky, but the E. coast, from the Adour to the mouth of the Gironde, is low and sandy. The largest rivers that flow into this bay are the Loire and Gironde; principal ports on it are Nantes, Bordeaux, Bayonne, La Rochelle, the new port La Pallice, and Rochefort in France, and Bilbao and Santander in Spain. Violent currents and winds render the navigation of this bay difficult.

Bisceglie (bê-shāl'yā), fortified seaport of Italy; province of Terra di Bari; on the Adriatic; 25 m. N.W. of Bari; currants and olives are raised in the vicinity. Pop. (1901) 30,885.

Bischof (bish'ōf), **Karl Gustav**, 1792-1870; German chemist and geologist; b. Wörd, near Nuremberg; became Prof. of Chemistry in Bonn, 1819. In 1840 he published a prize essay on the means of avoiding explosions in mines, experimented on inflammable gases; improved safety lamps. He wrote treatises on mineralogy, dynamic geology, and chemistry, his principal work being "Elements of Chemical and Physical Geology."

Biscuit, hard kind of unfermented bread formed into small cakes or flat pieces, and sometimes called ship bread or sea biscuit; composed of wheat flour, water, and salt, and rendered hard and dry by baking, in order that it may be preserved for a long time. Water or hard biscuits are made of flour, water, with variable quantities of butter, eggs, and sugar. Soft biscuits contain increased proportions of butter and sugar. Meat biscuit consists of wheat flour, combined with the essential or soluble part of beef. It is used in the form of soup, which is made by boiling the biscuit in water. Biscuit, in pottery, is applied to porcelain and earthenware after it has been hardened in the fire, and before it has received the glaze. Biscuit in sculpture is a species of porcelain, of which groups and figures in miniature are formed.

Bish'op, Isabella Bird, 1832-1904; British traveler; b. York, England; spent most of her life in adventurous travel; especially active in medical missions in the East, and built five hospitals; elected, 1892, the first woman fellow of the Royal Geographical Society;

numerous works include "The Englishwoman in America," "Unbeaten Tracks in Japan," "The Golden Chersonese," "Journeys in Persia and Kurdistan," "Korea and her Neighbors," "The Yangtze Valley and Beyond."

Bishop, ecclesiastic of the highest rank—all patriarchs, archbishops, metropolitans, and the pope himself belonging to the order of bishops. In many Protestant denominations the order of bishop is held to be identical with that of presbyters or elders; and in such sects these names are used in preference to that of bishop. The Eastern, Roman, and Anglican churches, with some minor sects, claim for their bishops, by direct succession, an authority derived from the apostles. Lutherans, Presbyterians, and other denominations also claim a tactual succession for their orders, but do not draw the same dogmatic inferences from it. The Methodist Episcopal churches and some others give their bishops a superiority of office, but not of order. In the Roman Catholic and Anglican churches bishops have the title of right reverend, while archbishops and metropolitans are addressed as most reverend. In Great Britain bishops of the Church of England are called lord bishops. The bishop is required by the ancient canons to be consecrated by three bishops. Consecrations by a single bishop, though valid, are deemed irregular. It pertains to the office of a bishop to administer, ordain, confirm, consecrate churches, etc., and to share in legislating for the church in conjunction with convocations, councils, and conventions, as the canons of the respective churches may direct. His vestments are properly cassock, alb, girdle, rochet, amice, tunic, dalmatic, chasuble, cope, mozetta, chimere, gremial, and buskins. Anglican bishops use only a portion of these vestments. The bishop's distinctive *ornamenta* are the miter, ring, and pastoral staff.

Bishops Suffragan, distinguished from suffragan bishops, every diocesan bishop being a suffragan of his metropolitan where provinces are established; bishops consecrated in England under Act 26, Henry VIII, to supply the place of the earlier bishops *in partibus* who formerly assisted the incumbents of English sees. A suffragan holds his commission at the will of the diocesan, at whose death it lapses. But the lapse or voluntary resignation of such commission does not affect the style, title, or dignity of the suffragan see.

Bis'marck, capital of N. Dakota and Burleigh Co.; on the Missouri, which is navigable for 1,200 m. above the city. Pop. (1900) 3,319.

Bismarck Archipel'ago, group off the N. coast of the E. end of New Guinea, including islands formerly called New Britain, New Ireland, New Hanover, and Duke of York group; appropriated by Germany, 1884 and 1885; area, 20,000 sq. m.; pop. estimated (1904) 188,000. New Britain was renamed New Pomerania, 1885, New Ireland, New Mecklenburg, and the Duke of York group, New Lauenburg.

Bismarck-Schönhausen (bîz'märk-shön-how'zën), Herbert (Prince von), 1849-1904; Ger-

man diplomat; son of Prince Otto Bismarck; b. Berlin; major in the German army; served as secretary to the embassy in London and as minister at The Hague; in the Reichstag for Schleswig-Holstein, and 1888-90 at the head of the German Foreign Office, but retired on the resignation of his father.

Bismarck-Schönhausen, Otto Eduard Leopold (Prince von), 1815-98; Prussian statesman, and unifier of Germany; b. Schönhausen, near Standal, Prussian Saxony. In his boyhood devoted to manly sports, and developed remarkable physical powers; studied law at the Univs. of Göttingen and Berlin, but instead of practicing his profession, led the life of a country squire in Pomerania. After sitting in the Prussian House of Burgesses, 1847-51, he entered the German Diet, where he not only opposed all revolutionary measures, but demanded that Prussia should have the same rights as Austria in that body; minister at St. Petersburg, 1850-62, and, in 1862, at Paris; in the latter year became Minister of Foreign Affairs and president of the Prussian Cabinet. He now took strong ground in favor of strengthening the military force, and of the royal prerogative in general. Despite the unfriendly attitude of Austria, he procured her coöperation in the Schleswig-Holstein War, 1854. In 1865 he was raised to the rank of count and invested with ministerial authority over the conquered territories. Relations with Austria continuing unsatisfactory, Bismarck concluded a treaty with Italy, and war was declared, 1866, against Austria and her allies. At the battle of Königgrätz, Austria was so disastrously defeated that the old Germanic Diet was dissolved, and Prussia became the head of a N. German Confederation. The statesman, formerly unpopular, now became a popular idol. France, alarmed at the aggrandizement of her old foe, and incensed by Bismarck's success in baffling Napoleon's attempt at a coalition with Austria, provoked the Franco-Prussian War, 1870-71, the result of which was the loss of her military prestige and the establishment of the new German Empire with the King of Prussia as its head. Bismarck was given the rank of prince and made chancellor of the empire. His diplomacy isolated France and united Germany, Austria, and Italy in a triple alliance. He also, in spite of opposition, secured the adoption of a high protective tariff. Aiming to make every party and power in the state subordinate to the general interest, he incurred the opposition of the Liberal Party and of the Ultramontanes, but by playing one party against another the "Iron Chancellor," as he was called, defeated his enemies. William I was unfavorable to the chancellor's policy, and his grandson, when he became William II, grew positively hostile. Bismarck resigned March 18, 1890, and on his retirement received many honors at the hands of the emperor, including the title of Duke of Lauenburg. The emperor and prince exchanged visits shortly before the latter's death.

Bis'muth, brittle metal (symbol Bi; specific gravity about 9.8; atomic weight 208) of

crystalline texture and grayish-white color, with a red tinge; native in Australia, Germany, France, Cornwall, California, Texas, and Sweden; also found in combination with oxygen, sulphur, and arsenic; fuses at about 500° F.; not often used in the arts in a pure state, but its alloys are of considerable importance. Other alloys are even more fusible. The most important of several compounds it forms with oxygen is the trioxide (Bi_2O_3), which is employed in the manufacture of porcelain as an agent for fixing the gilding and for increasing the fusibility of fluxes. The subnitrate is a tasteless, heavy powder of pure white color, used as a cosmetic. As a medicine it acts as a tonic and antispasmodic.

Bi'son, genus of animals of the order *Ungulata*, family *Bovidae*; allied to the ox; natives of Europe and N. America. The bisons have short horns, which are curved inward at the point; differ from true buffaloes in having a hump, and in the absence of the dewlap; the horns turn outward in the true buffaloes and inward in the bisons. (See BUFFALO.) At least six species of fossil bison have been discovered. (For the European bison, see AUROCHS.) The American bison (*Bison americanus*), known in the U. S. by the incorrect name of buffalo, is similar to the European bison, but the fore parts are more shaggy, and it is a powerful and ferocious-looking animal. Vast herds of bisons formerly roamed over the plains and prairies between the Mississippi and the Rocky Mountains. They were generally inoffensive and preferred to run rather than to fight. During their migration they moved in herds, which were innumerable and irresistible. Great numbers were killed by Indians, who subsisted on their flesh. Their hides, under the name of buffalo robes, were an important article of commerce. Bisons are nearly extinct, and only a few small herds now exist in N. America, the largest in Yellowstone Park. See AUROCHS; BUFFALO.



BISON.

Bi'sen, Herman Vilhelm, 1798-1868; Danish sculptor; b. Schleswig; went to Copenhagen, 1816. His works are numerous, and he ranks second only to Thorwaldsen in Denmark. Became, 1850, director of the Academy in Copenhagen.

Bissex'tile, a year which contains 366 days; usually called in English, "Leap Year" (*q.v.*). In the Julian calendar the length of the year was fixed at 365½ days, about eleven minutes more than the actual length. In order that the year should always begin with the beginning of a day, it was directed that every fourth year should contain 366 days, and the other years 365. The additional day was given to February, and was inserted next after the 24th, which the Romans called *Sexsto Kalendas Martii*. This was reckoned twice, and the repeated day was *Bis Sexto Kalendas*; hence *bissextile*.

Bit, or **Bitta**, two short but strong vertical timbers fixed upon the deck of a ship; used for fastening the cable when the ship rides at anchor, and for leading the principal ropes of the rigging. To bit the cable is to fasten it round the bit. Topsail-sheet bits are for belaying or fastening the topsail sheets.

Bithur (bî't-hôr'), town of India, in the United Provinces of Agra and Oudh; on the Ganges, about 12 m. NW. of Cawnpore; has numerous pagodas, and is visited by many pilgrims. During the mutiny of 1857 it was a stronghold of Nana Sahib, and was taken by Havelock. Pop. abt. 5,000.

Bithynia (bi-thîn'î-ä), ancient country of Asia Minor, bounded on the N. by the Pontus Euxinus (Black Sea), on the E. by Paphlagonia, on the S. by Galatia and Phrygia, and on the W. by the Propontis (Sea of Marmora), which separated it from Europe; chief towns were Nicomedia, Chalcedon, Nicea, Prusa, and Heraclea. Bithynia was annexed to the Persian Empire, 543 B.C., and afterwards became independent. Nicomedes I began to reign over it, 278 B.C., and d., 246. Prusias II was king of Bithynia in the time of Hannibal, who sought refuge at his court. In 74 B.C., Bithynia became a province. Nicomedia was long the capital of the kingdom. In 1298 the Turks conquered the country, and, 1328, made Prusa the capital of their whole empire.

Bitlis (bî't-lês'), town of Turkish Armenia; on the Bitlis River and the N. slope of the Armenian Taurus, a few m. SW. of Lake Van. The dancing dervishes have twelve monasteries here. Gold and silver ware, cotton cloth, carpets, and tobacco are produced. Pop. (1900) 38,800. The town is said to have been founded by Alexander; came into possession of Turkey, 1514; and its vicinity was the scene of the defeat of Solyman the Magnificent, by the Persians, 1554.

Bitonto (bê-tôn'tô), town of Italy; province of Bari, 11 m. W. of Bari; is well built, has a fine cathedral and several monasteries. The Spaniards gained a victory over the Austrians here May 25, 1734. Pop. (1901) 27,011.

Bitsch (bê'tsch), small fortified town of Lorraine; 36 m. NNW. of Strassburg; a citadel on a steep isolated rock nearly impregnable. It was originally a countship held by the counts of Alsace and Flanders, but was given to the Duke of Lorraine by Frederick III, and finally passed to France with the duchy of Lorraine, 1738. It was in the French department of Moselle until 1870, when possession was taken of it by the Germans at the general cession of the country; for, in spite of a long siege and bombardment, it was not surrendered. Pop. (1900) 3,640.

Bit'tern, wading bird allied to the heron; genus *Botaurus* and family *Ardeidae*; has a long, straight, and sharp bill, long legs and neck; frequents marshy fens and reedy shores of rivers and lakes; feeds by night on frogs, fish, etc. The common bittern of England is widely diffused in Europe, Asia, and Africa. In the U. S. are found two bitterns similar in habits to *B. stellaris*



BITTERN.

—viz., *B. lentiginosus* (bittern or bog bull) and *Ardetta exilis* (least bittern).

Bit'terroot, a plant of Canada and part of the U. S., so called from its root being bitter, though edible; esteemed as an article of food by whites as well as Indians. From the root, which is long, fleshy, and tapering, grow clusters of succulent green leaves, with a fleshy stalk bearing a solitary rose-colored flower rising in the center, and remaining open only in sunshine.

Bit'ters, certain medicines, chiefly of vegetable origin, characterized by a bitter taste, and for the most part having tonic virtues. There are two classes: *aromatic bitters*, having a fragrant odor, due to volatile oils, and simple bitters, which possess no peculiar properties beyond their bitterness. "Bitters," as popularly used, are generally compounds of dilute alcohol with various drugs, as aloes if a cathartic effect be desired; if a tonic effect is sought, the bitters used are calisaya bark, gentian, quassia, columbo, and others. An aromatic is often added.

Bit'tersweet, or Wood'y Night'shade (*Solanum dulcamara*), perennial plant with a shrubby stem, allied to the potato; native of Europe and Asia; naturalized in the U. S.; has ovate, heart-shaped leaves and purple flowers. The fruit is a poisonous red berry. The name bittersweet is frequently given in this country to climbing woody vine, the wax-work and staff tree, *Celastrus scandens*, of the *Celastraceae*, which grows wild in the N. and Atlantic states.

Bit'terwood, several trees and shrubs of the genus *Xylopi*a, family *Anonaceae*; natives of Brazil and the W. Indies; remarkable for the bitterness of their wood. The term is also applied to the *Picraea excelsa* and *Quassia excelsa*, the wood of which is used in medicine as a tonic. See QUASSIA.

Bitts. See BIT.

Bitu'men, term applied to a variety of substances, mixtures of hydrocarbons, usually of a very complex nature, from natural gas through naphtha, petroleum, and mineral tar to solid asphaltum, containing for the most part carbon and hydrogen, with more rarely oxygen, nitrogen, and sulphur. No general

chemical formula can be assigned to it. It has been known in its varied forms from the dawn of history. The Hebrew word translated slime in Gen. xi, 3, is rendered bitumen in the Vulgate. Bitumen is one of the most permanent substances in nature. It resists decay and has remained unchanged through countless cycles of geological time. It forms a part of the oldest existing monuments. Nearly all forms of bitumen are widely distributed over the earth. On the W. continent a basin in the central and N. portion of the Mississippi Valley, said to embrace 200,000 sq. m., yields natural gas and petroleum in enormous quantities. In the central valleys of the E. slope of the Rocky Mountains, from the mouth of Mackenzie River to Mexico, outcrops of maltha and asphalt occur at intervals. They occur in the valley of the Mackenzie for a distance of 1,500 m. Along the Athabasca River a mass of asphaltic sand outcrops in bluffs 150 ft. high for 60 m. In W. Louisiana and Texas maltha and asphalt are frequently found. In S. central Texas an extensive deposit of calcareous asphalt has been reported similar to that of Val de Travers. In E. Mexico asphalt and maltha are of frequent occurrence. In Utah extensive deposits of ozokerite and gilsonite occur. On the Pacific Coast of California, from San Luis Obispo to San Diego, but chiefly in the valley of the Santa Clara River, springs of asphaltum, maltha, and petroleum are numerous. In Cuba, Barbados, and Trinidad asphaltum and petroleum have long been known as Cuban asphalt, Barbados tar, and Trinidad asphalt, from the celebrated pitch lake. On the mainland in Venezuela another and larger pitch lake is known, and in Peru and Bolivia petroleum occurs in large quantities. On the E. continent a line of bituminous outcrops occurs from Hanover on the North Sea through the Carpathians, the peninsula of Taman, the Caucasus, the peninsula of Apsheron at Baku, the table-lands of Armenia and Persia, the environs of the Dead Sea, the valleys of the Tigris and Euphrates, the mountains of Baluchistan and Hindustan, Burma, and the islands of Java and Sumatra. Petroleum occurs in China and Japan, Egypt, Italy, the Ionian islands, Sicily, and the Pyrenees. Asphalt and maltha occur in Dalmatia, on the E. shores of the Adriatic, and in many localities in France. In the Val de Travers, in Switzerland, and in the Tyrol and Sicily a peculiar limestone occurs impregnated with asphalt, which is widely used for pavement under the name of asphalt. The amount of natural gas produced and marketed in the U. S., 1907, was valued at \$52,866,835. The production of petroleum reached 106,095,335 bbls., valued at \$120,106,749; of bituminous coal, 394,759,112 short tons, valued at \$451,214,842. See ASPHALT; PETROLEUM.

Bitu'minous Coal. See COAL.

Bizerta (bē-zēr'tā), extreme N. town of Africa and fortified seaport of Tunis; 38 m. NW. of Tunis; converted by the French into a naval station, second only to Toulon, 1892-95. The lake on which it stands communicates with the Mediterranean by a canal, and has

been so improved that it is large enough to accommodate at one time all the navies of the world. Bizerta was fortified by Agathocles abt. 308 B.C., and was a magnificent city in the time of Barbarossa. Pop. abt. 8,000, mainly Arabs.

Bizet (bè-zä'), **Alexandre César Léopold**, commonly called **GEORGES BIZET**, 1838-75; French composer; b. Paris; best known as the composer of the opera "Carmen"; other operas include "Vasco da Gama," "Les Pécheurs des Perles," "La Jolie Fille de Perth," "Djamileh"; also completed Halévy's opera "Noé."

Björnson (bè-yörn'sön), **Björnstjerne**, 1832-; Norwegian dramatist and novelist; b. Kvikne, NW. Norway, where his father was a minister; published a little novel, "Synnøve Solbakken," 1857, followed by "Arne," "En Glad Gut" (A Happy Boy); "Fiskerjenten" (The Fisher Lass), etc.; published his first tragedy, "Halte-Hulda," 1858; followed by "King Sverre"; "Sigurd Slembe," a trilogy; "Maria Stuart," etc.; also dramas dealing with social, religious, and political problems, including "Redaktören" (The Editor); "Det nye System" (The New System); "Ober evne" (Overstrained), and many other works; an advocate of republicanism and free thought in religion; the most popular orator of Norway.

Björnstjerna (byörn-shër'nä), **Magnus Fredrik Ferdinand** (Count), 1779-1847; Swedish general and author; b. Dresden; fought against the French, 1809-13, and negotiated the treaty by which Sweden and Norway were united; ambassador at London, 1828-46. Among his works is "The Theogony, Philosophy, and Cosmogony of the Hindus."

Black, Jeremiah Sullivan, 1810-83; American jurist and Democratic politician; b. Somerset Co., Pa.; judge of the Supreme Court of Pennsylvania, 1851; attorney-general in the cabinet of Buchanan, 1857; Secretary of State in 1860, where he exerted himself to prevent disruption by the secessionists.

Black, Joseph, 1728-99; Franco-Scottish chemist; b. Bordeaux, France; Prof. of Anatomy, Glasgow, 1756, and of chemistry at Edinburgh, 1766, reputation founded chiefly on the theory of latent heat, which he propounded between 1759 and 1763.

Black, William, 1841-98; Scottish novelist; b. Glasgow; engaged in journalism in Glasgow, later in London; editor of the *Daily News*; numerous novels include "In Silk Attire," "A Daughter of Heth," "Strange Adventures of a Phaeton," "A Princess of Thule," "Macleod of Dare," "New Prince Fortunatus."

Black Acts, acts of the Scottish parliaments passed between 1425 and 1586—so called because printed in black letter. In English law books "black act" is applied to the 9 George I, c. 22 (1722), because it was occasioned by the outrages committed by persons whose faces were blackened.

Black Art. See **MAGIC**.

Black Bass, a common name for two American fishes of the genus *Micropterus*; highly esteemed as game fishes. The small-mouthed species, *M. dolomieu*, and the large-mouthed, *M. salmoides*, are well known to anglers, and are found in almost all streams of the U. S. E. of the Rocky Mountains. The former abounds in clear or swift streams; the other in sluggish waters or lakes. See **BASS**.

Blackberry, one of several brambles belonging to the *Rosaceæ*. The common blackberry of the most important commercial species is *Rubus villosus*, a native over a large part of



BLACKBERRY (*RUBUS VILLOSUS*).

the country. Many of the cultivated varieties are simply selected wild variations. The great part of the garden sorts belong to the variety *Sativus sativus*.

Blackbird, or **Merle**, popular name in the British islands of the *Merula merula*; a species of thrush which abounds in Europe. The plumage of the male is all deep black, but that of the female is brown. It has a powerful voice; is often kept in cages, and is easily trained. Its nearest American relative is the common robin, from which it differs little except in color. Quite distinct from this bird is the blackbird of the U. S. (*Quiscalus quiscula*), sometimes called crow blackbird or purple grackle. The rusty crow blackbird (*Scolecophagus ferrugineus*) is a rather less common bird of the U. S. The swamps and meadows of the U. S. are frequented by the *Agelaius phoeniceus*, or red-winged blackbird.

Blackburn, manufacturing town of Lancashire, England; 24 m. NNW. of Manchester. The principal business of the town is the making of cotton stuffs, chiefly coarse calicoes and muslins. Pop. (1901) 132,134.

Black'cap (*Curruca atricapilla*), European bird of the *Sylvioidæ*; nearly allied to the nightingale, which it rivals in sweetness of song.

Black'cock, or **Black Grouse** (*Lyrurus tetricus*), bird of the *Tetraonidae*; abundant in Scotland and the N. of England; also occurs in the mountains and marshy parts of the continent of Europe, and abounds in Scandinavia and Russia. Its favorite haunts are moors, bogs, and morasses. The male is of a shining bluish-black color; the female is of a rust color, and is called the gray hen.

Black Death. See **PLAQUE**.

Black Duck (*Anas obscura*), one of the best known and most highly prized of American wild ducks; breeds abundantly throughout E. N. America from Texas to Labrador. Its range extends to Kansas and Iowa. It is of a generally blackish-brown color, with white lining to the wings, the speculum violet, bordered with velvety black.

Black'feet, tribe of N. American Indians, residing partly at the Blackfeet Agency, in Montana, and partly in Canada; divided into the true Blackfeet, Bloods, Piegans, and Small Robes. These are distinct from the Blackfeet Sioux, now at the Cheyenne River, S. Dak., and Standing Rock, N. Dak., agencies.

Black'fish, (1) the blackfish or tautog of the N. U. S. (*Tautoga onitis*); a species of *Labridae*, of an oblong form, with smooth scaly skin; one of the chief market fishes of New York. (2) In Great Britain the *Centrololopus*



BLACKFISH (TAUTOGA AMERICANA).

pompilus, a species of *Stromateidae*; found most abundantly in the Mediterranean and contiguous waters. The name blackfish is also applied to cetaceans of the genus *Globicephalus*—e.g., *G. melas* of the Atlantic Coast, and *G. scammoni* of the Pacific Coast, of the U. S.

Black Flags, name given to the more desperate survivors of the Taiping rebel army, China, who, on its defeat, took refuge in Tonquin. They live in the upper part of the Red River Valley, where they have settlements and chiefs of their own. In 1873, 1882, and 1885 they aided the Tonquinese in their attempts to expel the French, and, 1884, massacred thousands of native Christians and their priests. They number abt. 5,000.

Black For'est, German **SCHWARZWALD**; ancient *Hercynia Sylva*; mountainous and wooded region in Baden and Würtemberg, with a chain of mountains which extends about 85

m., and separates the basin of the Rhine from that of the Neckar. This region is remarkable for its extensive forests and its mines of silver, copper, zinc, lead, and iron. The highest point of this chain is the Feldberg, which rises 4,903 ft. The Danube, Neckar, Kinzig, Murg, and Elz rise in the Black Forest. A valley called Murgthal, in this forest, is famous for its beautiful scenery. The inhabitants are employed in the manufacture of wooden clocks and toys.

Black'friars, a term applied, on account of the color of their garments, to the Dominican order of monks, who first went to England abt. 1220 A.D., and settled at Oxford. Their second house was the Blackfriars in London, and from it the district still bears the name of the order, which had nearly sixty houses in England and Wales at the time of the abolition of monasteries.

Black Fun'gi (*Pyrenomycoetæ*), order of degraded plants of the class *Ascomycetes*, often of a black color and usually of a hard texture. They are essentially parasitic plants, although many are saprophytic. They number fully 7,000 species, grouped into a number of families. The ergot of rye and the black knot of plum trees are well known.

Blackguard (blåg'gård), any person of vile character, or who uses vulgar or ruffianly language; said to have been applied originally to scullions and menials who, during the progress of kings of England from one royal residence to another, followed with kitchen utensils and coals, and were exceedingly dirty in appearance.

Black Gum, popular name of the *Nyssa multiflora* of the *Cornaceæ*, an American tree, sometimes called pepperidge, hornpipe, tupelo, and sour gum; has oval or obovate leaves, which turn bright crimson in autumn. The wood is close grained, tough, and very difficult to split. It is used for cogwheels, hatter's blocks, and wheel naves.

Black Hand Soci'ety. See **MAFIA**.

Black Hawk, 1767–1838; American Indian; chief of the Sac tribe; b. Kaskaskia, Ill.; waged war against the U. S., 1832, for the recovery of lands which certain chiefs of the Sacs and Foxes had ceded to the whites.

Black'heath, elevated common in Kent, England; 5 m. SE. of London, adjoining Greenwich Park; a favorite holiday resort; the scene of the insurrections of Wat Tyler and Jack Cade, and formerly infested by highway robbers.

Black Hills, low mountains lying chiefly in S. Dakota, but partly in Wyoming. The summits rise from 2,000 to 3,000 ft. above the surrounding plains, and the culminating point, Mt. Harney, is 7,400 ft. In 1875 the hills were ceded to the U. S. by the Dakota Indians. The Black Hills district in S. Dakota, 1905, produced gold to the value of \$6,989,492, and silver to the value of \$110,381.

Black Hole, a small dungeon or cell in Calcutta. The nabob Suraja Dowlah, June, 1756, having captured the English garrison of a fort at Calcutta, confined the prisoners, 146 in number, in a cell 20 ft. square, with only two windows. Only twenty-three survived, the rest died of suffocation in the first night.

Black Hun'dred, Russian organization, professedly patriotic, first came into notice in 1906; composed of certain bishops of the Orthodox Greek Church, ignorant priests, small merchants and traders, and the lawless elements of the cities and towns. Under the pretext of supporting the autocracy, and of crushing out liberalism, it openly incited massacres and persecutions, especially of the Jews, and is chiefly responsible for the anarchy and wanton destruction of property prevalent in Russia and Siberia, 1906-7.

Black'ie, John Stuart, 1809-95; Scottish classical scholar; b. Glasgow; Prof. of Greek, Univ. of Edinburgh, 1852-82; translated Goethe's "Faust" into English verse, and produced an able translation of Æschylus. Among his works are "Lays and Legends of Ancient Greece," "Lyrical Poems," "Homer and the Iliad," with a translation in ballad meter; "Natural History of Atheism," a plea against Agnosticism; "Lay Sermons," and "Essays on Subjects of Moral and Social Interest."

Black'jack, the name given by miners to blende (sulphide of zinc). It is also a popular name of a small species of American oak (*Quercus nigra*), sometimes called barren oak and iron oak. Its wood is very hard and makes a good firewood, but is rather perishable.

Black-let'ter, Gothic or Old English types or letters used in first books ever printed in England. Books printed before 1500 are generally in this character. Similar type to this is still used by the Germans.

Black-letter Days, (1) holy days recorded in the calendars of the service books in black-letter type, rather than in the same type printed in red, consequently holy days of an inferior dignity. (2) In the English Prayer Book the black-letter days are days of observance for which no special collects or services are provided.

Black'list, name applied to lists connected with insolvency, bankruptcy, and other matters affecting the credit of firms and individuals compiled for the guidance of the mercantile community. The lists are extracts from public registers, as are the ordinary lists of bankruptcies in the newspapers. Similar information is furnished in the U. S. by commercial agencies.

Black'mail, impost formerly submitted to in parts of Scotland and the N. of England as a compromise with robbers. A class of men, often belonging to families in good standing, levied a tax on their neighbors on the pretext of protecting them from cattle thieves. Rob Roy was one of these blackmailers. The prac-

tice ceased in Scotland after the rebellion of 1745. It had already been long extinct in England. In modern usage, blackmail signifies money extorted by threats of accusation or exposure.

Black'more, Richard Doddridge, 1825-1900; British novelist and poet; b. Longworth, Berks, England; practiced law in London. "Lorna Doone," a romance of Exmoor, is the most successful of his novels, among which are "The Maid of Sker," "Cripps the Carrier," "Springhaven," besides volumes of original verse; he published a translation of Vergil's "Georgics."

Black Moun'tains, group in Yancey Co., N. C., a few m. W. of the Blue Ridge; derives its name from the forests of dark balsam firs which crown its summits; has the shape of a horseshoe. The highest of its peaks rises to 6,688 ft., and is called the Black Dome, Mt. Mitchell, or Mitchell's High Peak, in honor of Dr. Mitchell of the Univ. of N. Carolina, who perished while exploring this inhospitable region, and was buried on its top. This is the highest point of the U. S. E. of the Rocky Mountains.

Black Prince. See EDWARD, PRINCE OF WALES.

Black Riv'er, or Big Black River, in Missouri and Arkansas; rises in Iron Co., Mo.; flows nearly S. to the N. line of Arkansas; afterwards runs SW., and enters the White River at Jacksonport, Ark.; length about 350 m.; navigable by steamboats 100 m., except when the water is low.

Black River of Louisiana, that part of Washita River below the mouth of the Tensas River, and between it and Red River, is sometimes called Black River.

Black River of New York; rises in Herkimer Co.; flows NW., and enters Lake Ontario 6 m. below Watertown; length about 125 m.

Black River of Wisconsin; rises in Marathon Co.; flows S. and SW. through Clarke and Jackson counties, and enters the Mississippi 15 m. above La Crosse; length is about 225 m.

Black River of Vermont (Indian name KASKATUAC), rises in Plymouth, Windsor Co.; flows S. by E., and empties into the Connecticut; furnishes abundant water power.

Black Rood (OF SCOTLAND), cross of gold alleged to contain a piece of the true cross; brought into Scotland, 1067, by Margaret, sister of Edgar Atheling, queen of Malcolm III. It was regarded as a national palladium. It was taken twice, at least, by the English, who after 1346 kept it in Durham Cathedral. It disappeared at the Reformation.

Black Sea, or Euxine (yux'in) Sea, large inland sea between Europe and Asia; extreme length about 700 m., greatest breadth about 380 m.; area, estimated 185,000 sq. m.; communicates with the Sea of Marmora by the Bosphorus, and with the Sea of Azof by the Strait of Kertch. The shores of this sea are high and bold on all sides except the NW.,

between the Crimea and the mouth of the Danube. In the middle of it no soundings were obtained at 160 fathoms. The largest rivers that flow into it are the Danube, Dniester, Bug, Don, Dnieper, Kuban, and Kizil Irmak. This sea has no tide, but strong currents are produced by the influx of the large rivers, in consequence of which the water is fresher than that of the Mediterranean.

In ancient times it was an important highway of commerce. The Turks excluded the ships of all foreign powers from it until 1774, when the Russians obtained the right to navigate its waters. By the Treaty of Paris, 1856, this sea was neutralized—that is, the Russians and Turks were not permitted to keep ships of war in it. In 1871 the Russians again were permitted to have men-of-war on this sea, and in 1905 it was the scene of a sensational naval mutiny in which the Russian battle ship *Prince Potemkine* was seized by its crew, prior to the excesses at Odessa.

Black Snake, or Blue Ra'cer, species of snake (*Bascanion constrictor*) common in nearly all



BLACK SNAKE.

parts of the U. S.; length from 4 to 7 ft.; climbs trees with ease, and moves along the ground very swiftly; feeds on frogs, mice, eggs, birds, etc.; although harmless, it will sometimes attack or resist its human enemies.

Black'stone, Sir William, 1723-80; British jurist and commentator; b. London; admitted to the bar, 1746, but obtained little practice; Vinerian Prof. of Law at Oxford, 1758; elected member of Parliament, 1761; made

a justice of the Court of Common Pleas, 1770; principal work, "Commentaries on the Laws of England," 1765-69.

Black Wal'nut (the *Juglans nigra*), tree of the U. S., belong to the *Juglandaceæ*, growing from Florida, N. and W.; rare in New England; produces an edible nut and valuable timber. The wood is employed for gunstocks, furniture, etc.

Black War'rior, river of Alabama; formed by the junction of the Locust and Mulberry forks, which unite near the S. extremity of Walker Co.; flows and enters the Tombigbee about 2 m. above Demopolis; length estimated at 175 m. Steamboats ascend this river from its mouth to Tuscaloosa.

Black Water. See RED WATER.

Black'well's Island, one of a group of islands in the East River; part of New York City;

the site of a lunatic asylum, workhouse, almshouse, penitentiary, smallpox, charity, and fever hospitals, one for incurables, one for epileptics and paralytics, and an asylum for the blind, all city institutions. The island has an area of 120 acres, and was named from a family which long owned it.

Black'wood, William, 1776-1834; Scottish publisher; b. Edinburgh; founder of *Blackwood's Magazine*, first issued in 1817. The magazine obtained speedy success and a high reputation, to which the writings of Scott, John Wilson, and J. G. Lockhart greatly contributed.

Blad'der, musculo-membranous sac contained in the anterior part of the pelvis, containing the urine or secretions from the kidneys. It is absent in invertebrate animals, and present in mammalia. In man the bladder is nearly triangular when empty, oval when full. The ureters, one on each side, convey the urine to it from the kidneys; and this is voided, by the contraction of the bladder, through the urethra.

Bladder Nut, popular name of several plants of the genus *Staphylea*, family *Sapindaceæ*. One species, the *Staphylea trifolia*, or American bladder nut, is a native of the U. S. It is a shrub about 10 ft. high, having three ovate leaflets. The seed is aperient, and the wood is suitable for turning.

Blad'derwort, aquatic plant of the genus *Utricularia*, family *Lentibulariaceæ*, which comprises numerous species abounding in tropical and temperate parts of both hemispheres. Their flowers adorn the surface of lakes, ponds, and stagnant or shallow waters; seventeen species are found in the U. S.; remarkable for a provision by which the plant, ordinarily submerged, is raised to the surface, in order that the flowers may expand in the air.

Blaine, James Gillespie, 1830-93; American statesman; b. W. Brownsville, Pa.; removed to Augusta, Me., and engaged in journalism, 1854; one of the founders of the Republican party and a delegate to its first national convention, 1856; elected to state legislature, 1858, and to Congress, 1862; Speaker of the House, 1869-76; U. S. Senator, 1876-81; secretary of state, 1881-82 and 1889-92; unsuccessful candidate for the presidency, 1884; best known publication, "Twenty Years in Congress," 2 vols., 1884-86.

Blair, Francis Preston, 1791-1876; American politician; b. Abingdon, Va.; entered political life as a Jackson Democrat; edited the *Washington Globe*, 1830-45; a founder of the Republican party through his opposition to slavery; in later years returned to democracy.

Blair, Francis Preston, Jr., 1821-75; American legislator; b. Lexington, Ky.; son of the preceding; Republican member of Congress from Missouri, 1857-59 and 1861-63; major general of Union volunteers and commanded a corps in Sherman's Atlanta campaign, 1864; joined the Democratic party, 1865; unsuccessful candidate for the vice-presidency, 1868; U. S. Senator, 1871-73.

Blair, Hugh, 1718-1800; Scottish clergyman; b. Edinburgh; best known as Prof. of Rhetoric and Belles-Lettres, Univ. of Edinburgh, and by his "Lectures on Rhetoric," which attained great popularity.

Blair, Montgomery, 1813-83; American lawyer; b. Franklin Co., Ky.; graduated at West Point, 1835, serving in artillery in Florida war till 1836; U. S. attorney for the district of Missouri, 1830-43; solicitor of the U. S. in the Court of Claims, 1855-58; counsel for plaintiff in the Dred Scott case; and Postmaster General, 1861-64.

Blake, Edward, 1833- ; Canadian statesman; b. Adelaide, Ontario; admitted to the bar, 1856; premier of Ontario, 1871-72; minister of justice, 1875-78; leader Liberal party, 1880-87; declined several high preferments, including knighthood, 1869-97; removed to S. Longford, Ireland, on invitation of Anti-Parnellites to enter British House of Commons for an Irish constituency, 1892; and represented that district until 1907.

Blake, Robert, 1599-1657; English admiral; b. Bridgewater, Somersetshire; raised a troop with which he fought against the royalists, 1642; gained distinction by his defense of Taunton, 1645; appointed "General of the Sea," 1649; destroyed or captured nearly all of Prince Rupert's fleet in the Tagus, 1651; chief admiral, 1652, and in May, 1652, gained a victory over Van Tromp, who attacked Blake in the ensuing November near Goodwin Sands. Blake was defeated, but in February, 1653, he attacked Van Tromp and gained a victory in a running fight of three days. In 1654 he chastised the dey of Tunis, and destroyed the Spanish plate fleet at Santa Cruz, 1657.

Blake, William, 1757-1827; English poet and artist; b. London. In 1783 appeared "Poetical Sketches by W. B." This was printed and published in the ordinary way, and was without illustrations. In 1789 came "Songs of Innocence"; 1793, "The Gates of Paradise," "Songs of Experience," and later several volumes of poetic rhapsody. All these were published by the author, and illustrated. Both text and illustrations were engraved, and when printed off Blake tinted both text and border in a style of his own, making each page a picture. He is best known by his "Canterbury Pilgrims," "Inventions to the Book of Job," and designs to Blair's "Grave."

Blanc (blān), Jean Joseph Louis, 1813-82; French historian; b. Madrid, Spain; educated in France; founded in Paris, 1839, the *Revue du Progrès*, which advocated social and political reform. In 1840 he published "Organization of Labor." His next important work was a "History of Ten Years—1830-40," which had a very damaging influence on the popularity of Louis Philippe; member of the provisional government, 1848, and popular with the socialists and workingmen of Paris, who revolted and were defeated in 1849. He then went into exile in England; 1871, elected to the National Assembly. Among his works is a "History of the French Revolution."

Blanchard (blān-shār'), François, 1753-1809; French aeronaut; b. Andeleys; noted for his mechanical ingenuity; constructed a balloon with wings and a rudder, with which he ascended, 1784; crossed the Channel in this balloon and landed in England, 1785, for which exploit the King of France gave him a pension; made many other ascents.

Blanche of Castile', 1187-1252; Queen of France; daughter of Alphonso IX of Castile; married, 1200, to the dauphin of France, afterwards Louis VIII; acquired much influence in affairs of state; on death of king became regent of the kingdom, which she governed with ability during the minority of her son, St. Louis. She was eminent for virtue and wisdom.

Blanch'ing, process by which gardeners arrest the progress of secretions in the leaves of plants, to render them more wholesome and palatable as food. Celery, sea kale, etc., are usually blanched by the exclusion of light, which deprives them of their green color and of certain bitter properties. The blanching is effected in various modes, as heaping up the earth against the growing plants, or covering them with boxes or blanching pots made of earthenware and perforated with many holes. See ETIOLATION.

Blan'co, Antonio Guzman, 1828-99; Venezuelan statesman; b. Caracas; took part in federalist revolts, 1850-63; then became first vice-president; headed a revolution and was president, 1870-82; appointed minister to France to get him out of the country, 1893; lived in Paris till his death.

Blanco y Areñas, Ramon (Marquis de Pena Plata), 1832-1906; Spanish executive; b. Bilbao; entered the army, 1854; served in war with San Domingo; governor of Mindanao, P. I.; made a brilliant record in the Carlist War; created marquis for successful storming of Pena Plata; served in Cuba, 1868-78; captain general there, 1880-81, and of Catalonia, 1882 and 1887-93; governor general of the Philippine Islands, where he narrowly escaped assassination, 1894; succeeded Gen. Weyler as the last Spanish captain general of Cuba, 1897, and was allowed to resign and return to Spain just before the surrender at Santiago.

Bland, Richard Parks, 1835-99; American legislator; b. near Hartford, Ky., and settled at Rolla, Mo., 1865; elected to Congress as Democrat, 1873, and was regularly returned till his death; chairman of the committee on mines and mining, 1875. Silver coinage having been discontinued, 1873, he introduced, 1876, the Bland Bill.

Bland Silver Bill, notable measure of congressional legislation; introduced by R. P. Bland; amended by the Senate, which struck out the free coinage clause and directed the purchase monthly of not less than \$2,000,000 nor more than \$4,000,000 worth of silver bullion and its coinage into standard silver dollars, to be legal tender for all debts. President Hayes vetoed the bill, 1878, but both Houses

passed it over his veto, and the silver purchase clause remained in force till repealed by the Sherman Act of 1890.

Blank Verse, heroic verse of five iambic feet without rhymes. It is peculiar to Italian, English, and German, having been imported into the two latter from the first. In England it was first adopted by the Earl of Surrey in his translation of the fourth book of the "Æneid," 1547; first applied to dramatic uses by Lord Buckhurst in his tragedy, "Gorboduc," 1561; popularized by Marlowe in "Tamburlaine," 1585. It has since been the accepted meter of English dramatic and heroic verse. In English poetry the eleventh syllable must be regarded as a sort of license, while Shakespeare and others occasionally double the short syllable at the end, and thus extend the number to twelve. Blank verse fell into disuse in England after the Restoration (1660), and was revived by John Philips in his "Splendid Shilling," 1703, and "Cider," 1706, and by Thomson in his "Seasons," 1726-30. Among the most successful of modern writers of blank verse are Bryant in "Thanatopsis," Tennyson in his "Idyls of the King," "Ulysses," and "Tithonus." See POETRY; PROSDOX.

Blanqui (blān-kē'), **Louis Auguste**, 1805-81; French revolutionist; b. Paris; several times imprisoned for revolutionary writings and acts, and once condemned to death, prior to 1848, when he organized the Central Republican Society. He led the attempt, May 15, 1848, to overthrow the Constitutional Assembly; was imprisoned till 1859; sentenced to four years' imprisonment, 1862; led movements culminating in the Commune, 1871; and was again imprisoned till 1879.

Blar'ney, village and castle of Ireland; in Munster; 4 m. NW. of Cork; surrounded by beautiful scenery. The castle, which once belonged to the earls of Clancarty, stands on a steep rock, at the base of which is a deep valley. Among its relics is the Blarney stone, which, according to the popular opinion, imparts to those who kiss it a peculiar style of eloquence, or skill in the use of complimentary speech.

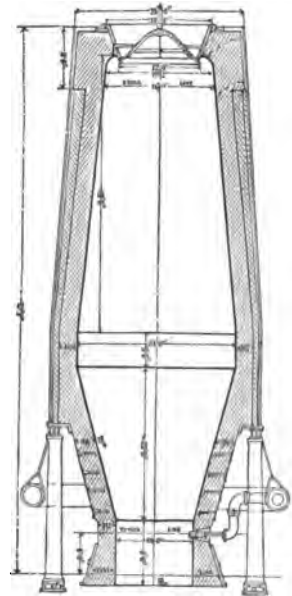
Blash'field, **Edwin Howland**, 1848- ; American painter; b. New York; specialties, genre pictures, portraits, and decorations; best known by latter, which include the dome of the Congressional Library, a dome of the Manufacturers' Building, Columbian Exposition, a piece in the New York Appellate Court, and ceiling of Waldorf-Astoria ballroom; other notable compositions, "Christmas Bells" and "Angel with the Flaming Sword."

Blas'phemy, any indignity offered to the Deity or to religion. According to Blackstone, it is denying the being and providence of God, contumelious reproaches of Christ, and profane scoffing at the Holy Scriptures, or exposing it to contempt and ridicule. It has been otherwise defined to be the act of wantonly uttering or publishing words casting contumelious reproach or profane ridicule upon God, Jesus

Christ, the Holy Ghost, the Holy Scriptures, or the Christian religion.

Blast Furnace. In its primary signification the term blast furnace implies an elevated shaft lined with a refractory material, designed for the reduction of metals from their ores. The shaft is open at the top, where the ore, fuel, and fluxes are charged, and supplied with a blast of air near the bottom, where openings are provided for removing the metal and cinder. Essentially a blast furnace consists of a stack, in whole or in part of masonry, surrounding a vertical chamber or shaft of circular section. The diameter of the shaft usually increases from the top downward and from the bottom

upward. The lower part of the furnace is the hearth, and has the smallest diameter. At its upper part are openings through which the blast of air is introduced, and in the lower part, or crucible, the molten iron and cinder collect. The hearth is prolonged toward the front of the furnace, and is closed by the dam, and covered in on top by the tump arch. The dam is formed of fire brick or other refractory material. It slopes inward toward the interior of the furnace, and has its outer vertical face covered with a cast-iron plate, called the dam plate. At the bottom of the dam is a channel communicating with the interior of the furnace, through which the molten iron is tapped off, and on its upper edge is a notch, called the cinder notch, over which the cinder flows. The tump arch is covered by the tump, a long, hollow casting, through which water circulates. The blast is supplied through tuyeres, from one to eight in number, which are set in the masonry of the furnace. They are hollow truncated cones, supplied with a constant current of water to prevent the bronze or iron of which they are composed from melting. Into these water tuyeres are fitted the nozzles of blast pipes, which are connected with the blast main which encircles the furnace. The sloping walls connecting the hearth with the widest part of the furnace are called the boshes. The illustration shows a section of a furnace in Pittsburg, Pa. Its height is 79 ft. 9. ins.; greatest diameter, 23 ft.; yield, 3,000 tons iron a week. The gases are taken off at the top of the furnace, and descend by a vertical flue, then by an underground channel to the



A TYPE OF BLAST FURNACE.

boilers and hot-blast stoves. The contrivance for closing the mouth of the furnace is known as the cup and cone, or bell and hopper. The history of the development of blast-furnace construction is largely a record of increasing dimensions, both in height and diameter, resulting in greater yield and greater economy of fuel. More recently progress in blast-furnace practice has developed in the direction of faster work, closer watchfulness of details, and more careful study, chemically, of stock and product. The blast furnace of to-day is an outgrowth of the primitive furnaces still to be met with in E. countries for reducing iron ores. The low furnaces produce an unmelted mass of soft iron and a cinder rich in oxide of iron, and the process is intermittent. A blast furnace produces a compound of iron and other substances, principally carbon, which is fluid at the temperature of the furnace; the cinder is composed of earthy ingredients, and is almost entirely free from iron, and the process is continuous.

Blast'ing. The use of explosives in quarrying stone or in the breaking up of rock masses, as in mining, dates back almost to the invention of gunpowder. In addition to gunpowder, nitroglycerin, and especially dynamite, are used for blasting. In ordinary practice, blocks of stone are separated from the mass by one or more blasts, each blast being made by boring a hole in the rock by the use of a drill, operated either by hand or by machinery driven by steam or electricity. In removing large masses of rock quickly it is the custom to run galleries into the rock, and to place in chambers prepared for the purpose large charges of an explosive of sufficient power to bring down the whole mass. Hand drilling is performed by means of a drill or jumper, consisting of a bar of steel, or of iron tipped with steel, which is flattened out into a fan shape, with a sharp cutting edge extending on each side a little beyond the body of the drill, so that the drill may have free play in working. The drills are of lengths suited to the depths of the holes to be drilled, it being customary to use a short drill in beginning a hole, and longer ones in succession as the hole is deepened. To prevent the cutting edge of the drill becoming heated, and thereby softened, water is frequently poured into the hole. After finishing the drilling and removing the chips, etc., from the bottom of the drill hole, the strength of the charge is determined, and then all moisture having been removed from the bottom of the drill hole, the explosive is inserted.

Blathwayt (bläth'wät), or **Blath'wayte**, William, abt. 1649-1717; English diplomatist; b. London; was in the English diplomatic service as early as 1668; was clerk of the privy council, and an important witness in the libel trial of the seven bishops in the reign of James II, 1688; under William III, was a member of the board of commissioners of trade and plantations, created by the king, 1696, for the purpose of making the colonies "most useful and beneficial to England," and drafted a new charter for Massachusetts.

Blavatsky (blä-vät'ski'), **Helena Petrovna**, 1831-91; Russian theosophist; b. Ekaterinoslav, of noble descent; love of curious knowledge led her to travel widely; succeeded, 1855, in entering Tibet. In 1858 she met with an accident which caused a strange psychological experience, and for eighteen months she was said to have led a complete dual existence. In 1873 she visited New York, where she remained for six years, and founded the Theosophical Society. Author of "The Secret Doctrine," "The Key to Theosophy," "Isis Unveiled," etc.

Bleach'ing, the art by which natural colors are removed from certain substances, especially textile fibers, as linen, cotton, wool, and silk, as well as straw, paper stock, ivory, wax, animal and vegetable oils, etc. Until the close of the eighteenth century the agents commonly used were air, light, and moisture, aided by weak alkalies and acids, but more recently chlorine, sulphur dioxide, and hydrogen peroxide have been used to accomplish the results more quickly. In modern bleaching the materials are subjected to preliminary cleansing processes, as washing in water, boiling with alkaline lyes or soaps, and treatment with acids. By these operations many resinous, fatty, and other impurities are removed from the fiber. The more powerful agents are then used for removing the last traces of coloring matter. The process of bleaching linen formerly consisted in the alternate treatment of the cloth with alkaline and acid liquids, followed by exposure on the grass to air, light, and moisture. As now practiced, the process consists in steeping the material in water or in an alkaline bath, followed by boiling in an alkaline bath and then exposing to the action of sunlight, after which it is steeped again in a bath of dilute sulphuric acid, then "chlorinated" in a dilute solution of bleaching powder. The operation is completed by further washing, souring, soaping, and scalding in soapsuds and weak lye. Cotton may be bleached either as yarn or as cloth. The process for the cloth consists in passing it over a red-hot roll, or over a series of gas flames, for the purpose of burning off the loose fibers on the surface, then boiling in a solution of lime, after which the cloth is washed. The next operation is "souring" by treatment with hydrochloric acid and washing, which is followed by boiling in a solution of soda ash and washing, then "chemicking" by passing the cloth through a weak solution of bleaching powder, and washing, then souring again with dilute hydrochloric or sulphuric acid and washing.

The special features of the wool-bleaching process is the preliminary washing or "scouring," sometimes done on the animal itself to remove the fatty substance known as suint, which is valuable as a source of potassium salts. The wool is then bleached by means of sulphur dioxide, either as a gas or in solution. After bleaching, the material is washed and tinted blue with indigo to counteract the yellowish tint which is liable to return. When silk is bleached it is first "soured" to remove

the fatty substances contained in the raw material by rinsing in dilute hydrochloric acid, then washing and passing it through a tepid solution of sodium carbonate, and again washing. The silk is then bleached by exposing it to the action of sulphur dioxide, or by steeping it in a dilute solution of hydrogen peroxide. The chemical changes that occur in bleaching are not fully established. When the coloring matter is absolutely destroyed, it is probable that it is due to the action of ozone, formed by the agents employed. In some cases sulphur dioxide unites with the coloring matter, forming a colorless compound.

Bleed'ing, or **Hem'orrhage**, the escape of blood from the vessels which normally contain it. A slight cut is usually followed by loss of blood, chiefly from the capillaries. Capillary bleeding will, in many cases, cease spontaneously, or it may require compression or the application of medicines, such as persulphate of iron or tannic acid. Arterial bleeding is recognized by the fact that the blood escapes in jets, and is of a bright red color. Arterial bleeding tends spontaneously to grow less, both from the feebleness of the heart's action and from the retraction and contraction of the arterial walls, and the consequent formation of a clot of blood, which plugs the wound; but it may be necessary to resort to ligation or tying or to pressure upon the artery between the heart and the wound. A handkerchief may be tied around and then twisted with a stick. The wounded part should be elevated if possible. Venous bleeding is not generally very formidable. It may be recognized by the steady flow of dark blood. A great source of danger when large veins are cut is that air may enter the circulation; in which case death may immediately follow. Hemorrhage from an internal and inaccessible surface may be treated by astringents. A tendency to hemorrhage from the mucous surfaces is characteristic of some diseases, such as typhoid fever.

The abstraction of blood from the circulation as a means of curing or preventing disease is called **bleeding** or **bloodletting**. This operation is performed either by opening a vein (venesection or phlebotomy), by abstraction from the capillaries by means of leeches or cups, or more rarely by opening an artery (arteriotomy). Bleeding was formerly greatly overused. The striking results obtained in certain cases and ignorance concerning many physiological and pathological processes led to this abuse of an agent which in cases now much better discriminated, is capable of the greatest good. Thus in the early stage of pneumonia, judicious letting of blood may alter the progress of the case.

Blende, native sulphide of zinc, which British miners call **black-jack**; abounds in primary and secondary rocks, and occurs both massive and crystallized in octahedrons and rhomboidal dodecahedrons; pure blende is composed of sixty-seven per cent of zinc and thirty-three of sulphur; is the chief ore employed in the important zinc industry of Illinois, Missouri, and Kansas.

Bléneau (blā-nō'), village in the department of Yonne, France; 29 m. WSW. of Auxerre; famous as the place where Turenne defeated the Prince of Condé. Pop. about 1,500.

Blenheim (blēn'fm), **Blind'heim**, small village of Bavaria, near the Danube; 23 m. NNW. of Augsburg. From it the English named the battle at the neighboring village of Hochstädt, August 13, 1704. Here the allied armies, commanded by Marlborough and Prince Eugène (with about 52,000 men), attacked the French and Bavarians (about 56,000 men), commanded by Tallard and the Elector of Bavaria. Marlborough and Prince Eugène gained a victory, and took about 13,000 prisoners, including Tallard. The French and Bavarians also lost nearly 10,000 killed and wounded, besides many that were drowned in the Danube. The French and Germans call this the battle of Hochstädt.

Blenheim Dog, small and beautiful variety of spaniel; closely resembles the cocker in form and appearance, but is generally white, with spots and markings of a red color; derives its English name from Blenheim, Oxford, where the breed has been preserved since the beginning of the eighteenth century.

Blennerhasset (blēn-ēr-hās'ēt), **Harman**, abt. 1704-1831; English victim of Aaron Burr's conspiracy; b. Hampshire; settled on an island in the Ohio, below Parkersburg; gave his time to scientific recreation and luxury; supplied Burr with a rendezvous and equipment for his southern schemes; involved in litigation and confiscations; tried in vain to recover his fortunes in Canada and England; died in Guernsey. His wife wrote some books and died in the U. S. while endeavoring to recover losses from the Government. See **BURR, AARON**.

Blen'ny, fish of the genus *Blennius*, order *Acanthopteri*, family *Blenniidae*. The true blennies are small, naked fishes, often gayly colored, abounding in seaweeds, tide pools, and among rocks near the shore, especially in warm regions; seldom used as food, but are in request for the aquarium, on account of their tenacity of life and their activity.



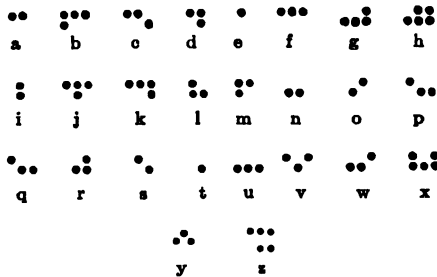
EYED-BLENNY.

The eyed-blenny (*Blennius ocellaris*) has a large and prominent dorsal fin, in which is a spot resembling an eye. This fish is common in the Mediterranean.

Blepharis (blēf'ā-ris), genus of fishes, family *Carangidae*; with a short, deep body, and long streamers on the fins. The American species (*B. crinitus*) reaches the length of a foot or more, and is found in warmer parts of the Atlantic.

Bléré (blā-rā'), town of France; department of Indre-et-Loire; on the Cher; 16 m. ESE. of Tours; has a bridge built abt. 1150;

part left out; the other letters are designated by new but simple forms. The Roman letter and the Point or Dot system are the most popular. There are two methods of distinguishing letters by points—the Braille and the New York, in use both for literary and musical composition. A recent method of printing books for the blind utilizes the space between the lines on one side of the page for



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the printing on the reverse side, thus reducing the bulk of the book one half. The industries taught the blind are basket making, broom making, mattress making, carpet weaving, sewing, knitting, and crocheting. There are individual cases on record where blind men have learned the trades of clock maker, wagon maker, and other mechanical pursuits. Blind persons who are endowed with musical capacity are taught to become organists, teachers of singing, instructors on the piano-forte, cornet, or other instruments. They are taught to tune pianos, in which they are especially successful. The pianos of the public schools in Boston are tuned by pupils of the Perkins Institution.

Blind-worm, popular name of *Anguis fragilis*, which is not blind, nor a worm, but a lizard with a snakelike body and no external limbs, but having shoulder bones and pelvis in a rudimentary state. It is found in nearly all parts of Europe, is inoffensive and timid, and moves very slowly, and is sometimes called slowworm. Its tail is very brittle, hence the popular name of glass snake for the American species of *Anguidæ*.

Bliss, Porter Cornelius, 1836-85; American diplomat; b. Cattaraugus reservation of Seneca Indians, Erie Co., N. Y.; traveled in Maine, New Brunswick, and Nova Scotia 1860-61, investigating the Indian tribes; accompanied Gen. J. W. Webb as private secretary to Brazil 1861-62; commissioner of the Argentine Republic for the exploration of the Indian country called the Gran Chaco, 1863; appointed by Pres. Lopez historiographer of Paraguay; secretary to Hon. C. A. Washburne, U. S. minister to Paraguay, 1866; imprisoned by command of Lopez on a charge of treason and conspiracy to assassinate him, September 10, 1868; rescued by a U. S. squadron, December 10, 1868; secretary of legation in Mexico, 1870-74, and acting minister, 1872-73.

Blis'ter, a term applied in medicine either (1) to a thin vesicle filled with serum pro-

duced upon the skin by certain applications, or (2) to the applications themselves. The material most frequently employed is cantharides or Spanish fly (*Cantharis vesicatoria*), which may be mixed with oily substances, or, incorporated in collodion, painted upon the surface. Ordinarily from four to six hours are required for a satisfactory blister, but in persons with delicate skin a shorter time may suffice, and it is well in such cases to have a thin sheet of gauze between the skin and the application. Poultices over the blister hastens its action. Ammonia is also useful in some cases, but the resulting blisters are more severe.

Bliz'ard, a storm characterized by a high wind, extreme cold, and an air filled with fine, hard, sharp crystals of snow. Blizzards generally follow an unusually deep "low" or storm area of winter when the pressure rises rapidly. They appear first in the plains of Canada E. of the Rocky Mountains and pass into the U. S. through E. Wyoming, N. Dakota, and Minnesota, and rarely pass E. of the region of the Great Lakes, unless the ground has a continuous covering of snow. They are very destructive to unprotected stock, and are dangerous to human beings exposed to them.

Block, a heavy piece of timber; a massy body, solid and heavy; the piece of wood on which criminals are beheaded; the wooden mold on which a hat is formed; any obstacle or obstruction; also a continuous row of buildings. In the rigging of a ship is the part of the apparatus for raising sails and yards, tightening ropes, etc. The block comprises a shell or exterior, a sheave or wheel on which the rope runs, a pin on which the sheave turns, and a strap to fasten the block in its place. Besides the designation of blocks according to the number of sheaves they contain (as single, double), they receive other names—such as cheek block, clew-garnet block, clew-line block, etc. Elm is used for blocks, and lignum vitæ for sheaves.

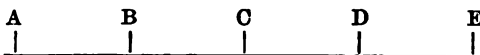
Blockade, act of shutting out all trade by sea with certain specified ports or coasts of one belligerent by another. It is a war right only, arising not from the theory that one state by occupation of certain waters of another has acquired sovereignty over them, but from the right which either party in war has of weakening his enemy's power of resistance by cutting off his neutral trade. Being a recognized belligerent right, there exists a corresponding duty on the part of the neutral to observe it. This duty, however, the neutral government is not bound to enforce through its municipal law, for this burden is held to lie upon the shoulders of the blockading power, the neutral merely warning its subjects of the fact of blockade and its penalty. Blockade implies no attempt to gain possession of a port or town; it is an act of prevention, restricting trade from within as well as from without the blockaded waters. By comity, at the commencement of a blockade, a delay is usually granted to enable ships inside either

already loaded or in ballast to leave the country. The circumstances essential to a valid blockade are: (1) The existence of a state of war; (2) the maintenance of the blockade by a force which makes it hazardous to attempt to enter or leave the port; and (3) notification to the neutral against whom the blockade is sought to be enforced. The penalty for breach of blockade is confiscation of the ship first and then of the cargo. See SIEGE.

Block Books, books printed from blocks of wood on which the letters have been cut in relief. Previous to the invention of printing, besides the calligraphists and illuminators who prepared and adorned the books of scholars and clerics, there existed a separate guild for the making of schoolbooks and books of devotion, as well as calendars and popular medical books for the lay public. These were ornamented with rude paintings. As the demand for the products of their art increased, they invented the process of block printing, cutting into blocks of wood, and sometimes plates of metal, so as to leave the letters and pictures standing out, and applying colors to these and taking impressions.

Block'house, wooden redoubt or temporary fort; always covered; usually rectangular, built of logs, and has two stories, one of which is sunk several feet below the surface of the ground. The upper story projects a few feet beyond the lower on all sides; is loopholed for the use of muskets; much employed in the U. S. as a defense against Indians.

Block Sys'tem, method of controlling railway trains moving in the same direction on the same track, so as to prevent rear collisions. Usually the block stations are a considerable distance apart, and communication between them is made by telegraph or telephone. To operate the block system a railroad is divided into sections *AB*, *BC*, *CD*, etc., of equal or unequal length, as may be most convenient,



and a signalman is stationed at each of the signal stations *A*, *B*, *C*, etc. This man is able to communicate with the signalmen at the two adjacent stations. If a train is on the section *BC* moving toward *C* a danger signal remains displayed at *B* until the train has passed *C*. The signalman at *C* then informs the signalmen at *B* and *D*, the danger signal is lowered at *B*, and one is displayed at *C*, and so on in succession; thus only one train can be upon one section at the same time. If a train should be derailed between *C* and *D* the train next following would be stopped at *C*, and this would cause the danger signal to be put out at *B*, so that the third train would stop there. The system, therefore, keeps a certain space interval between all trains on the track, and thus prevents rear collisions if its rules and regulations are observed. In the automatic block system the signals are so connected or interlocked that it is impossible for the danger signal at *C* to move until the

track is clear between *C* and *D*. This system, moreover, by passing the electric current through the rails, can be made to display a danger signal at *C* if a rail should be broken or a switch be opened between *C* and *D*.

Blodg'et, Lorin, 1823–1901; American physicist; b. Chautauqua Co., N. Y. In 1851 he became assistant professor at the Smithsonian Institution, Washington. He may be said to have laid the foundation of American climatology. In 1855 he published a volume of climatological observations, and in 1857 "Climatology in the United States." He was editor of the *North American*, published in Philadelphia.

Bloemfontein (blēm-fōn'tin), capital of the former Orange Free State, S. Africa; on a tributary of the Modder, 200 m. NW. of Durban; is the seat of an Anglican bishopric; was the scene, May 31, 1899, of a conference between Sir Alfred Milner, in behalf of the British Govt., and the presidents of the two Boer republics, looking toward a settlement of the grievances of the Outlanders. The conference resulted in no agreement, and in the war that followed the Free State cast its lot with the Transvaal. The town was taken by Lord Roberts, March 13, 1900, and made his base of supplies for the movement on Johannesburg and Pretoria. The Orange Free State was proclaimed the Orange River Colony, May 28, 1900. Pop. abt. 12,000.

Blois (blwä), a town of France, capital of the department of Loire-et-Cher; situated on high ground on both sides of the Loire. Here is the celebrated castle of Blois, the scene of many interesting historical events, and once the favorite residence of the kings of France. Blois is a place of great antiquity, and was once more important than it is now. It has manufactories of gloves and porcelain, and a trade in brandy, wine, and timber. Here is an aqueduct cut in the rock by the ancient Romans. Pop. (1900) 23,789.

Blondin (blōn-dān), Charles, 1824–97; French tight-rope walker; b. St. Omer, Pas-de-Calais; crossed Niagara Falls, 1859, in five minutes; and at other times blindfolded, trundling a wheelbarrow, on stilts, and carrying a man on his back.

Blood, principal nutritive fluid of the body; consists of a clear liquid, the plasma or *liquor sanguinis*, and small bodies, the corpuscles of different refractive power from the plasma, and therefore the two commingled make an opaque mixture. In most of the invertebrates and in the amphioxus the blood is clear and transparent. In many invertebrates it is colored, red, green, or yellowish. In man the blood is light red in the arteries, in the veins it becomes dark bluish or even blue black. The color is due to an organic substance hemoglobin, contained in the red corpuscles. The oxygen of the air entering at the lungs combines with this substance, and gives rise to the bright red color of arterial blood. In the tissues the oxygen is consumed, the hemoglobin becoming reduced—that is, deprived of

oxygen—and the bluish color of the venous blood results.

The corpuscles are the red, the white and the blood plaques or plates. The red corpuscles are small biconcave disks about $\frac{1}{250}$ of an inch in diameter, of amber color when seen separately, but when in mass of the red color characteristic of the blood. In the lower vertebrates they are of oval or elliptical outline; in man and the mammals, excepting the camel tribe, the outline is circular. The white corpuscles or *leucocytes* vary in size; are generally somewhat larger and much less numerous than the red. Besides these there are the blood plaques or plates, small circular disks, pale amber in color, and about half the size of the red corpuscles; their true nature is in doubt. The plasma serves to convey to the tissues the various nutritive substances derived from digestion, and from them the excrementitious products of tissue waste and oxidation. The hemoglobin, chemically albuminous and containing iron, has the property of readily uniting with oxygen and setting this free again. It thus accomplishes the chief purpose of the red corpuscle, that of carrying oxygen from the lungs to the tissues. The functions of the white corpuscles bear a close relation to the processes of growth and tissue repair, and the destruction of bacteria. See BLEEDING; CIRCULATION OF BLOOD.

Blood Mon'ey, reward for betraying a criminal to justice; more commonly the compensation by a slayer to the slain person's next of kin. With primitive peoples, who cannot understand how taking a life is compensation for life, the practice prevails of a paying a fine to surviving relatives in cases of homicide. The amount is fixed by custom or law.

Blood Poi'soning, condition produced by the absorption of injurious substances from a wound, from a local disease, or from an intact mucous membrane. Ordinarily denotes the constitutional disturbances which result from the absorption of injurious substances from wounds. Diseases so produced have been divided into two groups, with the distinction that in one, *septicæmia*, no abscesses are produced in distant localities, in the other *pyæmia*, abscesses are produced.

Blood'root (*Sanguinaria canadensis*), plant of the family *Papaveraceæ*; growing wild in many parts of N. America; is one of our most beautiful early spring flowers. It takes its name from the orange-colored sap of the root, which contains the alkaloid sanguinaria, remarkable for the fine red color of its salts; the root is a stimulant expectorant, but its use require caution, for its administration has been followed by the symptoms of acronarcotic poisoning.

Blood Stains, stains produced by the deposit of blood, in regard to which medico-legal questions often arise; for example: Is it possible to decide whether a stain is produced by blood? And is it produced by the blood of man or animal? Either a microscopic or spectroscopic examination will detect blood or a blood stain. Chemical tests may also be

used; but they are not so decisive as the physical. The blood corpuscles may, however, be so much altered by time as to render the microscopic test defective. It has been found that the colorless corpuscles, or leucocytes, resist the action of time better than the red globules; also that spatters of blood upon bright instruments will prevent rust from forming upon such places, and knives nearly covered with rust have been discovered to be the instruments of murder by the detection of blood films over a few unruined spots.

Blood'hound, one of several varieties of dog, distinguished for the keenness of their scent and the persistency with which they will follow the track of game. They have been employed in many petty wars to track small forces of partisans, also to follow escaped prisoners, etc., as in time of peace they have been trained to hunt felons, poachers, and fugitive slaves. The Cuban and Russian hounds are celebrated for their ferocity.

Blood'y Assizes (äs-siz'ez), name given to a series of trials held in England, 1685, in which those who had taken sides with the Duke of Monmouth in his rebellion were tried. The infamous Judge Jeffreys who presided over these assizes condemned more than 300 persons to death after unfair trials and sentenced hundreds more to imprisonment or slavery in America.

Bloom'ary, furnace for converting pig or cast iron into malleable or wrought iron, or for producing malleable iron from iron ore directly. In the latter case it differs from the Blast Furnace, in reducing the ore and producing the iron in a mass or bloom without melting it, while the blast furnace produces an impure molten iron, which is tapped off and cast into pigs; the blast furnace working continuously, the bloomary (in many cases) interruptedly. The two best known modern forms of the bloomary (the Catalan furnace and the German bloomary) are at present used in Spain, Sweden, Russia, and parts of the U. S. for the reduction of ores, chiefly by means of charcoal. Only the richest ores can be profitably used, and the loss of iron is much greater than by the blast furnace.

Bloom'field, Joseph, 1755-1823; American army officer; b. Woodbridge, N. J.; entered the Revolutionary army in the Third Regiment of New Jersey troops as captain, serving throughout the war; was governor of New Jersey, 1801-12; brigadier general in the war with Great Britain, 1812-15; and an influential Jeffersonian member of Congress, 1817-21.

Bloom'ington, capital of McLean Co., Ill.; 60 m. NNE. of Springfield. It has manufactories of stoves, furnaces, grain separators, ice, flour, and plows; car works and repair shops. Pop. (1900) 23,286.

Blouet (blö-ä'), best known by his pen name MAX O'RELL, 1848-1903; French author; b. Brittany, France; commissioned in French army, 1869; taken prisoner at Sedan in Franco-Prussian War, 1870; was badly

wounded in fighting against the Commune; newspaper correspondent in England, 1873; head French master in St. Paul's School, 1876-84; lectured in Great Britain and the U. S., 1887-90. Author of "John Bull and his Island," 1883; "John Bull's Daughters," 1884; "Drat the Boys," 1886; "Jonathan and his Continent," 1889.

Blowing Machine, machine for producing forced draught, or artificial blasts of air. They are used where large volumes of air, at a comparatively low pressure, are required, as in foundries, smelting furnaces, blacksmiths' forges, and in ventilating systems; and also where comparatively small amounts of air at great pressure are required as in rock-drilling, boring, and riveting devices.

The earliest form of apparatus for producing an air blast was the bag of skin or leather which developed into the well-known bellows. The next advance was to the piston blower, used in the large blowing engines of to-day. This is essentially a pump with inlet and outlet valves, worked by a steam engine, water wheel, or turbine. It may be directly connected with the piston rod of the engine or by crank and pitman, or through the medium of gearing.

Among the largest blowing machines are those built upon the design of E. P. Allis. The steam cylinder is 42 in. in diameter, the air cylinder 84, and the stroke 60 in. Rotary machines, including fan blowers and disk blowers, are used largely for ventilating purposes. The fans or blades are attached to a shaft, and the whole inclosed in a casing. They revolve at a high rate of speed and move enormous volumes of air. A recent use of compressed air can be seen in machines for cleaning carpets, cars, hotels, and places where large quantities of dust accumulate.

Blowitz (bló'vitz), Henry Georges Stephane Adolphe Oppen de, 1832-1903; French journalist; b. Pilsen, Austria; successively Prof. of German at Tours, Limoges, Poitiers, and Marseilles; Paris correspondent of the *London Times*, 1871; telegraphed the text of the Treaty of Berlin to the *Times* before it had been signed; revealed, 1875, the intention of the German Military Party to reinvade France; noted for success in acquiring important information, and for the eminent men he interviewed; published works on the public affairs of Europe; invented a machine for wool carding by steam.

Blow-pipe, tube bent at right angles and terminating in a fine nozzle, for directing a current of air from the mouth across the flame of a lamp, candle, or gas jet; produces a conical-pointed flame, intensely hot, which can be readily directed on small objects by the operator; used by the jeweler in soldering, but in the hands of the chemist and mineralogist is the basis of a distinct and comprehensive system of analysis.

Blow-pipe and Arrow, called also *Gravata'na* and *Pocu'na*, a weapon used by the Indians of S. America, both in war and in hunting. It is

a straight tube, in which a poisoned arrow is placed and forcibly expelled by the breath. The tube, etc., is from 2 to 12 ft. long, the bore not large enough to admit the little finger. It is made of reed or of the stem of a palm. The arrows are from 2 to 18 in. long, made of the spines of a palm, notched so as to break off in the wound, and their points covered with curare or other poison. A little down is twisted round each arrow, to fit the tube. In the hand of a practiced Indian it is a very deadly weapon, as it makes no noise.

Blubber, cellular membrane in which the oil or fat of the whale is inclosed; the layer of fat which lies just beneath the skin of the whale; serves to protect the whale from cold and to diminish its specific gravity; is used as food by the Eskimo.

Blücher (blük'h'ér), Gebhard Leberecht von (Prince of Wahlstadt), 1742-1819; Prussian military officer; b. Rostock; entered the service, 1760; became a colonel, 1790; for gallantry in the war with the French, raised to major general, 1794; defeated and taken prisoner near Lübeck, 1806; commander in chief Prussian army, 1813, in war between the Allies and Napoleon; gained victories over Macdonald and Marmont; formed a junction with the allied armies, which resulted in the defeat of Napoleon at Leipzig, 1813; raised to field marshal and invaded France, 1814; defeated by Napoleon, but defeated the same enemy and entered Paris (March), and here received the title of prince; on renewal of war, 1815, took command of the Prussian army; defeated at Ligny, but reached Waterloo in time to decide the victory.

Bluebeard, epithet applied to the central figure of a famous tale, first given popular form by Charles Perrault in his "Contes de ma Mère l'Oyle," 1697. The wife of a rich nobleman, named Raoul, distinguished by a blue-black beard, on being forbidden to enter a certain room, disobeyed, only to discover the heads of six previous wives. Her brothers arrive just in time to save her by killing her husband. Bluebeard is generally identified with the Seigneur de Retz.

Bluebell, name in Great Britain of two different wild flowers: (1) the *Hyacinthus non-scriptus*, a hyacinth with beautiful blue flowers; (2) the *Campanula rotundifolia*, the harebell, very common in Europe, and having a wide range in Asia and N. America.

Blueberry. See HUCKLEBERRY.

Bluebird, a bird of the family *Turdidae*; a general favorite in the U. S., which it visits as a summer bird of passage, and is welcomed as a harbinger of spring. It prefers the vicinity of human habitations, and often builds in orchards and gardens. The upper part of the bird is a rich sky-blue color; the breast and throat are a reddish chestnut. Its song is a mellow, sweet-toned, and agreeable warble. This bird lays about five pale-blue eggs.

Blue Books, term applied in various countries to official government publications. be-

cause they usually have blue paper covers; recently other colors have been adopted by various countries, and though there are now green, yellow, and white, as well as blue books, the original term has been retained as a class name. In U. S. also applied to the rules and regulations of the navy and to the official register of the names and salaries of all government employes.

Blue'breast. See BLUETHROAT.

Blue'eye (*Entomiza cyanotis*), sometimes called Blue-cheeked honey eater; a beautiful bird abundant in New S. Wales; feeds on insects and honey.

Blue'fields, seaport and capital of the department of Zelaya, Nicaragua; on the Atlantic Coast near the mouth of the Bluefields River and 165 m. E. of Managua; originally the Mosquito Indian reservation and belonged to Honduras; then became a British protectorate; town taken possession of by Nicaragua, 1894, after the war between that country and Honduras; British authority reestablished soon after; the reservation and its capital were the subjects of controversy between the U. S., which had commercial interests there, Great Britain, Nicaragua, and the natives, 1893-96; authority of Nicaragua recognized by a convention of Mosquito delegates, 1894, and the name of the reservation changed to Zelaya in honor of the president of Nicaragua.

Blue'fish (*Pomatomus saltatrix*), fish of the family *Pomatomidae*; allied to the mackerels; derives its specific name from a habit of leaping out of the water; it frequents the coasts of the U. S. in spring and summer; is a fine fish for the table.

Blue'gowns, order of paupers formerly existing in Scotland. They received annually from the king a largess of alms, including a blue gown or cloak, on condition that they prayed for his welfare; hence also called the king's bedesmen, or beadsmen. Every year after his accession to the throne the king appointed an additional member to the order. They continued to be appointed up to 1833, but the order did not become finally extinct until 1863.

Blue'grass, called also GREEN MEADOW GRASS and JUNE GRASS, a species of grass (*Poa pratensis*) which is a native of both Europe and America; distinguished from other species of its genus by its flat panicles, smooth culms and sheaths, and short, blunt ligules. Though common in many regions, this grass attains its chief value in that part of central Kentucky which is called the "blue-grass region," where it is considered to afford the most important crop that can be raised by farmers. It is chiefly cultivated for pasturage and lawns, though on certain soils it makes excellent hay. To this grass Kentucky owes her great reputation as a stock-raising state.

Blue Gum. See EUCALYPTUS.

Blue Laws, certain fanatical and meddlesome laws said to have once existed in the colony

of New Haven, now a part of Connecticut. They are the fabrication of Samuel Peters, an Episcopal clergyman, and are found in his "A General History of Connecticut," published in London, 1781. The laws of the New Haven colony had been called "blue laws" in New York early in the eighteenth century, in allusion to the strictness of its religious and moral laws, and to the fact that only church members could vote or hold offices. According to the alleged laws of Peters, "No woman shall kiss her child on the Sabbath or fasting days"; "No one shall read Common Prayer, keep Christmas or Saints' days, make mince pies, dance, play cards, or play on any instrument of music, except the drum, trumpet, and jew's-harp," etc.

Blue Light. See BENGAL LIGHT.

Blue Mon'day, so named from an ancient custom in some parts of Europe of decorating churches with blue on the Monday before Lent, this particular Monday, and afterwards all Mondays, being considered holidays for men whose business obliged them to work on Sundays.

Blue Moun'tain, Pennsylvania. See KITTA-TINNY.

Blue Mountains, range in the E. part of New S. Wales, and N. of the Australian Alps; about 100 m. from the coast. The highest peaks rise over 4,000 ft. above sea level.

Blue Nile. See BAHB-EL-AZREK.

Blue'throat, **Blue'breast** (*Phoenicoua suecica*), beautiful bird of the *Sylvidae*; common on the continent of Europe as a summer bird of passage; supposed to pass the winter in Africa.

Blue'wing Duck, or **Blue-wing Teal**, species of duck (*Anas discors*); abundant game bird of America. Vast numbers spend the winter in the marshes near the mouth of the Mississippi; the summer migrations of the species extend as far N. as the 57th parallel; breeds also in the marshes of the South, and is common in Jamaica, where it is a permanent resident.

Blue Rac'er. See BLACK SNAKE.

Blue Ridge, range of the Appalachians which is nearest to the Atlantic Ocean. It extends through Pennsylvania, Maryland, Virginia, N. Carolina, and Georgia. The part in Pennsylvania is called the S. Mountain. In Virginia it forms the SE. boundary of the Great Valley. The Peaks of Otter, which are the highest points in Virginia, rise to 3,993 ft. From N. Carolina southward the name of Blue Ridge is applied to the watershed which divides the waters flowing into the Atlantic from those of the Gulf of Mexico.

Blue'stocking, term applied to literary ladies, and generally with the imputation of pedantry; originated in England in Dr. Johnson's time, when there existed bluestocking clubs, at which literary ladies met to converse with distinguished literati. According to Boswell, they

were so called because Mr. Stillingfleet, one of the prominent members, always wore blue hose.

Blue Vitriol (vī'trī-ūl), the sulphate of copper. See COPPER.

Blum (blóm); **Robert**, 1807-48; German liberal leader; b. Cologne; founded the Schiller-Verein (Schiller Society) at Leipzig, 1840, and the German Catholic Church at Leipzig, 1845. In 1848 was the master spirit of the Saxon Liberals or Democrats, and a member of the Frankfort parliament, in which he was the leader of the Left or moderate opposition. Having been sent by this party to Vienna, he joined the insurgents of that city; was arrested and shot.

Blumenbach (bló'mën-bäkh), **Johann Friedrich**, 1752-1840; German naturalist; b. Gotha; Prof. of Medicine and Anatomy in the Univ. of Göttingen, 1778-1828; published a "Manual of Natural History," 1780, often reprinted. He first placed natural history on the scientific basis of comparative anatomy.

Bo, or **Pee'pul**, the *Ficus religiosa*, or sacred fig tree of Hindustan and Ceylon; venerated by the followers of Vishnu (who was born under this tree), and especially by the Buddhists. It is a large tree, whose sap abounds in caoutchouc, and which yields a small, edible fig, not much valued. The bo tree of Anarajapura, in Ceylon, is believed, on apparently good grounds, to have been planted 288 B.C.

Bo'a, genus of large nonvenomous serpents; devoid of poison fangs, they kill their prey by constriction; all natives of the warm parts of America, the similar large serpents of Asia



BOA CONSTRICTOR.

and Africa forming the genus *Python*, though formerly the name was applied without any distinction to both genera. The prey is first seized by the mouth, and then the serpent coils itself around it; the muscles of the body afterwards compress it, so that in a few min-

utes life is extinct. The food is always swallowed entire, and the process seems to require no small effort. After a repast these serpents spend a considerable time in a state of torpidity, several weeks elapsing before they require a new supply. The boa constrictor is far from being one of the largest of this species, seldom obtaining a length of more than 12 ft. The only members of the boa family in the U. S. are two or three small species found in Arizona and neighboring regions.

Boabdil (bō-āb-dēl'), properly **ABU-ABDAL-LAH**, last Moorish king of Granada; wrested the throne from his father, 1481; defeated by the Castilians, and made to pay tribute, 1483; weakened by contest with his father and uncle, finally surrendered Granada to Ferdinand of Aragon, 1491; soon after crossed to Africa, where he died in battle.

Boadicea (bō-ād-i-sē'ā), written also **Voad'ica**, warlike British queen; wife of Prasutagus, king of the Iceni, who died abt. 60 A.D. Soon after this date she and her subjects, exasperated by the outrages of the Roman soldiers, took arms against them. She was defeated, 62 A.D., by Suetonius Paulinus, and then killed herself.

Boar, male of the *Sus scrofa*, or swine. When applied to the wild stock of swine the term is used without particular reference to the sex of the animals. The wild boars found



WILD BOAR.

in the S. States (especially in Florida) are descended from the domestic swine. No true swine are native to America or Australia. Boar hunting is one of the most exciting sports of the chase in Europe, India, and Syria.

Board of Trade, in the U. S. a voluntary association of business men of a city to promote the commercial interests of the place; also called Chamber of Commerce. Local boards of trade or chambers of commerce have more importance and more legal recognition in Europe than in the U. S. In Great Britain the Board of Trade is a branch of the government dealing with commerce and statistics; its various departments deal with labor, railway, harbor,

slipping, finance, and bankruptcy questions. See CHAMBER OF COMMERCE.

Boarfish, fish of the genus *Capros* and dory family, or *Zeidae*. The resemblance of the mouth to the snout of a hog is supposed to have originated the name. The common boarfish (*Capros aper*) is a well-known inhabitant of the Mediterranean.

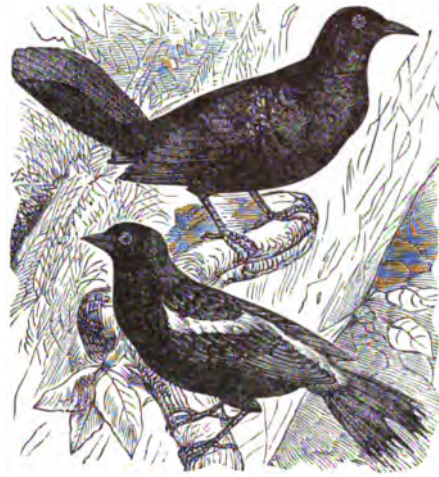
Boat, any water craft, but usually a small open vessel propelled by oars, sails, steam, etc. The boats used on board ship are the launch, longboat, barge, pinnace, cutter, yawl, jolly-boat, dingey, gig, lifeboat, whaleboat. A carvel-built boat has the planking running fore and aft, with flush joints; clinker built, the planking running fore and aft, and lap jointed. The diagonal built has the planking running diagonally, the direction of the inside planking crossing that of the outside, and flush-jointed. The seats for the crew of a boat are called the thwarts; a single-banked boat has one rower, or oarsman, to a thwart; a double-banked boat has two. The strip running fore and aft on which the thwarts rest is the rising. The stern sheets is the space abaft the after thwart; the foresheets, the space forward of foremost thwart. The spaces in the wash streak for the oars are the rowlocks. The frames, knees, hooks, stern, and stern-posts of wooden boats are generally of oak; the planking of cedar. Oars are made of ash. The blade of the oar is the flat part that goes into the water; the loom is the rounded part, at the inner extremity of which is the handle. The rigs for boats are the sloop rig, sliding gunter, sprit, and lug. The barge is a large flat-bottom boat for carrying freight; the racing shell is built of veneering or paper; others are the gondola, dory, wherry, skiff, the sampan of China, etc.

Bobadilla (bō-bā-dēl'yā), Francisco de, d. 1502; Spanish governor of Hispaniola and knight of Calatrava; sent, 1500, by Ferdinand and Isabella to investigate the affairs of that colony; immediately put Columbus, then governor, in irons, and sent him to Spain; was recalled for inefficiency, 1502, but his ship was lost in a hurricane.

Bobbinet', sort of lace or net fabric woven by machinery, and usually made of cotton; a fine and elegant textile fabric of a peculiar texture, which consists in the interlacing of a set of long threads, representing the warp in common weaving with a set of cross ones, in such a manner as to form a mesh texture; made at Nottingham, England, and in France.

Bob'olink, Reed'bi'-d, or Ricebird (*Dolichonyx oryzivorus*), beautiful American migratory bird of the order *Passeres* and family *Icteridae*; passes the winter in the W. Indies or in S. lowlands; arrives in May in the latitude of New York State, in which latitude it breeds; builds its nest in meadows among the grass. In May and June the male is very musical, singing in the air with great volubility and hilarity, and rising and falling as if by a series of jerks. They are called reedbirds in

Pennsylvania, where many of them are shot for the table in autumn. In the latter part



BOBOLINK.

of autumn immense flocks of them attack the rice crops of South Carolina, where they receive the name of ricebird.

Bob'white (*Colinus virginianus*), very common small game bird of the U. S., belonging to the *Tetraonidae*, and hence allied to the European partridge; usually known as quail in the N. States and as partridge in the South. The name bobwhite is given for its peculiar call. See QUAIL.

Boca del Rio (bōk'ā dēl rē'ō). See BAGDAD.

Boca Tigris, i.e., mouth of the tiger; the entrance of the Canton River into the Outer Waters, or Lintin Bay, called also the *Bogue*. On A-nung-hoy Point, on S. Wang-tong and Tiger islands, are the remains of forts and batteries, which guarded the entrance to the river, and were stormed by the British in 1841 and 1857.

Boccaccio (bōk-kāt'eidō), Giovanni, or Boccaccio da Cartal'do, 1313-75; celebrated Italian poet, novelist, and scholar; b. Paris; spent his life chiefly in Naples and Florence; lectured on Dante in Florence and acted as Florentine ambassador; principal works, the noted "Il Decamerone," prose tales, written probably, 1344-50, and published, 1353; "Life of Dante"; "Il Filocolo," prose romance; "Il Teseide," poem; "If Filostrato," "Il Ninfale Fiesolano," "Il Ninfale d'Ameto," prose alternating with lyrics; "Fiammetta," prose romance; "Corbaccio"; also "De Genealogie Deorum Libri XV," and other works of encyclopedic character, which gave a great impulse to European scholarship.

Böckh (bōkh), Philipp August, 1785-1867; German antiquary; b. Carlsruhe; Prof. of Rhetoric and Ancient Literature in Univ. of Berlin, where he taught for over forty years; opened a new era in philology and archæology, by extending his inquiries beyond mere lin-

guistic research to all vestiges and aspects of civilization. His works include "The Political Economy of the Athenians," "Investigations Concerning the Weights, Coins, and Measures of Antiquity," and "Records of the Maritime Affairs of Attica." He commenced, 1824, the great work called "Corpus Inscriptionum Græcarum" (fourth volume, 1867), which he destined to comprise all existing Greek inscriptions.

Böcklin (bök'lën), **Arnold**, 1827-1901; Swiss painter; b. Basel; studied at Brussels, Paris, and in Italy. His works are remarkable for their originality and their powerful, though imaginative delineation of scenery. Many of his landscapes, showing real poetic power and great wealth of color, are marred by the figures introduced. His best paintings are "Pan," "Chase of Diana," "Surprised by the Corsairs," "Venus Reposing," and "Isle of the Blessed."

Bode's (bô'dés) **Law**, empirical formula announced by Johann Bode, a German astronomer, 1747-1826, which marks quite closely the relative distances of the planets, Neptune excepted, from the sun; is a modification of one announced by Kepler. To 4 add 3 multiplied by 2 once, twice, thrice, etc., and the sums multiplied by 9,500,000 will give the distances of the several planets from the sun. The progression is merely that of the number 4, 4 + 3, 4 + 6, 4 + 12, etc.

Bodle'ian Library, principal library of Oxford Univ.; founded and endowed by Sir Thomas Bodley, an English diplomat, who expended some £10,000 of his own money in the purchase of books on the Continent, and secured the coöperation of his numerous friends; thrown open to the public by James I, 1603, who gave the library Bodley's name. Since 1610 it has been entitled to receive a copy of every book published in the United Kingdom. Private donors have added to its stores. It contains (1907) 600,000 printed volumes and over 30,000 MSS.

Bod'y Col'or, in painting, color so mixed as to be thick and to form a coating upon the surface to be painted; term especially used in water color to distinguish color made opaque by mixing white with it, from transparent or translucent color, which merely stains the surface.

Bœhmeria (bü-mê'ri-ä). See **RAMIE**.

Bœotia (bê-ô'shî-ä), country or state of ancient Greece; bounded N. by Locris, NE. and E. by the Eubœan Channel, S. by Attica and Megaris, SW. by the Corinthian Gulf, and W. by Phocis; area, estimated at 1,100 sq. m. It was a hollow basin, inclosed by mountains. The surface is diversified by other mountains and several valleys and plains. The largest rivers of Bœotia were the Asopus and the Cephissus, the latter of which rises in Phocis and enters Lake Copais. The plain of the Copais is remarkable for its fertility. Bœotia was famous for meadow and pasture land, on which were raised the horses of the Bœotian cavalry. The grape and other fruits flourished

in this region. At the commencement of the historical period the Minyans, Cadmeans, and other tribes of the heroic age had nearly disappeared, and the country was occupied by the Bœotians, who are supposed to have come from Thessaly. The principal cities formed a confederacy under the presidency of Thebes. Orchomenus was the second city in importance. The Bœotians were regarded as a dull, unintellectual people, and less refined and polished than most of the Hellenic tribes. Yet Bœotia produced Epaminondas, Hesiod, Pindar, and Plutarch.

Boers (bôrs), Dutch, farmers; term particularly applied to the descendants of a small colony that left Holland and settled at the Cape of Good Hope, 1652. They literally made the wilderness bloom, and were successful in their industrial, social, and governmental relations. The territory was seized by the British as a fruit of war, 1796; restored, 1803; again seized by the British, 1806; was ceded to Great Britain by Holland as a result of the Congress of Vienna, 1814. The settlement had then come to be known as Cape Colony. After its annexation troubles arose between the government and the Boers, and, 1836, many of them left the colony and founded the Orange River Free State and the Transvaal Republic, while others settled in what became the colony of Natal. In 1858 they gave themselves a constitution, and after a time the commonwealth was recognized; but, 1877, the Cape Govt., fearing an outbreak which might lead to a general rising of the natives, took possession of and annexed the territory. In December, 1880, the Boers took up arms, and were successful in their encounter with small bodies of British troops. More soldiers were poured into the colony, but after a truce the government determined to give up the country to the Boers, subject to certain regulations recognizing the suzerainty of the British crown, 1881. In 1884 this treaty was modified, and Great Britain practically gave up the suzerainty. In 1906 Great Britain granted a constitution to the Boers in the Transvaal. There was a common feeling among the Boers that the British should not predominate in South Africa. Negotiations with Great Britain were in process throughout the summer of 1899, Great Britain urging upon the Transvaal the propriety of granting to the foreign-born residents such privileges as she asserted were due to them as a matter of common justice, that certain monopolies that pressed heavily upon the miners in the Rand be abolished, and that the suzerainty of Great Britain over the Transvaal receive some official recognition. The suzerainty proposition President Kruger flatly rejected as inconsistent with the treaty of 1884, and at the same time he offered to submit the other demands to arbitration. Meanwhile, the Orange Free State decided to support her sister republic in the outcome of the dispute. In the latter part of September, while negotiations were still pending, the British Govt. called out the reserves; troops were sent from England and India and the troops already in S. Africa were massed on the Natal

border at Ladysmith and Glencoe. In answer to this, a part of the burgher militia was called out, and on October 9th President Kruger sent his ultimatum to the British Govt. demanding the withdrawal of troops from the borders, the removal of all reinforcements that had arrived since June 1st, and that British troops then on the high seas should not be landed in S. Africa. An affirmative answer was demanded within forty-eight hours, otherwise the action of the British Govt. would be considered a virtual declaration of war. The British Govt. replied that the conditions were such as they deemed impossible to discuss. The war began October 11th and ended June 2d, 1900, with the annexation of the two states by Great Britain.

Boethius (bō-ē'thī-ūs), or **Boe'tius**, **Anicius Manlius Torquatus Severinus**, after 475-525 A.D.; Roman philosopher and statesman; b. Rome; chosen consul, 510; became *magistrar officiorum* under King Theodoric; was accused of treason and executed; works include "Consolation of Philosophy," partly in verse, written in prison, which was translated into Anglo-Saxon by Alfred the Great and into English by Chaucer.

Bog, swamp or tract of wet land, covered in many cases with peat. Bogs, called mosses in Scotland and swamps in the U. S., often contain the well-preserved trunks of trees, especially of the oak in Ireland and of the cypress in the U. S. S. New Jersey has a remarkable swamp in which are several layers of prostrate cedars.

Bog But'ter, substance found in peaty earth in some of the bogs of Ireland; in composition and qualities exhibits the general properties of a fat, and melts at 124° F.

Boghead Coal, highly bituminous variety of the cannel coal of Scotland; from Boghead, in Linlithgowshire; more valuable for gas making, and for the oils and paraffin obtained from it by distillation, than for fuel.

Bogoslof (bō-gō-slāv'), small volcanic island of the Aleutian Archipelago; originally a group of reefs and low rocks. An eruption, 1795, threw up a peak 450 ft. high; another, 1883, a broader peak, Grewinck, at a distance of a mile, and the trio were connected by a spit.

Bogota (bō-gō-tā'), capital republic of Colombia; at the junction of the San Francisco River and the Rio de Bogota; 8,000 ft. above sea level; has a genial climate, but is subject to earthquakes; mines of coal, salt, and precious stones abound in the vicinity; the seat of an archbishop, and has a cathedral, university, national academy, public library, and presidential palace; great Cataract of Tequendama, where the Bogota has perpendicular fall of 475 ft., is a few m. below the city; founded, 1537; pop. (1905) 100,000.

Bohemia (bō-hē'mī-ā), former kingdom, now part of Austria-Hungary; bounded N. by Saxony and Prussian Silesia, E. by Moravia and Prussia, S. by lower Austria, and W. by Bavaria; area, 20,060 sq. m.; pop. (1900) 6,318,

697. It is inclosed on all sides by mountains; the Erzgebirge (Ore Mountains), separate it from Saxony on the N. and NW; the Riesengebirge (Giant Mountains) extend along the NE. frontier; the Moravian Mountains separate it from Moravia on the SE.; the Böhmerwald (Bohemian Forest) extends along the SW. border for about 130 m., forms the boundary between Bohemia and Bavaria, and separates the basin of the Danube from that of the Elbe. The surface of Bohemia is mostly undulating, and belongs to the basin of the Elbe. The other principal rivers are the Moldau and the Eger, both navigable for steamboats. The staple productions are rye, oats, barley, flax, and wheat. Nearly one third of the country is covered with forests. Bohemia is rich in copper, tin, iron, lead, cobalt, silver, nickel, zinc, arsenic, sulphur, coal, cinnabar, alum, precious stones, marble, granite, and sandstone. The manufactories are important and varied, the principal being linens, cotton goods, woolens, glass, and paper. The chief towns are Prague, Pilsen, and Budweis. A large majority of the inhabitants belong to the Roman Catholic Church, that being the established religion, but other churches are tolerated. Bohemia is named from the *Boii*, a Celtic people who settled here before the Christian era, and were expelled by the Marcomanni in the time of Augustus. It was conquered by the Cechi (or Czechs), a Slavic race, who first established themselves in Bohemia in the second half of the sixth century, and 630 A.D. made themselves independent. For several centuries the family of the Przemyslides ruled with varying success until, 1310, the kings of the House of Luxemburg ascended the throne, and ruled until 1437. John Huss effected a religious reformation, 1400-14, and was burned by the Catholics. The consequence was the long war of the Hussites. In 1526 Bohemia was annexed to the dominions of Ferdinand I of Austria. In recent times the country has been agitated by a strong antagonism between the Czechs and the Germans, the former demanding the reestablishment of a kingdom embracing Bohemia and Moravia, with the autonomous administration conceded to Hungary.

Bohe'mian Breth'ren, Christian society which originated in the Hussite movements of the fourteenth century, and rejected the mass, purgatory, prayers for the dead, and adoration of images, and contended for communion in both kinds. They were at first affiliated with the Calixtines, but separated from them after their first synod, 1460. In 1549 persecution drove them in large numbers to Poland, where they flourished. In 1620 the fate of the Brethren was sealed at the battle of the White Mountain, and they well-nigh vanished. In 1656 the Polish branch was similarly destroyed; but in 1722 the remnants of the sect, which had secretly existed all these years, came together on the domain of Count Zinzendorf at Berthelsdorf, near Zittau, and then arose the renewed Moravian Brethren.

Bohemond (bō'hē-mōnd), **Marc**, abt. 1060-1111; Norman crusader; son of Robert Guis-

card, Duke of Apulia and Calabria; joined the first crusade with a large army, 1095, and took part in the capture of Antioch, 1098; remained there while the other crusaders marched to Jerusalem, and undertook to found an independent principality under the name of Bohemond I. Later he carried on a disastrous war with Alexis in Epirus, and married a daughter of Philip I of France.

Böhm (böm), **Theobald**, 1794-1881; German musician; b. Munich; noted for an improvement in the construction of the flute. The Böhm flute is more accurate and even in tone, and more easily fingered, than those formerly in use. He also improved other instruments, and gained celebrity as a composer.

Böhme (bömë), or **Böhm** (böm), or **Behmen** (bämën), **Jakob**, 1575-1624; German mystic; b. near Görlitz; learned the trade of a shoemaker; became a member of the Lutheran Church; had a very fertile imagination and a remarkable faculty of intuition, and professed to be divinely inspired and illuminated. His first work was entitled "Aurora, or the Morning Redness," abt. 1612. This was condemned by the ecclesiastical authorities of Görlitz. He published several other works, which were admired by some eminent men, but they appear visionary and unintelligible to the average person.

Bhon (bön), **Henry George**, 1796-1884; English bookseller, of German extraction; b. London; promoted the popularization of good literature by publishing translations from ancient and modern languages; made several useful compilations, and wrote "Handbook of Pottery."

Bohol (böhöl), island in the Visayas or Bisayas group, P. I., between Cebu and Leyte; length, 47 m.; average breadth, 34 m.; area, 1,614 sq. m.; pop. (1903) 243,148; has rich deposits of gold; produces cacao, tobacco, cotton, hemp, rice, etc.; most important town, Taglibaran. The island was restored to civil government, 1902, and the ports opened to coastwise trade.

Bo'hun U'pas. See UPAS.

Boii (bö'i-1), ancient Celtic people; emigrated across the Po and occupied Umbria, where they fought for several centuries against the Romans; were defeated, 283 B.C., and became allies of Hannibal when he invaded Italy, 218 B.C. Many years later the Romans expelled them from Umbria and drove them beyond the Alps. A portion of the Boii migrated to the country on the side of the Danube and founded the kingdom of Boiohemum (Bohemia), from which they were expelled by the Marcomanni in the time of Augustus. From them also Bavaria takes its name.

Boil, or **Furuncle**, a local inflammation of the skin caused by the staphylococcus bacteria in the sebaceous glands of the hair; it forms a hard, painful swelling which usually suppurates with the formation of a soft core of dead tissue. There is no essential difference between a boil and a carbuncle (*q.v.*). Parts

exposed to friction, dirt, or discharges are most liable to boils. Diabetes and albuminuria predispose to them, as do also overindulgence in alcohol and meat, and constipation and exhausting diseases. Aperients and tonics should be taken, and a carbolic-acid ointment with antiseptic dressing applied to the boil. It is rarely necessary to incise it, but when the boil points and breaks it should be washed out thoroughly with peroxide or some other mild germicide, and the wound dressed antiseptically. Swabbing the wound with pure carbolic acid, followed by alcohol, may be advisable in extreme cases.

Boileau-Despréaux (bwä-lö'-dä-prä'ö), **Nicolas**, 1636-1711; French poet; b. near Paris; began his career, 1660 or 1661, by composing a satire (subsequently cut in two) for recitation to his friends, "Adieux d'un poète à Paris" and "Les Embarras de Paris"; was so successful that the young author composed others, five in number, between 1661-65. Among his best works are the "Lutrin," 1674, and the "Art of Poetry," 1674, considered by some French critics as equal to Horace's "Art of Poetry."

Boil'er. See STEAM BOILER.

Boil'ing Point, the temperature at which the elastic force of the vapor of any liquid is equal to the pressure of the atmosphere. When water is heated, the temperature rises and vapor passes off from the surface; but at 212° F. or 100° C. (the barometric column standing at 30 in. at sea level) steam begins to be formed in bubbles at the bottom, and rising through the liquid throws it into commotion. If the steam is allowed freely to escape, the temperature of the water rises no higher. The water is then said to boil, and the temperature at which it remains is its boiling point. Every liquid has a boiling point of its own. The boiling point of liquids depends upon the pressure to which they are subjected. When the barometer stands at 30 ins., showing an atmospheric pressure of 15 lbs. on the sq. in., the boiling point of water is 212° F. (100° C.).

TABLE OF BOILING POINTS AT 76 CENTIMETERS PRESSURE.

LIQUID.	DEGREES (CENTIGRADE).
Nitrogen.....	-194.4
Carbon monoxide.....	-190.0
Oxygen.....	-181.4
Methane.....	-164.0
Nitrogen dioxide.....	-153.6
Ethylene.....	-102.5
Nitrogen monoxide.....	-87.9
Carbonic acid.....	-78.2
Ammonia.....	-38.5
Chlorine.....	-33.6
Sulphur dioxide.....	-10.0
Ether.....	+34.9
Carbon disulphide.....	+46.2
Chloroform.....	+60.2
Alcohol.....	+78.3
Water.....	+100
Oil of turpentine.....	+159.1
Phosphorus.....	+287.3
Mercury.....	+357.25
Sulphur.....	+448.5

Bois d'arc (bwü däre'), osage orange tree (*Maclura aurantiaca* or *Toxylon pomiferum*, family *Artocarpacæ*); often used for a hedge plant and by the Indians for making bows and arrows.

Bois de Boulogne (bwä' dé bö-löä'), public park near Paris; on the Seine, about 3 m. W. of the city; nearly 3 m. long and 1 m. wide; was the finest promenade in the vicinity of Paris, but many of the trees were cut down and burned when that city was besieged, 1870. It is during the afternoon the rendezvous of the elegant society of Paris, and in the height of the season presents a sight of unequalled splendor.

Bois-le-duc (bwä-lé-dük'), in Dutch 'S *Her-togenbosch*, i.e., duke's wood, town of Holland; capital of N. Brabant; at the junction of the Aa and Dommel rivers; 30 m. SSE. of Utrecht; founded, 1184, by the Duke of Brabant, in a wood while hunting. Pop. (1900) 44,034.

Boisé (boi'zä), capital of Idaho and of Ada Co.; on Boisé River; is surrounded by a fine agricultural and grazing country, and derives support from the placer and quartz mines in the mountain districts within 50 m. N., S., and E. It is the only city in the world with a natural supply of hot water. Pop. (1900) 4,174.

Bokhara (bö-kä'rä), Russian vassal state of Central Asia; N. of the upper Oxus River; between Russian Turkestan and Afghanistan; area about 80,000 sq. m.; pop. abt. 1,250,000. The high mountain range of Hindu Kush extends along the S. border of Bokhara, the E. part of which is occupied by offsets from the Bolor Tagh, but the greater part of the country is level. The largest rivers are the Amu (Oxus), the Jihun, and the Samarcand, or Kohik. The climate is moderate. Gold is found in the sands of the Oxus, but Bokhara is deficient in metals and timber. Among the products are cotton, rice, wheat, barley, silk, tobacco, and abundant fruits. The inhabitants raise camels, sheep, goats, and horses, and make silk stuffs, firearms, cutlery, shagreen, gold and silver ornaments, sabers, etc. The population is a mixture of races, mostly Mohammedans. Bokhara partly corresponds to the ancient *Bactria*. It was conquered by Jengis Khan, 1219; Uzbegs became masters of it, 1505; Russians captured several important cities, together with the N. half of Bokhara, and formed the government of Turkestan, 1864. Since 1868 Bokhara has become more and more dependent on Russia. The capital is the city of Bokhara; other chief towns are Karshi and Hissar.

Bokhara, the city, 138 m. WSW. of Samarcand, is probably the most important commercial town of Central Asia, and has extensive bazaars, in which all kinds of goods can be procured; said to have 360 mosques. It has long been famous as a seat of Mohammedan learning, and is said to contain over 100 colleges, with abt. 10,000 students. Among the principal edifices is the palace of the khan, inclosed by a wall 65 ft. high. Bokhara was

ruined by Jengis Khan, 1220; rebuilt at the end of his reign; pillaged again by his successors, 1273 and 1276. Pop. abt. 75,000.

Bo'lan Pass, noted pass in the mountains of Baluchistan; 50 m. long, and on the route from Sind to Kandahar and Kelat. The highest part is 5,793 ft. above sea level. The average ascent is 90 ft. in a mile. The Bolan River rises here. In 1839 a small British army with heavy artillery marched through this pass from Sind to Afghanistan, and, 1877, was permanently occupied by the British.

Bo'las, name of a missile used by the Indians of the S. American plains; consists of a pair of balls (formerly of clay, but now often of iron) fastened by a thong of hide. The bolas are hurled with great precision at the ox, horse, guanaco, or ostrich, and, entangling the legs of the animal, detain it till it can be captured or killed. Sixty feet or more is a moderate range for the bolas, which are thrown from the saddle.

Bolero (bö-lä'rö), Spanish national dance; accompanied with the guitar and castanet, and with songs. The dancer seeks to represent by pantomime the successive symptoms and emotions of amorous affection, with its various moods of jealousy, despair, triumph, etc.

Boleyn (bö'län), or **Bul'len, Anne**, 1507-36; Queen of England; daughter of Sir Thomas Bullen, afterwards Earl of Wiltshire; educated at the French court, and became, abt. 1525, maid of honor to Queen Catherine. Henry VIII applied to the pope to obtain a divorce from Catherine, and married Anne privately, 1533. She became the mother of the Princess Elizabeth. Having been supplanted in the favor of the king, she was accused of criminal intercourse with several men, was condemned by a jury of peers, and beheaded in the Tower of London.

Bolingbroke (bö'l'ing-brök), **Henry St. John** (Viscount), 1678-1751; English author and statesman; b. Battersea; entered Parliament, 1701; prominent orator of the Tory Party; Secretary of War, 1704-8. Queen Anne dismissed the Whigs, 1710, and placed Harley at the head of a ministry in which St. John was Secretary for Foreign Affairs; received, 1712, the title of Viscount Bolingbroke; concluded the treaty of Utrecht, 1713; supplanted Harley as prime minister, 1714. The death of Anne frustrated his designs to restore the Stuarts. He was attained, 1715, but escaped to France, and served the Pretender as prime minister. In 1724 he was permitted to return, but not to enter Parliament; published, besides other works, a "Dissertation on Parties," 1739, and "Remarks on the History of England," 1743. He was brilliant and versatile, but not profound.

Bolivar (bö'l'y-vär), **Simon**, or **Bol'ívar y Pon'te**, surnamed **THE LIBERATOR**; 1783-1830; S. American patriot; b. Caracas; joined the patriots against Spain, 1810; in command of a separate army defeated the Spaniards, 1813, and was appointed dictator; driven out of Venezuela, 1814; gained victories over the

Spanish Gen. Morillo, 1817; chosen president of a congress opened at Angostura, 1819; first president of the Republic of Colombia, formed 1819; liberated Peru from the Spaniards, 1822; became dictator; president for life of Bolivia on its creation as a separate state, 1825; re-elected president of Colombia, 1828.

Bolivia (bō-liv'ĭ-ä), central country of S. America, between Brazil and Argentina on the NE. and S., and Chile and Peru on the W.; area, 605,400 sq. m.; pop. 1,953,916. The Andean or high region occupying the SW. half is the highest region of its size in America, averaging about 13,000 ft. It is a tableland capped by mountain chains, of which the principal are the Andes and the E. Cordillera, each with an elevation of about 15,000 ft. The highest peak of the latter, the Nevado de Sorato, or Illampu, exceeds 21,000 ft. The space between these ranges is occupied by two great elevated basins separated by a cross range of mountains, the N. being that of Lake Titicaca, the largest lake in S. America. Eastward from the E. Cordillera branches and spurs spread over the highlands, inclosing fertile valleys. Eastward of these are lowlands, including a portion of the Gran Chaco. The lowlands are hot, with heavy rains; there is a marked dry season only in the Paraguayan basin; the valleys above 11,000 ft. are cold and sterile. The great rivers are the Desaguadero, 150 m.; Pilcomayo, Paraguay, forming part of the boundary with Argentina; Mamore, Beni, and Madre de Dios. The Andes range is largely volcanic, and several peaks are active. Earthquakes are frequent in the mountain regions.

In minerals Bolivia is probably the richest country in S. America; silver, gold, copper, tin, lead, mercury, iron, and coal are found. The richest rubber region in the world is about the river plains of the N. Coffee, cocoa, and wheat are raised for export; mandioca, plantains, tropical fruits, maize, potatoes, and barley for home consumption. Sheep and cattle raising are important industries.

The executive power is vested in a president, elected for four years; congress consists of a senate and house of representatives, elected, like the president, by universal suffrage. There is a small standing army; primary education is free and obligatory; four universities are well patronized. The recognized religion is Roman Catholic, but other religions are tolerated. The Inca empire of the Titicaca basin, probably the oldest civilized empire in America, was overturned by Pizarro, 1538. In 1559 this region was formed into the *audiencia* of Charcas or Upper Peru; in 1776 it was made a province of Buenos Ayres. In 1825 Bolivar freed Charcas from Spain, and it became independent, taking the name of its deliverer. A federal republic, consisting of N. Peru, S. Peru, and Bolivia, existed, 1836-39; war between Chile and Bolivia and her ally, Peru, 1879, ended in the defeat of Bolivia and the cession of Atacama, leaving Bolivia without a seacoast. Nearly all the civilized population is in the highlands, and three fourths are pure Aymará Indians, speaking their own language.

Spanish is spoken in the towns. The Indian pop. in 1900 was 50.9 per cent of the whole. The largest city is La Paz, the capital; pop. (1906) 87,235. Other towns are Sucre or Chuquisaca, Cochabamba, Potosi, Santa Cruz, Oruro.

Bologna (bō-lōn'yā), Giovanni, real name JEAN BOULOGNE, 1524-1608; Italian sculptor; b. Douai, France; removed to Italy in his youth and became a resident of Florence; works include the equestrian statue of "Cosimo I," the "Rape of the Sabines," the "Flying Mercury," all in Florence, and the bronze gates of the Cathedral of Pisa.

Bologna, a famous city of Italy; capital of province of same name; situated in a fertile plain near the N. foot of the Apennines, 83 m. N. of Florence. Among its remarkable edifices are the leaning tower of Asinelli, built abt. 1110, and 256 ft. high; the Church of San Stefano, one of the oldest in Italy, and containing Greek frescoes of the twelfth century; and the Church of San Domenico, in which may be seen sculptures by Michaelangelo and paintings by Guido, L. Caracci, and Colonna.

Bologna is one of the great centers of learning in Italy. Its university, said to have been founded as early as 425, is the oldest in the peninsula. This school attained great celebrity, and was attended by thousands of students from all parts of Europe. The number of its students about the year 1260 is said to have amounted to 10,000. Here are important manufactures of silk goods, velvet, crape, chemicals, paper, and musical instruments. A town called *Felsina*, founded here by the Etruscans, was perhaps as ancient as the city of Rome. The Romans, who obtained possession of it in 189 B.C., changed its name to *Bononia*. It was taken by Charlemagne in 800 A.D., and was the capital of the most powerful Italian republic from 1118 to 1274. It was annexed to the Papal States in 1514, and to the new kingdom of Italy in 1859. Pop., with suburbs (1901) 132,237.

Bologna Stone, radiated, globular variety of barite or heavy spar, sulphate of baryta, found in a bed of clay in Mt. Paterno, near Bologna, Italy; also known as Bolognian or Bononian phosphorus.

Bolom'eter, instrument for the measurement of radiant energy by means of the change in electrical resistance of a metallic strip or wire; one of the most delicate instruments used in actinometry. The strip forms one arm of a Wheatstone's bridge, the balance of which is determined by a galvanometer of great sensitiveness. The metal employed is usually iron or platinum. By this instrument in the hands of its inventor, Prof. S. P. Langley, heat measurements previously considered to be entirely below the range of direct experiment have been made. The most striking instances are the determination of the heat of the moon's direct and reflected rays and the exploration of the spectrum of the light of the Cuban firefly.

Bolt, dart or pointed shaft, a thunderbolt; also a cylindrical metal pin. Metallic bolts, with a head at one end and a screw thread and nut at the other, are used, in building ships and houses, to bind together timber or masonry. Bolts in shipbuilding are usually either iron or copper.

Bol'ton-le-Moors', or **Bolton**, manufacturing town of Lancashire, England; on the Croal; 11 m. NW. of Manchester; chief products, muslins, fine calicoes, counterpanes, dimities, cotton shawls, and fustians. Pop. (1905) 178,112.

Boma (bō'mā), capital of the Kongo; on the Kongo River; has considerable trade.

Bomb, or **Bomb'shell**, hollow ball of cast iron which, filled with an explosive, is discharged from a mortar or heavy ordnance, and explodes when it strikes the ground or before it falls. The largest bomb in ordinary use is 13 in. in diameter, weighs about 195 lbs., and is charged with 7 or 8 lbs. of powder. Bombs are thrown at angles varying from 20 to 45 degrees. It is also the name of a small hand missile, variously constructed, and used in recent years with terrible effect by anarchists, and especially by revolutionists in Russia.

Bom'ba, a surname or nickname given to Ferdinand II, King of the Two Sicilies, in consequence of his cruel bombardment of Messina, September 2-7, 1848.

Bom'bard, name applied during the Middle Ages to a war engine resembling the ballista; after the invention of gunpowder, applied to all kinds of firearms; at the beginning of the fifteenth century restricted to short pieces of large caliber, firing stone projectiles.

Bombard'ment, firing from mortars or guns, of bombs or shells, into a fortress or place to compel its surrender. It is usual to give twenty-four hours' notice of a determination to bombard, so that noncombatants may take measures to protect themselves and their property. Hospitals and other buildings flying the red cross are not aimed at, and the cannonade is directed so that its object is attained without undue destruction of private property or injury to public monuments or works of art. Among historic bombardments are those of Geneva, 1684; Brussels, 1694, when 3,000 bombs and as many shots were thrown; Lille, 1794, one hundred and forty hours in duration; Antwerp, 1832, when 31,679 shells were thrown, one of the mortars used casting a shell of 1,100 lbs.; Vera Cruz, 1847, four days in duration; and Odessa, 1854, of forty-five hours' duration, during which 41,500 projectiles were thrown, killing and wounding 2,000. Forts Jackson and St. Philip, Mississippi River, were bombarded in 1862, six days and nights, during which 7,500 bombs were fired, 1,080 of which exploded in the air. The bombardment of Island No. 10, Mississippi River, 1862, lasted twenty-two days, during which time neither the cannonade nor the bombs had much influence in causing its surrender. In 1861 Fort Sumter, Charleston,

S. C., was bombarded by the Confederates; and again in 1863, when two bombardments of this fort by Federal forces took place during the first of which, seven days in duration, rifled guns were used and 5,000 projectiles thrown. Fort Pulaski, Savannah River, Ga., was bombarded in 1862 by Federals, and 3,921 shells were thrown. Strassburg, 1870 (August 18th to September 27th); Paris, 1871, nearly a month in duration, during which, in thirteen days, about 500 shells a day fell, and Port Arthur, 1905 (December 3-31), are other historic bombardments. See SIEGE.

Bom'box, genus of large soft-wooded trees of the *Sterculiaceae*; related to the baobab tree; natives of tropical climates, especially America. They yield cotton, but the fiber is short, does not spin well, and is not durable.

Bombay', a presidency of British India; bounded W. by the Indian Ocean and Baluchistan. Area, including Sind and Aden, 123,064 sq. m.; pop. (1901) 18,559,561. A large part of the surface is mountainous. Important rivers are the Nerbudda, Tapti, and Indus. Cotton and rice are the staple productions of this region; sugar and indigo are also raised. Bombay has important manufactories of silk stuffs and of woolen and cotton cloths. The administration of this country is vested in a governor and three councilors, subject to the superintendence, direction, and control of the Governor General of India in council. Capital, Bombay, situated on the S. end of the island of Bombay and on the Indian Ocean. It has a harbor, with anchorage for ships of the largest size; is favorably situated for commerce, being in a direct line between Calcutta and Aden. At the S. end of the island, which is about 11 m. long and 3 m. wide, is the fortified European town, and a mile N. of that is the Black Town, in which the Hindus and Mohammedans reside. The island of Bombay is, next to Salsette, the largest of the group, and next to Madras, the oldest of the British possessions in the East. In the sixteenth century it passed into the possession of Portugal, and was given to Charles II of England in 1661 as part of the dowry of his queen, Catherine of Braganza. Bombay imports raw silk, sugar, and silk stuffs from China, and cotton yarn, cotton cloth, hardware, glass, copper, etc., from England, and exports raw cotton, shawls, opium, coffee, pepper, ivory, and gums. Bombay, next to Canton, is the greatest commercial emporium of Asia. Among the races that compose the population of Bombay the Parsis, descended from the Persian fire worshipers, are distinguished for their respectability, wealth, and commercial enterprise. They are extensively engaged in shipbuilding, which is one of the most important interests of the city. The most flourishing and important industry in Bombay is the manufacture of yarn and cotton cloth. Pop. of the city (1901) 776,006.

Bomb' lance, explosive missile used in whale fishery; consists of a cylindrical shell of iron armed with a sharp and heavy point of a triangular form. The lance is discharged from

the barrel of a musket, and is exploded by a fuse after it has penetrated the body of the whale.

Bona (bō'nā), ancient *Hippo Regius*; called by the Arabs, BELED-EL-ARAB; fortified seaport of Algeria, province of Constantine; on the Mediterranean; 74 m. NE. of Constantine; has manufactories of tapestry, saddles, and native clothing. Wool, hides, grain, and coral are exported. Near Bona are the ruins of Hippo Regius, destroyed by the Arabs, 646 A.D. Pop. (1901) 32,300.

Bo'na De'a, Roman divinity; the sister or wife of Faunus; worshiped only by the Roman women, who concealed her name from the men; according to some, she was identified with Ops. Her festival was celebrated, May 1st, with mysterious rites, from which all males were strictly excluded. Her symbol was a serpent.

Bo'na Fi'de, a legal term derived from the civil law, and meaning in good faith, without fraud or deceit, innocently. A *bona fide* purchaser is one who purchases for a valuable consideration, without notice of opposing interests of third parties. A court of equity will grant no relief against a purchaser in good faith. If, on the other hand, the purchaser has notice, actual or constructive, of the equitable rights of others, he will stand in no better position than the person from whom he acquired his title. Thus, if a mortgage of land were canceled through mistake by a mortgagee, a purchaser in good faith from the mortgagor would hold free from the mortgage. On the other hand, if he had notice of the facts, a court would set up the mortgage against him as well as against the mortgagor. The same question is presented in the case of bills of exchange, promissory notes, and other commercial paper. If the acceptor or maker has a defense to it as the payee, it will in general be shut off as to a purchaser in good faith before maturity. But if the purchaser had notice of the defense before the purchase, he would stand in the same position as the payee. A contract not entered into in good faith is voidable at the option of the innocent party. The question of good faith is often of importance in actions for slander or libel, where it is frequently the case that certain acts if done *bona fide*, or in good faith, are not actionable, but are if done with malicious intent.

Bonan'za, in California and N. Mexico, an abundance of metal or an ore body. The mines of N. Mexico are principally what are called "pocket mines." When a pocket of rich ore is struck the mine is said to be in *bonanza*.

Bonaparte (bō'nā-pärt), Jérôme, 1784-1860; King of Westphalia; brother of Napoleon I; b. Ajaccio; entered the French army, 1800, and during a visit to the U. S. married, 1803, Miss Elizabeth Patterson, of Baltimore, without the consent of Napoleon. This marriage was annulled by order of Napoleon, 1805. Jérôme served as general of brigade against the Prussians, 1806, and was crowned King of Westphalia, 1807; in the same year, mar-

ried a daughter of the King of Württemberg; lost his throne, 1813; led a division at Waterloo, 1815; after many years in exile, became a marshal of France, 1850.

Bonaparte, Joseph, 1768-1844; King of Spain; eldest brother of Napoleon I; b. Corte, Corsica; elected to the French Council of Five Hundred, 1797; negotiated the treaty of Lunéville with Austria, 1801, and that of Amiens with England, 1802; showed considerable talents for diplomacy; urged by Napoleon, accepted the throne of Naples, 1806; transferred, 1808, to the throne of Spain, against the will of the majority of the Spanish people. During his nominal reign many battles were fought between the French and the allied English and Spanish armies, who expelled him from Spain, June, 1813. In 1815 he emigrated to the U. S., and lived at Bordentown, N. J., under the name of the Count de Surville; d. in Florence, Italy.

Bonaparte, Louis, 1778-1846; King of Holland, brother of Napoleon I; b. Ajaccio; entered the army in youth, and served at Arcola and Rivoli, 1797; in compliance with Napoleon's will, married Hortense de Beauharnais, 1802, and became King of Holland, 1808. He and his wife separated abt. 1807, through incompatibility. As nominal King of Holland he was compelled by Napoleon to sacrifice the interests of the Dutch to the designs of the emperor; abdicated, 1810, after which he resided in Italy; the putative father of Napoleon III.

Bonaparte, Louis Napoleon. See NAPOLEON III.

Bonaparte, Lucien, 1775-1840; Prince of Canino; brother of Napoleon I; b. Ajaccio; an energetic republican in the French Revolution; chosen, 1798, a member of the Council of Five Hundred, in which he opposed the Directory; on the 18th Brumaire (November), 1799, displayed great resolution, and efficiently promoted the success of Napoleon; became Minister of the Interior, 1799, ambassador to Spain, 1800, and a tribune, 1802; having lost his first wife, married, 1803, a widow named Jouberton without the consent of Napoleon; went into exile, and refused the throne of Italy, which Napoleon offered him on condition that he should divorce his wife; was in France during the Hundred Days, 1815, and actively supported Napoleon in that crisis; passed the latter part of his life in Italy; left five sons and six daughters.

Bonaparte, Napoleon. See NAPOLEON I.

Bonaparte, Napoléon Joseph Charles Paul, 1822-91; prince, son of Jérôme, King of Westphalia; b. Trieste. As a professed democrat was elected to the French Constituent Assembly, 1848; in 1852 received the title of prince, and was recognized as the heir of his cousin, Napoleon III; married Clotilde, a daughter of King Victor Emmanuel; was called Plon-Plon; was banished from France in 1873 and 1886.

Bonaparte, Pauline, 1780-1825; Princess Borghese; b. Ajaccio; the most beautiful of

Napoleon's sisters. In 1801 became the wife of Gen. Leclerc, who d., 1802; married, 1803, to Prince Camille Borghese, an Italian, from whom she soon separated.

Bona'ssa, genus of gallinaceous birds, the *Tetraonidae*, included in the popular term, grouse; comprises the hazel grouse, a European bird, the *Bonasa bonasa*. Another species is the American ruffed grouse (*B. umbellus*), about 18 in. long; called the pheasant in Pennsylvania and the partridge in New York and New England. The male has on each side a large shoulder tuft or ruff. In the breeding season it struts with erected ruff and tail like a turkey cock.

Bond, Sir Robert, 1857- ; Canadian statesman; b. St. John's, Newfoundland; called to the bar, but entered politics; member legislature, 1882; speaker of house, 1884; executive councilor and colonial secretary, 1889-97; assisted Lord Paunceforte in negotiating a reciprocity treaty with the U. S., 1890, and was mainly instrumental in negotiating the "Bond-Blaine Convention"; delegate to convention on the Newfoundland Fisheries question, 1892; special delegate to conference on French treaties, 1901; knighted, 1901; reopened negotiations with the U. S. for reciprocal trade, 1902, and negotiated the "Hay-Bond Treaty."

Bond, in law, an instrument in writing, sealed and delivered, whereby a person binds himself to pay a sum of money. It is also called a deed. It is either simple or with a condition. A bond is said to be simple when the engagement to pay is absolute. An instrument in the form of an ordinary promissory note becomes a simple bond if executed under seal. The most common form of bond is one executed under a condition consisting of two parts—the engagement to pay, and the condition upon which the engagement to pay will become inoperative and void. The person who enters into the bond is called the *obligor*; the person to whom the engagement is made is termed the *obligee*. When it is executed by two or more persons, they may be either "joint" obligors or "joint and several"; that is, they may either bind themselves collectively, or both collectively and separately. See RECOGNIZANCE.

Bond'age, originally, the villeinage or basest form of tenure of the old English feudal law; now used for a tenure existing in Scotland and the N. of England, by which the tenant of a cottage on a farm is bound to work at certain seasons for the farmer under whom he holds the cottage. Such a tenure is called a bond-ager.

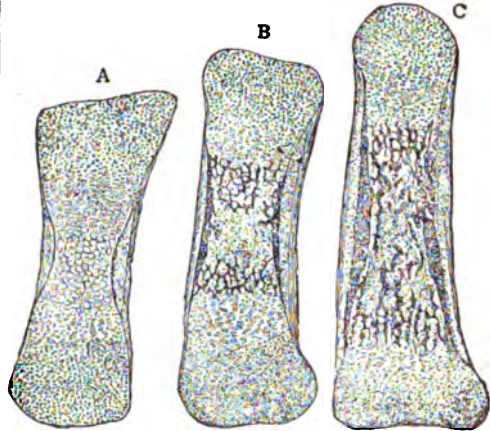
Bond'ed Warehouse. See WAREHOUSING SYSTEM.

Bön'der, yeomanry of Sweden and Norway. The bönder often claim an aristocratic origin. They constitute a large majority of the population.

Bondu', small district or kingdom of W. Africa; in the French Sudan; is bounded on the E. by the Falemé River, which separates it

from Bambuk; staple productions, cotton, indigo, maize, tobacco, and millet; capital, Bulibani; estimated pop. 1,500,000.

Bone, substance of which the hard internal skeleton or framework of most vertebrate animals is formed. In the embryo the bones, with few exceptions, are preceded by cartilage, or gristle, which is replaced by true osseous tissue; in some of the low fishes no such substitution takes place, the cartilage persisting as the adult skeleton. In addition to contrib-



TRANSFORMATION OF CARTILAGE INTO BONE.
A, B, and C, showing progressive changes.

uting the supporting framework, in many animals bone occurs in other localities; thus bony plates are found in the integument of armadillos, turtles, lizards, and certain fishes, in the heart of ruminants, in the diaphragm of camels, in the eye of many animals, in the tongue of certain birds and fishes, and in other organs. In animals below the vertebrates there is no true bone, osseous tissue here being substituted by amorphous incrustations and hardened excretions, composed principally of calcium carbonate.

Bone consists of (1) an organic portion, or matrix of interwoven connective-tissue fibers, united by a homogeneous ground substance, containing cellular elements, the bone cells, within interfibrillar spaces, and yielding gelatin on boiling; and (2) earthy matter, which impregnates the ground substance and produces the characteristic hardness of the tissue. Bones are usually covered at their ends or in some other part by cartilage; but the surface, with the exception of portions forming joints, is covered by a tough, fibrous membrane, the periosteum; hollow bones have a similar membrane within, the endosteum. These membranes are of the utmost importance in the growth, nourishment, and repair of bones. The endosteum also nourishes the marrow, a substance filling the cavities of bones, and occurring in the adult in two forms—red and yellow marrow. For the particular bones, see CLAVICLE, HUMERUS, etc. See also SKELETON.

Bone Ash, residue of burned bones; amounts to about sixty-six per cent of the weight of

the original bones; consists of the earthy salts of the bone; used as manure, for making superphosphates, phosphorus, and cupels, and is an important constituent of English china. Also called bone earth.

Bone Black, or **Animal Charcoal**, residue left on calcining bones in close vessels. On the application of heat destructive distillation takes place; combustible gases escape, accompanied by vapors which condense to ammoniacal water and offensive oils. Bone or Dippel's oil is thus produced. The residue in the vessels amounts to about fifty per cent in weight of the original bones. It is passed between rollers, and separated by sieves into different sizes. The composition of dry bone black is carbon, containing nitrogen; phosphate of lime, including a little phosphate of magnesia; carbonate of lime, sulphate of lime, alkaline salts, oxide of iron, and silica.

Animal charcoal has the property of absorbing gases, and also of absorbing substances from solutions. Its action is not limited to any one class of substances. Its chief application is for the purification of sugar. It may be revived after it has thus been used, but when exhausted, it, as well as the fine dust which is not suited for sugar refining, is used for making superphosphate, fertilizers, for making phosphorus, etc. As ivory black, animal charcoal is used as a pigment, especially for shoeblacking.

Bone Dust, finely ground fertilizers of dry and clean bones, or the product of fresh or soft bone, meat, and other animal material, which are by-products in other industries or the refuse of slaughterhouses. The value of bone dust lies in its phosphorus.

Bone'set, *Eupatorium perfoliatum* (*Compositæ*), herbaceous plant, a native of the U. S., growing in low or moist places. An infusion of the leaves is used as a tonic, diaphoretic, etc.

Bonheur (bō-nōr'), **Marie Rosa**, 1822-99; French painter of animals; b. Bordeaux; pupil of her father, Raymond Bonheur; began her studies by copying pictures in the Louvre; first attracted public notice by two pictures at Bordeaux, 1841; exempted by a special decree, 1853, from having her works passed upon by the Salon jury; received the Legion of Honor, 1865. "The Horse Fair," painted 1853, the most celebrated of her pictures, is in the Metropolitan Museum, New York City. A replica of this picture is in the National Gallery, London; "Plowing in the Nivernais" is in the Luxembourg Gallery, Paris. Her painting is exceedingly robust and vigorous in style and she possessed a fine talent for composition.

Boniface (bōn'ē-fās), the name of nine popes, the most important of whom were BONIFACE III, d. 607; convoked the council of seventy-two bishops, and obtained from Emperor Phocas acknowledgment that the See of Rome had universal supremacy; BONIFACE IV, d. 615; converted the Pantheon at Rome into a Christian church; BONIFACE VIII, 1294-1303; one

of the ablest and most ambitious popes; was engaged in incessant quarrels with Germany and France in his efforts to raise the papal chair to a sort of universal monarchy.

Boniface, Saint Winifrid, 680-755; the "Apostle of Germany"; b. Kirton, England; began to preach in Germany, 716; converted a great number of people and founded schools and monasteries; was made bishop by Gregory II, 723, and 732 Gregory III made him archbishop and primate of all Germany; Archbishop of Mainz, 745; assassinated by a pagan mob at Dokkum in W. Friesland, and his remains finally taken to the abbey of Fulda, founded by him.

Bonifacio (bō-nē-fā'chō), Strait of, channel which separates Corsica and Sardinia. The narrowest part is only 7 m. wide. On the top of a rock on the N. stands the town of Bonifacio, which has a good harbor.

Bonin' Islands, in the Pacific Ocean; 500 m. S. of Japan; divisible into three groups, the extreme N. are called Parry Islands, and the extreme S. Baily Islands; area, 38 sq. m. Peel Island, one of the middle group, is occupied by a small number of European and Polynesian colonists, the only inhabitants of the group. Japan now owns the islands.

Bonito (bō-nē'tō), fish of the family *Scomberidæ*, allied to the mackerel. One of these, *Gymnosarda pelamys*, is a native of warm seas. It is a beautiful fish, about 2½ ft. long, and resembles a mackerel in form. The term bonito is frequently applied to a related species (*Sarda sarda*) found on both shores of the N. Atlantic. On the Pacific Coast is another bonito (*Sarda chilensis*).

Bonn (bōn), a city of Rhenish Prussia, on the left bank of the Rhine; 19 m. by rail SSE. of Cologne. It has an ancient cathedral, which is a fine specimen of the Romanesque style. Bonn is famous as the seat of a celebrated university founded in 1818. Connected with which are an observatory, a botanic garden, and a museum of natural history. Bonn is a very ancient town; was an important Roman station; is said to have been rebuilt by the Emperor Julian in the fourth century. It was conquered by the French in 1802, and annexed to Prussia in 1814. It is the native place of Beethoven. Pop. (1900) 50,736.

Bonnat (bō-nā'), **Léon Joseph Florentin**, 1833- ; French painter of portraits, historical and religious compositions, and genre pictures; b. Bayonne; president of the Society of French Artists; one of the three professors of painting at the École des Beaux-Arts; works include portraits of many distinguished persons; "Christ on the Cross," 1874; "Jacob Wrestling with the Angel," 1876; "The Youth of Samson," 1891; "Martyrdom of St. Denis."

Bon'ner, Edmund, abt. 1500-69; English prelate; b. Hanley; gained the favor of Henry VIII, who appointed him Bishop of Hereford, 1538, and Bishop of London, 1539. Being hostile to the Protestant cause, he was deprived of his bishopric, 1549, and imprisoned until

the accession of Queen Mary, 1553, when he was restored to his office. He was the principal instigator of the bloody persecutions under Mary. Refusing to take the oath of supremacy on the accession of Elizabeth, he was imprisoned in the Marshalsea, London, where he died.

Bonneville (bôn'vil) Lake, extinct Pleistocene lake that twice occupied the now desert interior basin in Utah. When at its greatest expansion its surface measured almost 20,000 sq. m., and its depth was nearly 1,000 ft. When at its highest level, the waters overflowed N. across Red Rock pass to a branch of the Shoshone River, and thus reached the Pacific.

Bonnivard (bôn-né-vâr'), François de, 1496-1571; writer and politician; b. France; succeeded to the priory of St. Victor, near Geneva, 1510; sided with Geneva against the Duke of Savoy, arrested and imprisoned in the castle of Chillon, 1530; liberated, 1536, when his countrymen captured Chillon; wrote the chronicles of Geneva, 1546-52, which are not of great value, being uncritical and unjust. His imprisonment is the foundation of Byron's "The Prisoner of Chillon."

Bonpland (bôn-plân'), Aimé, 1773-1858; French botanist; b. La Rochelle; accompanied Humboldt in an expedition to S. America; discovered 3,500 new species of plants; published "Equinoctial Plants Collected in Mexico," 1808-16; Prof. of Natural History at Buenos Aires, 1816; arrested while in Paraguay and imprisoned for ten years; resided for many years in Uruguay.

Bony Fish. See **MENHADEN.**

Bony Pike, ganoid fish of the genus *Lepidosteus*; found in America; examples of a type now almost extinct. To the same genus belong the gar pike and the alligator gar of the U. S.

Bonze (bônz), a name applied by foreigners to the Buddhist monks of China and Japan; may be a corruption of the Japanese *bozu*, a Buddhist monk, or of the Chinese *fan sūng* (pronounced in Japan *hon*, or *bon*, *zo*), an ordinary member of the assembly, i.e., of the monastic order founded by the Buddha.

Booby, aquatic bird of the same genus as the gannet (*Sula*), family *Sulidae*; found on the coasts of tropical and subtropical countries. They seldom swim, but are birds of powerful wing; remarkable for stupidity and slow movement on the land. The name is more commonly applied to the darker species, the white ones being known as gannets. The commonest in the U. S. is *S. leucogastra*, very abundant along the S. Atlantic and Gulf coasts.

Book, literary composition, written or printed on any material and put together in any convenient form. The ordinary writing material of the ancients was papyrus. Parchment, thin leaves of lead and copper, ivory tablets, linen, etc., were also used. Leaves joined end to end and rolled up on a small roller made a volume (Latin *volumen*, from *volvare*, to roll). **Books** in a square form came in later. Such

a book was called a codex. Books were copied by hand down to the invention of printing, were frequently illuminated—i.e., adorned with sketches and miniatures in colors—and were rare and expensive. From the seventh to the eleventh centuries books were so scarce that often not one could be found in an entire city, and even rich monasteries possessed only a single mass book. The introduction of paper into Europe about the thirteenth century, and the invention of printing in the fifteenth century made modern bookmaking possible. Books printed before 1500 are known as incunabula (Latin *incunabulum*, cradle). Scarcity of parchment led in the Middle Ages to the washing or scraping off one writing to make room for another. A manuscript so treated was called a palimpsest. The terms folio (fol.), quarto (4to), octavo (8vo), duodecimo (12mo), etc., applied to books, indicate in a general way the size, folio being the largest. Books are printed on large sheets of paper; when these sheets are folded once, making each two leaves and four pages, the book is a folio; when folded twice, so as to make each four leaves and eight pages, the book is a quarto; folded so as to make eight leaves and sixteen pages, octavo, etc. See **BIBLIOGRAPHY**; **BIBLIOMANIA**; **CENSORSHIP OF BOOKS.**

Book of the Dead. See **RITUAL OF THE DEAD.**

Bookplates, printed or engraved labels pasted within the front covers of books to denote ownership. Their use dates back certainly to the last quarter of the fifteenth century. The earliest specimens known were made and used in Germany. Albrecht Dürer transformed the crude drawing and rough woodcut of his predecessors into an artistic design, engraved on wood or copper. The earliest dated plate yet found in France was made, 1574; in England, 1518. The plates of William Penn, founder of Pennsylvania, and of Francis Page, of Virginia, are dated 1703, were made in England, and are the earliest dated armorial bookplates used in the American possessions. The first American engraver to date a bookplate (1749) was Nathaniel Hurd, of Boston. Bookplates are found in all the countries of Europe, but the number is not large beyond the limits of England, Germany, and France. Sweden began their use some years after Germany. Switzerland and Italy have plates dating very early in the seventeenth century, and Spain, Denmark, Russia and Austria, the Netherlands, and Norway contribute but few early examples. The collecting of bookplates has been and is a matter of deep interest to many, and there are numerous publications on the subject.

Bookbinding, art of fastening together and inclosing the leaves of a book for preservation and use; practiced for many centuries. Long before the invention of printing, the written leaves of missals and other books were united together, and inclosed in covers of wood, parchment, etc. Much labor and expense was bestowed on a single volume, and the covers were frequently decorated with jewels and gold and silver. Modern bookbinding may be

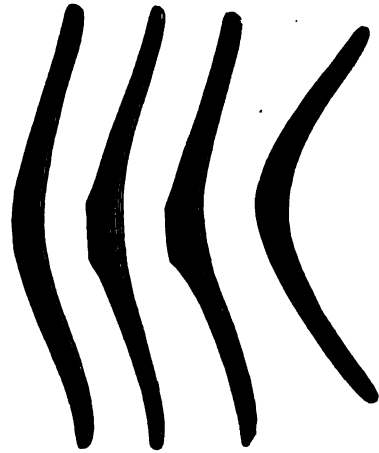
grouped in two main divisions—forwarding and finishing, the first comprehending what is necessary for the preservation of books, the latter pertaining to their embellishment. The first operation is to fold the sheet. The next process is gathering and collating. Gathering consists in putting together one each of the various sheets of which the book is made, and collating is the examination of the numbers 1, 2, 3, etc., which are placed at the foot of the outside page of the folded sections, called signatures. The book is then made solid by placing it under pressure. The book is then sewed and trimmed, and the edges, if desired, are gilded or colored. The case or cover is separately prepared, then lettered, embossed, and gilded by heated stamps. The book is now pasted on the sides, placed in the cover, and pressed until dry. This is the process of cloth-case binding, and some pursue the same course in extra or leather binding. Extra binding is properly distinguished from case binding by more careful sewing, and by the different parts of the cover being strongly connected with the book during the forwarding process, after which the external ornamentation is applied by hand. The process by which ornamentation is made on the outside of a book is called tooling, and when gold is not used, blind tooling. Full binding is the entire cover of leather; half binding, the back and corners only of leather, and the sides of paper or cloth. Sheepskin is extensively used, but calf, Russia, and morocco leathers are the best. Of the various kinds of binding, half roan is the cheapest, half calf the richest, and half morocco the strongest library binding. Much of the machinery used in bookbinding has been invented in the U. S. The folding, sewing, cutting, and backing machines are the most important.

Bookkeeping, art of recording the transactions of merchants or other persons engaged in pursuits connected with money. There are two modes of keeping books of account—the one by what is termed single, and the other by double entry. Both are in general use. The system of single entry is the simpler mode of bookkeeping. Where extensive and multifarious transactions have to be recorded, recourse is had to the system of double entry. The space which an account occupies in the ledger being vertically divided, the left-hand side is denominated debtor and the right-hand side creditor. The subsidiary books in general use are: The cash book, which contains a daily record of the receipts and payments of money; the bill book, a daily record of the bills, notes, or acceptances received and issued; the invoice book is simply a transcript of the invoices or bills of parcels of goods purchased; the sales book, which contains the particulars of goods sold on credit or shipped abroad on consignment; the day book, to record transactions which do not properly belong to the other subsidiary books. The journal is a record of the transactions compiled from the subsidiary books, daily, weekly, or monthly, as may be expedient. The rules for distinguishing the accounts which are to be debited

and credited are inferred from the arrangement of the ledger. The thing received, or the person accountable to you, is debtor; the thing delivered, or the person to whom you are accountable, is creditor. Thus: (1) The person to whom anything is delivered is debtor to the thing delivered when nothing is received in return. Therefore, when money is paid, the receiver is debtor to cash; when goods are sold on credit, the purchaser is debtor to goods. (2) The thing received is debtor to the person from whom it is received when nothing is delivered in return. Therefore, when money is received, cash is debtor to the payer; when goods are bought on credit, goods are debtor to the seller. (3) The thing received is debtor to the thing given for it. Therefore, goods bought for ready money are debtor to cash; when goods are sold for ready money, cash is debtor to goods. (4) When one person delivers anything to another on your account, the person who receives the value is debtor, and the person who gives it is creditor.

Boolak (bū'lāk). See BULAK.

Boom'erang, missile used by the aborigines of Australia in war and the hunt, consisting of a piece of hard wood about 2 ft. long, bent



BOOMERANGS.

to a parabolic curve. It is thrown as if to hit an object directly in advance, but finally takes a retrograde motion and falls near the projector.

Boondee (bôn'dē). See BUNDI.

Boone (bôn), Daniel, 1735-1820; American pioneer; b. Berks Co., Pa.; emigrated to N. Carolina; in 1769, with five companions, penetrated the forests of Kentucky, then uninhabited by white men; captured by Indians, but escaped, and continued to hunt in that region for more than a year; moved with his own and five other families to Kentucky, 1773; built, 1775, a fort at Boonesboro on the Kentucky River. The Indians attacked this fort several times, 1777, but were repulsed. Boone

was surprised and captured by them, February, 1778. They took him to Detroit, and treated him with lenity, but he soon escaped, and returned to his fort, which he defended with success against 450 Indians, August, 1778. He removed, 1795, to a place nearly 45 m. W. of St. Louis, Mo., and found there a new field for his favorite pursuits; received large land grants in Kentucky and Missouri which involved him in litigation, and most of his property was wrested from him. He died on his Missouri farm, but his remains were removed, 1845, by the State of Kentucky and interred near Frankfort.

Boonville, capital of Cooper Co., Mo.; on the Missouri River; 187 m. W. by N. of St. Louis; on a bluff 100 ft. above the river; is very healthful, and has an advantageous position for trade. The railroad bridge which here crosses the river is one of the most costly that spans the Missouri. The town was founded 1818. During the Civil War a Confederate camp was established here. June 16, 1861, Gen. Lyon reached Rockport, opposite Boonville, and the next day attacked the forces at Boonville under Col. Marmaduke. The Confederates, amounting to only 2,500 poorly armed raw troops, were routed, abandoning two guns and a quantity of clothing, camp equipage, etc. Pop. (1900) 4,377.

Bootan'. See BHUTAN.

Boötes (bō-ō'tēz), name of PHILOMELUS; son of Ceres and a brother of Plutus; said to have invented and used the plow. To reward him for this service he was translated into the constellation Boötes.

Boötes, constellation; represented on celestial globes as a man holding in one hand a club, and in the other a leash by which he leads two hunting dogs; comprises Arcturus, of the first magnitude. Boötes is bounded N. by Draco, E. by Corona Borealis and Serpens, S. by Virgo, and W. by Canes Venatici and Coma Berenices.

Booth, Edwin Thomas, 1833-93; American tragedian; b. Belair, Md.; son of Junius Brutus Booth; in youth traveled with his father, and first appeared at the Boston Museum, September 10, 1849, as *Tressell* in *Richard III.* His father playing *Richard*. His first appearance before a New York audience, was as *Wilford* in "The Iron Chest," at the National Theater, Chatham Street, September 27, 1850. Then played with a Baltimore stock company, and went with his father to California, 1852. He made an unprofitable trip to Hawaii and Australia, 1854, and, 1856, returned to the E. States, where he was welcomed and honored as a worthy successor of his famous father. His success extended in almost an unbroken line from that time till his death. He visited Great Britain and Germany, 1880-82, where he was received with enthusiasm. His notable parts were *Hamlet*, *Macbeth*, *Lear*, *Othello*, *Iago*, *Wolsey*, *Richard III.*, *Shylock*, *Richard II.*, *Benedick*, *Petruchio*, *Richelieu*, *Payne's Brutus*, *Ruy Blas*, and *Don Caesar de Bazan*.

Booth, John Wilkes, 1838-65; American actor; b. Hartford Co., Md.; son of Junius Brutus Booth; appeared on the stage at an early age, but met with indifferent success; sided with the Confederates, and, angered by their defeat, formed a conspiracy with Surratt, Herold, Payne, Atzerot, Arnold, Mudd, McLaughlin, Spangler, and others against the life of Lincoln, and personally shot the President during a performance in Ford's Theater, April 14, 1865; was tracked to a barn in Virginia by detectives, and, refusing to surrender, was shot dead.

Booth, Junius Brutus, 1796-1852; English tragedian; b. near London; first appeared on stage, December 13, 1813, at Deptford, England, as *Campillo*, in Tobin's "Honeymoon," and within four years became famous in London as *Richard III* and *Sir Giles Overreach*. These and *Pescara* were his great parts. He first acted in the U. S., July 13, 1821, at Richmond, Va., as *Richard III*. His career on the American stage was one long triumph, marred, however, by intemperance and incipient insanity.

Booth, William, 1829- ; founder of the Salvation Army; b. Nottingham, England; became a minister of the Methodist New Connection, 1850; resigned from the Conference, 1861, to enter upon evangelistic work; July, 1865, started "The Christian Mission" in the E. End of London, which grew rapidly, and was organized on military lines. In 1878 he gave to it the name of The Salvation Army, of which he became general and absolute commander. His entire family shared with him in this work. He has published several hymn books; "Salvation Soldiery," "Training of Children," "Letters to Soldiers," "In Darkest England," the latter containing a scheme for the enlightenment and industrial support of the lowest classes.

Boothia Felix (bō'thī-ā fē'līx), peninsula or island of N. America; in the Arctic Ocean; extends from latitude 69° to 75° N.; is bounded on the E. by Boothia Gulf; was discovered by Sir John Ross, and named in honor of Sir Felix Booth; contains the N. magnetic pole.

Boo'ty, in international law, personal property captured on land by a public enemy in time of war. It differs from prize, which is captured at sea. In prize the ownership of the property does not pass to the captor until condemnation by a prize court. Booty belongs to the captor after an undisturbed possession of twenty-four hours, and the right of *post liminium* is at an end. In strictness of law, booty belongs to the sovereign, and not to the individual soldier who captures it.

Boracic (bō-rās'īk) or Bo'ric A'cid, occurs native in certain lagoons of Tuscany, and in a crater in the island of Vulcano, N. of Sicily; is important for the manufacture of borax. The acid has the composition B(OH)₃. When heated it forms the oxide B₂O₃; is frequently called boracic acid. It is an antiseptic, and does not irritate when applied to wounds, etc.

Borax, compound of boracic acid and soda; found as a saline incrustation on the shores of lakes in Persia, Tibet, India, and in Peru, Chile, California, Nevada, and other regions. Borax is also prepared from boracic acid by solution in boiling water and the addition of sodium carbonate. It is also prepared from borate of lime, a salt largely procured from Chile, Peru, etc. Borax is a white salt of a sweetish taste, soluble in twice its weight of boiling water. It is useful as a flux in promoting the fusion of metallic mixtures and producing fusible silicates in assaying and in welding iron. As an agent in experimenting with the blowpipe it is valuable for the readiness with which it forms colored glasses with various metallic oxides. It is also used in medicine, and as a detergent in the laundry.

Bordeaux (baw-dô'), seaport of France; capital of the Department of Gironde; on the Garonne; 364 m. SSW. of Paris; has a capacious harbor, is accessible by vessels of 600 tons; the river here is about 650 yards wide, and crossed by a bridge of seventeen arches. Among the remarkable edifices are the Gothic cathedral, consecrated, 1096; the church of St. Croix, which belongs to the tenth century; the bridge, which cost about \$1,300,000; and great theater, one of the finest in Europe, built by Louis XVI. Superior wine, called Médoc, claret, or Bordeaux wine, is produced in this vicinity. Bordeaux, called in ancient times *Burdigala*, was founded before the Christian era; and was the capital of the Bituriges Vivisci; capital of Aquitania Secunda in the reign of Hadrian; and, 1152, was transferred to the English crown by the marriage of Henry of Anjou (afterwards Henry II of England) with Eleanor of Guienne. It has belonged to France since 1451. On December 10, 1870, the seat of government was transferred to Bordeaux, while Paris was besieged by the German armies. Pop. (1901) 257,638.

Bordeaux Wines, general name for several sorts of French wine produced in the department of Gironde. The red wines of Bordeaux are called claret in the U. S., to which they are largely exported. The average quantity produced annually in the Gironde is about 31,500,000 gal., the ravages of the phylloxera having diminished the vintage. Among the best are the Médoc, red, and the Graves, white. No French wines except champagne are so largely exported.

Border States, in American history, Delaware, Maryland, Virginia, Kentucky, and Missouri, on the border line between the free and slave states.

Bore, called also *Ea'ger*, term applied to the rapid rushing of the tide inland against the current of a river; produces the imposing phenomenon of a huge wave, which, like a moving wall of water, advances with great rapidity and a deep roaring noise up the river, often for hundreds of miles, to the limit of tidewater. In the Hugli River, one of the main mouths of the Ganges, the bore rushes up the river with great impetuosity. In the Chinese river, Tsientang, it rises to 30 ft. in

height, and travels at 25 m. an hour, sweeping everything before it. In the Amazon, at the equinoxes, bores of 15 ft. follow each other in quick succession, and within the space of 200 m. five such mighty waves may be seen traveling simultaneously up the river.

Boreas (bô'rê-ās), Grecian mythology, the personification of the N. wind, brother of Hesperus, Zephyrus, and Notus; imagined to dwell in the caves of Thrace, and represented with snow-covered wings, hair, and beard.

Borghese (bôr-gă'zâ), Camillo Filippo Ludovico (Prince of Salmona and Rossano), 1775-1832; b. Rome; son of Marco Antonio Borghese 3d; served in the French army in his youth, and married, 1803, Pauline, sister of Napoleon; was created Duke of Guastalla, 1806; sold the Borghese collection of antiquities and artistic treasures, gathered by his father, to Napoleon, but some of them were restored to him after the fall of the emperor.

Borgi (bôr'jê), Giovanni, abt. 1735-1802; Italian philanthropist; b. Rome; while a poor mechanic provided for the education of vagrant children; later was aided by Pius VII; considered the founder of "ragged schools."

Borgia (bôr'jâ), Cesare (Duc de Valentinois), 1476-1507; Italian cardinal and soldier; natural son of Pope Alexander VI; became cardinal, 1492; received from Louis XII of France the title of Duc de Valentinois, 1498; married a daughter of the King of Navarre, 1499; and with the connivance of the pope, his father, waged with success an aggressive war against several princes of the Romagna who were feudatories of the Roman See. He was guilty of many acts of cruelty and treachery, and procured the death of several persons by poison. He made himself master of the duchy of Urbino, but his prosperity was ruined by the death of Pope Alexander VI, 1503, and the accession of Julius II, an enemy. He was killed in battle, at Mendavia, Spain.

Borgia, Lucrezia, 1480-1519; sister of the preceding; b. Rome; was renowned for beauty, talents, and vices; married, 1493, to Giovanni Sforza, Lord of Pesaro; separated from him, and given, 1498, to the Duke of Bisceglia, a son of the Duke of Ferrara, who was assassinated two years later; married, 1501, Alfonso, Duke of Ferrara, of the house of Este. She was accused by contemporaries of poisoning, but several modern writers maintain that the charges against her are exaggerated.

Borgu (bôr-gô'), former native kingdom in Central Africa; W. of the Niger; now a district in N. Nigeria; in about latitude 10° N., now in part in the British Niger protectorate. The banks of the Niger are fertile and thickly populated, producing rice, indigo, grain, cotton, yams, lemons, bananas, sorghum, honey, and game in abundance. The population consists of the original inhabitants and Fulahs, and a Mohammedan conquering tribe speaking a language cognate with the Yoruba tongues.

Born, Bertran de (Count of Hauteville), d. abt. 1215; French poet; b. Provence; wrote

poems of war and of love; used his poetic art in affairs of great importance; had a harmful influence in the struggles of the sons of Henry II of England against their father and then among themselves; in his old age entered the monastery of Dalon.

Borneil (bōr-nāy'), *Guirant de*, flourished abt. 1175-1220; French poet; reckoned by Dante one of the three great troubadours, with Arnaut, Daniel, and Bertran de Born.

Borneo (bōr-nē-ō), island of Malaysia; length, 807 m.; width about 600 m.; area of the island proper, 283,400 sq. m.; with the small islands adjacent, 284,500 sq. m. Next to New Guinea, it is the largest island on the globe. The interior is traversed by chains of mountains. Near the N. extremity of the island is a peak called Kinibalu, which rises 13,680 ft. The maritime parts of the island are mostly marshes or low plains covered with dense forests. Borneo is watered by numerous navigable rivers—*viz.*, the Kapuas, Barito, Mahakkam, Redjang, and others. These mostly enter the sea through extensive deltas. The climate in the low grounds is hot; in the higher lands of the interior it is moderate and healthful. Among the minerals are gold, tin, antimony, zinc, diamonds, iron of fine quality, and coal, and among forest trees are the teak, ironwood, gutta-percha tree, ebony, cocoa palm, and sago. The island produces also cinnamon, camphor, betel, pepper, ginger, cotton, rice, and yams. The forests and jungles are infested with tigers, bears, leopards, buffaloes, and orang-outangs. The elephant also is found. The pop. (1901) 1,329,889 is chiefly of four races: Malays, Dyaks, Bugis, and Chinese. The Dyaks are the aboriginal inhabitants, and are the most numerous. Borneo is divided into (1) British N. Borneo, the N. end of the island from the Padas River on the W. coast to the Sibuco River on the E. coast; area, 31,106 sq. m.; pop. 200,000, consisting of the aboriginal tribes inland and Mohammedan and Chinese settlers on the coast; chief town, Kudat. (2) Brunei, a native sultanate, under British protection, on the W. coast from British N. Borneo to the Barram River; area, 4,000 sq. m.; pop. 10,000; chief town, Brunei or Borneo. (3) Sarawak, a sultanate occupying the W. coast from Brunei to Cape Datu and extending inland to the central mountain chain; is under British protection; area, 50,000 sq. m.; pop. 600,000. (4) Dutch W. Borneo includes the SW. part of the island S. of Sarawak and W. of about longitude 117° E., with all of the basin of the Kapuas River; area, 55,825 sq. m.; pop. 413,060. (5) Dutch S. and E. Borneo, including the parts of the island S. of N. Borneo and E. of Brunei, Sarawak, and W. Borneo; area, 156,912 sq. m.; pop. 716,800; chief towns of Dutch Borneo Pontianak (W. coast, on the Kapuas River) and Banjermassin (S. Borneo, on the Barito River). Borneo was discovered, 1518, by the Portuguese, who formed a settlement at Bandjermassin, 1690. The Dutch, who first visited the island, 1598, made a treaty of commerce with the Sultan of Sambas, 1609. They erected a fort and a

factory at Tatis, 1643, and another at Pontianak, 1778. The first British settlement was at the NE. angle, 1756.

Bornu (bōr-nō'), or **Bornou'** (native *Ka-nouwa*), state of Central Africa, mostly included in British Nigeria; bounded N. by the Sahara Desert, NE. by Lake Tchad, S. by Adamawa, W. by Sokoto; area about 50,000 sq. m.; pop. abt. 5,000,000; soil fertile, producing maize, millet, rice, cotton, indigo, pulse; climate excessively hot; principal rivers the Shari and Yeou, which flows into Lake Tchad; dominant race the Shouans, of Arab descent, and bigoted Mohammedans. Bornu was formerly a part of the kingdom of Kanem, founded in the ninth century; at the end of the fifteenth century Bornu was founded. In 1808 the Fellatahs conquered Bornu; and, 1838, an Arab dynasty replaced that of the Fellatahs.

Bo'ro Bud'ur, or **Bo'ro Bo'do**, ancient Buddhist temple of Java; on the river Probo; 25 m. NW. of Yuyakarta; believed to have been built 1350 A.D.; is a square pyramid, with nine terraces or stories (116 ft. high in all) and 400 ft. square at the base, each terrace covered with cells or small houses for monastics, and the whole covered with profuse carvings.

Borodino (bōr-ō-dē'nō), village of Russia; government of Moscow; on the Kolocza River; 70 m. WSW. of Moscow; celebrated as the scene of a great battle between the army of Napoleon and the Russian army commanded by Kutusof, September 7, 1812. The French claimed the victory, but lost nearly 30,000 men. The loss of the Russians was still greater; some say 50,000 killed and wounded. The French took Moscow a few days after this battle, which they call the battle of the Moskwa, a river near the field.

Bo'ron, element which Sir Humphry Davy discovered abt. 1808, by exposing boracic acid to the action of a galvanic battery; chemical symbol, B; atomic weight 11; specific gravity about 2; combined with oxygen and hydrogen, forms boracic acid; occurs in nature only in combination with oxygen, generally in the form of that acid or borax; is obtained in the form of an olive-brown powder, which is infusible, and has neither taste nor smell; is not used in the arts in a separate state. Wöhler and Deville have obtained boron by heating pure dry boracic acid with aluminium, when the latter unites with the oxygen, leaving the boron as minute quadratic octahedral crystals, called boron diamonds. These rival the real diamond in luster and refractive power, and are scarcely inferior to it in hardness.

Borough (būr'ō), in England, formerly, a fortified town; an incorporated town; any populous place, or a town, in general; now a town possessing a municipal corporation, and a town which returns one or more members to Parliament. There are often municipal and parliamentary boroughs of the same name, but differing in territorial extent. In Scot-

land, the borough is called a burgh, and designates a town having a charter. There are royal burghs, with a charter from the king, burghs of regality, with a charter from a lord of regality, and burghs of barony, with a charter from a baron. In the U. S. the term borough in Connecticut, Minnesota, New Jersey, and Pennsylvania designates an incorporated town or village of a lower grade than a city, and in New York, applied to the divisions of New York City. In New Jersey and Connecticut the borough is a part of the township, but in Pennsylvania and Minnesota the boroughs have independent municipal organizations.

Borough English, a custom existing in some boroughs in England by which the youngest son, of a person dying intestate, inherits all the realty. Lyttleton states that its reason is that the youngest son is less able to take care of himself than his elder brothers, but Blackstone refers the custom to primitive conditions which have now disappeared. Similar customs are occasionally met in other countries.

Borromean (bör-rö-má'än) **Islands**, group of four small islands of N. Italy; in Lago Maggiore; named from the family of Borromeo; are noted for their beauty. The most celebrated is the Isola Bella, occupied by a palace of the Borromeo family.

Borromeo (bör-rö-má'ö), Carlo (Saint), 1538-84; b. Arona, Lake Maggiore, Italy; nephew of Pope Pius IX; appointed a cardinal and archbishop of Milan, 1560; suppressed the Reformation in Italy; reformed his own clergy; canonized, 1610; wrote several religious works.

Bor'row, George, 1803-81; English author; b. Norwich; in his youth associated with the gypsies; as agent of the British and Foreign Bible Society traveled through Europe; published "The Zincali, or an Account of the Gypsies in Spain," 1841; "The Bible in Spain," 1843; "Lavengro," regarded as an autobiography, 1851; "The Romany Rye," "Wild Wales," 1862, etc.

Bosh-bok (bösh'bök), *Tragelaphus sylvaticus*; a S. African antelope; found in thick underbrush; prized for its fine venison; is about 4 or 5 ft. long, and has a voice like the barking of a dog.

Bosjesmans (böś'yēs-män). See BUSHMEN.

Bosnia (böz'nī-ä), with Herzegovina, a province of Austria-Hungary; bounded N. by the Save, E. by the Drin, S. by Albania, and W. by Dalmatia; area of Bosnia and Herzegovina, 19,702 sq. m.; pop. (1895) 1,568,092. The largest rivers, besides the Save, are the Bosna, Verbas, Narenta, and Drin (or Drina). The soil of the plains and valleys produces maize, wheat, hemp, and various fruits. Cattle grazing is important. Bosnia is rich in coal, iron, lead, and other metals. Has few manufactories except firearms, sabers, and knives. The population is a mixture of

Bosnians, Croats, Morlaks, Turks, Illyrians, Jews, gypsies, etc., the majority being Slavs. Capital, Sarajevo; other important towns, Mostar and Baniäluka. Settled by Slavs in the fifth or sixth century Bosnia was under the Byzantine empire for several centuries; once a powerful kingdom, it was, both before and after, in turn the prey of Hungary, Serbia, the German Empire, and the popes; its inhabitants, largely Protestants, amid terrible persecutions, repelled the attempts of all to convert them, till at last, in sheer despair, they surrendered to the Turks, 1463 to 1483, and their children were made Mohammedans by force. In the Russo-Turkish War of 1877-78 Bosnia opposed Turkey, and while remaining nominally a Turkish province, was occupied, with the consent of the great powers, by Austria. In 1908, with Herzegovina, it was annexed by Austria-Hungary.

Bosporus (bö'spö-rüs), ancient name of the strait which connects the Black Sea (Pontus Euxinus) with the Sea of Mármora (Propontis), and forms part of the boundary between Europe and Asia; 16 m. long, and from $\frac{1}{2}$ to 2 m. in width. Constantinople stands at its SW. end; sometimes called the Strait of Constantinople. It was also called the Thracian Bosporus, to distinguish it from the Cimmerian Bosporus.

Bosporus, Cimmerian, ancient name of the Strait of Yenikale (or Strait of Kaffa); connects the Black Sea with the Sea of Azov (Palus Mæotis); width of the narrowest part about $3\frac{1}{2}$ m.

Bossuet (bö-sü-ä'), Jacques Bénigne, 1627-1704; French theologian; b. Dijon; in 1652 ordained a priest, received the degree of D.D., and became Canon of Metz; having become renowned as a pulpit orator, was appointed to preach the Advent sermons before the king and court, 1661; in the ensuing years he preached in many churches of Paris, and converted Turenne to the Catholic communion; became Bishop of Condon, 1669; preceptor to the dauphin, 1670; and Bishop of Meaux, 1681. For the dauphin he wrote a "Discourse on Universal History," 1681, which marks a new stage in the philosophy of history; author of four articles which were adopted by an assembly of French clergy, 1682, and which secured the liberties of the Gallican Church against papal aggression. Against the Protestants he wrote "Exposition of the Doctrines of the Catholic Church on Subjects of Controversy," 1671; but his principal polemical work against the Protestants is his "History of the Variations of the Protestant Churches," 1688, an attempt to argue from the alleged contradictory teachings of Protestantism, shown in the various confessions of the sixteenth and seventeenth centuries, in favor of the Church of Rome which has doctrinal stability. Among his most admired compositions are his "Funeral Orations" on the Prince of Condé, on the two Henriettas of England, and other eminent persons.

Bos'ton (perhaps degenerated from Botolph's Town), borough and seaport of Lincoln, Eng-

land; on both sides of the Witham; 107 m. N. of London; supposed to be identical with Icanhoe, where St. Bodolph founded an abbey, 54 A.D. About 1200 was a chief seaport of England. Here is the parish church of St. Bodolph, built, 1309, with a tower 290 ft. high, surmounted by a lantern visible 40 m. at sea. Pop. (1901) 15,667.

Boston, capital of Massachusetts, in Suffolk Co.; commercial metropolis of New England; jocularly called "the Hub of the Universe"; at the W. extremity of Massachusetts Bay. The site, originally a pear-shaped peninsula less than 2 m. in length, with an area of a little more than $1\frac{1}{2}$ sq. m., has been increased by reclamation, the filling in of coves, creeks, etc., and by the annexation of adjacent towns, about 43 sq. m.; now includes S. Boston, E. Boston, Roxbury (Boston Highland), W. Roxbury, Dorchester, Charlestown, and Brighton. Pop. (1908) 602,278. No city in the U. S. has suburbs of greater historic interest. Near the heart of Boston proper is the Common, shaded with trees, containing the historic Frog Pond; separated from it by a single street is the Public Garden. The park system consists of a chain of parks extending from the Back Bay Fens to City Point, and embracing about 2,400 acres. The street-railway system is one of the largest in the world under a single management. There are several subways. The notable historic buildings include the Faneuil Hall, 1742, Old South Meeting House, 1729, and Christ Church (Episcopal), 1742. Boston is noted for its educational institutions, among which are the Boys Latin School, 1635; Boston University (Methodist Episcopal); Massachusetts Institute of Technology; medical schools of Harvard and Tufts; Perkins Institute for the Blind, and New England Conservatory of Music.

Boston has a deep and secure harbor containing nearly 60 sq. m. of anchorage. It is the principal mart for wool, shoes, and leather, and the business and financial center of New England. The U. S. Census of 1905 reported 2,747 manufacturing and mechanical industries, with aggregate capital of \$131,562,822; value of products, \$184,351,163. Sugar and molasses refining, printing and publishing, foundry and machine-shop products are leading industries.

Boston was called by the Indians, Shawmut. The first white settler (abt. 1623) was William Blackstone, an English clergyman. In 1630 a colony under Winthrop and Dudley arrived and located here, calling the place Trimountain, from the three peaks which Beacon Hill originally showed, subsequently naming it Boston, after the town in England from which many of them had come; it became the capital of Massachusetts colony, 1632. The city charter was granted, 1822. The first American newspaper, the *Boston News Letter*, was issued, 1704. From the old town the British troops went to meet "the embattled farmers" at Lexington and Concord. The battle of Bunker Hill, the site of which is now within the city limits, followed; then the siege of Boston, and the evacuation of the

British troops, forced by Washington, 1776. Boston was the richest and most populous town in the colonies at the time of the Revolution, although it contained less than 20,000 inhabitants.

Boston, complex but interesting game of cards; played with two packs, which count as in whist. The players bid in turn for the privilege of undertaking to do any one of fifteen different things, which rank in the order of difficulty, and vary from taking all the tricks to playing with hand open on the table and taking no tricks. There are, consequently, no poor hands, as in whist.

Boston Mas'sacre, an affray between a mob of Boston citizens and a squad of British soldiers, March 5, 1770. It was caused by the opposition of the Bostonians to the quartering of British troops in Boston in time of peace. Five persons were killed and several wounded. At the town meeting next day, under the lead of Samuel Adams, the withdrawal of the troops from town was demanded; the authorities finally acceded and removed the troops to Castle Island.

Boston Port Bill, name of a bill passed in March, 1774, by the British Parliament in retaliation for the destruction of tea in Boston Harbor, December 16, 1773. It provided for the complete closing of the port to all commerce until the town paid for the tea and promised submission to the laws.

Boston Tea Par'ty, name given to the action of a body of Boston citizens, December 16, 1773, opposing the parliamentary tax on tea. England had hoped to coax or bribe the colonies into paying the tax by reducing it, so that the price of tea was actually less than in England. Cargoes of tea were sent to Boston, but the people refused to pay the tax, and demanded that the tea be sent back to England. The authorities refusing to allow the return of the vessels, a body of Boston citizens, disguised as Indians, boarded the vessels at night and threw the tea into the harbor. Parliament retaliated by passing the Boston Port Bill.

Boston Univer'sity, coeducational institution at Boston, Mass.; chartered, 1869; founded by members of the Methodist Episcopal Church. All its colleges and schools have separate faculties and separate administrations. The university council consists of the president and the deans of all the colleges and schools; the university senate, of all members of the council, together with all regular professors in the different faculties.

Bos'tra, **Bots'rah**, or **Bos'rah**, formerly a great city of Arabia, now in ruins; in an oasis of the Syrian desert, 5 m. S. of Damascus, and 40 m. E. of the Jordan. It was in the S. part of the district of Auranitis, the modern Hauran, of which it was the capital in the Middle Ages. Trajan made it the capital of the Roman province of Arabia abt. 105 A.D. The Roman Emperor Philip gave it the title of Metropolis, probably because it was his native place.

Boswell (bōz'wēl), James, of Auchinleck; 1740-95; British author; b. Edinburgh; studied law, but did not practice; in 1773 became a member of a literary club in London established by Dr. Johnson; established an intimacy with the latter; recorded his sayings, opinions, and actions in "Journal of a Tour to the Hebrides" and in "Life of Dr. Samuel Johnson," 1791.

Bosworth (bōz'wērth), market town of Leicester Co., England; 10 m. W. of Leicester. On a moor near this town was fought, August, 1485, the battle of Bosworth, in which Richard III was defeated and killed. This battle terminated the civil war of the Roses, and raised Henry VII to the throne.

Bot'fly, any dipterous insect of the family *Æstridae*, but in the U. S. generally restricted to the horse botfly, *Gastrophilus equi*. The fly lays her eggs upon the hairs of the horse, and almost immediately dies. The eggs, conveyed to the horse's stomach, are hatched, and the larvæ are provided with mouth hooks, by which they cling to the coats of the stomach. In about a year's time they are discharged with the excrement, and in one month they are changed into perfect flies.

Bot'any, that branch of biology which treats of the plant kingdom. Aristotle and Theophrastus (abt. 350-300 B.C.), and Dioscorides and Pliny (in the first century A.D.), all left writings descriptive of plants. For the next thousand years little or nothing was added to botanical literature. About the middle of the sixteenth century, Brunfels, a German monk, published an illustrated "History of Plants." The first attempt to classify plants was made by Cesalpino, an Italian physician, who died in 1602. His classification was based upon the fruits. In 1682 John Ray, an Englishman, first recognized the true affinity of plants, and promulgated what may be called the first "natural" system of classification. Tournefort, about the same time, classified plants as herbs, undershrubs, shrubs, and trees; he was the founder of *genera* in plant grouping, as now understood. His system was supplanted by the binomial system of Linnæus, who also proposed a system of grouping plants according to their stamens and pistils. This system was further elaborated and perfected by Jussieu (1789), De Candolle (1816), and Robert Brown (1830), and finally placed upon a sure foundation by Charles Darwin abt. 1860.

For convenience in study, botany has been divided into three main divisions, *viz.*, structure, functions, and relationships of plants and their parts. Sometimes these are subdivided; structure, into anatomy and morphology; function, into physiology, pathology, etc.; while the relationships of plants are discussed under classification, distribution, economic botany, ecology, etc.

We may say that, for the most part, plants are cells inclosed in walls of cellulose, or aggregates of such cells, all or part of which contain chlorophyll, a green substance by means of which they are able to appropriate

carbon from inorganic matter. Protoplasm is composed of minute balls of soft matter, each surrounded by a harder coat, or cell wall. The protoplasm and wall together form the cell. Soft tissue may be regarded as typical plant tissue, inasmuch as it constitutes the essential part of every plant. All assimilating, growing, and reproductive organs are composed of such cells. The other tissues are accessory, and serve to protect, strengthen, or connect the masses of soft tissue, and are called filaments, thallomes, shoots, and roots, as they develop in the higher plants.

The food supply for the cells of a plant is (1) water, (2) solutions which are used directly by the cells, (3) the hydrocarbon made by the green cells, to which may be added (4) oxygen, which is freely absorbed by the active cells. Considering the higher plants only, it is found that nearly all growth is made by taking gases from the air and minerals in solution from the soil or water, the solutions entering through the cell wall. In terrestrial plants the absorption of mineral materials is through the delicate root cells in contact with the soil. Once inside the cell the food material may be converted into cell matter at once, or it may be transferred to distant parts of the plant for use. The bulk of the material going to make up the plant comes from the air, by the green cells taking carbon dioxide therefrom. In an ordinary plant, water is conducted from the roots to the leaves and young twigs, where it meets the carbon dioxide absorbed by the cells containing chlorophyll and under the action of sunlight certain compounds are formed, among them starch. After its formation these cells use what they require, and the remainder is converted into a soluble form and transferred to other parts of the plant, where it is utilized for growth or is stored. All plants contain a considerable amount of water, carrying food materials in solution. This fluid is subject to certain movements from cell to cell, but there is nothing in plants analogous to the circulation of blood found in the higher animals. There is an evaporation or exudation of water from leaves and from exposed or cut surfaces, and this gives rise to a movement of water or sap in the roots and stems. A large amount of watery vapor is lost through the leaves, and this loss is supplied from deeper cells, which in turn draw from others more remote.

The lower plants secure reproduction of their kind by the simple process of cell division, each portion becoming a new individual. In many of the lower plants special portions are developed, and later separate from the parent plant as spores, and form new plants. Among the higher plants, groups of cells, buds, leaves, and even shoots are spontaneously cut off and develop into new plants. In the flowering plants the male cells form the pollen grains and the female cells the ovules, the fertilization of which results in the development of the seed. Plants are distributed over the globe in many ways. Air currents, water, animals, man, and other agencies are concerned in carrying plants from place to place. When spores or seeds fall upon the ground their successful

establishment depends upon a number of factors, one of which is temperature; others of almost equal importance are moisture, light, air, food supply, etc. Each combination of conditions results in different plant associations, and a study of plants in relation to environment is a branch of geographical botany called ecology.

Economic botany treats of plants in their relation to man. It is concerned with the uses of plants, their habit of growth, limitations for introduction into new regions, improvement by breeding and selection, their diseases, the remedies, etc. Many plant diseases are due to physiological disturbances, as lack of nutrition, drought, light, etc., while others are caused by parasitic fungi and bacteria. Of this class are the rusts and smuts, leaf spots and blights, wilts, scabs, rots, etc. Means for preventing some of these very destructive diseases are known, and by precautions to secure vigorous growth and spraying with certain chemicals, crops may be produced in regions where otherwise there would be almost complete failure.

Many attempts have been made to classify the 200,000 species of plants of all kinds. A classification that embraces the more modern idea of grouping is given herewith. In this, six subkingdoms of plants are recognized, while other systems combine some of these and others divide them still more.

I. **PROTOPHYTA**.—The lowest of plants; they consist of single cells. These plants are minute, many are aquatic, and are colorless, or nearly so. Here are classed the slime molds, nostocs, yeasts, bacteria, etc.

II. **PHYCOPHYTA**.—Consists of single cells, chains, or masses, sometimes forming branched plants with rootlike processes. About 10,000 species are known, most of which are aquatic. Embraces the green and brown algæ, volvox diatoms, desmids, black molds, downy mildews, many seaweeds, pond scums, etc.

III. **CORPOPHYTA**.—These consist of chains, plates, or masses of cells; the latter often forming branched growths furnished with rootlike organs (rhizoids). This group of plants embraces from 40,000 to 50,000 species, many of which are imperfectly known, and includes the sac and cup fungi, the mildews, truffles, lichens, black fungi, rusts, smuts, puffballs, mushrooms, red seaweeds, stoneworts, etc.

IV. **BRYOPHYTA**.—This group is characterized by more or less flattened branching plants with rhizoids or a small branching stem. About 8,000 species are embraced in this group, which includes mosses, liverworts, scale mosses, bog mosses, etc.

V. **PTERIDOPHYTA**.—In this group the plant consists of masses of cells arranged in various ways; some are flat with greatly reduced body, others with stem and true roots and spore-bearing leaves. In this group are classified some 4,000 or 5,000 species, and includes the ferns, horsetail rushes, club mosses or lycopods, quillworts, etc.

VI. **SPERMATOPHYTA**.—This is the largest and highest group of plants, and is the only one the members of which bear flowers. About 120,000 to 150,000 species are embraced in this

great group, which includes most of the plants of ordinary use and interest.

All these groups are divided and subdivided until the species is reached, and even this is sometimes further separated into subspecies, variety, form, etc. In classifying plants the sequence followed is about as follows:

- Kingdom.
- Subkingdom or series.
- Class.
- Subclass.
- Order.
- Family.
- Genus.
- Species.
- Variety or form.

The development in the study of botany made necessary botanical gardens, where collections of living plants could be brought together for comparison and study. Such collections, now recognized as important adjuncts in teaching the subject, are maintained in connection with many universities, research laboratories, and agricultural experiment stations, etc. Botanic gardens were first established for the study of medicinal properties of plants, and it is said that such gardens were in existence more than two thousand years ago in Pontus and Pergamum. Among the more noted modern botanic gardens are those at Kew, England, first established as a private institution, and taken over by the government in 1841; the Jardin des Plantes, in Paris; and gardens in Berlin, Germany; Buitenzorg, Java; and other places. The first established in the U. S. was that founded by John Bartram near Philadelphia. Other noteworthy botanic gardens in the U. S. are the Arnold Arboretum of Harvard Univ.; New York Botanic Gardens, Bronx Park, N. Y., and the Missouri Botanic Gardens, St. Louis. Collections of plants are also kept for study in a dried form, arranged between sheets of paper, or preserved in some other way. Such a collection is called an herbarium. The most important public herbaria in Europe are at London and Kew, England. In the U. S. the principal ones are the Gray Herbarium at Harvard Univ.; the collections of the New York Botanic Gardens; the National Herbarium, Washington, D. C.; the Missouri Botanic Gardens, St. Louis; and the Field Columbian Museum, Chicago, Ill. See FLOWER, FRUIT, TREE, etc.

Botany Bay, bay of Australia; in New S. Wales; discovered by Cook, 1770; received its name from Joseph Banks, botanist of the expedition. A colony of British convicts was planted here, 1787, and was removed to Port Jackson, 1788, but the penal colony long continued to retain the name of Botany Bay. The transportation of criminals was discontinued in 1840.

Bo'tha, Louis, 1864- ; Boer leader; b. Greytown, Natal; became a farmer near Vryheid, Transvaal; represented Vryheid in the Volkraad; when war broke out with Great Britain, led the Vryheid commando; directed the Boers with success at Colenso and Spion Kop; succeeded Joubert as commandant gen-

eral on latter's death, March, 1901; showed remarkable ability in planning and leading; by proclamation, September, 1901, declared Lord Kitchener and all in arms under him outlaws; his forces demoralized near Lydenburg, September, 1901, and put to flight; with Gens. De Wet and Delany, received by King Edward at Cowes, August, 1902. Under the constitutional government granted the Transvaal Colony, 1906, he became premier, 1907.

Bothnia (bóth'ní-ä), formerly a country of N. Europe, which belonged to Sweden, situated on both sides of the Gulf of Bothnia. The E. portion is now comprised in Finland, and the W. forms the Swedish province of Piteå and Umeå.

Bothnia, Gulf of, N. portion of the Baltic Sea; extends from Torneå S. to the island of Åland; is about 400 m. long and from 60 to 130 m. wide; bounded on the E. by Finland and on the W. by Sweden; greatest depth about 50 fathoms.

Bothwell, James Hepburn (Earl of), abt. 1536-78; b. Scotland; inherited the title and large estate of his father, 1556; was imprisoned for a conspiracy to seize the queen's person, 1562, but escaped to France, and was outlawed; returned, 1565, and became an enemy of Regent Murray and a favorite adviser of Queen Mary. The murder of Darnley (1567) is generally imputed to him; he was indicted, but as he came to court with 4,000 followers, was acquitted. In 1567 many nobles signed a bond or document in which they commended Bothwell as a fit husband to the queen, whom he carried to Dunbar Castle, and married in May of the same year. A strong party soon took arms against Bothwell, who fled to Denmark, where he was imprisoned till his death.

Bothwell, village of Bothwell parish, Lanark, Scotland, near the river Clyde, 8½ m. SE. of Glasgow. In the vicinity are the ruins of Bothwell Castle. The Covenanters were routed by the Duke of Monmouth, June 22, 1679, at Bothwell Bridge.

Botocudos (bó-tó-kó'dóz), a native tribe of Brazil, living in the forests on the Rio Doce, along the boundary of the provinces of Espírito Santo and Minas Geraes; are said to resemble the Chinese. They are brave, but treacherous, and have caused the government considerable trouble. They number about 4,000, and are rapidly dying out. They pierce the lower lip and insert a block of wood in the hole, from which comes their Portuguese name (*botoque*, a block of wood).

Botta (bót'tä), **Paul Émile**, 1802-70; Italian archaeologist and traveler; b. Turin; entered the service of Mehemet Ali of Egypt as physician, abt. 1830, and became French consul at Alexandria. Having visited Arabia, 1837, he published a "Narrative of a Journey to Yemen, etc." 1844; went as consul to Mosul, and, 1843, began to excavate the mound at Khorsabad near the Tigris for monuments of ancient Assyria, and there discovered the palace of Sargon (King of Assyria, 722-705 B.C.)

with statues and cuneiform inscriptions. With the aid of the artist Flandin, he published a magnificent work, entitled "Monuments of Nineveh, Discovered and Described by M. Botta, with Designs by Flandin," five volumes, 1847-50.

Bottesini (bót-tá-sé'né), **Giovanni**, 1822-89; Italian musician; celebrated not only as a composer, but also as the most remarkable performer on the double bass ever known; b. Crema, Lombardy; admitted to the Milan Conservatory when eleven years old, and took up the double bass as a solo instrument; visited the U. S. with Arditi, and made a successful tour; first opera, "Christophe Colombe," was produced in Havana, 1846; "L'Assedio di Firenze," Paris, 1856; "Ali Baba," London, 1871; "Ero e Leandro," Turin, 1879; his oratorio, "The Garden of Olivet," was sung 1887.

Böttger (bót'tjér), **Böttcher**, or **Böttiger**, **Johann Friedrich**, 1682-1719; German alchemist; b. Schleiz; noted as the inventor of Meissen porcelain; spent much time and money in the search for the philosopher's stone.

Botticelli (bót-té-chél'le), **Sandro**, real name **ALESSANDRO FILIPEPI**, 1447-1515; Italian painter. He took the name Botticelli from his first master, a goldsmith, but his teacher in painting seems to have been Fra Lippo Lippi. Before 1480 he had painted a remarkable "Birth of Venus," now in the Uffizi Gallery of Florence, the "Adoration of the Three Kings," in the Academy of Florence, and the large picture in the same gallery called "The Triumph of Spring," "The Triumph of Venus," and by other names. The last-named work is of mystical subject, and is very characteristic of the Italian Renaissance. In 1480 he was invited to Rome, and before 1484 he had painted on the walls of the Sistine Chapel several large frescoes, which still exist. Drawings of his exist illustrating the great poem of Dante, and he is thought to have engraved some of his own designs. Botticelli's work from 1484 to his death is but little known. In his prime he shared with Ghirlandajo the credit of being at the head of Florentine painting, and all the tendencies of advance and development of the epoch are to be seen in his work.

Bot'tle Gourd, or **Cal'abaah**, plant of the genus *Lagenaria*, order *Cucurbitaceæ*; nearly allied to the *Cucurbita*, in which it was formerly included. The *L. vulgaris*, or common bottle gourd, is a native of India, but cultivated in many warm climates. It is a climbing annual, having white flowers, and a large bottle-shaped fruit with a hard rind, called a *calabash*, which is used for holding or dipping water. This fruit is sometimes several feet long. Some varieties have an edible pulp, which is an important article of food.

Bot'tle-nose Whale, or **Bottlehead** (*Hyperodon rostratus*), cetaceous mammal of the family *Ziphiidæ*; inhabits the N. Atlantic and sometimes ascends rivers; reaches a length of about 25 ft., and is remarkable for its bottle-shaped head.

Bottle Tree, Australian tree of the family *Sterculiaceæ*; has a greatly expanded trunk, which is swollen to a disproportionate size;



BOTTLE TREE.

branches emerge from top as from the neck of a bottle; wood abounds in a gum similar to tragacanth.

Bot'tomry, in maritime law, a contract by which the owner of a ship, or the master as his agent, hypothecates or binds the ship as security for the repayment of money advanced for the use of the ship.

Boucher (bōw'chër), **Jonathan**, 1738-1804; Anglo-American philologist; b. Blencow, Cumberland, England; removed to Virginia, 1756; ordained in England, 1762; in 1768 appointed by Gov. Eden to St. Anne's, Annapolis, and afterwards to Queen Anne's, Prince George Co. Sympathizing with the motherland at the breaking out of the Revolution, he returned to England, 1775; compiled a "Glossary of Archaic and Provincial Words," published "A View of the Causes and Consequences of the American Revolution," 1797.

Boucicault (bō-sē-kō'), **Dion**, 1822-90; Irish playwright and actor; b. Dublin; produced his first successful play, "London Assurance," written in conjunction with John Brougham, 1841; among other plays of this period, "The Irish Heiress" and "Old Heads and Young Hearts"; lived in the U. S., 1853-60; produced in London plays including "The Colleen Bawn," 1860; "The Octoroon," 1861, which denounced slavery; "Arrah-na-Pogue," "The Flying Scud," "The Long Strike," 1867; returned to the U. S., 1872; produced "Daddy O'Dowd," 1873; "The Shaughraun," 1876, etc.; best successes won in impersonations of eccentric characters. His plays are seldom original in plot, but are often original in action, treatment of incidents, and are bright in dialogue.

Boudinot (bō'dī-nōt), **Elias**, 1740-1821; American philanthropist; b. Philadelphia; practiced law in New Jersey, and supported

the popular cause in the Revolution; was a member of Congress, 1778-79, 1781-84; its president, 1782, in which capacity he signed the treaty of peace with Great Britain; and was director of the mint at Philadelphia, 1795-1805. In 1813 he was a founder of the American Board of Commissioners of Foreign Missions; in 1816 became the first president of the American Bible Society, and so remained till his death. He gave large sums of money for charitable purposes. His "The Star in the West" is an attempt to identify the lost tribes of Israel with American Indians.

Boufflers (bō-fîér'), **Louis François** (Duc de), 1644-1711; French general; served under Turenne and Catinat; distinguished himself at Shteenkerke, 1692; became a marshal of France, 1693; commanded at Namur when it was besieged by William III of England, 1695, and defended Lille with success, 1708, against Prince Eugène.

Bougainville (bō-gān-vêl'), **Louis Antoine de**, 1729-1811; French navigator; b. Paris; aide-de-camp to Montcalm in America, 1756; served with distinction in Germany, 1761; the first Frenchman to circumnavigate the globe, 1767-69; during the American Revolution had a high command in several naval battles between the French and British.

Boughton (bōr'tōn), **George Henry**, 1834-1905; English figure painter; b. Norwich; lived in the U. S. (Albany, N. Y.), 1836-60; in London from 1861; works include "The Scarlet Letter," "Return of the Mayflower," "Puritans Going to Church," "Canterbury Pilgrims," "Edict of William the Testy" (Corcoran Gallery, Washington, D. C.).

Bouguereau (bōg-rō'), **Adolphe William**, 1825-1905; French figure painter; b. La Rochelle; worked in Paris; paintings include "Youth of Bacchus," "Madonna of Consolation," "Birth of Venus," "Nymphs and Satyr." A skillful draughtsman and a delicate but not forceful colorist. His ability has been the subject of difference of opinion among artists, though most of his pictures are weakly sentimental figures of woman and children.

Bouillé (bō-yā'), **François Claude Amour** (Marquis de), 1739-1800; French general; b. Auvergne; served in the Seven Years War; governor of Guadeloupe, 1768; during American Revolution captured several British islands in the W. Indies; member of assembly of notables, 1787-88; commander in chief of the army of the Meuse, Saar, and Moselle, 1790; aided Louis XVI in his attempt to escape from Paris; served under Gustavus III of Sweden, 1791; later under Prince of Condé; author of "Mémoires sur la Révolution Française."

Bouillon (bō-yōn'), **Godefroi de**. See GODFREY OF BOUILLON.

Boulac (bō-lāk'). See BULAK.

Boulanger (bō-lōn-zhā'), **Georges Ernest Jean Marie**, 1837-91; French soldier; b. Rennes; chief of battalion in the army of Paris during the Franco-Prussian War; brigadier general, 1880; sent to the U. S. as head of the

mission to the Centennial Celebration, 1876; Minister of War, January 7, 1886; became the idol of the populace and the rising hope of the radicals, but eventually brought forward measures for the reorganization of France which were accepted by Bonapartists, monarchists, clericals, and socialists. The movement known as Boulangism attracted all the malcontents, who elected him deputy for Nord by 100,000 majority, and for a time seriously disturbed political affairs in France. Accused of embezzlement, treason, and conspiracy, 1889, he fled to Great Britain to avoid arrest; trial proceeded in his absence, and he was sentenced to transportation for life; committed suicide.

Boul'der, large mass or rock, usually rounded by attrition; many have been transported hundreds of miles by icebergs or glaciers. Large masses of Scandinavian rocks are scattered over the plains of Denmark and N. Germany. The pedestal of the statue of Peter the Great at St. Petersburg was hewn out of an erratic granite boulder 42 ft. long, 27 ft. broad, and 21 ft. high. In the W. states occur many granite boulders which probably came from Canada. They abound along the coast of New England, where they often are so large as to form a prominent feature in the landscape. The famous Plymouth Rock is a boulder of syenite. See **Rock**.

Boule, the ancient Athenian senate; instituted by Solon as a check on the *ecclesia*, an assembly of the whole people. The boule was at first composed of 400 members, but Cleisthenes increased the number to 500 when he divided the Athenians into ten tribes. The number was later raised to 600.

Boulevard, originally a kind of fortification introduced in France by the Normans after their conquest of Normandy; in France and Germany these defensive works have been generally leveled and turned into public promenades or avenues lined with trees; and the term is now chiefly applied to such avenues.

Boulogne (bô-lôñ'), or **Boulogne-sur-Mer** (-sür-mär'), seaport of France; department of Pas-de-Calais; on the English Channel; at the mouth of the Liane; 158 m. NNW. of Paris; divided into two parts—upper and lower town, from the former the English coast is visible; upper town has beautiful promenades, an old Gothic cathedral, an *hôtel de ville*, and an episcopal palace; lower town is newer, more regular, and more populous. Boulogne occupies the site of the ancient *Gesoriacum*, which after the time of Constantine was called *Bononia Oceanensis*. Several centuries later the name was changed to *Bolonia*. Here Napoleon assembled, 1804, 180,000 men and a flotilla of 2,400 transports for the invasion of England. To commemorate this design, which was never executed, a column 164 ft. high was erected. Pop. (1901) 48,075.

Boulton (bôl'tôn), **Matthew**, 1728-1809; English inventor; b. Birmingham; noted for his energy and enterprise; became a partner of James Watt; established at Soho, near Birmingham, a factory of steam engines, 1765;

invented an improved apparatus for coining money and a new mode of inlaying steel; for many years he and Watt executed the entire copper coinage of England.

Boun'ty, a premium given by a government to foster some branch of industry, or to encourage enterprises of national importance and conducive to the public interests. The British Govt. formerly gave bounties to encourage the herring fisheries and the exportation of grain and Irish linen, and for other purposes. Bounties are given, particularly in new countries, for the destruction of ferocious animals, as wolves, bears, etc. The general government and some of the U. S. give bounties for tree planting. Subsidies to sugar planters, steamship companies, and land grants to railways are common in the U. S. A bounty in money is also often given to induce men to enlist in the army and navy. Recruits in the Civil War sometimes received \$500 or more, as a bounty upon enlistment; many of them deserted, and were then called "bounty jumpers."

Bounty, Mu'tiny of the. See **BLIGH**, **WILLIAM**, and **PITCAIRN ISLAND**.

Bounty, Queen Anne's, fund applied in England by a corporation of *ex officio* governors to the augmentation of the incomes of the poorer clergy of the Church of England.

Bouquetin (bô-kê-tân'), or **I'beX of the Alps** (in German *Steinbock*), species of wild goat (*Capra ibex*) formerly found on the Alps; it is larger than the common goat, and has large horns which curve backward; those of the male are sometimes 20 in. long or more. The bouquetin is now extinct in the Alps, except possibly near Courmayeur.

Bourbaki (bôr-bâ-kê'), **Charles Denis Sauter**, 1816-97; French general; b. Pau; took part in the wars in the Crimea and in Italy; and in the German-French War of 1870 commanded the Imperial Guards before Metz. After the deposition of Napoleon III he organized the Army of the North under Gambetta; then tried with disastrous results to break the German line at Belfort; attempted suicide, and gave up the command to Clinchant, who crossed the Swiss frontier with 84,000 men, 1871; in 1873 he commanded an army corps at Lyons; retired, 1881.

Bourbon (bôr-bôñ'), French ducal and royal family, different branches of which have ruled France, Spain, Naples, and Parma. The fief of Bourbon was early in the tenth century held by a descendant of Childebrand, brother of Charles Martel, and in the thirteenth by the house of Dampierre, till 1872, when Beatrix, the heiress, married Robert, son of Louis IX, who became the head of the house. It was erected into a dukedom, 1327, for Robert's son Louis. The two branches took their origin from this Louis, Duke of Bourbon, who d. in 1341. The elder line was that of the dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527. The younger branch, which included the counts of La Marche and the dukes of Vendôme, the most important of whom was Henry of Na-

varre (Henry IV of France), were early divided into the dukes of Condé and the royal branch. The royal branch was divided by the two sons of Louis XIII, the elder of whom, Louis XIV, continued the chief branch, while Philip the Younger founded the house of Orleans; this house occupied the throne only during the period between the revolutions of 1830 and 1848. The royal line included Louis XIII, XIV, XV, XVI, XVII, XVIII, and Charles X. The Spanish-Bourbon Dynasty originated when Louis XIV, in 1735, placed his grandson Philip on the Spanish throne as Philip V of Spain. From him descends the present occupant of the throne, Alfonso III. The royal line of Naples took its rise through the younger son of Philip V, the succession remaining in this family until Naples was incorporated in the new kingdom of Italy, 1860.

Bour'don, in music, the humming sound produced by blowing through a long hollow staff. Hence the name given to the stop of low pitch found in all pipe organs.

Bourg (börg), a place of refuge or fortified place; the name of about forty villages and towns in France. The most important is Bourg, or Bourg-en-Bresse, a town of France; capital of the department of Ain. Pop. (1900) 18,887.

Bourgeois (bör-zhwä'), French word signifying a citizen or resident of a city; a commoner, as distinguished from a nobleman; a civilian, as distinguished from a soldier. A citizen of the state or republic is called *citoyen*.

Bourgeoisie (bör-zhwä-zé'), French term; defined in dictionaries as citizens, citizenship, commonalty; is applied to the great middle class of French society, composed mostly of merchants, manufacturers, master mechanics, lawyers, etc., who live in towns and cities; inferior in rank to the aristocracy, and superior to the peasantry and to the *prolétaires* of the towns.

Bourges (börzh), anc. *Avaricum*, later *Bituriges*, capital of the department of Cher, France; at the confluence of the Auron and the Eure; 146 m. S. of Paris; was inclosed by ramparts now converted into boulevards; streets are crooked and the houses mostly antique; has a magnificent Gothic cathedral, considered one of the finest in Europe. This town was formerly the seat of a celebrated university founded, 1463, and suppressed, 1780. *Avaricum*, which occupied this site, was a very ancient town; the capital of Celtic Gaul abt. 500 B.C.; and the chief town of the Bituriges in the time of Cæsar, who besieged and took it, 52 B.C., after which it became the capital of the Roman province of Aquitania. During the Middle Ages seven councils of the Church were held here, and, 1438, the Pragmatic Sanction of the Gallican Church was established here. Pop. (1901) 46,551.

Bourget (bör-zhä'), Paul, 1852- ; French novelist and critic; b. Amiens; devoted himself early to journalism and literature; attracted much attention by his work in criticism, and by his novels, in which the sad conclusions of

so-called realist or naturalist psychology and the pessimism of the *fin de siècle* are embodied in delicate and subtle art. He visited the U. S., 1893, and was elected to the French Academy, 1894.

Bourinot (bör-rë-nöt), Sir John George, 1837-1902; Canadian historian and publicist. Founded *Halifax Reporter*, and conducted it for many years; appointed clerk of Dominion House of Commons, 1880; president of Royal Society of Canada; contributed to leading periodicals; author of "Parliamentary Procedure and Practice," "Manual of Constitutional History," "How Canada is Governed," "Parliamentary Government in Canada," "Canada under British Rule"; was knighted, 1898.

Bournemouth (börn'müth), a health resort of Hampshire, England; on Poole Bay, English Channel, 25 m. SW. of Southampton; pine groves and parks. It has many health establishments, and its soft winter climate makes it a favorite resort. Pop. (1901) 47,003.

Bourrienne (bör-rë-ën'), Louis Antoine Fauvelet de, 1769-1834; French diplomatist; fellow-student of Bonaparte at the school of Brienne. In 1796 Bourrienne became private secretary to Bonaparte. While minister to Hamburg he was accused of peculation, and was recalled in 1811 and forced to refund 1,000,000 fr. Having deserted Napoleon in 1814, he was appointed Minister of State by Louis XVIII, 1815. He published an interesting work entitled "Memoirs upon Napoleon."

Bout'well, George Sewall, 1818-1905; American statesman; b. Brookline, Mass.; entered political life, 1840; governor of Massachusetts, 1851-52; organized the internal revenue department of the national government and became its first commissioner; member of Congress, 1863-69; Secretary of the U. S. Treasury, 1869-73; U. S. Senator, 1873-77; later, an active anti-imperialist; wrote "Reminiscences of Sixty Years in Public Affairs."

Bouvier (bör-vër'), John, 1787-1851; American jurist; b. Codogno, Italy; emigrated to the U. S., 1802; practiced law in Philadelphia; published a "Law Dictionary" and "Institutes of American Law," long standard reference books.

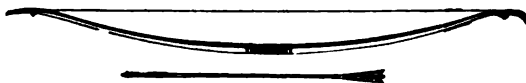
Bovianum (bör-vë-ä'nüm), ancient city of Italy; founded by the Samnites on or near the site of the modern Bojano; surrounded by high mountains; according to Livy it was a wealthy and powerful city; besieged and taken by the Romans, 311 B.C.; in the second Punic War it was several times headquarters of the Roman army. During the Social War it was capital of the confederates.

Bovidæ (bör'vi-dë), ox family; an important family of ruminant mammals; rich in species, and including many most useful to man. They vary greatly in form, the average type being exemplified in the antelopes, while extremes are represented by the oxen, the sheep, and the goats. The family includes all the hollow-horned ruminants except the prong-horn of America and *Saiga* of the plains of

W. Asia, each of which represents apparently a distinct family. See ANTELOPE, BULL, CATLE, etc.

Bow, in music, the implement by which the tone is produced from violins and like instruments. It is made of a thin stick of flexible wood tapering slightly toward one end. Between the ends of the stick, from 80 to 100 horse hairs are strung, the tension being regulated by a screw in the larger end of the bow.

Bow and Ar'row, one of the oldest of missile weapons. Bows have been made of various



ENGLISH LONG BOW.

materials and different sizes and powers from prehistoric times, and were generally used until the introduction of small arms. The English long bow, which accomplished such remarkable results in the fourteenth and fifteenth centuries, was usually about 5½ ft. long, of yew, although elm and wych-hazel were also used. The arrow was 3 ft. long, feathered, and furnished with a steel head. The crossbow, which was a bow attached to a stock resembling a musket, was shorter and stiffer, and was sometimes drawn by a small windlass attached to the stock.

BOW AND ARROW OF THE NORTH AMERICAN INDIANS.

The shorter bows in different ages have been made of steel, horn, and other elastic materials, and the arrows have sometimes been poisoned, particularly those used by savages.

Bow Bells, famous chime of bells in the Church of St. Mary-le-Bow, Cheapside, London, from which is derived the saying that any one born within their sound is a true cockney.

Bowditch, Nathaniel, 1773-1838; American mathematician; b. Salem, Mass.; made several long voyages as an officer or supercargo of a merchant vessel, and learned Greek and Latin without a teacher; published "The Practical Navigator," which for eighty years remained the standard among American seamen. His greatest work, a translation of the "Mécanique Céleste," of Laplace, which he enriched with a commentary explaining the complicated mathematical operations of the work.

Bowdler, Thomas, 1754-1825; English expurgator; b. near Bath; chiefly noted for "The Family Shakespeare," ten volumes, 1818, in which he omitted from the original text "those words and expressions . . . which cannot with propriety be read aloud in a family."

He also prepared an edition of Gibbon's "History," "with the omissions of all passages of an irreligious or immoral tendency."

Bowdoin (bō'd'n), James, 1727-90; American patriot; b. Boston; graduated at Harvard, 1745; was president of the convention which, 1778, formed the constitution of Massachusetts; governor of that state, 1785; suppressed Shay's rebellion, 1786.

Bowdoin, James, 1752-1811; American benefactor; b. Boston, Mass.; son of the preceding; sent, 1805, on a mission to Spain, to procure the cession of Florida to the U. S., and to obtain indemnity for injuries to American commerce; was a benefactor of Bowdoin College, to which he gave 6,000 acres of land and £1,100, besides bequeathing to it his collections of books, minerals, and paintings, and the island of Naushon, in Buzzard's Bay, his summer residence.

Bowdoin College, oldest college in Maine; chartered, 1794; opened, 1802, at Brunswick; named in honor of Gov. James Bowdoin, of Massachusetts. Its graduates include Longfellow, Hawthorne, Chief Justice Fuller, and ex-Speaker Reed.

Bow'er Bird, name given to certain birds which construct bowers wherein the males disport themselves to attract the females. These structures have nothing to do with the nests, and are built by the males alone. The bowers or "runs" are made of small twigs or pieces of stiff grass, so arranged as to form a walk from 1 to 3 ft. long and 7 or 8 in. wide. This bird is found generally in E. Australia, and is partial to the thick woods. It is of moderate size, 8 to 10 in. long, and the males are usually much gayer in plumage than the females.

Bowie (bō'ē), James, abt. 1790-1836; American soldier; b. Burke Co., Ga.; was involved, 1828, in a *mêlée* opposite Natchez, which resulted in the death of six persons and the wounding of fifteen. Bowie, who had been shot early in the engagement, drew his knife, a rude one made from a blacksmith's rasp, and killed Maj. Norris Wright with it. This knife was remodeled by a Philadelphia cutler, and became the murderous bowie knife of frontier fame. Bowie removed to Texas, and engaged in the revolt of that State from Mexico, 1835, attaining the rank of colonel. In 1836 he was at Alamo with Crockett and Travis, and perished in the massacre of the garrison.

Bowls and Bow'ling. Two games are known as bowls, one an indoor game played on a long wooden alley, and the other an outdoor game played on a level grassplot or bowling green. The indoor game (called also *tempins* and *skittles*) is played with lignum-vitæ balls rolled on a long alley about 3 ft. 6 in. wide, slightly convex in the center, and 60 ft. long. The object of the game is to knock down a number of wooden pins arranged at one end of the alley in a triangular form, the apex of which is toward the player, who stands at the other end of the alley. The

game of bowling at pins was formerly played with nine pins, set in the shape of a diamond, and was called ninepins, but to evade a law prohibiting the playing at ninepins a tenth pin was added, and they were set in a triangular frame, and the game, became known as tenpins.

The games which gave origin to the modern bowling at pins have been traced back to the Middle Ages. The open-air game is the more ancient, and was early known under various names, such as "casting the stone," "bowles," etc. Stone bowls were used, and the object of the player was to roll his bowl so that it came to rest as near as possible to the cone placed at the end of the rink. The object of the opposite side was to strike their opponents' bowls away from the cone and interpose their own bowls nearer to the cone than the adversary. Bowls as an indoor game had its origin in several games, variously styled club kayles, cayles, kayle, keiles (French *quilles*), skittles, loggats, and skayles.

Bowring, Sir John, 1702-1872; English linguist; b. Exeter; was well versed in modern languages, especially the Slavonic; collected and translated into verse the ancient and popular poems of almost all the countries of Europe; Governor of Hongkong, China, 1854; in 1856 ordered the bombardment of Canton in consequence of the "Arrow" affair; knighted, 1854; writings include the hymn "In the Cross of Christ I Glory."

Bow'sprit, a large spar which projects over the stem or bow of a ship. It serves to support the foremast, which is fastened to it by large stays or ropes; also to carry sail forward, as a means of counteracting the effect of the after sails and keeping the sail power well balanced. In many cases the bowsprit rises at an angle of about 45 degrees. It supports the jib and flying jib booms.

Box, an evergreen shrub or small tree of the genus *Buxus*, family *Euphorbiaceæ*. The most important species is the *B. sempervirens* (common box), which is a native of Europe and Asia, has oval, shining, and deep-green leaves, and is remarkable for its compact growth. In S. Europe it grows 20 ft. high or more. Dwarf box, 2 or 3 ft. high, is used to form edgings of flower beds and gravel walks, being reduced by clipping to a few inches. Boxwood, which is very hard and fine grained, is the best material for wood engraving; is of a pale yellow color, takes a fine polish, and is not liable to be wormeaten. Much boxwood is exported from Spain and Turkey.

Box El'der, or Ash-leaved Ma'ple, small tree of the *Sapindaceæ*, the *Acer negundo* or *Negundo aceroides*, which grows from Florida to Pennsylvania and is one of the characteristic trees of the Far West. In Minnesota, Nebraska, etc., it is tapped like the sugar maple, for its sap, which affords sugar.

Box'ers ("Combination of Righteous Harmony Fists"), Chinese secret society, formed by Yu-Hsien, prefect of Esao-chau, in Shantung, to resist foreign aggression and crush

the reform movement in the empire, with which the native Christians were identified. Massacres and tortures of Christian converts and missionaries and the destruction of mission stations occurred in many places, beginning in April, 1900. In response to protests from foreign powers, an edict forbidding the organization was issued, but the imperial government secretly directed the movement. With the firing on foreign vessels at Taku, and the siege of Peking by the Boxers, in June, intervention became necessary. Japanese, Russian, U. S., German, British, Austrian, French, and Italian troops, 20,000 strong, marched to the relief of Peking, defeated the Chinese in several battles, and captured the city, August 14th, preventing a general massacre of the foreigners, who were making a heroic defense in the British Legation. Meanwhile the empress and court officials had taken flight. Still earlier the Chinese had invaded Manchuria, and Russia had proclaimed a state of siege in her Asiatic dominions. The U. S., having taken the ground that the Chinese Govt. had been powerless to suppress the Boxers, the offices of that country were invoked in dealing with the powers. One of the demands made by the powers was the punishment of the guilty officials; accordingly, some were executed, others condemned to commit suicide, go into exile, suffer degradation of rank, or to lose office. China acceded to these demands and agreed, in 1901, to pay the powers a gross indemnity of \$320,000,000.

Box'hauling, method of working a ship from one tack to the other, characterized by the bracing of the head yards *aboa*, or aback, either after luffing into the wind as in tacking, or at once without deadening the headway. The latter is sometimes called *scaring short round*.

Box'ing the Com'pass, nautical phrase, an enumeration of the thirty-two points of the mariner's compass in their proper order, as north, north by east, nor-northeast, and so on around till north is reached by way of the south and west quadrants. This enumeration may be considerably varied by beginning at any other point and going around both ways in turn.

Box Tor'toise, or Box Tur'tle, popular names of the *Cistudo carolina*; an American tortoise, characterized by the crosswise division of the shell into two parts, united, however, by a ligament which serves as a hinge on which the parts of the shell turn, thus enabling the animal to shut himself entirely up in his shell. These tortoises are very timid and of gentle disposition. Their legs are longer and their speed greater than is usual among tortoises.

Boyacá (bō-yā-ká'), small village in state of Boyaca, Colombia; was the scene of a battle, August 7, 1819, in which Bolivar, with about 2,000 patriots, defeated the superior Spanish forces of Barreiro, took him prisoner, with most of his army, and forced the Spaniards to leave the country, then called New Granada.

Boyar (bō-yār'), title given in ancient Russia to those who distinguished themselves in war. This afterwards came to be the title of the nobility, who under the Grand Duke of Moscow formed an aristocracy with powers differing according to the character of the monarch, but which were so considerable that even Ivan the Terrible in his ukases added to the words "The czar has commanded," also "The boyars have approved." The last boyar died 1750.

Boy Bish'op, in Middle Age church history a member of the choir of a cathedral elected by his associates to act the part of a bishop. The election generally took place on December 6th, St. Nicholas's Day, after which the boy bishop was vested in the episcopal attire, with miter, ring, and pastoral staff. He held office till December 28th (Holy Innocent's Day). If the boy bishop died within his short period of office, he was buried in his episcopal robes. A tomb with the effigy of a boy so clothed may be seen in Salisbury Cathedral, England.

Boy'cotting, a combining of persons or a concerted action to restrain from or prevent social or business intercourse with another. The term was coined from the name of Capt. Boycott, an agent of Lord Erne's Lough Mask estate, Mayo, Ireland, who in 1880 evicted many tenants. These and their neighbors refused all intercourse with him and his family, and would not work for him or trade with him, or allow others to do so. Boycotts are often declared by labor unions to enforce strikes, the offending persons or firms being placed on an "unfair" or "we-do-not-patronize" list. When the combination amounts to a conspiracy to wrongfully prevent another from carrying on a legitimate business it is a criminal offense. See STRIKES.

Boy'dell, John, 1719-1804; English engraver; b. Dorrington, Shropshire; promoted the improvement of British art by his liberal patronage of native engravers and painters; founded the Shakespeare Gallery, London; lord mayor, London, 1790.

Boyesen (boi'ē-sēn), Hjalmar Hjorth, 1848-95; Norse-American author and scholar; b. Fredericksvaern, Norway; came to the U. S., 1868; Prof. of German, Cornell, 1874-80; and Columbia, 1880-95; wrote "Gunnar; a Norse Romance," "A Norseman's Pilgrimage," "Falconberg," "Goethe and Schiller, their Lives and Works," "Ilka on the Hilltop," "Queen Titania," "A Daughter of the Philistines," etc.

Boyle, Robert, 1627-91; Irish philosopher; b. Lismore Castle, Ireland; devoted himself to chemistry and natural philosophy; improved the air pump, and made important discoveries in pneumatics; a founder of the Royal Society; wrote a "Discourse of Things above Reason," "Excellency of Theology," and "Hydrostatical Paradoxes," etc.

Boyle Lec'tures, called from Robert Boyle, who bequeathed an annual salary to be paid to some clergyman for preaching eight sermons in a year in defense of Christianity; still

delivered at St. Mary-le-Bow Church at London.

Boyle's Law, often called Mar'iotte's Law, a law in physics usually expressed as follows: that "The volume of a gas is inversely as the pressure"; that is to say, if we double the pressure on a gas we reduce its volume to one half; if we make the pressure three times what it was at first, the bulk of the gas is reduced to one third.

Boyne, most important river in the E. of Ireland; rises in the Bog of Allen; flows NE. and enters the Irish Sea after a course of 65 m. Many ruins of monasteries and castles are found on its banks. An obelisk 150 ft. high, nearly 3 m. from Drogheda, commemorates the battle of the Boyne, in which William II defeated James II, July 1, 1690.

Boys' Republics, organizations imitating the government of the U. S. as applied to national, state, and city affairs; popular and highly successful in many public and reform schools in the U. S. The pupils or inmates elect their own officers: mayor, president of the council, city clerk, sanitary staff, grand jury, and, when necessary, policemen and jailers, and make their own laws. The civic training the young electors receive and the improvement in their morals are among the advantages of these organizations. The George Junior Republic, at Freeville, N. Y., an industrial community to which girls as well as boys are committed, generally for purposes of reformation, is thus governed.

Boz'rah, an ancient city of Idumæa (Edom), often mentioned in the Bible. See Genesis xxxvi; Isaiah xxiv, and liii. It was situated to the SE. of the Dead Sea, about halfway between the latter and Petra; site probably occupied by the modern Buseireh.

Bozzaris (bôt'sā-ris), or Bot'zaris, Marco, 1788-1823; Greek patriot; b. Suli, in Albania; enlisted in the French army abt. 1808, and served several campaigns. When the Greeks took arms against the Turks, 1820, Bozzaris became the leader of a band of Suliotes, and gained several victories; defended Missolonghi against the Turks, 1822; attacked and defeated a superior force at Carpenisi, August 20, 1823, but was killed in the action.

Brabançons (brā-bān-sōn'), class of mercenary soldiers chiefly from Brabant, whence they took their name; served principally in the armies of England and France from the eleventh to the thirteenth centuries. They had little discipline, and were not much better than robbers.

Brabant (brā'bānt), former duchy of the Low Countries; in the sixth century conquered by the Franks; during the Middle Ages changed masters often, until in the fifteenth century it came to the House of Hapsburg. Charles V left it to his son, Philip II, under whom the provinces revolted, but only the N. part became independent and joined the Netherlands, 1648, while S. Brabant remained with the Spanish-Austrian line until 1714, when

it passed into the possession of the imperial line of Austria. It was conquered by the French, 1794, and divided into two provinces; Napoleon also conquered the Dutch part, 1810. In the treaty of Paris (1814) Brabant became a part of the Netherlands, and was divided into the provinces of N. Brabant, Antwerp, and S. Brabant. After the Belgian revolution of 1830, Antwerp and S. Brabant passed to Belgium, while N. Brabant remained with Holland.

Brachial (bră'ki-äl) **Ar'tery**, main artery of the arm, a continuation of the axillary, as the latter is of the subclavian trunk. The brachial vessel lies upon the inside of the humerus, or arm bone, just back of the biceps muscle; near the elbow it passes forward and divides into the radial and ulnar arteries.

Brachiopoda (bräk-i-öp'ö-dä), marine animals with bivalve shells, which as fossils form a characteristic feature of Palæozoic rocks. There are few living forms. The shells resemble those of the bivalves, but the two halves, or valves, of the shell are dorsal and ventral instead of lateral, and each valve is divisible into symmetrical halves. The embryology of the Brachiopods indicates their relationship with the *Bryozoa*, and affinity rather with the annulate worms than with the mollusks.

Brachistochrone (bräk-kis'tö-krön), the plane curve down which a material particle must slide without friction in order to pass in the shortest possible time from the upper to the lower of two given points not in the same vertical line. It is the common cycloid. The problem of the brachistochrone is celebrated in the history of mathematics. It was first proposed by John Bernoulli, 1696, and was solved by Sir Isaac Newton and James Bernoulli. It is often called "the curve of quickest descent."

Brac'ton, properly **Brat'ton**, **Henry de**, English ecclesiastic and jurist. He was Archdeacon of Barnstaple in 1264, and later chancellor of the cathedral, which office he probably held till 1268, when he is supposed to have died. His principal work, "De Legibus Angliæ et Consuetudinibus," is a treatise on jurisprudence and legislation on the plan or framework of the Institute of Justinian. Though this work is a landmark in English law, no even tolerably reliable edition exists.

Brad'dock, **Edward**, 1695-1755; British general; b. Perthshire, Scotland; commanded in the war against the French and Indians in N. America; when marching to attack Fort Duquesne, was surprised by Indians near Pittsburg, defeated, and mortally wounded.

Brad'ford, **William**, 1589-1657; Pilgrim Father; b. Austerfield, York, England; emigrated to New England in the *Mayflower*, 1620; governor of Plymouth Colony, 1621; held the office till his death, except five years, when he declined election; a patent, or charter, for the colony was granted, 1630, to him, his heirs

and associates; left a "History of Plymouth Colony," printed, 1856.

Bradford, **William**, 1660-1752; American printer; b. Leicester, England; emigrated, 1682, and landed on the spot where Philadelphia was afterwards built; he began printing under the patronage of the Friends, 1685; first work was an almanac. In 1692 he incurred the displeasure of the dominant party in Philadelphia, through his sympathy with George Keith, and was imprisoned for libel; induced, 1693, by Gov. Benjamin Fletcher to remove to New York to become printer to King William and Queen Mary. In that year he printed "A Journal of the Late Actions of the French at Canada, with the Manner of their Being Repulsed by His Excellency Benjamin Fletcher," and the laws of the colony, commonly known as "Bradford's Laws." On October 16, 1725, he began the publication of the *New York Gazette*, the first newspaper printed in New York City; printer to the government of New York for more than fifty years, and for more than thirty years the only one in the province.

Bradford, city in McKean Co., Pa.; 79 m. S. of Buffalo. The center of the most productive oil field in the U. S. Pop. (1900) 15,050.

Bradford, town in York, England; 9 m. W. of Leeds; is the chief seat in England of the manufacture of worsteds, alpaca, broadcloths, cotton goods, mohair, etc. Pop. (1901) 279,809.

Bradlaugh (bräd'law), **Charles**, 1833-91; English reformer; b. London; began speaking on the streets when fifteen; served in the army in Ireland; edited the *Investigator* and the *National Reformer*, a futile prosecution of which by the government led to the repeal of the statutes against the liberty of the press; entered Parliament, 1880; refused to take the oath of allegiance (demanding the right to affirm), and was forcibly expelled; thrice re-elected and expelled for same reason, but was allowed to take his seat, 1885. In 1888 carried a bill through Parliament allowing all persons to affirm instead of taking the oath. Established a labor bureau; initiated and secured the adoption of much excellent legislation affecting labor; an authority on E. Indian affairs. Respected by all parties for his good sense, eloquence, and kind disposition.

Brad'ley, **Edward**, better known as "CUTHBERT BEDE," 1827-89; English clergyman and novelist; b. Kidderminster; entered the Anglican ministry, and received a number of church preferments; author of much prose and verse, chiefly novels, of which his first venture, "Verdant Green," a humorous story of Oxford life, is the best known.

Bradley, **James**, 1693-1762; English astronomer; b. Sherbourn, Gloucester; Savilian Prof. of Astronomy at Oxford, 1721; announced the discovery of the aberration of light, which serves to demonstrate the earth's motion around the sun, 1729; appointed astronomer royal, 1742; announced discovery, 1748, that the inclination of the earth's axis

to the ecliptic is not constant, which explained the precession of the equinoxes and the nutation of the earth's axis, and a discovery that forms an important epoch in astronomy; left in MS. thirteen volumes of observations, published 1798-1805.

Bradley, Joseph Philo, 1813-92; American jurist; b. Berne, N. Y.; admitted to the bar, Newark, N. J., 1839; associate justice, U. S. Supreme Court, 1870; member of Electoral Commission, and cast the vote that gave the presidency to Hayes, 1877; was a profound mathematical scholar.

Bradshaw, John, 1602-59; one of the English regicides; b. at Wibersley Hall, Cheshire; became chief justice of Chester in 1647; and in 1649 president of the High Court which condemned Charles I. He afterwards opposed Cromwell's ambitious designs, and the latter unsuccessfully tried to remove him from his chief-justiceship. Died in London, 1659, and was buried with great pomp. At the Restoration his body was exhumed from Westminster Abbey, along with those of Cromwell and Ireton, and the three bodies were hanged at Tyburn in their coffins.

Bradstreet, Anne, 1612-72; first American versifier; b. Northampton, England; daughter of Thomas Dudley; wife of Simon Bradstreet; removed to Massachusetts probably, 1630; father and husband both became governors of the colony. She published a volume of poems in London, 1650, entitled "The Tenth Muse Lately Sprung Up in America"; these poems and her other writings have been several times reprinted.

Bradstreet, Simon, 1603-97; English colonial executive; b. Horbling, Lincoln, England. He removed to Salem, Mass., 1630, as an assistant judge; a founder of Cambridge and Andover; besides holding other important positions, he was governor of Massachusetts, 1679-86 and 1689-92.

Bradwardine (bräd'wär-dën), Thomas, 1290-1349; English prelate; called "the Profound Doctor"; b. Chichester; confessor to Edward III; consecrated Archbishop of Canterbury, 1349; principal work, "De Causa Dei Adversus Pelagium," is a masterly argument for the doctrine of Augustine.

Bra'dy, Nicholas, 1659-1726; English versifier; b. Bandon, Ireland; is best known for his share in the metrical version of the "Psalms," London, 1695, in conjunction with Nahum Tate, 1652-1715, the laureate. "Tate and Brady's Psalms," though ridiculed for their clumsiness, quaintness, and bombast, have some noble passages.

Brag, game of cards played by from four to eight persons with the entire pack, the cards ranking as in whist, except the knaves and nines, called "braggers," ranking the same as any cards they may be held with. The best hand is a royal pair, *i.e.*, three cards of one kind.

Braga (brä'gä), ancient *Bracara Augusta*, town of Portugal; capital of the province of

Minho; near the river Cavado; 39 m. NNE. of Oporto; was the capital of Lusitania after its conquest by the Suevi. Church councils were held at Braga, 563, 572, and 672 A.D. Pop. (1900) 24,202.

Braganza (brä-gän'sä), or **Bragança**, name of the royal family of Portugal and the late imperial family of Brazil; descended from Affonso, Duke of Braganza, natural son of John I, King of Portugal. The first member to become king of Portugal was the eighth duke, who began to reign as John IV, 1640. The first Emperor of Brazil was Dom Pedro I, eldest son of King John VI.

Braganza, fortified town of Portugal; province of Tras-os-Montes; 35 m. NW. of Miranda; has a citadel, a college, and a castle partly ruined, the seat of the dukes of Braganza. The name of the reigning family of Portugal is derived from this town. Pop. of town and district abt. 17,000.

Brage (bräg), in Scandinavian mythology, a son of Odin. He is the god of poetry and eloquence, and one of the twelve chief gods in Asgard. He is not only skilled in poetry, but the art itself is called Brage, which epithet also denotes a great poet. He is represented as an old man with a flowing beard, and persons with heavy beards are called after him beardbrages.

Bragg, Braxton, 1817-76; U. S. army officer; b. Warren Co., N. C.; graduated at West Point, 1837; served with distinction at various posts until his resignation, January 3, 1856. In the Civil War he was in command of the Confederates at Pensaoola against Fort Pickens, 1861; of Second Corps at Shiloh, 1862, being promoted to general on the death of Gen. A. S. Johnston; moved against Buell into Kentucky, 1862, whence he was compelled to retire after defeat at Perrysville, October 8, 1862; defeated at Murfreesboro, January 2, 1863; after a brief arrest overthrew Rosecrans at Chickamauga, September 20, 1863; relieved from command, December 2, 1863, for loss of Mission Ridge in the battle of Chattanooga, November 25, 1863; led a small force from North Carolina to Georgia, 1864; became chief engineer of Alabama, and made improvements in Mobile harbor.

Bragi (brä'jē) the Old, or **Bragi Bod'dason**, Norwegian poet; the most ancient skald whose name is known; thought to have lived abt. 770-850 or later. The meager extant fragments of his verse have been edited by H. Gering, Halle, 1886.

Brahe (brä), Tycho, 1546-1601; Danish astronomer; b. Knudstrup, Sweden then a province of Denmark); was early fascinated with astronomy, and, 1563, began the correction of the "Alphonsine Tables." The king, Frederic II, gave him the island of Hoëne, in the Sound, abt. 1575, where he built the finest observatory which ever had been erected in Europe. He enriched astronomy, partly by his numerous observations, partly by inventing new instruments. He formed a catalogue of 777 stars, increased by his pupil Kepler to

1,000 from the records which he left, and his recorded observations of Mars furnished to Kepler the material from which he deduced his famous Laws. He rejected the Copernican system, which was not then supported by the evidence now in its favor. Tycho's theory, which made the sun move round the earth, and all the other planets round the sun, explained equally well all the phenomena then known.

Brahma (brā'mā), word that occurs in Hindi in two forms: (1) *Brahmā*, nom. sing. neut., and (2) *Brahmā*, nom. sing. masc. of a Sanskrit crude form *brahman*, meaning growth, increase, or expansion. The form *Brahmā* is not found in the Vedas or Brāhmanas. In philosophical Brahmanism, *Brahmā* is used to designate the supreme, self-existent, and all-pervading soul of the universe, from which all things emanate, and to which they return; *Brahmā* is the Supreme Spirit, regarded as impersonal, and divested of all quality and action. It is described as absolute, eternal, without beginning or end, immaterial, invisible, and inappreciable by the senses until "the film of mental blindness has been removed." It receives no worship, but is an object of abstract meditation, the only means by which absorption into it can be attained. In Hindu mythology this impersonal Supreme Being, when dominated by Activity becomes *Brahmā*, the Creator, the first of the Hindu triad of gods, the others being Vishnu, the preserver, and Siva, the destroyer, and the lord and father of all creatures. *Brahmā* is represented as of a red color, and with four heads and four arms. His vehicle is a swan. He is never worshiped by the people, and only one temple is known to have been erected in his honor.

Brahmanism (brā'mān-izm), religion of the Hindus, established on the basis of the "Vedas," the earliest literary productions of India. The literature of the "Vedas" consists of various strata. The lyric parts, the so-called "Mantras," are prayers or hymns addressed to the personified forces of nature. In connection with the worship of these divinities, there grew up a vast system of sacrificial ritualism and theosophic speculation laid down in texts called "Brāhmanas," "Sūtras," and "Upanishads." The "Upanishads" have remained the foundation of all the higher thought in Brahmanism up to our day. They are the first exponents of Hindu pantheism. Nothing really exists, they affirm, but the one Universal Spirit (called *ātman*, the self, or *brahma*, the spiritual essence), and whatever appears to exist independently is identical with that spirit. Coupled with this is the doctrine of transmigration of souls (metempsychosis), which seems to rest upon a more popular foundation than pantheism, but which fused very readily with it. At present the essentials of Brahmanical belief are the admission of the spiritual supremacy of Brahman, and obedience to the caste rules concerning food, intermarriage, and professional pursuits. One may say that the practical religion of the 150,000,000 or more Brahmanical Hindus now

living is the law of caste. The more general and abstract laws of religion and worship of the gods and idols are not ignored, but they take a distinctively secondary place. The highest law which concerns the Hindu is to eat correctly, to drink correctly, to marry correctly.

Brahmaputra (brā-mā-pō'trā), river of Asia; rises in Tibet, where it is known as the Khar-ta; then has a long course E. as the Sanpu, flowing in the valley between the Himalaya and Gangri Mountains; opposite E. Bhutan it turns SE., and is known as the Dihong; in NE. Assam it receives its largest tributary, the Burang, when it becomes the Brahmaputra; general direction is then nearly WSW. until it passes through Assam and enters Bengal, through which it flows S., and enters the Bay of Bengal with the Ganges. After receiving the tributary called the Meghna on the E. side, it takes the name of that stream, and so remains to its mouth. It thus has five different names in its course, which is estimated at 1,800 m.

Brah'min, member of the sacred or sacerdotal caste among the Hindus. See CASTE.

Brahmo-Somaj (brā'mō-sō-māj'), society of Theists in India; founded, 1830 by Rammohun Roy; increased in numbers and activity after 1842, under the leadership of Debendro Nath Tagore, who succeeded in emancipating it from Vedantism; in 1859 a new impulse was given to it by Keshub Chunder Sen, who effected the separation of those who were willing to abolish caste in their communion, as the "Brahmo-Somaj of India." The more conservative members remains in the Somaj or Church of Calcutta. Many of them are young Hindus educated at English colleges. Keshub Chunder Sen, in his sermons and published tracts, avowed a belief in the unity of God, in immediate revelation, in the necessity of a new birth, in the immortality of the soul, and in the efficacy of prayer.

Brahms (brāms), Johannes, 1833-97; German composer; b. Hamburg; principal works, four symphonies for full orchestra, several overtures, and other orchestral works: "Rinaldo," a cantata; "Noenia," "Song of Destiny," "German Requiem," "Song of the Fates," "Rhapsodie," "Song of Triumph," "Ave Maria," "Funeral Hymn," "Thirteenth Psalm." His orchestral works are more frequently heard than his choral compositions owing to the great difficulties in the latter. His admirers consider him the true successor of Beethoven.

Braila (brā-ē'lā), Turkish *Ibraila*; fortified town and chief port of Roumania; on the Danube; 102 m. NE. of Bucharest. Large quantities of grain and other produce are shipped. Pop. (1900) 58,392.

Braille (brā-ē' or brāl), Louis, 1809-52; French musician; b. Paris; lost his sight at the age of six years; remarkable for rapid acquisition of knowledge, especially music; Prof. in the Royal Institute for the Blind; invented the system of writing and reading

with points now called by his name; applied it also to musical notation. See BLIND, EDUCATION OF THE.

Brain, the *encephalon* or contents of the cranium; the material instrument of thought, impulse, and perception in man and the higher animals. Only vertebrates have a true brain; in others ganglia or nerve centers exist, but they are not always strictly homologous with the brain. The central nervous system of vertebrates consists of the spinal cord, contained within the vertebral column, and the expanded and highly differentiated encephalon, lying within the cranium.

The average weight of the adult human brain in the male is about 49½ oz.; in the female, about 44 oz. The usual difference between the two is attributed to the lesser general body weight in the female, and not to inferiority of cerebral development. The brain attains its greatest weight at about the fortieth year; after that time a diminution is said to take place at the rate of about 1 oz. for each decade. The capacity of the cranium closely corresponds with the central development; the average capacity of the normal cranium is about 85 cu. in. The Eskimo and European possess the largest cranial capacity; the Hindu the smallest. The cranium of idiots may be reduced to correspond to a brain weight of only 23 oz.

The brain is composed of four chief divisions—*cerebrum*, *cerebellum*, *pons*, and *medulla oblongata*. These are enveloped within the skull by protecting membranes, which, from without inward, are the *dura*, *arachnoid*, and *pia*. The *dura* (mater) is the outer dense fibrous investment. The *arachnoid* is an extremely delicate, weblike structure, usually so closely applied to the *dura* that it is frequently overlooked. The *pia* (mater) supports and conveys the blood vessels supplying the nervous tissue, lying close to its surface. These coverings are known as the meninges of the brain, and their inflammation is the dangerous disease, meningitis.

The *cerebrum* in the human brain greatly exceeds the other parts both in volume and weight, constituting about .87 of the entire brain weight. It consists of two *hemispheres* divided by a deep median cleft, the *longitudinal fissure*; the separation of the hemispheres in front and behind is complete, the two halves, however, being connected by a transverse bridge, the *corpus callosum*, situated at the bottom of the fissure. The *cerebellum*, or little brain, weighing about one eighth as much as the cerebrum and contributing about one tenth of the weight of the entire brain, occupies the posterior fossa of the cranium. The *cerebellum* consist of two hemispheres, partially separated by a deep valley traversed by various commissural tracts. The remaining divisions of the brain—the *pons* and *medulla*—contain chiefly white matter, being made up largely of bundles of nerve fibers. The *pons* (*Varolii*) unites the various segments of the encephalon, connecting the cerebrum above, the cerebellum behind, and the medulla below. It lies above the medulla, between the hemispheres of the cerebellum, and

beneath those of the cerebrum. The *medulla oblongata*, the most dependent division of the brain, extends from the lower border of the pons to become continuous with the spinal cord below. It is composed principally of the tracts of nerve fibers of the spinal cord.

The surface of the hemispheres in the adult human brain present a complicated arrangement of *convolutions* and intervening *fissures*. These cardinal fissures divide each hemisphere into five principal divisions—the *frontal*, *parietal*, *occipital*, *temporo-sphenoidal*, and *central lobes*. These convolutions, notwithstand-

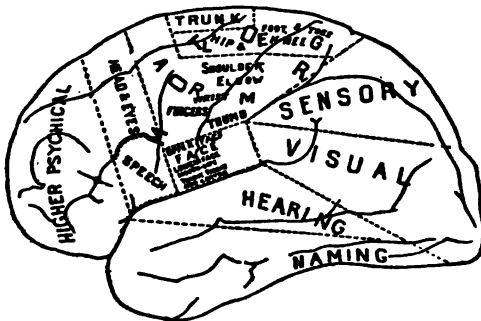


DIAGRAM OF THE BRAIN CENTERS.

ing their apparent irregularity, are found to be nearly identical in arrangement in each individual of a class, though varying greatly as between different kinds of animals.

Regarding the *functions* of the structures constituting the brain much uncertainty still exists; but it may be regarded as highly probable that every voluntary act influencing a given part of the body is under the control of some definite area of the cerebral cortex. Such areas have been determined with accuracy by experiment and disease for some few functions; among these, that the movements of the lower extremity, upper limb, and face are controlled respectively by the ascending frontal and parietal convolutions. The area for speech is situated chiefly at the posterior part of the inferior frontal convolution of the left hemisphere. Hearing is attributed to the upper temporal convolution, while sight is probably connected with a center situated within the occipital lobe. Smell and taste seem to be associated in their areas, their joint center being ascribed a position on the inner and under side of the temporal lobe. The cerebellum apparently exercises great control over exact coordination of movement. Neither psychical activity, volition, nor consciousness is disturbed by injuries limited to this part of the brain. The medulla contains the areas presiding over many reflex acts, among these being the centers controlling respiration, coughing, sneezing, swallowing, vomiting, and others. See SENSATION.

Brain Coral, one of several species of massive actinoid coral in which the furrowed surface of the coral resembles the convolutions of the brain. Over the curved surface of a live brain stone are stretched the soft organic parts of the coral, while in the superficial

furrows lie the stomachs. On the surface of the brain stone are rows of mouths, each opening into that stomach or part of the stomach which lies just beneath it.

Brain Fe'ver, a popular name for cerebral meningitis, a dangerous disease, characterized in its earliest stages by very high fever and intense headache, usually followed by delirium and death.

Brain'tree, town in Norfolk Co., Mass.; 10 m. S. of Boston; has granite quarries and manufactories of machinery, woolens, shoes, rubber goods, cordage, tacks, etc.; the birthplace of John Adams, John Quincy Adams, and other members of that family. Pop. (1900) 5,981.

Brake, a thicket; a place overgrown with shrubs, brambles, or ferns. In the U. S. a thicket of canes is called a "canebrake." The name is also applied to *Pteris aquilina* and many other large ferns.

Brake is also the name for an instrument used to break flax or hemp; the hand or lever by which a pump is worked; a large harrow used in agriculture; a sharp bit or snaffle of a bridle; a machine attached to the wheels of heavy carriages and railroad cars, which, when pressed against the wheels, retards or stops their motion by friction. Patents have been obtained in the U. S. for numerous machines or inventions for this purpose. Among these are "steam-car brakes," in the use of which the friction is produced by steam power, and the engineer of a locomotive applies the brakes by the turning of a cock; and the "Westinghouse air brake," also controlled by the engineer, now extensively used.

Bramah (brā'mā), Joseph, 1749-1814; English inventor; b. Stainborough, Yorkshire; gained distinction by valuable inventions, among them a safety lock, a hydrostatic press, and improvements in fire engines and steam engines.

Bramah's Press. See HYDRAULIC PRESS.

Bramante (brā-mān'tā), Donato Lazzari, 1444-1514; Italian architect; at first a painter of considerable merit; later devoted himself to architecture; patronized by the popes. He united the straggling buildings of the Vatican with the Belvedere Gardens, and so formed a beautiful whole. He was the first architect of St. Peter's at Rome, but died before its construction had proceeded far, and his designs were altered by succeeding architects.

Bram'ble, the name of the bush with trailing prickly stems which bears the deep purple or almost black berries known as brambles or blackberries; it is of the same genus as the raspberry, of the natural order *Rosaceæ*; grows wild in great abundance, but is rarely cultivated. It flowers late in the summer and the fruit does not ripen till autumn.

Bran, the husk or outer covering of wheat, which in the process of flouring is separated from the fine flour. In 100 parts of bran there are of water, 13.1; albumen, 19.3; oil, 4.7; husk (with a little starch), 55.6; ash or sa-

line matter, 7.3. Calico printers use bran and warm water to remove coloring matter from those parts of their goods which are not mordanted. Bran and the flour united, i.e., unbolted wheat flour—make a good bread, which is considered more digestible than that made of fine white flour.

Branch, in botany, a part of any organ or member of the plant body which has grown out from another similar organ or member; thus we have root branches, stem branches, branches of leaves, branches of stamens, branches of hairs, etc.; among lower plants, branching cells, branching threads, branching thallomes, etc. In systematic botany branch is a great division of the vegetable kingdom; thus the branch of *Protophytes*, the branch of *Bryophytes*, etc.

Branchiopoda (brān-ki-ōp'ō-dā), suborder of *Crustacea*, deriving their name from the peculiarity of having the gills, which are numerous, attached to the feet. They are small, many of them almost microscopic, and are found chiefly in stagnant fresh waters.

Brand, Henry (Sir). See HAMPDEN, VISCOUNT.

Brand, John Henry (Sir), 1823-88; Boer statesman; b. Cape Town, Cape Colony, Africa; studied law in Leyden; began practice in native city, 1849; Prof. of Law in S. African College, 1853; elected president of the Orange Free State, 1863, and, by reflections held the office till his death; was knighted for his strong pro-British influence; city of Ladybrand was named in honor of his wife.

Brandenburg (brān'dēn-bōrg), most important province of Prussia, formed the nucleus of the Prussian kingdom; corresponds nearly to the old Mark of Brandenburg; area, 15,382 sq. m.; pop. (1900) 3,108,554. It is drained by the Oder, Warthe, Spree, Havel, and Elbe, which latter forms part of its W. boundary. It has manufactories of cotton, wool, linen, silk, paper, leather, sugar, etc. The chief towns are Potsdam, Königsberg, and Frankfort-on-the-Oder. It is divided into two regencies (*Regierungsbezirke*) and thirty-three circles. This country was conquered by Charlemagne, 789 A.D. The first Margrave of Brandenburg was Albert the Bear, the founder of the house of Brandenburg. He began to reign, 1134. Early in the fifteenth century the margrave became an elector of the German Empire, and took the title of Elector of Brandenburg. Frederick William, who became elector, 1640, added the duchy of Prussia and part of Pomerania to his dominions, and his son took the title of King of Prussia, 1701.

Brandenburg (ancient *Brennaborch* or *Brennabor*), a town of Prussia; in province of same name; on the Havel; 38 m. WSW. of Berlin; is inclosed by walls, and divided by the river into the old and new town, between which, on an island, is a quarter called Venice, containing a castle and a mediæval cathedral; has manufactories of woolen and linen goods, hosiery, paper, leather, etc. Pop. (1900) 49,263.

Bran'des, Georg Morris Cohen, 1842-; Danish critic and literary historian; b. Copenhagen; forced on account of his radical religious and political opinions to leave Denmark, 1877; lived at Berlin; induced to return to Copenhagen, 1883, by an association of private persons, who assured him a salary for ten years as a lecturer. To his influence is ascribed in great part the realistic movement in recent Danish literature. Chief works include: "Main Currents in the Literature of the Nineteenth Century," 1872-90; "Critiques and Portraits," "Danish Poets," "Eminent Authors of the Nineteenth Century," "Men of the Modern Awakening," "Reminiscences of My Childhood and Youth," 1906.

Brand'ing, punishment formerly practiced in Greece and Rome on slaves and convicts. Under Constantine the face was protected from such disfigurement. It was a mark of degradation provided for in the canon law, and in France galley slaves could be branded down to 1822. In England vagabonds, gypsies, and brawlers might be burned in the cheek or forehead from the days of Edward VI to 1636. From the time of Henry VII this penalty was inflicted in the case of all clergyable offenses, but it was abolished 1822. Branding had then become obsolete, except in the case of deserters from the army, who were marked with the letter D, by ink or gunpowder. This also has been abolished. In mercantile law, branding refers to the stamping of some distinguishing mark on manufactured articles. Cattle are often branded to denote ownership.

Bran'don, the wheat city of the Canadian West; situated on Assiniboin River, in province of Manitoba, 132 m. W. of Winnipeg, in center of an excellent wheat-growing region. Has grain elevators, flour mills, and railway machine shops. An important distributing center. Pop. 12,000.

Bran'dy, liquid containing 48 to 56 per cent alcohol; obtained by distilling the fermented juice of the grape; generally made from white and pale red wines. The wines of the S. of Europe yield the most brandy. The usual yield is from 100 to 150 gal. from 1,000 gal. of wine. The best brandy is that distilled in the Department of Charente, known as cognac and armagnac (names of towns). Inferior brandies are distilled from dark red wines of France, Spain, and Portugal; also from the fermented marc, or refuse, of the grape, and from the lees of wine and the scrapings of the casks. The wines of California yield brandy abundantly and of good quality. Various other liquors are known as brandies, such as cider brandy or apple-jack, distilled from cider or from the pomace or refuse ground apples from the cider press. Peach brandy is made from the pulp of ripe peaches in some of the S. states. The greater part of the brandy and cognac of commerce is made from alcohol derived from Indian corn, diluted to proof, 50 per cent, flavored with acetic ether, cænanthic ether, oil of grapes, argol, and tannin, and colored with burned sugar. It is improved by the addition of a little real brandy, and by keeping it a few years in the cask, which oxidizes and removes the ranker fusel

oils, and the tannic acid of the cask precipitates possible traces of copper or lead derived from the still.

Brandy Sta'tion, village in Culpeper Co., Va.; 56 m. SW. of Alexandria; scene of conflicts between the Federals and Confederates, August 20, 1862, June 9, September 13, and October 11, 1863.

Bran'dywine Creek, stream formed by E. and W. branches, which unite in Chester Co., Pa.; flows SE. into Delaware, and enters the Christiana Creek near Wilmington; furnishes water power for numerous mills. On its banks, in Chester Co., the British general, Howe, defeated Washington, September 11, 1777, which resulted in the occupation of Philadelphia by the British.

Branks, instrument formerly used in England and Scotland for the punishment of scolding women; was of various forms, but consisted essentially of a bridle of iron or leather, to which was attached a piece of iron which held the tongue firmly.

Brant, Joseph Thayendanega, 1742-1807; Mohawk Indian chief; sent to the Indian school which grew into Dartmouth College; fought in the British army in the American Revolution; distinguished himself in Leger's expedition against Fort Stanwix, and at Oriskany, 1799; he prepared a version of the "Gospel of St. Mark" in Mohawk, which was published with the Mohawk "Book of Common Prayer."

Brant, Sebastian, 1458-1521; German poet; b. Strassburg; appointed an imperial councillor by the Emperor Maximilian; wrote a satirical poem entitled "Das Narrenschiff" (The Ship of Fools), 1494, a Latin translation of which made him famous throughout Europe; held up to ridicule the vices and follies of his time, although without direct religious intention; was one of the most influential authors of his time, who may be classed among the fore-runners of the literature of the Reformation.

Brant'ford, capital of Brant Co., Ontario, Canada; on Grand River; 24 m. WSW. of Hamilton. Here are large railway machine shops and engine houses, and manufactories of brass and iron castings and farming implements. The Ontario Institution for the Blind is just beyond the city limits. The city is named from Brant, the Indian chief, who surrendered the site to the government. Pop. 20,000.

Brasidas (brās'ī-dās), d. 422 B.C.; Spartan general in the Peloponnesian War which began 431 B.C.; relieved Megara, 424, and gained several victories over the Athenians; was killed at Amphipolis, where he was opposed to the Athenian general Cleon. His memory was long honored by annual sacrifices.

Brass, alloy of copper and zinc, extensively used in the arts on account of the ease of working and its acceptable color. It is made (1) by fusing in crucibles copper and zinc, placing the latter below; (2) by heating copper in grains or sheets with oxide of zinc and charcoal; (3) the ancient method, by heating

copper with calamine, a native ore of zinc, and charcoal. Common brass cast in molds and finished by turning and filing, contains about 70 parts of copper and 30 of zinc. A little lead diminishes the ductility, while tin increases the hardness of brass. Brass is harder than copper, is malleable and ductile, and can be readily cast, rolled, stamped, and turned in the lathe. Next to iron, it is the most important metal used in the arts.

Brasses, Monumen'tal, sheets or plates of brass, upon which are engraved figures of men and women, in attempted portraiture of the dead, accompanied by heraldic devices, etc. Many still exist in England which date from the latter part of the Middle Ages; some in their original position, let into the floor or wall, and others preserved in churches and museums.

Brassey, Thomas, 1805-70; English railroad contractor; b. near Chester; built the Great N. Railway, the Grand Trunk, in Canada, besides lines in many other countries; accumulated a fortune estimated at \$35,000,000.

Brassica (bräs'si-kä), genus of herbaceous plants of the *Crucifere*; comprises the cabbage, cauliflower, broccoli, turnip, rape, etc.; are found in temperate and cold regions of Europe and Asia.

Brathwaite (bräth'wät), **Richard**, 1588-1673; English poet; wrote "The Golden Fleece," 1611; "The Poet's Willow," 1614, pastorals; a collection of satirical verses; and "Barnabee's Journal" in doggerel and Latin rhymes, which came to its eleventh edition, 1876.

Brawn, preparation of food obtained from the flesh of the wild boar or of swine. Mock brawn is the flesh of the pig's head and feet cut into small pieces, boiled, and pickled. The term also denotes the muscular part of the human body.

Brax'ton, Carter, 1736-97; American legislator; b. Newington, Va.; elected to the Continental Congress, 1775; signed the Declaration of Independence.

Bray, small parish in Berkshire, England; 22½ m. W. of London; famous for its vicar, who changed his religion three times during the reign of Henry VIII, Edward VI, Mary, and Elizabeth, that he might "live and die the vicar of Bray."

Bra'zen Sea, a great bowl of cast metal, probably of copper or bronze, which stood in the priests' court in Solomon's temple. (1 Kings vii, 23-26; II Chr. iv, 2-5; Josephus's "Antiquities," viii, 3, 5.) Its purpose was to hold water for the ablutions of the priests—*e.g.*, to wash their hands and feet (Ex. xxx, 18, *sqq.*). The brazen sea stood upon twelve oxen. The best commentators think its contents exceeded 11,000 wine gal. It was broken up by the Chaldeans at the destruction of the temple, and the pieces taken to Babylon (2 Kings xxv, 13; Jer. lii, 17).

Brazen Serpent, name of a copper or bronze figure of a serpent erected by Moses during the journey of the Israelites from Egypt, for

the miraculous cure of those who had been bitten by serpents (Num. xxi, 5, *sqq.*); became an object of superstitious worship, and was destroyed by Hezekiah (2 Kings xviii, 4). In accordance with John iii, 14, the brazen serpent is regarded as a type of Christ.

Brazil', United States of, the largest country of S. America, occupying about two fifths of the continent; bounded E. by the Atlantic, and NW. and S. by all the other S. American countries except Chile. Length from N. to S. over 2,600 m.; greatest breadth, probably 2,700 m. Area, 3,218,991 sq. m. There are three main divisions: (1) the Brazilian plateau, (2) the great depressions of the Amazon and Paraguay, (3) a strip of land N. of the Amazon, forming a part of the Guiana plateau. The principal mountain chains are the Coast Range, from 50 to 250 m. in width; Serra do Mar, including the Organ Mountains, with peaks over 7,000 ft. high, and Sierra da Mantiqueira, the latter ending in Itatiaia, 8,900 ft.; Serra da Canastra between the São Francisco and Tocantins river systems, and the Goyaz or Pyreneos Mountains between the Tocantins and Araguaia, with peaks over 7,000 ft. The only outlying islands are the volcanic rocks of Trinidad and Fernando de Noronha, with the neighboring islands. The NE. coast is practically without harbors; the SE. coast has many excellent landlocked ones. No country exceeds Brazil in number and magnitude of navigable rivers, which form a complete network, and render the most central parts of the country accessible. The most important are the Amazon, Javary, Jurua, Purús, Madeira, Tapajos, Xingó, Rio Negro, Tocantins, São Francisco, Paraná, Araguay, Parnahyba, and the Uruguay. Brazil has no large lakes.

Brazil has a moderately warm and very healthful climate. Rains are abundant nearly everywhere, although the NE. portion is subject to periodical droughts. The Amazonian depression is covered with a thick tropical forest. The principal minerals are gold, silver, copper and lead ores, iron, coal of inferior quality, petroleum, manganese, diamonds, rock crystals or Brazilian pebbles, agates, and carnelians. Among the forest products are rubber, Brazil nuts, sarsaparilla, Tonka beans, vegetable oils, and drugs. There are a number of beautiful cabinet woods, but almost the only one exported is rosewood. Among the larger animals are tapirs, jaguars, stags, ostriches, alligators, and large water snakes. The fisheries of the Amazon and coast are very productive. Brazil has a large amount of fertile land, especially in the SE. portion and on the Amazon; but a great portion of the plateau is probably fitted only for grazing. By far the most important product is coffee, in which Brazil stands first in the world. Sugar and tobacco are largely produced. The cotton crop is insignificant. Cacao is one of the principal products of the lower Amazon. Manioc, maize, beans, rice, and tropical fruits and vegetables are much raised for home consumption. The most important grazing districts are Rio Grande do Sul and NE. Brazil from Pernambuco to the Amazon. Manufactures

generally are on a small scale, though collectively important. Cigars are largely made at Bahia, and paper, furniture, saddles, hats, beer, and rum.

Primary education is general, but the country schools are poor; in the cities and larger towns there are excellent schools (*collegios*), and provisions for the study of law, medicine, and theology. Young Brazilians seeking higher education generally go to Portugal or France.

The government is a federal republic, very similar to that of the U. S. The president and vice president are elected for four years, and cannot be reelected for the next succeeding term; senators are elected for nine years, and deputies, or members of the lower house, for three years. The states are completely independent in internal administration. Freedom of religious worship is guaranteed by the constitution. The president and congress are elected by practically universal suffrage. There are twenty states and a federal district (Rio de Janeiro).

Before Brazil was discovered, Spain and Portugal had regulated their claims of conquest by the Treaty of Tordesillas. By this all new lands E. of about longitude 50° W. were assigned to Portugal. The first colony, São Vicente, S. of Rio, was formed by Martin Afonso de Souza, 1532. Bahia was founded, 1549, and became the capital. Spain did not dispute the rights of Portugal to Brazil, but other nations made attempts to colonize it. The Dutch seized Bahia (1624) and held it for a year, and, 1631, took Pernambuco and formed a powerful colony around it, but were driven out, 1654. After 1640 Brazil was governed by viceroys. In 1762 the capital was changed to Rio de Janeiro. Napoleon drove the prince regent, Dom John, out of Portugal, and he took refuge in Brazil, 1808, making his capital at Rio de Janeiro. He succeeded to the Portuguese throne, 1816, and returned to Portugal, leaving his son, Dom Pedro, as regent in Brazil. The prince placed himself at the head of the movement for independence; a constituent assembly was convoked; Brazil was declared an independent empire, and on December 1, 1822, Dom Pedro was crowned as Emperor Pedro I of Brazil. His son, Pedro II, reigned, 1840-89, when he was dethroned. A federal constitution was adopted, 1891, Manoel da Fonseca being first president. A gradual emancipation law was passed, 1871, and the abolishment of slavery decreed, 1888. Uruguay formed a part of Brazil, 1821-25, under the name of the Cis-Platine State.

The pop. (1900) was 17,371,069. Over one third the people are classed as white, but this includes many with Indian and a smaller proportion with negro blood. One fifth are civilized Indians. The wild Indians probably do not number 250,000. The mass of the population is gathered in SE. Brazil. The largest cities are Rio de Janeiro, the capital (pop., 1906, 811,265), Pernambuco, Bahia, Belem, São Paulo, Ceará, Pelotas, Ouro Preto and Blumenau, Maranhão, Porto Alegre, all above 30,000. The whites are mainly of Portuguese descent, but in S. Brazil there are several hundred thousand German colonists.

Brazilian Grass, popular name of a substance used in making hats, sometimes called chip hats. It is not grass, but the leaves of a palm (*Chamærops argentea*) imported from Cuba.

Brazil Nuts, seeds of the *Bertholletia excelsa*, a beautiful tree of the *Myrtaceæ*, which attains a height of 100 ft. or more, abounds on the banks of the Orinoco and in N. Brazil, and



BRAZIL NUT.

bears a round woody pericarp nearly as large as a man's head. This pericarp contains about twenty-four seeds or nuts. They yield a large quantity of oil, which is valuable for burning in lamps, and are also favorite articles of food.

Brazil Wood, dyewood obtained from the *Cæsalpinia crissa*, a tree of *Leguminosæ*. There



BRAZIL WOOD.

are several varieties, known as Pernambuco, Lima, Santa Martha, Sapan or Japan, etc.

Brazil wood has been largely supplanted by artificial dyes. It is used in calico printing and in wood dyeing, but has not proved satisfactory.

Brazos (brä'zós), one of the largest rivers of Texas; rises in the high table-land in the NW. part of the state; flows first nearly to Baylor, then SE. for 200 m., and SSE. till it enters the Gulf of Mexico; length estimated at 900 m. In the rainy season, from February to May, inclusive, it is navigable for steamboats about 300 m. from its mouth.

Bread, the most common kind of prepared food. It is made from the flour or meal of some grain, moistened with water, mixed or kneaded till of a uniform consistence, and baked before a fire or in an oven. Bread which is not raised is often called *unleavened* bread; it may be made from the whole grain by soaking it in water, and either drying it in the sun or baking it before a fire. This is the simplest process of bread making. Raised bread is bread which is made porous and spongy by the aid of some gas, produced either before or during the baking. This gas may be carbonic acid, either generated by fermentation, or mingled with the flour in solution in water under pressure. It may be air which is incorporated with the dough during the kneading and expanded during the baking, or it may be carbonate of ammonia, which is vaporized during the baking. The best bread is made of wheat flour, although the flour of rye, oats, and other grain is used. Wheat flour owes its superiority to the large percentage of gluten which it contains. The other cereals contain scarcely any gluten. Fermented bread is prepared either with leaven or yeast. Leaven is dough, *i. e.*, flour and water, in a state of incipient putrefaction. Aërated bread is prepared by kneading flour in a closed vessel with water supersaturated under pressure with carbonic-acid gas. On bringing the dough into the air, the carbonic-acid gas set free by the removal of the pressure expands it into a sponge. Graham bread is made from the unbolted meal of wheat, a mixture of bran and flour. Rye bread is largely used in N. Europe, and to some extent in the U. S. It is dark colored, is harder than wheat bread, and has a peculiar taste.

Bread is made by mixing the proper quantity of flour with tepid water, leaven, and a little salt, the whole being well kneaded. The mixture is placed in a warm situation and left overnight to ferment. If the leaven is in the proper stage of decomposition, it will induce vinous fermentation. If, however, the leaven be in a more advanced stage of decomposition, or if some other necessary condition fail, instead of alcohol and carbonic acid, lactic acid will be formed and the dough will not be raised by gas, but will be heavy and sour. To avoid this result, saleratus, bicarbonate of potassa, or soda is added to the dough. Carbonic acid may be developed in the dough by the decomposition of bicarbonate of potassa (saleratus) or by some acid. Sour milk, hydrochloric acid, tartaric acid, bitartrate of potassa (cream of tartar), and the acid phos-

phate of lime have been used for this purpose. The advantage of these substitutes for fermentation or "baking powders" is that bread may be mixed and baked at once, without the delay of several hours which is necessary where fermentation is resorted to. The baking of bread can be effected at 212° F., but no crust will be formed; to secure the best result a temperature of 350° to 570° F. should be employed. A high heat should be avoided at first, lest a hard crust be formed, while the interior of the loaf remains unbaked.

Bread'fruit Tree (*Artocarpus incisa*), tree of the *Artocarpacææ*; native of S. Asia, of the



BREADFRUIT TREE.

islands of the S. Pacific, and of the Indian Archipelago, now naturalized in some of the



BREADFRUIT.

W. Indies; grows to a height of 40 or 50 ft.; fruit nearly spherical, and covered with a

rough rind; sometimes weighs 4 lbs. or more, contains a large portion of starch or fecula, and is a principal part of the food of the natives of the S. Sea islands.

Bread'nut, fruit of the *Brosimum alicastrum*, a tree of the *Artocarpaceæ*; native of Jamaica; allied to the breadfruit. Its fruit is a one-seeded drupe, edible, and used instead of bread after it has been boiled or roasted.

Break'water, a structure built to tranquilize the surface of a body of water, oppose the action of the waves, and regulate the currents, and thus make safe harbors and roadsteads. Breakwaters may project from some cape or



DELAWARE BREAKWATER.

headland, or may be insular or detached; they may be supported on the bed of the sea, or floating. They are usually made of huge blocks of stone, ballasted with rubble, or rough broken stone, secured by timbers and masonry. The largest breakwaters in the world are at



DOVER BREAKWATER.

Cherbourg, France; Plymouth, England; Delaware Bay, U. S., and Buffalo, N. Y. The Cherbourg breakwater was begun in 1784 and completed in 1858, at a cost of about \$13,000,000. It is 4,130 yards long, in water from 42 to 62 ft. deep. The breakwater at Plym-



PLYMOUTH BREAKWATER.

outh, England, was begun in 1812 and finished in 1847. Its total length is 1,700 yards, and its cost about \$1,470 per lineal foot; it is only about 3 ft. above the highest tides. The Delaware Breakwater was begun in 1829 with the intention of making a national harbor.



CHERBOURG BREAKWATER.

It is 1½ m. long, in from 13 to 53 ft. of water. In fresh water, as on the Great Lakes, most of the breakwaters are composed of cribs framed on shore, and then towed to the site of the work and sunk. These are then filled with

stone and covered with planks and caps, making piers as well as breakwaters. Where there are no teredo to eat up the timber, they form comparatively durable structures, but in sea water they will only last a few years, and hence are inapplicable. The great breakwater at Buffalo (1903) forms the most important section of a line of breakwaters extending along the water front for about 4½ m. Two uncompleted breakwaters, which will rank among the largest in the country, are at Point Judith, R. I., and at San Pedro, Cal. That at Point Judith will be 10,000 ft. long, and that at San Pedro 8,500 ft. long, in water from 19 to 51 ft. deep. See HARBOR; JETTIES.

Breast. See MAMMARY GLANDS.

Breast Wheel, in hydraulics, a water wheel so placed as to be struck by the stream of water nearly on a level with the axle, the lower quadrant of the circumference on the side opposed to the stream being placed in a race or channel concentric with the wheel, through which the water is conducted in its descent.

Breast'works. See FORTIFICATION.

Breath. See RESPIRATION.

Breccia (brët'chä), a rocky mass composed of angular fragments of the same or different rocks united by a cement or matrix. Some varieties of marble are a kind of breccia, in which the cemented fragments form a beautifully mottled surface when polished. When the fragments are rounded instead of angular the mass is called pudding stone or conglomerate.

Breck'inridge, James, 1785-1846; a soldier of the Revolution; b. near Fincastle, Va.; became an eminent Federalist lawyer in Virginia. He was member of Congress (1809-17), and cooperated with Jefferson in establishing the Univ. of Virginia. He was one of the originators of the Chesapeake and Ohio Canal.

Breckinridge, John Cabell, 1821-75; U. S. army officer; b. near Lexington, Ky.; elected to Congress, 1851; chosen Vice President of the U. S., 1856, when Buchanan was elected; nominated for the Presidency by the Anti-Douglas Democrats who seceded from the convention that met at Charleston, 1860; received seventy-two electoral votes; entered U. S. Senate, 1861, but joined the Confederate States army; was major general at the battle of Stone River, which ended January 2, 1863, and at Chickamauga, September 19 and 20, 1863; in May, 1864, defeated Gen. Sigel at Newmarket, Va.; Confederate Secretary of War, January, 1865.

Breda (brä-dä'), a town of Holland; N. Brabant; at confluence of Aa and Merk; 16 m. SSE. of Dordrecht; has a castle built 1350, a Gothic cathedral, the spire of which is 362 ft. high, and a magnetic observatory; also manufactories of linens, carpets, hats, soap, leather, etc. This town can be protected against an invading army by inundating the country around it. It is celebrated as the scene of the "Compromise of Breda," by which the patriots

protested against the tyranny of Philip II, 1566, and as the place from which Charles II issued the "Declaration" which preceded his restoration, 1660. Pop. (1905) 26,949.

Breech'-loading Fire'arms, those which are loaded by putting the cartridge directly in at the breech instead of ramming it in at the muzzle. It is said that breech-loading guns were used early in the reign of Henry VI of England, and it is certain that they were used in Scotland about that time. There are several ancient specimens in the Tower of London. Many attempts to improve this kind of arms have been made, and of late with much success. Among the most celebrated weapons of this character are the Armstrong and Whitworth guns, the Krupp steel guns, the *mitrail-leuse*, and among small arms the needle gun and the Chassepot, Enfield, Greener, Lebel, Martini, Mauser, Sharps, Snider, Spencer, Ward-Burton, and Remington rifles.

Breed, variety produced in any animal species in consequence of domestication, by changes analogous to those which occur in cultivated plants. Some of the results of artificial selection on animals are marvelous. The numerous varieties of the dog and the pigeon have been, to a great extent, produced by design; animals being bred to develop certain desired peculiarities, the principle being that, like produces like, or that certain qualities possessed by the parent may be perpetuated and increased in the offspring.

Breed's Hill, elevation in Charlestown, section of Boston, Mass., where most of the fighting was done in the battle of Bunker Hill. The American redoubt against which the British charged repeatedly was here, and here also Warren fell, and the famous monument was erected. It is about 700 yards from Bunker Hill.

Brehon (brē'hōn) **Law**, law by which Ireland was governed generally before the conquest, and to some extent as late as the eighteenth century; so called from the brehons who expounded it, and who were a class of jurists existing among the Irish according to a system common to the Gauls, Britons, and other Celtic nations.

Breitenfeld (brī'tēn-fēld), German village; 5 m. N. of Leipzig; scene of two victories of the Swedes over the imperialists, the first by Gustavus Adolphus over Tilly, September 17, 1631, the second by Torstenson over Archduke Leopold and Piccolomini, November 2, 1641. It also figured in the battle of Leipzig, October 16, 1813.

Breit'mann, Hans. See LELAND, C. G.

Bremen (brā'mēn), state and free city of Germany; on both sides of the Weser; 60 m. SW. of Hamburg; is divided into the old and the new town, the former of which is on the right bank of the river, and has narrow, crooked streets; the new town is more regular. Bremen has manufactories of woolen and cotton goods, beer, liquor, sugar, paper, starch,

and cigars, and extensive shipbuilding. Is one of the most important commercial cities of Germany, having an extensive foreign trade, especially with the U. S., to which it ships about half of the total German emigration. Bremen was founded before 788 A.D., and was made a bishopric by Charlemagne; one of the chief towns of the Hanseatic League; admitted, 1815, into the Germanic confederation by the Congress of Vienna; in 1888 joined the German Zollverein. Pop. (1900) 163,297.

Bremer (brē'mēr), **Fredrika**, 1801-65; Swedish novelist; b. Abo, Finland; became in early youth familiar with German literature. Her first story, "Axel and Anna," appeared in 1828 as No. One of "Sketches from Every-day Life," a general title under which she continued to publish stories until 1848. Some of the best known of these sketches are, "The President's Daughters," 1834; "Nina," 1835; "The Neighbors," 1837; "Home," 1839; "Brothers and Sisters," 1848; "The Bondmaid," 1840, is in another style. She visited the U. S., 1849, and after her return to Sweden published "The Homes of the New World," 1853-54.

Bremerhaven (brā-mēr-hā'fēn), town and port of Germany; on the Weser, near its mouth; 35 m. NNW. of Bremen; part of the state of Bremen; has an outer and an inner harbor, built by the citizens of Bremen (1827-30) for large ships which cannot ascend the river. Pop. (1900) 20,322.

Bren'nus, famous chief of the Senones, a tribe of ancient Gauls who crossed the Apennines, 390 B.C., invaded the Roman state and defeated its army. Brennus then captured Rome, except the capitol, which he besieged for six months. During this siege he attempted to surprise the garrison by night, but was repulsed by Manlius, who was awakened by the cackling of some geese. The Romans purchased peace by the payment of 1,000 lbs. of gold. To increase the price Brennus is said to have thrown his sword on the scale.

Brennus, a Gallic chief who invaded Greece with a large army abt. 280 B.C., and ravaged Macedonia and Thessaly; defeated at Delphi by the Greeks, who were said to have been aided by an earthquake.

Brentano (brēn-tā'nō), **Clemens**, 1778-1842; German novelist and dramatist; b. Frankfurt-on-the-Main; brother of Goethe's friend, Bettina von Arnim; was a romanticist, with unsettled mystic tendencies, so that for six years his dominant task was recording the revelations of the nun of Dülmen; produced dramas entitled "Ponce de Leon," 1804, and "The Foundation of Prague," 1816. Among his admired novels is "The History of Caspar the Brave and the Fair Annel."'

Brent'ford, capital of Middlesex, England; on the Thames; at the mouth of the Brent; 7 m. WSW. of London. The town has frequently been alluded to by Shakespeare and other dramatists. Here Edmund Ironside defeated Canute, 1016, and Prince Rupert, Colonel Hollis, 1642. Pop. (1901) 15,171.

Brenz, Johann, 1499-1570; German reformer; b. Weil, Swabia; became a Protestant under Luther's influence; was a popular preacher at Halle, 1522-46; at outbreak of the Smalcald War, became an exile; called by Duke Christopher to Stuttgart, 1553, as provost of the cathedral church, he reorganized the Württemberg Church, giving it its church orders, confession, and catechism.

Brescia (brěsh't-a), ancient *Brixia*, city of Lombardy, Italy; capital of province of same name; on the Garza; 62 m. ENE. of Milan; has an old cathedral, a mediæval structure, and a new marble cathedral (*Duomo Nuovo*), commenced 1604. The Temple of Hercules, dating from the second century, was excavated, 1822, and is now an archæological museum. Brixia was the capital of the Cenomanni, a Gallic tribe; was plundered by Attila, but soon recovered from this injury. Otho I declared it a free city abt. 936. It was bombarded and taken by the Austrian general, Haynau, 1859. Pop. (1901) 70,614.

Breslau (brěs'lōw), city of Prussia; capital of Silesia; at the mouth of the Ohlau; 221 m. SE. of Berlin; is, next to Berlin, the most populous city of Prussia; divided by the Oder into the old and new towns, which are connected by numerous bridges; has a cathedral founded in the twelfth century; has an extensive trade; is the greatest market for wool in Germany; has manufactories of woolen, linen, cotton, and silk fabrics, broadcloths, lace, jewelry, soap, earthenware, starch, and ardent spirits. Breslau is first mentioned by Ditmar, the chronicler, 1000 A.D., and seems to have been founded about that date; became the seat of a bishop, 1052, and the capital of an independent duchy, 1163. Reduced to ashes by the Mongolians, 1241, it recovered, and, 1261, joined the Hanseatic League; it came under Bohemia, 1335; after the battle of Mohacz it passed to Austria; was taken, 1741, by Prussia. Pop. (1900) 422,738.

Brest (brěst), fortified city and seaport of France; department of Finistère; 314 m. W. of Paris; said to be the strongest military port in France; is on the N. shore of the harbor of Brest; its outer harbor is one of the best and most capacious in Europe, having ample room for 500 ships of the line, and is defended by powerful batteries. The harbor communicates with the ocean by a single channel, the Goulet. From its natural advantages and the strength of its defensive works, Brest is considered one of the first naval stations of Europe. Here are five large basins, extensive quays, an arsenal, vast magazines, large barracks, and a prison encircled by ramparts, which, being planted with trees, form pleasant promenades. Brest was not of much importance until Richelieu commenced, 1631, the fortifications, which were completed by Vauban. Pop. (1901) 68,750.

Bretagne (brě-tāff'), Latin *Britannia Minor*, usually called BRITANNY in English, or LITTLE BRITANNY, former province of France; extensive peninsula; bounded N. by the English Channel, and W. and SW. by the Atlantic

Ocean; now comprised in the departments of Finistère, Côtes-du-Nord, Morbihan, Ile-et-Vilaine, and Loire-Inférieure. It was divided into Haute-Bretagne (Upper Brittany), capital Rennes, and Basse-Bretagne (Lower Brittany), capital Vannes. This region and its people have a special interest for antiquarians. It became subject to the Franks in the time of Charlemagne. In 848 A.D. Nominoé, an Armorican chief, assumed the title of King of Bretagne, and defeated the army of King Charles the Bald. The Normans conquered it in the tenth century. Geoffroi, Count of Rennes, became, 992, the first Duke of Bretagne, which continued to be an almost independent feudal duchy until it was annexed to France, 1531.

Breth'ren and Clerks of the Com'mon Life, religious order established in the Netherlands in the fourteenth century by Gerhard de Groot; divided into two classes; the first, chiefly clergy, were devoted to books; the second, to manual labor. They adopted the rule of St. Augustine, held their property in common, and were highly esteemed. By the middle of the seventeenth century the order became extinct. Thomas à Kempis was a member of the order, and Erasmus was one of its pupils.

Brethren of the Christian Schools, order founded at Rheims by the Abbé de La Salle, 1679, to provide instruction for the poor. The brethren take the usual vows, and priests may be admitted, but no member may become a priest. The chief house of the congregation is at Paris, and there are branches in the U. S.

Brethren of the Ho'ly Trin'ity, society founded in France near the close of the twelfth century by John of Matha and Felix de Valois, for the redemption of Christian captives among the Mohammedans.

Brethren, White, short-lived Italian sect, abt. 1399. Their leader, a priest, proclaimed himself the Prophet Elias, prophesied the speedy destruction of the world, gathered followers in the Italian Alps, and entered Genoa with 5,000 clothed in white. He was burned at the stake, and the sect became extinct after a few months' existence.

Breton (brä-tōñ'), Jules Adolphe, 1827-1906; French figure painter; b. Courrieres; works, chiefly illustrating peasant life, include "Blessing the Harvest," 1857; "Calling Home the Reapers," 1859; "The Gleaner," 1877; "Evening in a Hamlet in Finistère," and "The Communicants," which brought \$45,000 at auction in New York.

Breughel (brth'gěl), Jan, 1568-1625; Flemish painter; b. Brussels; called "Velvet" Breughel, in reference to the material of his clothing; painted landscapes, animals, flowers, and small figures; chief works are several pictures of "Adam and Eve in Paradise," which are in the museums of the Louvre, Berlin, and The Hague. The figures of these were painted by Rubens.

Breughel, Pieter, abt. 1520-69; Flemish painter; father of the preceding; b. Breughel,

near Breda; painted village festivals, comic subjects, and the amusements of rustic life.

Brevet', a military term applied to a class of commissions granted to U. S. army officers and to the army and navy officers of Great Britain. Formerly in Great Britain a general brevet was issued upon special occasions, such as coronations, the end of a great war, the birth of an heir to the throne, etc., and when no occasion of this kind occurred they were issued at intervals of about six years, for the purpose of giving to officers a rank and pay commensurate with their length of service. The brevet advanced all officers of the army above the rank of lieutenant one grade in rank and pay. The officers of the navy received a similar advance. Brevets were also conferred upon officers for acts of conspicuous gallantry in the field. In 1854 this system was changed and restricted. In the U. S. brevets may be conferred for distinguished services upon officers of all ranks, by nomination by the President and confirmation by the Senate, in the same way that other appointments are made. Brevets, however, give no additional pay, and confer upon the officer the right to command according to his brevet rank only upon special assignment by the President. In the U. S. army a relation between pay and length of service is established by allowing to officers of the lower grades a certain increase of pay for each five years' continuous service.

Breviary (bré'vi-ā-ri), book containing the daily service of the Church of Rome or of the Greek Church; so called, probably, because it was abridged from another service book, called *Plenarium officium*, the "full service." The Roman Catholic Church has several breviaries, some being used in particular dioceses or in special monastic orders, but the *Breviarium Romanum* (Roman Breviary) is the most generally used, and is rapidly taking the place of the others throughout the Latin rite, and it has been translated into some of the E. rites.

Brew'er, David Josiah, 1837- ; American jurist; b. Smyrna, Asia Minor; Judge of the Supreme Court of Kansas, 1870-81, and of the U. S. Circuit Court for the Eighth Circuit, 1884-89; thence an Associate Justice of the U. S. Supreme Court; president of the Venezuela Boundary Commission, 1896; published "American Citizenship" (Yale lectures), 1902.

Brew'ster, Sir David, 1781-1868; Scottish natural philosopher; b. Jedburgh; editor of the "Edinburgh Encyclopedia," 1808; received, 1815, the Copley medal of the Royal Society for an "Essay on the Polarization of Light by Reflection"; invented the kaleidoscope, 1816; in conjunction with Prof. Jameson, founded the *Edinburgh Philosophical Journal*, 1819; suggested the formation of the British Association for the Advancement of Science, and with Herschel had the chief part in shaping its constitution, 1831. About this date the Royal Society awarded to him the Rumford gold and silver medals for his discoveries in optics; knighted, 1832; elected one of the eight foreign associates of the French Institute.

1849; invented, 1850, the stereoscope; became principal of Univ. of Edinburgh, 1859.

Brewster, William, 1560-1644; one of the Pilgrims of Plymouth; b. at Scrooby, England; entered the public service; became a Nonconformist; imprisoned at Boston, Lincoln, 1607; liberated with great expense and difficulty, went to Leyden, where he taught English; removed to America on the *Mayflower's* first voyage, 1620; was ruling elder of the church, preaching frequently, but never administering the sacraments.

Brialmont (brē-āl-mōŋ'), **Alexis Henri**, 1821- ; Belgian engineer and military writer; entered the military school of Brussels, 1839; now a lieutenant general, retired. He participated in the fortification of Antwerp and Diest, and his work is said to be "unrivalled in Europe in the intelligent application of true principles of art to a great practical example." He is an authority on modern fortification.

Brian Boru (brī'ān bō-rō'), or **Boroihme** (bō-roim'), abt. 927-1014; King of Ireland; succeeded his father, Kennedy, on the throne of Munster, 978; subdued the Danes; made himself supreme monarch of Ireland, 1002; constructed a road round the whole island; was killed at the moment of victory over the King of Leinster at Clontarf.

Briançon (brē-ōŋ-sōŋ'), ancient *Brigantium*, fortified town of France; department of Hautes-Alpes; on the Durance; 56 m. SE. of Grenoble, and near the Italian frontier; is the principal French arsenal among the Alps; commands the chief pass to the Italian and Swiss frontiers; is surrounded by triple ramparts and protected by seven forts with subterranean connections; considered almost impregnable.

Briareus (brē-ā-rē-ūs), or **Ægæon**, in Greek mythology, a giant, son of Cœlus and Terra and brother of Gyges and Cottus, and having, like them, 100 arms and fifty heads. After aiding Jupiter against the inferior deities, he revolted and was imprisoned under Etna, which belched forth fire as often as he struggled for freedom.

Bri'bery, criminal law, a taking or giving of a reward or consideration with the intent to corruptly influence a person in the performance of the duties of a public office or function. The offense is completed by the corrupt taking or giving, whether the act contemplated be legal or illegal, performed or unperformed. An unaccepted offer to give or receive a consideration with such a corrupt intent constitutes an attempt to bribe. The bribing of a juror is comprehended in the term embracery.

Brick, a species of artificial stone made by molding clay into blocks, and burning them. The earths most employed in brickmaking are (1) the plastic clays, composed principally of silica and alumina; (2) the loams or sandy clays; and (3) the marls, which are either sandy, clayey, or calcareous. Rich clays all have to be tempered with sand, ashes, or cinders before they can be used for bricks. Some

clays contain too much sand, and are weak and brittle after burning; these must be mixed with the richer clays. The red color of burned bricks is caused by the presence of a small percentage of oxide of iron, generally the protoxide. When there is more than ten per cent of iron oxide present the clay burns to a blue and almost a black color. In general, brick-making machines consist of a hopper in which the clay is mixed and from which it is forced, either in a solid rectangular stream which is cut into bricks by wires working transversely, or into molds. The molds, which are made of wood, and contain six bricks each, are then placed on trucks and wheeled under the drying shed. The bricks are thrown out upon the flat. When sufficiently dry they are given a clear edge, and placed in long and narrow rows on edge. When dry enough they are built up in "arches," set on edge in the order called "three over one." The arches contain 28,000 to 35,000 bricks each, and are 6 bricks or 4 ft. wide, about 44 bricks or 30 ft. deep, and from 45 to 55 courses high. Each arch has an opening at the bottom, in which the wood used in baking is placed. A number of arches are built up contiguously, so as to form a solid mass. The whole is then covered with a dry wall of baked bricks. The heap so prepared is called a kiln. This system of burning is pursued rather than that with permanent kilns, on account of the greater number of bricks which may be burned in a given space. Yards controlling only 200 ft. frontage can thus make from 5,000,000 to 6,000,000 bricks per season of 150 working days. About four cords of wood are used per arch, and the burning requires six days.

Three qualities of brick are taken from the kiln. Those forming the top and sides of the arches are called *arch brick*, those from the interior of the pile are *body brick*, and those from the exterior are *soft brick*. The arch bricks are hard and often brittle and weak from overburning; the soft bricks are underburned, and fit only for backing and filling. The body brick is of the best quality. Fire bricks are used for lining furnaces, kilns, ovens, etc., subjected to an intense heat that would destroy common bricks or stone. The fire bricks after molding are dried in artificially heated sheds at a temperature of 60° to 70° F., or by the sun in clear weather. They are burned from eight to fourteen days, being subject to the intensity of flame or white heat for about four days and three nights. In burning, the heat is slowly increased and gradually lowered, and the burned contents require seven days to cool.

Bridge, Sir John Frederick, 1844-; English organist and composer; b. Oldbury, Worcester; organist of Westminster Abbey since 1875; Prof. of Harmony and Counterpoint, Royal Academy of Music since 1890; conductor Royal Choral Society since 1896; King Edward Prof. of Music, London Univ. since 1902; knighted, 1897; composer Queen's Jubilee anthem; cantatas "Boadicea," 1880; "Rock of Ages," 1885; "Callinohoe," 1888; "The Lord's Prayer," 1892; dramatic oratorio "The Repentance of Nineveh," 1890.

Bridge, game of cards, probably named from Russian "*biritch*," called out when the player declares "no trumps." A form of it has been played in Constantinople since 1860. In Russia it is known as *yerplash*, in Egypt as *khe-dive*. Introduced into England, 1894, and thence to the U. S. It is played with fifty-two cards and four players, two called dealer and dummy, who are partners against the other two, called leader and pone. The dummy's cards are exposed and played by the dealer, and the game resembles single dummy whist. See WHIST.

Bridge, a structure spanning a valley, river, or other space for the passage of men, animals, or vehicles. The simplest bridge is a tree thrown across a stream. Another primitive method, practiced in America, and also in China, is the suspension of a rope across a stream, to which a hammock is so hung that it can be drawn across from shore to shore; these are made of such stability that even mules are carried over. Pontoons, or floating assemblages of boats, were constructed by the ancient Egyptians, and are used in military operations. If the bridge is used for an ele-

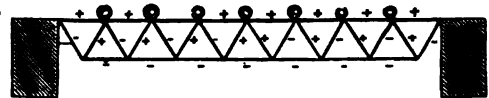


FIG. 1.—THE WARREN TRUSS.

vated channel for water, it is called an aqueduct. A bridge containing a road over a ravine, or over another road, is a viaduct.

A bridge consists of a structure and a superstructure, the former being the abutments and piers, usually of masonry, and the latter the framework supported by them. When the beams composing a bridge are not solid, as are wood or stone beams, but constructed of a network of crossbars, they are called trusses. Bridge structures are formed of arches springing from one abutment to another, or trusses and girders resting upon the abutments, or of chains or of cables suspended from towers. Thus arises the fundamental classification into arch bridges, truss bridges, and suspension bridges. The distribution of material so that the strongest parts will be where the strain is greatest is an important consideration in bridge construction. In Fig. 1 is shown a skeleton diagram with spheres at the several apexes of the upper chord to represent the loads, the mark + denoting the compressive stress under a uniform load, while the mark — denotes tensile stress. In an arched bridge the main ribs are mostly subject to compressive stresses, while the abutments receive a horizontal thrust in addition to the vertical pressures.

Truss bridges are most numerous at present, and may be built as fixed independent spans, as continuous over several spans, as drawbridges, and as cantilever structures. The first iron suspension bridges in the U. S. were built between 1796 and 1810, and the first in England, 1819; chain cables were used. Cast-iron drawbridges are of comparatively recent origin; the first in England was built, 1779.

The Britannia (1850) and Conway wrought-iron tubular bridges, both erected by Stephenson, are widely celebrated. The longest simple truss span erected up to 1908 was built, 1888, over the Ohio at Cincinnati, 550 ft. between centers of piers, or 545 ft. between centers of end pins. In the usual type of drawbridge in the U. S., the truss is symmetrical, and rests on a turntable on the central or pivot

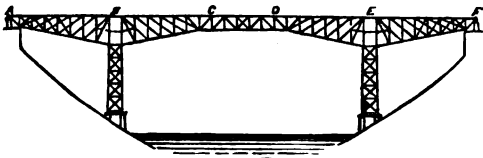


FIG. 2.—A TYPE OF CANTILEVER BRIDGE.

pier. The longest drawbridge is that erected, 1893, over the Missouri at Omaha, Neb., its length being 520 ft.; the heaviest drawbridge is that, erected 1895, over the Harlem River at New York City; this carries four railroad tracks, has three trusses, and it can be opened in one and one half minutes.

The cantilever bridge over the East River, called the Queensboro Bridge, completed 1909, has a total length of 8,231 ft. The river span W. of Blackwell's Island is 1,182 ft., the second longest cantilever span in the world. The Firth of Forth cantilever bridge, with the longest span in the world, was completed 1890, at a cost of \$13,000,000, and consists of the two shore arms, each 680 ft., and two main spans, each 1,710 ft. long. The cantilever type of truss bridge, introduced and perfected since 1882, will be understood from Fig. 2. *A C* is a truss, supported by the anchorage *A* and the tower *B*. On the other side of the river is a similar truss, *F D*, supported at *F* and *E*. Connecting these two is a truss, *C D*. The arm *B C* is the cantilever part of the truss *A C*, and from this circumstance arose the term "cantilever bridge."

The latest development in the U. S. is the rolling, lift, or bascule bridge, of which Chicago has several. It is built in two sections, each resting on a shore bank. When opened to permit the passage of a boat, each half

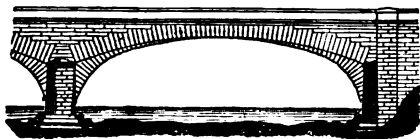


FIG. 3.—A STONE ARCH BRIDGE.

rears itself upright on the bank on which its shore end is resting.

The great arched bridge at St. Louis has two spans of 497 ft. and one of 515 ft. in the clear, and a total length, including abutments, of 1,700 ft., it carries two railroad tracks, together with a highway on the upper deck; it cost \$5,300,000. The Washington Bridge over the Harlem, a beautiful highway structure, has two metal arches, each 510 ft. in clear span, and seven masonry arches, each of

60 ft., the total length being 2,375 ft.; width of roadway, 80 ft.; height above mean high tide is 151 ft.; cost, \$2,850,000. The longest arch in the world is the steel structure for highway and electric-car traffic, erected at Niagara Falls, 1898; span 480 ft. The Brooklyn suspension bridge, with a main span of 1,595 ft., was for years the longest in the world, but it is now exceeded by the Williamsburg Bridge over the East River, at New York, completed 1903; cost, \$11,000,000, with a central span of 1,600 ft., and side spans each 596 ft. in length. The Manhattan suspension bridge, New York, completed in 1909, and crossing the East River, has a central span of 1,470 ft.; its length is abt. 6,854 ft., extreme width, 120 ft., and it rises 135 ft. above mean high water.

Military bridges are temporary structures for the passage of troops; the form was well known to the ancients. The army of Xerxes constructed two bridges across the Hellespont, the first of 360, and the second of 314, vessels,



FIG. 4.—OLD LONDON BRIDGE, 1616.

anchored head and stern alongside each other, their keels in the direction of the current. Alexander had a pontoon train of light boats attached to his army. The Romans had wickerwork vessels, covered with hides, destined to support the timber platform of a bridge; these formed a part of the train of their armies until the end of the empire. They also constructed a more solid military bridge whenever a rapid river had to be crossed, as the famous bridge on piles, on which Cæsar crossed the Rhine, 55 B.C. Pontoon bridges came into general use during the Thirty Years' War. The pontoons now employed by the armies of Europe are larger, but similar in principle to those of one hundred years ago. The most famous natural bridge is in Rockbridge Co., Va., 115 m. W. of Richmond, 14 m. by stage from Lexington. A rocky stratum, 40 ft. thick at the crown and 60 ft. wide, spans a chasm about 93 ft. wide. The walls of the chasm are of solid rock almost perpendicular, and the bed of the little stream, called Cedar Creek, which flows through the chasm is over 200 ft. below the surface of the plain. Another natural bridge, in Walker Co., Ala., has a span of about 120 ft., and is about 70 ft. high; another, in Christian Co., Ky., is 130 ft.

high, with a span of 70 ft. California has five natural bridges, the largest is on a small creek emptying into the Hay Fork of Trinity River, where a ledge of rock 3,000 ft. wide crosses the valley. The arch is 20 ft. high and 80 ft. wide. On Lost River, at the N. extrem-

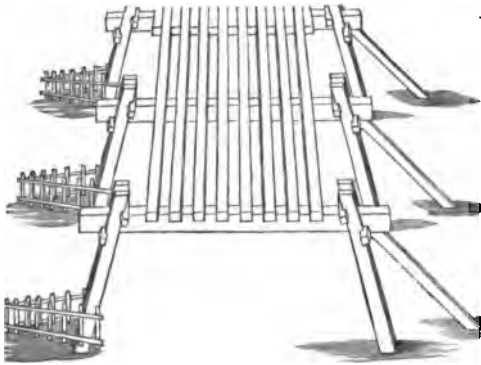


FIG. 5.—CAESAR'S BRIDGE OVER THE RHINE.

ity of the state, are two natural bridges about 30 ft. apart; each is from 10 to 15 ft. wide. On Coyote Creek, Tuolumne Co., are two natural bridges, one 285 ft. long with the course of the water, 36 ft. high, and 30 ft. above the water. The other bridge is similar in size and height. See VIADUCT.

Bridge, Magnet'ic, device for the application of the principle of Wheatstone's bridge to the measurement of magnetic resistances.

Bridge'port, one of the capitals of Fairfield Co., Conn.; at the mouth of Pequonnock River; 18 m. WSW. of New Haven; is one of the chief manufacturing cities of the state, with a capital investment, 1905, of nearly \$50,000,000, and output valued at nearly \$45,000,000; notable industries; carriages and wagons, corsets, sewing machines, hardware, and articles of metal. Bridgeport was settled, 1670, under the name of Fairfield Village; incorporated as a city, 1836. Pop. (1906) 84,274.

Bridger's Pass, defile in the Rocky Mountains; in the S. part of Wyoming. The Overland Stage Route passed through it before the railroad was built. It is a narrow gallery, walled by noble precipices of red granite and metamorphic sandstone, rising directly from the traveler's side to the almost perpendicular height of from 1,000 to 2,500 ft., and is several miles in length.

Bridg'et, or **Brig'it**, **Saint**, or **Saint Bride**, 453-523; one of the three patron saints of Ireland; b. Fochart, now Faugher, 47 m. NW. of Dublin; early showed great energy, courage, unselfishness, and holiness; became a devotee, and founded a monastery of the Columbian order at Kildare, 30 m. WSW. of Dublin; and there d. The name Brigit means "the fiery arrow." Her day is February 1st.

Bridget, **Saint** (BIRGITTA PERSSON), abt. 1302-73; Swedish mystic and religious reformer; b. Finstad; at fourteen married a

nobleman; on his death entered a convent; lived in Rome, 1350-73, exerting great influence by means of "revelations" received in trances; attacked the corruption of the Church; founded the Order of the Holy Savior or Birgittine Order, established at Vadstena, Sweden, her daughter Katarina (St. Catherine) being the first abbess; was reinterred at Vadstena, 1374; canonized, 1381; committed to paper her "revelations," many times printed.

Bridge'ton, capital of Cumberland Co., N. J.; on both sides of the Cohansey River; 20 m. from Delaware Bay, 37 m. S. of Philadelphia; as a port of entry is second in the state; is leading city of S. New Jersey in variety and value of manufactures; was of considerable importance prior to the Revolutionary War. Pop. (1905) 13,624.

Bridge'town, capital of the island of Barbados; on its W. coast; extends along the N. side of Carlisle Bay, which forms its roadstead. Pop. (1901) 35,000.

Bridge'water, Francis Egerton (third Earl of), 1736-1803; projected the canal from Worsley to Manchester and one from Manchester to Liverpool; called "The Father of British Inland Navigation."

Bridgewater, Francis Henry Egerton (eighth Earl of), 1756-1829; son of John Egerton, Bishop of Durham; inherited the earldom, 1823; was an Anglican priest and noted for his eccentricities; by his last will left £8,000 to be paid to the author of the best treatise on the "Power, Wisdom, and Goodness of God as Manifested in the Creation." This sum, however, was divided among eight writers, whose collected works are known as "The Bridgewater Treatises."

Bridgman (brj'män), Laura, 1829-89; American blind deaf-mute; b. Hanover, N. H.; lost sight, hearing, and smell at the age of two, through illness; became a pupil in the Perkins Institute, Boston; learned to read and spell with a manual alphabet; afterwards learned to write and to sew; later was a teacher in the institute.

Brief, in law, an abridged statement of the plaintiff's or defendant's case, prepared by his attorney for the use of the counsel. In the U. S., where the same person is both attorney and counsel, the word brief is used to denote the sketch of the argument of counsel, with or without a statement of facts, which is either used by him or submitted to the court.

Brief, Pa'pal, letter addressed by the pope to temporal princes or communities on subjects of discipline or public affairs. It differs from the papal bull in giving decisions on matters of inferior importance, which do not require the deliberations and assent of a conclave of cardinals. It is not signed by the pope, but by an officer of the papal chancery. It is dated after the modern and not, as in bulls, after the Roman fashion, and sealed with the pope's private seal, "the fisherman's ring."

Briel (brël), or **The Brill**, fortified seaport of Holland; province of S. Holland; near the

mouth of the river Meuse; 13 m. SSW. of The Hague; has a good harbor, is intersected by several canals, and contains several magazines. The capture of this town by William de la Marck, 1572, was the first important event in the long contest between the Dutch and Philip II of Spain. Pop. (1900) 4,107.

Brienne (brě-ën'), or **Brienne-le-Château**, called also **BRIENNE-NAPOLÉON**, small town of France; department of Aube; on the river Aube; 23 m. ENE. of Troyes. Here was a military school in which Napoleon I was educated. In January, 1814, a battle was fought here between Napoleon and the allies commanded by Blücher and Schwarzenberg, but without important results.

Brienz (brě-ěnz'), **Lake of**, Switzerland; formed by the river Aar, at the foot of the Hasli Valley; is 8 m. long, 2 m. wide, and from 500 to 2,100 ft. deep. The surface is 1,847 ft. above sea level, and is surrounded by high mountains. Its surplus flows through the Aar into Lake Thun. On the N. shore of the lake at the foot of the Brienzzer Grat is the village of Brienz, the center of the wood-carving industry of the Oberland.

Brigade', a group of regiments or battalions combined into one body. In the British army it denotes a temporary body formed by the union of two or more regiments or battalions under one commander, called a brigadier. In the U. S. army two or more regiments of infantry or squadrons of cavalry may constitute a brigade. A brigade of cavalry is usually eight or ten squadrons. The Royal Guard in Great Britain, consisting of three cavalry and three infantry regiments, is known as the Household Brigade.

Brigadier', or **Brigadier General**, commander of a brigade; an officer who is one degree higher than a colonel, and one lower than a major general; in the British army an officer (usually a colonel) who for a limited time and for a special service is appointed to the command of a brigade. When this is broken up he either falls back to the rank of colonel or is raised to major general.

Brigandage, highway robbery by organized gangs, who make their home in secure places in the forests or mountains, from which they issue to rob wayfarers or to hold them for ransom. The vast forests of Gaul and Germany furnished a natural refuge for brigands; continual wars favored them, and many features of the feudal system were little better than respectable brigandage. Italy until very recent times was infested with these outlaws, generally in league with the authorities. Brigandage still exists in Spain, Albania, and some other countries.

Brigantes, powerful nation of ancient Britain; inhabited what is now the N. of England, including the counties of Cumberland, Westmoreland, Durham, York, and Lancaster.

Briggs, Henry, 1551-1630; English mathematician; b. near Halifax, York; Savilian Prof. of Astronomy, Oxford, 1619; made important contributions to the theory of logarithms, and

published, 1624, "*Arithmetica Logarithmica*," giving the logarithms of natural numbers from 1 to 20,000, and from 90,000 to 100,000, calculated to fourteen places. His "*Trigonometaria Britannica*" contained "tables" of natural sines, tangents, and secants with logarithms to the hundredth of a degree.

Bright, John, 1811-89; English orator and statesman; b. near Rochdale, Lancashire; member of the Society of Friends; advocate of the Anti-Corn-Law League; sat in Parliament, 1843-57; during the Civil War in the U. S. supported the Union cause; member of Gladstone's Cabinet, as President of the Board of Trade, 1868-71; again a member, 1880-82, resigning because he differed from his colleagues on Irish home rule and Egyptian policy; Lord Rector, Univ. of Glasgow, 1880.

Brighton, formerly **Bright-helmstone**, town and watering place of England, in Sussex; on the English Channel; 50 m. S. of London; has magnificent hotels, two theaters, assembly rooms, and boarding schools. Among its institutions are Brighton College, for the education of the sons of noblemen, a hospital, and the Sussex Literary and Scientific Institution. Pop. (1905) 127,183.

Bright's Disease', or **Nephritis**, essentially a degeneration of the kidney structure. In consequence of this, the normal excretory processes are not accomplished, and poisonous substances are retained, to the impairment of general health. The causes of this disease, or group of diseases, for under Bright's disease are included various degenerations of the kidneys, are varied. Chronic Bright's disease is the result of slowly acting causes, and may be accompanied by a variety of symptoms. The first effect of degeneration of the kidney is alteration in the urine, the presence of albumin in which, though by no means always indicative of Bright's disease, rarely fails to be a symptom.

Brigit'ta. See **BRIDGET**, **SAINT**.

Brigittines, or **Order of the Saviour**, monastic order affiliated with the Augustinians. See **BRIDGET**, **SAINT**.

Brihuega (brě-wā'gā), town in New Castile, Spain; on the Fajuna; 51 m. NE. of Madrid, where, December 9, 1710, the French under Vendôme defeated the allies under Lord Stanhope. Pop. abt. 3,500.

Brimstone, commercial and common name for sulphur.

Brindaban' (ancient *Vrindavana*), sacred town of British India; in the united provinces of Agra and Oudh; on the river Jamna; 40 m. NNW. of Agra; has several temples of Krishna, which are visited by pilgrims from all parts of India. Pop. abt. 22,000.

Brindisi (brěn'dě-sě), fortified seaport of Italy; province of Lecce; at the head of a bay of the Adriatic; 38 m. NNW. of Lecce. The ancient Brundisium was taken from the Salentines by the Romans, 287 B.C., and was their principal naval station on the Adriatic. It

was long an important maritime city of Italy. Here is a mediæval cathedral and an ancient castle. The position of Brindisi has been rendered very advantageous by the opening of the Suez Canal. Pop. (1901) 23,000.

Brisbane (briz'bān), Sir Thomas Macdougall, 1773-1860; Scottish astronomer; b. Largs, Ayr; commanded a brigade in the Peninsula, 1812-13; governor of New South Wales, 1821-25; improved the penal colonies and promoted the commerce of the colony; catalogued 7,385 stars while in Australia, and on his return built an observatory on the Tweed; was made a baronet, 1836; succeeded Sir Walter Scott as President of the Royal Society of Edinburgh.

Brisbane, capital of Queensland, Australia; on Brisbane River; 20 m. from its entrance into Moreton Bay, and 600 m. N. by E. of Sydney. Wool and other products are exported. Pop. (1904) 125,672.

Brissonot de Warville (brē-sō də vār-vēl'), Jean Pierre, 1754-93; French Girondist and political writer; b. near Chartres; published, 1780, a "Theory of Criminal Laws"; with the aid of friends founded, abt. 1788, the Society of the Friends of the Negroes, and visited the U. S. to promote the abolition of the slave trade; after his return founded and edited the *Patriote Français*, a republican journal; in 1791 elected to the national assembly; was so prominent a leader of the Girondists that they were often called the Brissonots; having been elected to the convention, opposed the execution of the king; was guillotined in Paris; wrote "Mémoires pour Servir à l'Histoire de la Révolution."

Bristol, maritime city of England; situated on the Avon at its confluence with the Frome; 118 m. W. of London. Among its remarkable buildings are the cathedral, which was founded abt. 1150; the church of St. Mary Redcliffe, which was completed in 1376, and the Temple church, which has a leaning tower. The Avon here, though narrow, is deep enough for large vessels. Bristol was the first British port between which and the U. S. a regular communication by steam was established. It has an extensive trade with Canada, the U. S., the W. Indies, France, Russia, the shores of the Mediterranean, etc. The chief exports are copper, iron, brass, coal, salt, and manufactured goods. The manufactures of this city are chiefly cotton goods, refined sugar, glass, woolen goods, chemical products, machinery, and earthenware. Here are extensive shipyards. This place was called *Caer-oder* by the Britons, and *Bristoce* or *Briestow* by the Anglo-Saxons. A fortified town existed here as early as 500 A. D. It was formerly the second commercial city in England. Pop. (1901) 339,042.

Bristol Brick, or **Bath Brick**, a variety of brick used for scouring steel table cutlery and other polished steel surfaces; is made at various places in England and the U. S. from a peculiar fine sand.

Bristol Chan'nel, inlet of the Atlantic Ocean; in the SW. of England; bounded on the N.

by Wales, on the S. by Somerset and Devon; at the E. end communicates with the estuary of the Severn; the largest inlet of Great Britain, and has a coast line of 220 m. The tides rise at Bristol about 40 and at Chepstow sometimes 70 ft. The principal bays are Swansea, Caermarthen, Barnstable, Cardiff Roads, and the Severn Estuary.

Bris'tow Sta'tion, now **Bristoe**, Prince William Co., Va.; 14 m. WSW. of Manassas Junction; scene of a battle, August 27, 1862, between Federal forces under Hooker and Confederates under Ewell; and of another, October 14, 1863, between Confederates under Hill and Federals under Warren.

Brit'ain, or **Britan'nia**, ancient name of Great Britain, of uncertain origin. The natives are said to have called it Eilauban and themselves Brydtrain, whence perhaps Albion and Britain. There is no historical knowledge of the island prior to Cæsar's invasion, when the Celts, the original inhabitants, had been driven by Gothic tribes into the less accessible parts.

Britannia Met'al, alloy of variable composition, but usually composed of 86 parts of tin, 10 of antimony, 3 of zinc, and 1 of copper; used for domestic utensils; sometimes called "white metal." Is harder than pewter and not so easily indented or bent.

Britannicus, 42-55 A. D.; son of Claudius and Messalina. His claim to the throne was set aside by his father in favor of Nero, who after his accession poisoned him.

Brit'ish America, all British possessions in the W. Hemisphere; usually applied to the territory embraced since 1873, in Canada and to Labrador and Newfoundland.

British Associa'tion for the Advance'ment of Sci'ence, society for promoting the mutual acquaintance of scientific men, the interchange of scientific ideas, and the solidarity of scientific workers; founded, 1831, at a meeting held at York. The funds of the society enable it to make grants for the pursuit of special scientific inquiries. In 1905 the Society held meetings in S. Africa.

British Colum'bia, largest province of Canada; bounded S. by the U. S. (Washington, Idaho, and Montana), N. by Mackenzie and Yukon districts, E. by Alberta, and W. by the Pacific Ocean and Alaska; area, 372,630 sq. m., including Queen Charlotte and Vancouver islands. Surface mostly rugged, but the soil near the coast and in the valleys is rich and productive; adapted to fruit growing. Climate mild, though rainy at the coast; more extreme in the interior. The coast line is characterized by remarkable fiords, called canals, which are often walled in by mountains of the Cascade Range. The highest peaks in the Rocky Mountains are Mt. Brown (about 16,000 ft.) and Mt. Hooker (about 15,700 ft.). Furs are largely exported. There is much valuable timber, and the fisheries are important. There is much fine grazing land. Gold, silver, copper, zinc, mercury, coal, iron, and marble are found. The province's trade

is the largest in the world per head of population. The principal towns are Victoria, the capital, and Nanaimo, on Vancouver Island, and Vancouver and New Westminster, on the mainland. The best harbor is at Esquimault. British Columbia was made a colony, 1858; Vancouver Island was consolidated with it, 1866; and it joined the Dominion, 1871. Pop. 290,000.

British Em'pire, The, comprises England, Scotland, Ireland, Wales, Shetland Isles, Orkneys, Hebrides, Scillies, Isle of Wight, Isle of Man, and Channel Isles; in the Mediterranean: Gibraltar, Cyprus, and the Maltese islands; in the Gulf of Aden: Aden, Perim Islands, the Kuria-Muria isles, and Socotra Island; in the Indian Ocean: Ceylon, Mauritius Island, and the Seychelles; in Asia: the Empire of India and the Native States, the Straits Settlements, the protected Malay States, Wei-hai-Wei, and Labuan Island in the Asiatic Archipelago: N. Borneo, Sarawak, and Hongkong, with Kow-Loon and Lema islands; the Commonwealth of Australia, and part of New Guinea; in the Pacific Ocean: New Zealand, Fiji Islands, and W. Pacific islands, including Gilbert, Tonga, and Cook islands; in America: Canada, Newfoundland, and Labrador, British Guiana, British Honduras in the North Atlantic: the Bermuda, Bahama, Leeward, Windward, Jamaica, Barbados, Trinidad, and Tobago islands in the S. Atlantic: the islands of Ascension, St. Helena, Tristan d'Acunha, Falkland, and S. Georgia; in Africa: Cape Colony, Basutoland, Natal, Bechuanaland Protectorate, Orange River Colony, Transvaal, Rhodesia, British Central Africa Protectorate, E. Africa Protectorate, Uganda Protectorate, Somali Coast Protectorate, Zanzibar and Pemba, Nigeria, Gold Coast Colony, Lagos, the Gambia, and Sierra Leone; total area, 11,755,333 sq. m.; estimated pop., 358,934,622. See articles on the respective countries, islands, etc.

British Guai'na. See GUIANA.

British Hondu'ras. See HONDURAS, BRITISH.

British In'dia. See INDIA.

British Muse'um, London; established, 1753, by Act of Parliament in pursuance of a bequest of Sir Hans Sloane to the nation of his cabinets of natural history and his library, numbering 50,000 volumes, in return for £20,000 to be paid to his heirs, and was opened, 1759. The palace of the Duke of Montague on Great Russell Street was purchased for the reception of the collection. In 1801 the Elgin marbles, in 1823, the library of George III, 80,000 volumes, were added to the museum, and it has since been enriched by extensive accessions. The library numbers over 2,000,000 volumes, besides 100,000 MSS., documents, and state papers. The collections of antiquities are the most complete in Europe, comprising the finest collection of vases, and the largest collections of Greek and Roman sculpture in the world.

British New Guinea. See NEW GUINEA.

British N. Bor'neo. See BORNEO.

Brit'on, native or citizen of ancient Britain; often applied to a modern inhabitant of Great Britain. See CELTS.

Brit'tany. See BRETAGNE.

Broach, district and city in the N. Division of Bombay, British India; district on the E. side of the Gulf of Cambay, and S. of the Mahi River; area, 1,453 sq. m. The town is on the right of the Nerbudda, 30 m. from its mouth; has a considerable trade; exports quantities of raw cotton; and contains a Brahminical hospital for sick and disabled animals, where even insects are received. Pop. 43,000.

Broad Ar'row, government mark used on British Govt. stores of every description, and so called as being likened to the head of a broad arrow. It is a felony to obliterate or deface this mark; and the unlawful use of it involves a penalty of £200 and the forfeiture of the goods. The mark is supposed to be of Celtic origin, by some identified with a Druidical letter typical of superiority of rank, or holiness. First used as a government mark abt. 1700.

Broad Moun'tain, ridge in the anthracite-coal region of Pennsylvania, in Carbon and Schuylkill counties; has an altitude of about 2,000 ft., and is nearly 50 m. long.

Broad Riv'er, river of the U. S., rising at the foot of the Blue Ridge, in the W. part of North Carolina. Having entered South Carolina, it flows in a SSE. direction through fertile uplands, and unites with the Saluda at Columbia to form the Congaree River; length, 150 m.

Broad Top Moun'tain, mountain of Pennsylvania, in the NE. part of Bedford Co., and the S. part of Huntingdon Co.; rises about 2,500 ft. Here are extensive beds of bituminous coal.

Brocade (brō-kād'), a silk fabric variegated with gold and silver threads, or a silk fabric on which figures of flowers, foliage, or other objects are formed by the threads of the warp and woof being raised by the Jacquard loom or other means. Brocade bears nearly the same relation to silk textures as damask to linen fabrics.

Brock, Sir Isaac, 1769-1812; British military officer; b. Guernsey; rose to the command of a regiment, which was ordered to Canada, 1802, where, 1803, he suppressed a threatening mutiny; made administrator of Upper Canada, 1811; and, 1812, captured Detroit from the American general, Hull; was killed in the battle of Queenston. Monuments were erected to him in St. Paul's, London, and on Queenston Heights. Brockville, Ontario, is named after him.

Brock'en, The, or Blocks'berg, mountain of Prussia; province of Saxony; 20 m. WSW. of Halberstadt; the highest summit of the Hartz Mountains, 3,740 ft. The Brocken is, according to an ancient belief, the scene of the annual witches' dance on Walpurgis night (May 1st). This superstition probably owes its ori-

gin to the phenomenon known as "The Specter of the Brocken," seen here and elsewhere, which is simply the shadow of a man or other object on the fog, best seen at sunrise. The apparent enlargement of the figure is an illusion, and the shadow can be seen only by the one who makes it or some one very close to him.

Brock'ton, city, Plymouth Co., Mass.; 20 m. S. of Boston. The manufacture of boots and shoes is the principal industry. Pop. (1905) 47,782.

Brogie (bröl-yä'), **Achille Léonce Victor Charles** (Duc de), 1785-1870; French statesman; b. Paris; married the daughter of Madame de Staël; was a friend of Guizot, and cooperated with him as a leader of the Doctrinaires. He was Minister of Foreign Affairs, 1832-34; conservative member of the Legislative Assembly, 1840.

Brogie, **Jacques Victor Albert** (Duc de), 1821-1901; French statesman; b. Paris; minister to London, 1871; Minister of Foreign Affairs in the MacMahon administration, 1873-74; Minister of Justice, 1877, but his exertions in behalf of the constitutional monarchy ended with the downfall of MacMahon; principal works include "L'Église et l'Empire Romain au Quatrième Siècle," 1856; "La Souveraineté Pontificale et la Liberté," 1861; "Frédéric II et Louis XV," 1885; "Maurice de Saxe et le Marquis d'Argenson," 1891.

Bro'ker, a species of agent acting as a middleman or negotiator between distinct parties, such as buyer or seller, though this would not include a pawnbroker. He differs from a factor, since he does not have possession of the property with which he deals. He is in a sense agent for both parties, though primarily of the party by whom he is employed. If he were employed to buy, he could not sell his own goods, but must buy of a third person, even though his engagement be gratuitous. For the purpose of complying with the rule of law requiring in certain sales a written memorandum, he is the agent of both parties. A broker may both sell and buy at private sale—an auctioneer only sells, at public sale. His compensation is a commission termed brokerage. Brokers form distinct classes, such as insurance brokers, stock brokers, real-estate brokers, produce brokers, etc. See AGENT.

Brom'berg, town of Prussia; province of Posen; on the river Brahe; about 6 m. from its junction with the Vistula; 65 m. NE. of Posen, etc.; distilleries, potteries, and breweries. Pop. (1901) 52,204.

Brome'lia Family (*Bromeliaceæ*), monocotyledonous tropical plants. The leaves are hard, rigid, channeled, and often spiny. Some of the species have beautiful flowers. The order comprises more than 350 species, among which are the pineapple (*Ananas sativus*) and the *Tillandsia usneoides*, which is called Spanish moss or old man's beard. It grows in the S. U. S. on forest trees, from the branches of which it hangs down in long gray threads. The fiber of this is used to stuff mattresses. Many of the species grow on trees, and are capable

of vegetating for a long time without contact with the earth, and will flower if suspended in the air after being severed from their roots. The leaves of some are so formed as to retain near their base a quantity of water, and thus supply travelers with refreshment. Many plants of this order afford valuable fibers, which are used in making cordage, cloth, etc. The fiber of the leaves of *Ananas sativus* has been made into a fabric resembling white muslin.

Bro'mine, or **Bro'mium**, element discovered in 1826 by Balard; symbol Br, atomic weight 80; resembles chlorine in chemical habitudes, and exists in minute quantity in sea water and the ashes of marine plants; also found in mineral springs and in many brines, especially those of Pennsylvania and W. Virginia, and in the waters of the Dead Sea; occurs as bromide of silver in the mines of Chile and other countries. It is usually extracted from the mother liquors or bitters of brines, or from the purification of rock salt and chloride of potassium by chlorine or bin-oxide of manganese and sulphuric acid. Bromine is a dark reddish-brown liquid, of powerful suffocating odor and emitting heavy red fumes and is very poisonous; combines readily with metals; possesses bleaching and disinfecting properties. Principally used to make bromide of potassium (K. Br.) used in medicine as a sedative and in photography to restrain development.

Bronchi (brön'ki), divisions of the trachea or windpipe through which air is conveyed to the lungs. The trachea divides into a right and left bronchus similar in structure to itself. Within the lung the bronchi divide and subdivide, forming minute tubes, lined with ciliated epithelium.

Bronchi'tis, disease characterized by inflammation or hyperæmia (congestion) of the mucous membrane lining the air passages, usually accompanied by excessive secretion of mucus. Young children, old people, and those who are feeble or ill nourished are especially liable to it. More or less bronchitis is usually associated with phthisis, obstructive heart disease, and asthma. It is often seen in patients with typhoid, measles, and smallpox. The most frequent cause is exposure to sudden extremes of weather. May be acute or chronic. Acute cases are treated by expectorants or emetics to remove the secretion and by counter irritants to relieve the congestion. In chronic cases, sedatives or tonics with inhalations of medicated vapors are useful.

Bronchocele (brön'kö-sël). See GOITER.

Bronté (brön'tä), **Anne**, sister of Charlotte Bronté, 1820-49; English author; b. Haworth, York; wrote, under the pen name ACTON BELL, two novels, "Agnes Grey," 1847, and "The Tenant of Wildfell Hall," 1848, besides a number of poems.

Bronté, **Charlotte** (CURBER BELL), 1816-55; English novelist; b. Thornton, York; was sent to a boarding school, where her health was impaired by impure air and unwholesome food;

taught until in 1842 she and her sister Emily went to Brussels to learn French. In 1846, Charlotte and her sisters, Emily and Anne, published a volume entitled "Poems by Currier, Ellis, and Acton Bell." Her first successful work was "Jane Eyre, an Autobiography," 1847, which was very popular. Her other chief works are "Shirley," 1849, and "Villette," 1852. She was married, 1854, to the Rev. A. B. Nicholls.

Bronté, Emily Jane, sister of Charlotte; 1818-48; English author; b. Thornton, York; wrote, under the pen name "Ellis Bell," her strong but painful novel, "Wuthering Heights," 1847, and a number of poems. She is the original of Shirley in Charlotte Bronté's novel of that name.

Bronx (brónks), **Borough** of the, one of the boroughs of the city of New York as constituted under the charter of January 1, 1898; that portion of the city lying N. or E. of the borough of Manhattan, between the Hudson River and the East River (Long Island Sound), with the several islands not included in the borough of Manhattan; contains the New York Botanical and Zoölogical Gardens. Pop. (1905) 271,630.

Bronze, alloy of copper and tin, or copper and aluminium; harder and more fusible than copper, but less malleable. Bell metal is a variety of bronze, and the cannon commonly called brass are made of this alloy. Bronze was used by the ancients for weapons and utensils before the art of working iron had been invented. The metal which the Romans called *æs* was probably bronze. The brass mentioned in the Bible is supposed to have been either pure copper or an alloy of copper and tin. Bronze is extensively used in statues, machinery, and ordnance. The French and English have issued bronze coins for currency. Tempering produces on bronze an effect directly opposite to that on steel. To render bronze malleable it must be heated to redness and quenched in water. A mixture of 90 parts of copper with 10 of aluminium produces aluminium bronze, a valuable alloy, used as a substitute for bronze. Manganese bronze contains manganese in substitution for tin, up to ten and even twenty per cent. Phosphor bronze is any standard bronze fluxed with phosphorus, and usually retains a small proportion of that element. All these alloys are usually stronger and sounder than the pure bronze. The varieties of bronze are composed of the following proportions: Bronze cannon, copper 9, tin 1; Chinese gongs, copper 5, tin 1; musical bells, copper 6, tin 1; house bells, copper 4, tin 1; large bells, copper 3, tin 1; bronze for wheels, copper 10, tin 1; telescope or speculum metal, copper 2, tin 1; mathematical instruments, copper 12, tin 1.

Bronze, Age of. It is held by some archæologists that the first weapons and utensils of primitive man were made of stone; that then (in most nations before the beginning of history) there succeeded a time when copper and its alloys were used in the place of stone, as among the Peruvians and some of the ancient

races of N. America; and that in the third stage men learned to work iron. Hence these stages are termed the Age of Stone, the Age of Bronze, and the Age of Iron. In Denmark and Scandinavia there have been found many relics of the Age of Bronze, most of which were made in prehistoric times.

Bronzed Skin. See ADDISON'S DISEASE.

Bronzing, covering of articles made of clay, metal, wood, etc., with a substance which gives them the appearance of being made of bronze. Sometimes bronze or some other alloy of copper is actually spread on articles by the electrotype process, or by applying the powdered alloy by means of gold size, which is a mixture of linseed oil and gum animé. Certain chemicals, also, when applied to various metals give them a bronzed appearance.

Brook Farm, a community established in W. Roxbury, Mass., in 1841, as an experiment in "plain living and high thinking." Its object was the establishment of an "agricultural, literary, and scientific school or college." The head of the community was George Ripley, of Boston, one of the founders of the Transcendental Club, with Emerson, Hedge, Alcott, and others. Associated with Ripley in the Brook Farm enterprise were Nathaniel Hawthorne, Charles A. Dana, John S. Dwight, and others. They bought a farm near Boston, where several trades besides agriculture were carried on, and a number of children were received as pupils, instruction being furnished in ancient and modern languages, history, mathematics, moral philosophy, music, drawing, etc. It was designed to substitute coöperation for selfish competition, and to dignify bodily labor by uniting it with the intellectual and spiritual life. In 1847 the experiment, having proved a failure financially, was given up.

Brooke, Sir James, 1803-68; Rajah of Sarawak; b. of English parents in Benares, India; served in the Burmese War of 1825; went to Borneo, 1838; rendered some service to the sultan, who, 1841, appointed him Governor of Sarawak; framed a code of laws for the natives, and displayed great energy in the extirpation of pirates; British Governor and Consul General in the island of Labuan, 1848-57; repulsed a desperate attack of Chinese on his estates, and drove them from Borneo; lived to achieve the independence of Sarawak; knighted, 1847.

Brooke, Stopford Augustus, 1832- ; English clergyman and author; b. Letterkenny, Ireland; held various livings in the Church of England, London; became a Unitarian, 1880; minister of Bedford Chapel, Bloomsbury, London, 1874-94; author of volumes of sermons, mostly promulgating Broad Church views, and of works including "Theology in the English Poets," "History of English Literature," "Life and Letters of Frederick W. Robertson," "Jesus and Modern Thought."

Brook'ite, mineral; pure native titanite anhydride; occurs in crystals, more or less translucent, which have a brilliant luster; found in

Perth, Scotland, at Tavistock, in Savoy, and other places. A variety found in the Ozark Mountains, Ark., is called arkansite.

Brooklime (*Veronica beccabunga*), perennial plant; native of Europe; grows in ditches and wet places. Its leaves are used in England as an ingredient in spring salads. In the U. S. is found a similar plant, the *Veronica americana*, or American brooklime.

Brookline, town in Norfolk Co., Mass.; on the Charles River, which separates it from Boston and Cambridge; is almost wholly a place of residence and claims to be the wealthiest town for its size in the world. Pop. (1905) 23,424.

Brooklyn, formerly a city, now a borough of New York City and the county seat of Kings Co.; on the W. end of Long Island; bounded by the East River, New York Bay, Buttermilk Channel, the Atlantic Ocean, Jamaica Bay, and the borough of Queens; area, 77.62 sq. m. It has 33 m. of water frontage. There are some fifteen ferries from different points to Manhattan and Jersey City, three suspension bridges connecting Brooklyn and Manhattan boroughs, also a tunnel to Manhattan. Its large number of churches has given it the name of the "City of Churches." The assessed property valuation of all taxable property January 1, 1909, was \$1,418,312,907. There are some fifteen national and state banks, twenty savings banks, nine safe deposit companies. The wharves and docks of the city have a water frontage of more than 25 m., lined with great storehouses and elevators, and represent an investment of hundreds of millions of dollars. Ninety per cent of the coffee and sugar imported into the U. S. is received there. Along the waterfront are also extensive basins, shipyards, dry docks, and marine railways. Here also is the New York Navy Yard, the most important naval station in the U. S. The borough is supplied with water from ponds, streams, and driven wells on Long Island. The principal park is Prospect; area, 516½ acres. In Fort Greene Park 11,000 victims of the Revolutionary War prison ships are entombed. The principal cemetery, widely known for the beauty of its grounds and monuments, is Greenwood. Settlements were made within the present limits of Brooklyn before 1642, the year in which the first ferry was established. The union of the various hamlets as Breuckelen took place 1646. Over the ground now occupied by the borough, on August 7, 1776, was fought the first great battle of the Revolution after the Declaration of Independence, the battle of Long Island. The village charter is dated 1816; the first city charter, 1834. In 1896 Brooklyn comprised all of Kings Co.; on January 1, 1898, it was consolidated with Greater New York as the borough of Brooklyn. Pop. (1905) 1,358,686.

Brooks, Phillips, 1835-93; American Episcopal prelate; b. Boston; ordained, 1859; rector in Philadelphia, 1859-69; of Trinity Church, Boston, 1869-91; Bishop of Massachusetts; had a charming personality and was equally

noted as preacher and author; published "Lectures on Preaching" (Yale Divinity School course), five volumes of sermons, many orations, poems, and carols.

Brooks, Preston Smith, 1819-57; American politician; b. Edgefield District, S. C.; was a captain in the army in the Mexican War; member of Congress from 1853 till his death; seriously assaulted Charles Sumner in his seat in the U. S. Senate chamber, May 22, 1856, because of expressions by the latter in his speech on "The Crime against Kansas"; resigned after motion of expulsion failed, and was reelected.

Broom, shrubs of the family *Leguminosæ*. The common broom of Europe (*Cytisus scoparius*) grows on dry soils and bears yellow flowers. The tough and angular branches are used for making brooms; and the young tops and seeds are used as diuretics. The white broom is cultivated in England as an ornamental shrub, and bears white flowers. The broom (French *genêt*) gave name to the royal family of Plantagenet, one of its ancestors having the broom for his crest.

Broom Corn, a plant of the order *Graminæ*; native of the E. Indies; cultivated in the U. S. It is a variety of the same species which produces sugar cane, durra corn, and other plants. It has a jointed stem, which grows to the height of 8 or 10 ft., and bears spikelets, two



BROOM CORN.

and three together, on the ramifications of an open panicle. The panicle is extensively used in the manufacture of brooms. It succeeds best in alluvial soils, but will generally produce a fair crop on any land that is adapted to maize. The average produce of an acre is about 500 lbs. of the brush or material for brooms. The brush, or stems of the panicle, grow straighter if the panicle stands in a horizontal or drooping position. The stalks are therefore broken over when the panicle is nearly full grown, at a point a foot or a foot and a half below the head. Two rows are ordinarily broken toward each other. This

operation is called "tabling." The seed of broom corn is often fed to chickens, but it has comparatively little value. The brush is not harvested until the seed is nearly ripe, and by this time the herbage is so hard that it has little value for fodder.

Brotherhood of Andrew and Philip, organization founded at Reading, Pa., 1888, by Rev. Rufus W. Miller, and based on the rules of the Brotherhood of St. Andrew. It is interdenominational, nineteen denominations now contributing to its membership, which amounts to about 25,000, spread over forty-four states. Any man can join by promising "to pray daily for the spread of the kingdom of Christ among young men, and to make an earnest effort each week to bring at least one young man within the hearing of the Gospel."

Brotherhood of St. Andrew, organization exclusively of men in the Protestant Episcopal Church. The parent brotherhood was organized in Chicago, 1883, and there are now more than 1,200 active chapters in the U. S., with a membership of about 14,000 men. Object, the same as the Brotherhood of Andrew and Philip (above).

Brother Jon'athan. See TRUMBULL, JONATHAN.

Brothers of the Christian Schools. See BRETHREN OF THE CHRISTIAN SCHOOLS.

Brougham (brō'am), Henry Peter (Baron Brougham and Vaux), 1778-1868; British statesman, jurist, and author; b. Edinburgh, Scotland; admitted to the Scottish bar, 1800, and the English bar, when he removed to London, 1808; entered Parliament as a Whig, 1810; gained popularity by his defense of Queen Caroline, 1821; Lord Chancellor, and raised to the peerage, 1830; followed an independent political course after 1834; a founder of the *Edinburgh Review*, 1802; a zealous advocate of popular education, law reform, Catholic relief, abolition of slavery, suppression of the slave trade, repeal of the Corn Laws, and other reforms; hearty promoter of scientific interests, and an indefatigable writer.

Broussa (brō'sä), or Brus'sa, a city of Asia Minor; in Anatolia; at the N. base of Mt. Olympus; about 60 m. S. by E. from Constantinople. It is on a beautiful and fertile plain, and presents a magnificent external appearance, having more than 200 mosques and minarets. Broussa is one of the most commercial cities in Asiatic Turkey, and raw silk, highly esteemed in the European markets, is the chief article of export. It has manufactures of silk, satin, gauze, cotton cloths, and tapestry. Here are warm mineral springs which were celebrated in ancient times. Broussa was the capital of ancient Bithynia. It was taken by the Turkish Sultan Orkhân in 1326, after which it was the capital of the Turkish Empire until 1453. Pop. (1905) est. 76,300.

Brown, Benjamin Gratz, 1826-85; American politician; b. Lexington, Ky.; settled as a lawyer in St. Louis; served in the Missouri Legislature; became a "free soiler"; estab-

lished and edited the *Missouri Democrat*; colonel in Union army in Civil War; U. S. Senator, 1863-67; elected governor, 1870; candidate for Vice President on ticket with Horace Greeley.

Brown, Charles Brockden, 1771-1810; American novelist and the first professional man of letters in the U. S.; b. Philadelphia; life spent in New York and Philadelphia, where he edited *The Literary Magazine and American Register*, 1803-8. His romances, "Wieland," "Ormund," "Edgar Huntley," "Arthur Mervyn," "Jane Talbot," and "Clara Howard," are weird and mysterious.

Brown, George, 1818-80; Canadian journalist and statesman; b. Edinburgh. Founded *The Globe* (Toronto), 1844; supported Reform party. Entered Canadian legislature, 1851, and became leader of Radical wing there; undertook, with A. A. Dorion, to form a ministry, 1858, but resigned within three days; became, 1864, president of council and leader of Reform section in Tache coalition ministry; took part in conferences leading to confederation of Canadian provinces; called to Senate, 1873; gazetted K.C.M.G., 1879, but declined the honor. Assassinated by a discharged employee.

Brown, Jacob, 1775-1828; American military officer; defended Sackett's Harbor, 1813; promoted to major general, he invaded Canada in the spring of 1814, and commanded at Chippewa and Niagara Falls in July of that year; commander in chief of the U. S. army, 1821.

Brown, John, 1735-88; Scottish physician, author of the Brunonian system of medicine; b. Dunse; published, 1780, "Elementa Medicinæ," in which he propounded his new system. This was received with favor by many physicians. His favorite medicines were alcohol and opium.

Brown, John, 1810-82; Scottish physician; b. Biggar; practiced in Edinburgh and published "Horæ Subæciivæ," 1858, containing the well known "Our Dogs," "Rab and his Friends," and "John Leech and Other Papers," 1882; wrote only of animals and things he loved; pathos and humor are his characteristics.

Brown, John, 1800-59; American abolitionist; b. Torrington, Conn.; emigrated to Kan-



JOHN BROWN'S FORT.

sas, 1855, where he fought against the pro-slavery party, and lived at Ossawatimie; was

the master spirit of the convention which met at Chatham, Canada, May, 1859, and organized an invasion of Virginia in order to liberate the slaves. In July of that year he rented a farmhouse about 6 m. from Harper's Ferry. On October 16th, aided by about twenty friends, he surprised Harper's Ferry, and captured the arsenal and armory; was wounded and taken prisoner by the Virginia militia the next day, and was hanged at Charlestown, December 2d.

Brown, Joseph Emerson, 1821-94; American lawyer; b. Pickens Co., S. C.; settled in Canton, Ga.; served in the Legislature; superior court judge, 1855; governor, 1857, and for three succeeding terms; as war governor seized the Savannah forts before his state seceded; disputed with Mr. Davis the Confederate conscription laws; opposed Sherman's march through Georgia with 10,000 recruits gathered from exempt classes, but refused to send them out of the state; prisoner of war, 1864; acquiesced in reconstruction laws, and supported Grant for the presidency at the cost of popularity at home; Chief Justice of Georgia, 1868; U. S. Senator, 1880-90; declined a réélection.

Brown, Robert, abt. 1550-1633; English theologian and founder of the Brownist sect, or Independents; b. Tolethorpe, Rutland; taught school in Southwark, and preached in the fields; went to Norwich and organized a Congregational church, 1581, publishing his views of church polity; took refuge in Holland and distributed tracts in England, for which two men were hanged; tried for heresy in Scotland, 1583; preached in Northampton, imprisoned for it; excommunicated by the Bishop of Peterborough, having never separated entirely from the establishment; conformed, 1591, and for forty years was rector of Achurch-cum-Thorpe, diocese of Peterborough; left treatises, of which three are extant, teaching Congregationalism as practiced in the U. S.

Brown, Sir Samuel, 1776-1852; English engineer; b. London; served in the British navy forty-eight years; invented a method of making chain cables which led to their introduction into the navy; built the first suspension bridge in England, 1819; made a Hanoverian knight, 1838; d. Blackheath.

Brown-Sequard (-să-kăr'), Charles Edward, 1818-94; Franco-American physiologist; b. Mauritius; father American, mother French; studied medicine in Paris and graduated, 1840; gained distinction by experiments on blood, animal heat, and the spinal cord; Prof. in Paris School of Medicine, 1869; lecturer in Harvard, 1864; practitioner in New York City, 1873; Prof. of Experimental Medicine, College of France, from 1878 till his death; chief works, "Physiology and Pathology of the Nervous System," 1860; "Paralysis of the Lower Extremities," 1860; "Lectures on Nervous Affections," 1873.

Brown University, founded, 1764, at Warren, R. I., and removed to Providence, its present seat, 1770; first name Rhode Island College; received its present name, in honor of Nicholas Brown, one of its chief benefac-

tors, 1804. Courses of study are provided for the degrees of A.B., B.P., B.S., C.E., and M.E. The studies for the first year are usually prescribed, the rest nearly all elective. The library has 140,000 volumes. The buildings are substantial and several of them new and of superior architecture. The gymnasium is exceptionally beautiful and well equipped. The observatory contains one of the finest telescopes in America. There are over eighty professors and instructors, and about 950 students; productive funds aggregate \$3,150,000; grounds and buildings valued at \$2,500,000.

Browne, Charles Farrar (better known as ARTEMUS WARD), 1834-67; American humorist; b. Waterford, Me.; learned the printer's trade; removed to Ohio, and about 1858 began contributing to the *Cleveland Plaindealer* a series of humorous "Letters from Artemus Ward, Showman"; went to New York, 1860, and joined the editorial staff of *Vanity Fair*; became a popular lecturer; published "Artemus Ward, his Book," 1862, and other works.

Browne, Hablot Knight (better known as PHIZ), 1815-82; English illustrator; b. London; principal work in Charles Dickens's books, beginning with "Pickwick."

Browne, John Ross, 1817-75; American traveler; b. Ireland; was taken to Kentucky in childhood; went to Europe as a newspaper correspondent, 1851; traveled on the Continent, in the East, and on the N. and W. frontiers of the U. S.; executed several government commissions; minister to China, 1868-70; author "Resources of the Pacific Slope," "Yusef," "The Land of Thor," "An American Family in Germany," and other works, nearly all illustrated by himself.

Brownian Move'ments (*Pedesis*), seen with the microscope among minute particles (not living) in a liquid. Robert Browne, a botanist, first described them in 1827. They have been mistaken for vital motions. When bacteria or other minute organisms in a solution are observed through a microscope they are found to be in motion, and after the liquid has been sterilized by heat or otherwise, motion still goes on. The same phenomena can be exhibited by rubbing fine powder of carmine or pumice stone in water. All solid matter when very finely divided, and in suitable liquid, shows this motion.

Brownie, a fairy in the old superstitions of Scotland. The tradition is that he was a good-humored goblin, who attached himself to farmhouses, and occupied himself when the family were in bed in performing any work, such as churning, threshing, etc.—a spirit not seen or spoken to, and only known by the performance of voluntary labors. In Cornwall a goblin known as Brownie is called to assist at the swarming of bees. See ELF; FAIRY.

Browning, Elizabeth Barrett, 1806-61; English poet; b. Carlton Hall, Durham; studied Greek and Latin; published, 1826, "Essay on Mind, and other Poems," and, 1833, translated Æschylus's "Prometheus Bound." She married, 1846, Robert Browning, and went to

reside in Italy. Among her poems are "The Seraphim and other Poems" 1838; "A Drama of Exile," 1844; "Aurora Leigh," 1856; "Poems before Congress," 1860; and "Last Poems," 1861. Many of her poems relate to Italy and the Italian aspirations for liberty and unity. "Aurora Leigh," 1856, a novel in verse of 12,000 lines embodies her philosophy of life and art, but cannot compare with her "Sonnets from the Portuguese," which contain some of the finest love poetry in the language.

Browning, Robert, 1812-89; English dramatist and poet; b. London; educated privately and attended lectures at University College, London. At first desired to enter the diplomatic service, and to that end spent some time in Russia and Italy, but his determination to devote himself to poetry soon led him to abandon other ambitions. He is the greatest dramatic poet since Shakespeare, and as a portrayal of character in its most varied phases ranks with the greatest of writers. His works deal with human character in all possible conditions and environments, portraying the highest and the lowest with equal fidelity. The objection often made that his style is obscure is founded upon the fact that many of his works deal with unusual conditions and complex personalities, and that his wealth of imagery can be appreciated only by the widely read. In his simple narratives there is no obscurity. His early work "Sordello," dealing with the development of a poetic soul environed by the contests between Guelphs and Ghibellines, has been said to be the most obscure poem ever written. Browning's greatest work is "The Ring and the Book," which describes the marriage of a young girl to a sordid Italian nobleman, and his subsequent murder of her and her parents.

The best method of studying Browning is first to take the simpler narratives, such as "An Incident in the French Camp," "My Last Duchess," and "How They Brought the Good News from Ghent to Aix"; then the shorter psychological studies, such as "Bishop Blougram's Apology," "Caliban on Setebos," "Rabbi Ben Ezra"; then proceed to the dramas, such as "The Blot on the 'Scutcheon'" and "In a Balcony"; then to a longer and more intricate portrayals of character. Browning's Greek versions, such as "Balanstion's Adventure," are probably the least popular of his works. It may be said that his understanding of Browning will serve as an index of the reader's intelligence, just as his appreciation of Browning will indicate the reader's temperament. He married, 1846, the poet Elizabeth Barrett. Their married life of fifteen years was spent chiefly in Florence, golden records of which are his "One Word More" and "O Lyric Love."

Brownsville, capital of Cameron Co., Tex.; on the Rio Grande, opposite Matamoras, Mexico; has steam navigation on the Rio Grande and an extensive trade with Mexico. Brownsville was taken from the Confederates by Gen. N. P. Banks, November, 1863; and was the scene of an encounter between members of a

Negro regiment and citizens, August 13, 1906, which led to the disbanding of the regiment by order of the President.

Broz'ik, Václav, 1852-1901; Bohemian painter; b. near Pilsen; specialties, historical subjects and genre; his "Columbus before Ferdinand and Isabella" is in the Metropolitan Museum, New York City.

Bruce, noble family of Scotland; descended from Robert de Bruis (or de Brus), a Norman knight who followed William I to England, 1066. He derived his lineage from Brusi, a Northman, a son of Sigurd. His younger son Adam, who acquired a large estate in Yorkshire, left a son, Robert, who received from David I of Scotland a grant of the lordship of Annandale, held by the tenure of military service. He d., 1141, and left a son Robert, the second Lord of Annandale. This second lord had a grandson, Robert, who was the fourth Lord of Annandale. He married Isabel, a daughter of David, Earl of Huntingdon, younger brother of William the Lion, and thus laid the foundation for the royal house of Bruce. He died 1245. Robert de Bruce, son of the preceding, and the fifth Lord of Annandale, was born 1210. When the Scottish throne became vacant by the death of Queen Margaret, 1290, this Robert de Bruce and Balliol claimed the throne. The dispute was referred to Edward I of England, who decided in favor of Balliol. Robert died, 1295, leaving a son, Robert II, who by his marriage with the Countess of Carrick obtained the title of Earl of Carrick, 1271. He fought in the English army against Balliol at the battle of Dunbar; d., 1304, and left a son, Robert (1274-1329), who became King of Scotland, 1306.

His son, David II (1324-71), was dispossessed by Edward Balliol, 1332, fled to France; was restored, 1341; invaded England, 1346; was captured in Durham, and imprisoned in the Tower of London till 1357; was succeeded by his nephew Robert II, the first of the Stuarts. Edward (d. 1318), brother of King Robert Bruce, was offered the crown of Ireland, 1315, crowned 1316, and killed in the battle of Dundalk.

Bruce, Robert, King of Scotland; 1274-1329; son of Robert de Bruce, Earl of Carrick. In 1296, as Earl of Carrick, he swore fealty to Edward I of England, but he soon joined the Scottish leaders who were fighting for the independence of Scotland. Having made peace with Edward I, he became in 1299 one of the four regents who ruled the kingdom. In 1305 he was involved in a quarrel with the Red Comyn, who was a nephew of Balliol, and was a claimant of the throne. Bruce killed Comyn, and was crowned at Scone, 1306. His army was defeated by the English, and he was compelled to take refuge in the island of Rathlin. Renewing the contest in the spring, he defeated the English at Loudon Hill, 1307. In less than two years he made himself master of nearly all Scotland, and in 1309 he drove back an invading army of Edward II. The latter invaded Scotland again in 1314 with an army of about 100,000 men. Bruce, who had less than half as many, gained a complete

victory at Bannockburn, June 24, 1314. In 1318 the Scots invaded England, and after several other campaigns the war was suspended in 1323 by a truce. By a treaty of peace concluded at Northampton in 1328 the English king recognized the independence of Scotland.

Bruce, James, 1730-94; Scottish traveler; b. Stirling; consul general at Algiers, 1763; studied several Oriental languages, and explored the antiquities of Barbary; set out to discover the source of the Nile, 1768; reached Gondar, 1770; discovered the source of the Blue Nile, November, 1770; remained about two years in Abyssinia, whose king treated him kindly; published "Travels to Discover the Source of the Nile" (five volumes), 1790. His veracity was at first doubted by many, but his statements have been confirmed by Salt, Belzoni, and others.

Bruges (br'jës), fortified city of Belgium; capital of W. Flanders; 8 m. from the ocean; 64 m. NW. of Brussels; named from the bridges (over fifty) which cross the canals; contains many fine Gothic edifices, some of which were built in the fourteenth century, and are richly adorned with works of art. Among these are the Church of Notre Dame, with a spire 450 ft. high, and containing a monument of Charles the Bold; the town hall, with a lofty tower and a celebrated chime of forty-eight bells; and the Cathedral of St. Sauveur, furnished with paintings of eminent artists. Bruges has an academy of painting, public library, museum, episcopal college, hospital, school of surgery, institution for the blind, and manufactories of cotton, linen, and woolens, lace, leather, cordage, tobacco, and soap. A ship canal, accommodating the largest vessels and connecting the city with the North Sea, was completed, 1907. Bruges was an important commercial town before the Norman conquest, 1066, after which it continued to increase in riches and population. In the thirteenth century it was central mart of the Hanseatic League. Pop. (1901) 52,867.

Brugach (bröksch), Heinrich Karl, 1827-94; German Egyptologist; b. Berlin; made his first scientific journey to Egypt, 1853; privat-docent in Egyptology in Berlin, 1854; accompanied the Prussian embassy into Persia, 1860; director of the museum of Bulak, 1868, and Prof. of Egyptology at Göttingen, 1869. In 1891 he took 3,000 papyrus rolls with him from Egypt. Among his numerous writings are "Grammaire Démotique," 1855; "Hieroglyphisch-démotische Wörterbuch," 1867-82 (seven volumes); "Geschichte Ägyptens unter den Pharaonen," 1877; "Religion und Mythologie der alten Ägypter," 1884; "The-saurus Inscriptionum Ægypticarum," 1883-91 (six parts); "Steinschrift u. Biblewort," 1891.

Brühl, Heinrich (Count von), 1700-63; German statesman; b. Weissenfels; was the favorite of Augustus II of Poland and Saxony; secured the Polish crown for Augustus III, 1733; Prime Minister, 1747-63; impoverished

the country in supplying his master's and his own extravagance. The Royal Library in Dresden contains his collection of 62,000 volumes.

Brumaire (brü-mär'), second month in the calendar of the French republic; comprised the time from October 23d to November 21st.

Brum'mell, George Bryan ("Beau Brum-mell"), 1778-1840; famous English fop; b. London; had elegant taste in dress, became intimate with the Prince of Wales, lived in sumptuous style, and associated with the nobility; was recognized as an oracle on etiquette and dress; squandered a fortune; went into exile, 1815; and d. in a pauper lunatic asylum.

Brundis'ium. See BRINDISI.

Brunei'. See BORNEO.

Brunel (brö-nël'), Isambard Kingdom, 1806-59; English engineer; b. Portsmouth; son of Sir Mark Isambard; was employed under his father as assistant engineer of the Thames tunnel; chief engineer of the Great Western Railway, 1833; designer and engineer of the *Great Western* steamship and of the *Great Eastern*, at that time the largest vessel ever built, and of the Royal Albert Bridge, Saltash.

Brunel, Sir Mark Isambard, 1769-1849; English engineer; b. near Rouen, France; driven from France by the Reign of Terror, removed to New York, 1793, and designed the Bowery Theater; went to England, 1799; invented a machine for making block pulleys and other useful machines; most important work the Thames Tunnel, which was commenced, 1825, and opened, 1843.

Brunelleschi (brö-nël-lës'kë), Filippo, 1377-1446; Italian architect and sculptor; b. Florence; promoted the restoration of the ancient style of architecture as a substitute for the Gothic, which then prevailed in Italy; first church built in Europe in the revived classical style was the Church of San Lorenzo in Florence, designed by him. Abt. 1418 was architect of the Cathedral of Florence, which had been commenced abt. 1296, and was unfinished. He raised over it a grand and beautiful dome, which is one of the largest in the world. Among his other works is the Pitti Palace of Florence.

Brunetièrre (brü-në-ti-är'), Ferdinand, 1849-1906; French critic; b. Toulon; Lecturer on French Language and Literature in the Ecole Normale Supérieure at Paris, 1886, and member of the Academy, 1893; lectured in Harvard, Columbia, and Johns Hopkins univ., 1897; as contributor to the *Revue des Deux Mondes* distinguished for his defense of the classic French tradition in literature, and for his sharp criticism of realism, naturalism, determinism, and similar literary and ethical doctrines; chief works "Études critiques sur l'Histoire de la Littérature Française" (three series), 1880-82-87; "Le Roman Naturaliste," 1883; "Histoire et Littérature," 1884-86; "l'Évolution des Génres dans l'Histoire de la Littérature."

Brunhil'da, or **Brun'hild**, legendary queen; identical with the Norse Walkyrie Brynhildr; married Sigurd (Siegfried), the hero of the "Nibelungen Lied"; caused his murder and married Gunther, a Burgundian king.

Brunhilde', or **Brunehaut'**, d. 613; Austrasian queen; daughter of Athanagild, King of the Visigoths; married Siegbert, King of Austrasia, 567, who was slain, 575, by Fredegonda, wife of his brother Chilperic; was regent for her son Childebert; on the death of Fredegonda seized Neustria; united under her rule the Merovingian dominions; was overthrown, 613, by Austrasian nobles under Clotaire II and dragged to death by a wild horse.

Brünn, fortified city of Austria; capital of Moravia; at the confluence of the Schwarza and the Zwittawa; 94 m. NNE. of Vienna; public buildings include the castle of Spielberg (now a state prison), cathedral, Gothic Church of St. James, the *Landhaus* (formerly a rich Augustine convent), theater, museum, public library, and botanic garden; has manufactures of woolen, cotton, and silk fabrics, ribbons, glass, soap, and tobacco; is the seat of the highest civil and military authorities of Moravia and Austrian Silesia; was Napoleon's headquarters before the battle of Austerlitz. Pop. (1900) 108,944.

Bruno the Great, 925-965; Archbishop of Cologne; brother of Emperor Otho I; was a man of great talents, virtue, and learning; influential in Church and State; lord high chancellor of the empire, 940; archbishop, 953.

Bru'no, Giordano, 1548-1600; Italian philosopher; b. Nola, Naples; entered the Dominican order, 1563; or independent and speculative spirit, he rejected the orthodox doctrines of the Church; on account of his opinions, was obliged to leave his monastery, 1576, and led a wandering life; fled first to Geneva; later to Paris and London; returned to Italy, 1592; accused of heresy, was imprisoned in Rome seven years, then burned at the stake. He advocated the Copernican system on speculative and not scientific grounds; declared the universe to be everlasting, complete, and to be God, nature being the self-evolution of God.

Bruno, Saint, 970-1008; apostle to the Prussians; b. Querfurt; succeeded St. Adelbert in his missionary labors; converted Emperor Henry II and became his chaplain; was assassinated by pagans of Lithuania.

Bruno, Saint, abt. 1030-1101; founder of the Carthusians; b. Cologne; master of the cathedral school in Rheims, 1057; retired from the world, and with a few friends began to live in solitude at Saisse-Fontaines, 1082; withdrew to La Grande Chartreuse, and founded the order of Carthusians, who adopted the rule of St. Benedict, 1084. In 1090 he went to Rome as papal adviser, but finding court life distasteful sought and obtained means to build another monastery at Della Torre, 1094; canonized 1628.

Brunswick (brünz'wik), German duchy; consists of three large and six small divisions;

area, 1,424 sq. m.; pop. (1900) 464,333. The larger part, containing the capital, is entirely surrounded by Prussia; chief mountain range is a part of the Hartz Mountains in the S.; is traversed by the Ocker in the N., and the Leine, Aller, and Bode; chief products, grain, flax, and hops; mineral products, silver, lead, iron, copper, coal, alabaster, alum, salt, etc.; manufactures of linen, wood, glass, sugar, tobacco, paper, cloths, etc., also breweries. The government is a constitutional monarchy, and the supreme power is vested in a duke and a legislative body of forty-eight members; originally a part of the Duchy of Saxony, and was given, 114, to Henry the Lion. His grandson Otto became first Duke of Brunswick, 1235. Brunswick joined the German customs union, 1844, assisted Prussia in the war of 1866, joined the N. German Confederation, 1866, and became a member of the German Empire, 1870. With the death of Duke Wilhelm the ducal line of Brunswick became extinct, Duke Charles having d., 1873, without issue. The heir to Brunswick is the Duke of Cumberland, excluded owing to his refusal to give up his claim to the throne of Hanover.

Brunswick, capital of the duchy of the same name; on the river Oker; 47 m. ESE. of Hanover; contains a magnificent ducal palace, ancient cathedral, the Church of St. Andrew with a steeple 316 ft. high, mint, museum, which contains paintings by Albrecht Dürer, Rembrandt, and Holbein; manufactures of linen and woolens, lacquered wares, papier-maché, tobacco, hardware, etc. A great annual fair is held here. Pop. (1900) 128,226.

Brush, Charles Francis, 1849- ; American electrician; b. Euclid, Ohio; inventor of many devices of value in the development of the electric light; best known as the inventor of the Brush dynamo for arc lighting, and of a lamp that worked uniformly on a large circuit supplying many lights; won long contest in courts over rights to make and sell storage batteries, 1891; awarded the Rumford medal, National Academy of Arts and Sciences, 1899.

Brush, in dynamo electricity, a device for making electric contact with the moving parts of a generator or motor. Brushes consist of strips of copper or brass, or of bundles of wire held with suitable pressure by means of a spring in contact with the commutator or other moving part with which connection is sought. Carbon plates or pencils are largely used instead of metallic brushes. In static electricity a brush is the name given to certain forms of silent discharge through the air, the illumination from which is so faint as to be visible only in a darkened room.

Brush Turkey, sometimes called **NEW HOLLAND VULTURE**, a bird (*Talegalla lathamii*) of Australia, remarkable for the peculiar manner in which its eggs are hatched. Several pairs of these birds having united to build a nest, collect leaves, grass, etc., into a heap, sometimes to the amount of several cart loads. In this mass the several females deposit their

eggs, where they remain till hatched by the artificial heat of the mound. The bird is about the size of the common turkey. When pursued, it endeavors to make its escape by running through the tangled brush or by flying into the low branches of a neighboring tree. Besides the above, there are several other species and genera, all Australian, and nearly all closely resembling the above bird in its peculiar habits. These now constitute the family *Megapodidae*. The birds are edible, and are much sought as game.

Brus'sels, capital of Belgium; in province of Brabant; on the Senne; 27 m. S. of Antwerp; the most important and populous city of Belgium; remarkable for the number and richness of its antique buildings; one of the finest cities of Europe. The principal public squares are the Place Royale, the Grande Place, on which stands the *hôtel de ville*, and the Place de la Monnaie. Among the remarkable edifices are the *hôtel de ville*, a fine Gothic structure with a spire 364 ft. high, in the grand hall of which the Emperor Charles V abdicated, 1555; the Gothic Cathedral of St. Gudule, built abt. 1270, and is celebrated for its painted windows, numerous statues, and carved pulpit; the Church of Notre Dame de la Chapelle commenced, 1134; the royal palace; the modern Church of Notre Dame de Bon Secours; the former palace of the Prince of Orange; and the Palace of the Fine Arts, which contains a large collection of paintings of the Flemish school; the Palais de Justice, built, 1866-83, at a cost of nearly \$10,000,000, and one of the most strikingly handsome buildings in Europe. Brussels is a center of Belgian industry, and is celebrated for its lace, considered the finest in the world; other chief products are fine linens, damasks, ribbons, gold and silver embroidery, mirrors, jewelry, paper, porcelain, hats, mathematical and musical instruments, carriages, and chemicals. The city was the seat of the International Monetary Conference, called by the U. S. to discuss the position of silver, which met, 1892. Pop. (with suburbs, 1900) 598,599.

Brussels Conference, conference of delegates from the principal military powers, called by the Emperor of Russia, 1874, to prepare the way for an agreement on a code of rules to govern civilized warfare. It met in Brussels July 27, 1874. Delegates from Russia, Germany, France, Austria, Great Britain, the Netherlands, Belgium, Italy, Spain, Denmark, Norway and Sweden, the Swiss Confederation, and Greece were present. The U. S. was not represented, alleging the lateness of the invitation. Although failing in its purpose, the conference was not without value. It brought out the points at issue, and the necessity for compromise. A later attempt to codify the laws of war was made in 1880 by a committee of the Institute of International Law, with the Brussels code as a basis. See HAGUE TRIBUNAL.

Brussels Sprouts, like the cabbage, a form of *Brassica oleracea*. It takes its name from Brussels, Belgium, and from the term

"sprouts," which is used for kalelike plants. It differs from the cabbage in forming little heads, or buds, in the axils of the leaves nearly the whole length of the stem. As these buds develop, the leaves are cut away until only a crown is left at the top of the stem. These little heads attain a diameter of an inch or two. Brussels sprouts is grown for a fall crop, the seeds being started out of doors.

Bru'tus, Lucius Junius, d. abt. 507 B.C.; Roman patriot; son of Tarquinia and nephew of Tarquin the Proud. According to tradition, that tyrant was about to put him to death, but he saved his life by feigning idiocy, which was the origin of his surname Brutus. When the tragic fate of Lucretia had prepared the people to revolt, Brutus led them, expelled the Tarquins from Rome, founded a republic (509 B.C.); was one of the consuls, and was killed in battle against the Tarquins.

Brutus, Marcus Junius, 85-42 B.C.; Roman republican; descendant of the preceding. In the civil war he fought under Pompey against Cæsar, but after Pharsalia was kindly treated by the dictator; appointed Governor of Cisalpine Gaul. His zeal for republican liberty and the influence of his friend Cassius induced him to join the conspiracy against Cæsar; both took part in his murder; became prominent leaders of the republican party; led an army against Antony and Octavius at Philippi (42 B.C.), and after the reverses of Cassius killed himself on the field.

Bryan, William Jennings, 1860- ; American politician; b. Salem, Ill.; began law practice in Jacksonville, Ill.; settled in Lincoln, Neb., 1887; elected as a Democrat to Congress, 1890; advocated tariff for revenue only; attracted attention as a speaker; being frequently spoken of as the "boy orator of the Platte"; reflected to Congress, 1892, and became a champion of free silver; at end of his second term returned to Nebraska and became editor of the *Omaha World-Herald*; in 1896 received the Democratic and People's Party nomination for President on a free-silver platform, but was defeated by William McKinley; became colonel of a Nebraska volunteer regiment in Spanish-American War, 1898; nominated, 1900, by the Democratic, Populist, and Silver Republican parties for the presidency, on platform chiefly opposing imperialism, and was again defeated by McKinley. In 1901 he established *The Commoner*, a newspaper devoted to the interests of the laboring man and to the advocacy of free silver, and in 1905-6 made a tour of Europe and the Far East; was again nominated for the presidency by the Democrats, 1908; was defeated by the Republican candidate, William H. Taft.

Bry'ant, William Cullen, 1794-1878; American poet and journalist; b. Cummington, Mass.; published, at the age of fourteen, "The Embargo," a political satire, and a poem, "The Spanish Revolution." In 1810 he entered Williams College as a student of law, but left without a degree in 1815. In 1820 he was admitted to the bar and published, in the

North American Review, "Thanatopsis," the most widely known of his poems. A collection of poems published in 1826 brought him into immediate prominence. He removed to New York in 1825, and became editor in chief of *The Evening Post*, 1828-1878. His last work of importance was the translation of the "Iliad" (1870) and "Odyssey" (1872), which many critics rank above all previous English translations of these poems. Bryant's poetry is "pervaded by a pure and genial philosophy, a solemn religious tone." His poetry and prose show purity and elegance of diction, and appreciation of nature.

Bryce (brīs), **George**, 1844- ; Canadian educator; b. Mt. Pleasant, Brant Co., Ontario; was authorized by the Presbyterian General Assembly to establish a college on Red River and to organize a church in Winnipeg, Manitoba, 1871; one of the founders of Manitoba Univ., 1871; Examiner in Natural Science in Manitoba Univ., 1877-1903; moderator of the first Presbyterian Synod of Manitoba and Northwest Territory, 1884; head of the faculty of Manitoba Univ.; works include "Manitoba," 1882; "Canada and the Northwest," 1887; "Short History of the Canadian People," 1886; "Makers of Canada," 1903.

Bryce, James, 1838- ; British statesman and author; b. Belfast, Ireland; educated at univs. Glasgow, Heidelberg, and Oxford; practiced law, 1867-82; Prof. Civil Law at Oxford, 1870-93; member of Parliament for Tower Hamlets, 1885; Under Secretary of State for Foreign Affairs in Gladstone's Cabinet, 1885; Chancellor Duchy of Lancaster with seat in Cabinet, 1886; President Board of Trade, 1894; Chairman Royal Commission on Secondary Education, 1894; succeeded Sir Henry Mortimer Durand as ambassador at Washington, 1907; decorated by Edward VII with the Order of Merit, 1907; works include "The Holy Roman Empire," 1862; "Transcaucasia and Ararat," 1877; "The American Commonwealth," 1888; "Impressions of South Africa," 1897; "Studies in History and Jurisprudence," 1901; "Studies in Contemporary Biography," 1903.

Bryn'hild, or **Brynhi'l'da**. See **BRUNHILDA**.

Bryn Mawr (brīn mār') College, educational institution exclusively for women, at Bryn Mawr, 10 m. W. of Philadelphia; founded by Joseph W. Taylor, M.D. (d. 1880), who bought forty-two acres of land and began erection of buildings before his death; intended to give women of intelligence and refinement the best opportunities for culture, combined with Christian influences and social amenities; standard of admission very high; has valuable fellowships; productive funds, \$1,200,000; grounds and buildings valued at \$1,250,000; faculty of nearly fifty, and over 450 students.

Bryozo'a. See **POLYZOA**.

Bubastis (bū-bās'tīs), goddess of ancient Egypt; deification of the moon corresponding to the Greek Artemis; said to signify literally "she who multiplies her aspects," in allusion

to the changes of the moon. According to others, Bubastis was the cat worshiped in ancient Egypt. Her name, according to modern Egyptologists, was *Pecht* or *Pasht*.

Bubastis (PI-BESETH of Scripture and modern **TELBASIA**), ruined city of lower Egypt; in the delta of the Nile; about 75 m. E. of N. from Cairo.

Bubon'ic Plague. See **PLAGUE**.

Bucaramanga (bō-rā-rā-mān'gā), capital of department of Santander, republic of Colombia; on the E. side of the main mountain range; there are gold, copper, and iron mines in the vicinity. Pop. (1902) 20,000.

Buccaneer (būk-kā-nēr'), name originally applied to French hunters in Haiti, then to the adventurers or filibusters who in the sixteenth and seventeenth centuries infested the W. Indies and the Spanish colonies of S. America. They were mostly English and French, and were united by a common hostility to the Spaniards, to plunder whom was their principal business. For mutual protection, they organized themselves into an association bound by a simple code of laws. The wars of William III with France dissolved the confederation, and by the Treaty of Ryswick, 1701, the buccaneers lost their political character, and became merely a set of marine thieves or pirates. See **COBSAIE**; **PIRACY**.

Bucentaur (bū-sen'tār), a celebrated Venetian galley gilded and sumptuously furnished, and used only once a year in a splendid aquatic procession, when the doge performed the ceremony of espousing the Adriatic, on Ascension Day, by dropping a ring into the water. It was burned in 1797, having been kept for this service since 1177.

Buceph'alus, favorite horse of Alexander the Great, who rode on him in all his campaigns. He was purchased in Thessaly by King Philip, and cost nearly \$20,000 of our money. The royal grooms were unable to manage him, but Alexander, then very young, succeeded, and Bucephalus would never permit anyone else to ride him; died in India from wounds received in battle abt. 326 B.C., and Alexander built in his honor the city Bucephala, on the Hydaspes.

Bucer (bōt'sēr), **Martin**, 1491-1551; German reformer; b. Schlettstadt, near Strassburg; for a time a Dominican friar; became a Protestant, 1521; a friend of Luther; introduced the reformed doctrines at Strassburg, 1523, and for many years prof. of theology there; composed the Tetrapolitan Confession, offered at Augsburg with that of the Lutherans; in his "Wittenberg Concord" he indorsed Lu-



BUBASTIS.

ther's doctrine of the Real Presence, but denied that unbelieving communicants received Christ's body. In 1543 he cooperated with Melancthon in the preparation of the Formula for the Reformation of Cologne by Archbishop Hermann, a document which bore an important part in the preparation of the English "Book of Common Prayer"; at the invitation of Archbishop Cranmer went to England, 1549, and became Prof. of Theology at Cambridge, prominently participating in the Cranmer reforms; wrote "Censura" on the prayer book and "Scripta Anglicana."

Buch (bōkh), **Leopold von**, 1774-1853; Prussian geologist; b. Stolpe-on-the-Oder; explored the geology of many countries of Europe, generally traveling on foot; his works are on his travels and on geology; also published a geological map of Germany, and was author of the doctrine of the slow upheaval of continents.

Buchanan (bū-kān'ān), **George**, 1506-82; Scottish historian; b. Stirling; classical tutor to Mary Queen of Scots, preceptor to James VI. and keeper of the privy seal; chief works, "History of Scotland," metrical version of the Psalms, and a posthumous tract, "De Jure Regni," affirming that kings exist by will of the people, which had great influence in the politics of the next century.

Buchanan, James, 1791-1868; fifteenth President of the U. S.; b. near Mercersburg, Pa.; admitted to the bar, 1812; a Federalist in his youth, but voted for Jackson, 1828; served in Congress, 1820-30; minister to Russia, 1831; was U. S. Senator, 1834-45; then Secretary of State; after four years of private life, was minister to England, 1853; nominated by the Democrats and elected President of the U. S., 1856. The other candidates were John C. Frémont, Republican, and Millard Fillmore, American. Buchanan received 174 electoral votes. His policy was hostile to those who opposed the extension of slavery. In his message of December, 1860, he blamed the Northern people for the disruption of the Union, and affirmed that the Executive had no power or right to prevent the secession of a state. He published, 1866, "Mr. Buchanan's Administration," a work in defense of his policy as President.

Buchanan, Robert Williams, 1841-1901; Scottish poet; b. Glasgow; went to London, 1860; published some forty volumes in prose and verse, consisting of novels, plays, poems, and critical essays. Among these are "Idyls and Legends of Inverburn," "David Gray and Other Essays," "The Drama of Kings," "The New Abelard, a Romance." He attacked Rossetti, Swinburne, and others in an article in the *Contemporary Review* entitled "The Fleshly School of Poetry."

Bucharest (bō-kā-rēst'), or **Bukharest'**, capital of former principality of Wallachia and of kingdom of Roumania; on the Dinebovetza; 140 m. NW. of Varna; Oriental in external appearance, but fast assuming the aspect and gayety of a European city; has manufactures

of gold and silver cloth, carpets, linen, beads, necklaces, pipes, and tobacco; merchants, mostly Greeks, Armenians, and Jews; artisans and tradesmen, Germans. The city was founded at the close of the thirteenth century; fell into the hands of the Turks at the end of the sixteenth century; has been besieged several times; suffered from earthquakes, fire, flood, and pestilence; and was the scene of conclusions of treaties, 1812, 1858, and 1886. Pop. (1899), 276,178.

Buck, male of the fallow deer and of other species of deer; also the male of sheep, goats, antelopes, and rabbits. The term is not properly applied to the male of red deer or American deer, which is called a stag. The term doe is applied to the females of those species of deer the males of which are called bucks.

Buck, Dudley, 1839-1909; American organist and composer; b. Hartford, Conn.; organist in churches in Hartford, Chicago, Boston, New York, and Brooklyn; conductor of the Apollo Club, Brooklyn, for twenty-five years ending 1902; composed the cantata for the opening of the Centennial Exhibition, Philadelphia, 1876; took the \$1,000 prize for his cantata "Scenes from Longfellow's Golden Legend" at the Cincinnati festival of 1880; other works include "Forty-sixth Psalm," "Legend of Don Munio," "The Light of Asia," "Hymn to Music," "King Olaf's Christmas," "The Story of the Cross."

Buck Bean, or **Marsh Trefoil** (*Menyanthes trifoliata*), a plant of the family *Gentianaceæ*. It is indigenous in Europe and the U. S., and is widely distributed in the colder parts of the N. Hemisphere. It grows in bogs and marshes, hence also called bog bean. The leaves are ternate, the corolla funnel shaped and five parted, and the fruit is a pod or two-valved capsule. A bitter extract obtained from the leaves is a valuable remedy for dyspepsia and disorders of the bowels. The whole plant is tonic, and is used in Germany as a substitute for hops.

Buck'eye, popular name of certain American exogenous trees and shrubs of the *Æsculus*, family *Sapindaceæ*, especially of the Ohio buckeye (*Æsculus glabra*), growing in the valley of the Mississippi, a large tree with small obscure flowers, and a large seed resembling that of the horse-chestnut tree, which is a near relative. The California buckeye (*Æ. californica*) is a tree growing on the Coast Range Mountains and the W. slopes of the Sierra Nevada. There are various other species in Asia.

Buckingham (būk'ing-ām), **George Villiers** (Duke of), 1592-1628; favorite of James I of England; b. Leicester; in 1616 was Lord Admiral of England; accompanied Charles, Prince of Wales, when he went to Madrid, 1623, to obtain in marriage the Infanta of Spain; negotiated the marriage of the prince with Henrietta of France; contrived a disastrous expedition against Cadiz and an impotent one against Rochelle, from which he returned in disgrace; after the death of James

I he became the favorite and Prime Minister of Charles I, but made himself odious; was assassinated in Portsmouth.

Buckingham, George Villiers (Duke of), 1627-88; English politician and author; b. Westminster; was profligate and unprincipled; on the defeat of the royalist party, 1651, went into exile; at the Restoration became a member of the privy council and an enemy of Clarendon, after whose fall, 1667, he was a confidential minister of Charles II; president of the ministry called the "Cabal"; wrote the "Rehearsal," a burlesque on the heroic plays of Dryden and other Restoration dramatists; also wrote other plays.

Buckingham, William Alfred, 1804-75; American legislator; b. Lebanon, Conn.; a manufacturer in Norwich, of which city he was mayor for four terms; was nine times successively elected Governor of Connecticut (1858-66); sent 55,000 troops to the Union army without drafting; U. S. Senator, 1869, to his death; eminent in temperance and missionary projects, and in Congregational councils.

Buckland, Cyrus, 1799-1891; American inventor; b. Manchester, Conn.; employed in the Springfield armory; invented a machine for turning gunstocks finished from the rough block; also perfected the interchangeability of the parts of a musket, reducing the cost one half.

Buckland, William, 1784-1856; English geologist; b. Tiverton; reader on geology on royal foundation at Oxford, 1819; author of a noted work in geology, "Reliquiæ Diluvianæ"; principal work the Bridgewater Treatise, "Geology and Mineralogy, Considered with Reference to Natural Theology," 1836; Dean of Westminster, 1845.

Buckle, Henry Thomas, 1822-1862; English philosophical historian; b. Lee, Kent; published "History of Civilization in England," 1857-61, a work displaying great boldness as well as affluence of thought. He taught that skepticism was the source of progress and credulity retarded it, working out his conclusions often with boldness offensive to conservative minds.

Buckner, Simon Bolivar, 1823- ; American army officer; b. Kentucky; graduated at West Point, 1844; served at frontier posts, 1844-52; Prof. at the Military Academy, 1846; in the war with Mexico, 1846-48; instructor at the Military Academy, 1848-50; superintendent of construction of Chicago custom-house, 1855; served in the Confederate States army; in command of Bowling Green, which he evacuated on the capture of Fort Henry, falling back on Fort Donelson (surrendered February 16, 1862, to Grant); prisoner of war at Fort Warren till August, 1862; in command of a division of Hardee's corps in Bragg's army in Tennessee; included, May 26, 1865, in Kirby Smith's surrender to Gen. Canby; elected Governor of Kentucky, 1887; nominated for Vice President by the Sound-money Democrats, 1896.

Buck'thorn, shrub or small tree of the genus *Rhamnus*, family *Rhamnaceæ*; distinguished by a bell-shaped calyx which is four or five cleft, and petals which are small and sometimes wanting. The common buckthorn (*Rhamnus catharticus*) is a deciduous shrub, a native of Europe, and naturalized in the U. S. The Atlantic states have two native species.



BUCKTHORN.

Buck'wheat, an annual plant (*Fagopyrum esculentum*, or *Polygonum fagopyrum*); of the order *Polygonaceæ*; said to be a native of Central Asia and Manchuria.

It is cultivated for food in Europe and the U. S. It grows to the height of 2 ft. or more. It has triangular, heart-shaped leaves. The seeds are triangular, and resemble a beech-nut in form. Cakes of buckwheat eaten warm are a favorite article of food, and very nutritious. Buckwheat meal contains about ten per cent of gluten and fifty per cent of starch. Bees are partial to the flowers of this plant, which secrete a large portion of honey, not of the first quality. Buckwheat comes to maturity in a shorter time than most other grains, and may be sown late. In the U. S. the seeds are usually sown broadcast. A good crop of this grain yields about 30 bushels on an acre, and a bushel of it weighs from 45 to 48 lbs.



BUCKWHEAT.

The buckwheat family (*Polygonaceæ*) are apetalous, dicotyledonous herbs, shrubs, or even trees, including about 600 species, widely distributed throughout the world. The most important genera are: *Eriogonum*, containing about 100 species, all American; *Polygonum*, *Rumex*, and *Coccoloba*. *Fagopyrum esculentum* of Asia is the well-known buckwheat; *Rheum raphanicum*, *R. undulatum*, and *R. officinale* are known as rhubarb, and supply the drug bearing that name, while the leaf stalks of the first and second are used for pies, tarts, sauces, etc.

Bucol'ic, pastoral or pertaining to herdsmen. This term is applied to a kind of pastoral poetry written in hexameter verse. The poems

of Theocritus and the "Eclogues" of Vergil are its most perfect models.

Bud (in plants). In the growth of a shoot it frequently happens that the elongation of the stem is checked for a time, while the leaves continue their growth for a while longer. The result is a collection of leaves, mostly closely packed together into a pretty solid mass, and this we call a *bud*. Usually the leaves are considerably modified, the outer ones soon becoming hard and scalelike, constituting the so-called "bud scales." When the elongation of the stem is resumed the leaves are separated, and the bud disappears. A bud is thus a quiescent state of a shoot. In popular botany buds are distinguished as "leaf buds" and "flower buds," the former developing leafy shoots and the latter one or more flowers. Inasmuch as flowers are themselves transformed shoots, all buds are, strictly speaking, essentially alike.

Buda (bō'dä), former capital of Hungary; on the right bank of the Danube opposite to Pest, with which it is now incorporated as one city, styled Budapest.

Budapest (bō'dä-pëst), capital of Hungary; composed of Buda, on the right bank of the Danube, and Pest, on the left bank, the two being connected by several handsome bridges; consolidated, 1873. Buda is strikingly picturesque. A rock, rising abruptly from the river, to nearly 1,000 ft. is crowned by the now useless citadel; a neighboring but lower eminence affords a striking site for the royal palace; and the city forms itself in an amphitheater about the base. Pest is on a sandy plain, but its location gives it commercial advantages. Budapest is the greatest grain market of the empire. The Imperial Parliament meets in alternate years at Budapest and Vienna. The city was the site of a Roman colony; was long the citadel of Christendom against the Turks; belonged to the Turks, 1529-1686; in 300 years its citadel was besieged twenty times. Pop. (1900) 732,322.

Bud'dha, ascetic and reformer; known among S. Buddhists as Gautama, or Gotama, among N. Buddhists as Sakyamuni, and generally among Europeans as the Buddha, or simply Buddha, the "enlightened" one. He was born, 624 B.C., the son of a wealthy Sakya chieftain, reared in luxury and surrounded with all the pleasures and seductions of an Eastern court, he seems to have reached the age of twenty-nine before realizing the universality, depth, and intensity of human suffering. He then set out to find salvation for himself and all mankind. Disappointed with the Brahmanical teaching, which he first tried, he plunged into the forest, and for six years unavailingly sought by increasing vigorous austerities to find the peace and deliverance he desired. At last, after forty days and nights of fixed contemplation, enlightenment came to him, and the problem was solved. His solution is expressed in the Four Verities, or Noble Truths, regarded as fundamental by all Buddhists. They are: 1. Suffering exists

wherever sentient being exists. 2. Cause of suffering is desire, a craving for pleasure or for existence. 3. Deliverance from suffering can be effected only by the extinction of desire. This is Nirvana. 4. This cessation of suffering and entrance into Nirvana can be attained only by walking in the Path of Buddha, or the Noble Eightfold Path. This comprises right views (as to the nature and cause of suffering); right thoughts; right words; right actions; right means of livelihood—that is, as a mendicant monk, living in celibacy and on offered alms; right application of the spirit



BUDDHA.

to the study of the law; right memory, or freedom from error in recollecting the law; and right meditation.

The complex religious system called Buddhism flourished in India for sixteen centuries, together with Brahmanism, from which it was evolved, and with which it had much in common. By the thirteenth century A.D. it had practically disappeared there, losing itself in that development of Brahmanism known as Hinduism. From India the system was carried S. to Ceylon abt. 250 B.C.; thence to Burma in the fifth century A.D., and to Siam in the seventh. As it now exists in these countries it adheres more closely to the primitive system than does that which prevails elsewhere, and is known among scholars as S. Buddhism.

In its primitive form Buddhism was essentially atheistic. The gods, equally with men and all forms of sentient existence, were subject to decay, death, and rebirth. Hence sacrifice and worship were useless, and a priesthood unnecessary. Later, however, the worship of various deities was introduced. It also denied the existence of the soul, and, indeed, of everything except body, mind, and sensation, of heaven, earth, and hell, all of which, however, are described as characterized by impermanency, and subject to continual disintegration and reintegration. Man is conceived

of as a combination of material qualities, sensations, abstract ideas, tendencies of mind, and mental powers. The breaking up of these is death. A force, however, is left behind, and under the influence of this there is a tendency in these elements to recombine and form a new personality or individual. This force is called Karma, the consequence of the acts, words, and thoughts of the individual during the continuance of the combination of qualities which has come to an end. It is this accumulation of merit or demerit which determines the nature and condition of the new personality, but it cannot be said to be a soul.

Bud'ding, mode of propagating improved varieties of fruit which cannot be reproduced by seeds. It is the best mode of propagating peaches, and is convenient in the case of plums, cherries, apples, pears, roses, etc. The best time for budding is the last half of summer.



BUDDING.

The operation is performed by opening the bark of the stock with a vertical and transverse cut, nearly like a letter T, and inserting into it a leaf bud of another variety. The length of the bark and wood cut off with the bud is about one inch. These buds are taken from a branch formed in the present or preceding year. They should be cut squarely at the top, so as to fit the transverse section of the bark of the stock. The leaf growing close to the bud should be cut off. The process is finished by tying the bud with bass matting, soft cotton twine, or woolen yarn. This operation is called shield budding, and is more rapidly performed than grafting (*q.v.*).

Buell (bū'ēl), **Don Carlos**, 1818-98; U. S. army officer; b. near Lowell, Ohio; graduated at West Point, 1841; served in the Mexican War; distinguished at Monterey, Contreras, and Churubusco (wounded); brigadier general, May, 1861; commanded Army of the Potomac, August; succeeded W. T. Sherman in command of Department of the Ohio, November; began vigorous campaign in Kentucky and Tennessee, 1862; compelled by Confederates under Bragg to abandon Lexington and Frankfort; fought indecisive battle with Bragg at Perryville; started in pursuit of retreating enemy; was suddenly relieved of command; resigned, 1864.

Buena Vista (bū'nā vis'tā), hamlet in Mexico; 90 m. SW. of Monterey; famous for the battle fought in its vicinity between the U. S. forces under Zachary Taylor and the Mexican

army under Santa Anna, February 22-23, 1847, which resulted in the repulse and retreat of the latter; American force, 5,000, loss 746; Mexican force, 20,000, loss 2,000.

Buenos Aires (bō'nūs ā'riz), former spelling, **Ayres**, province of Argentina, S. America; bounded NE. by the river Rio de la Plata, E. and SE. by the Atlantic Ocean, SW. by the river Rio Negro; area, 117,777 sq. m.; pop. (1904) 1,312,953; capital, La Plata. It became independent of Spain, 1810, seceded from the Argentine Republic, 1853, but reunited, 1860.

Buenos Aires, capital and largest city of Argentina; on the right bank of the La Plata; nearly opposite Montevideo, 100 m. distant. Its trade and prosperity were long impeded by its inadequate harbor, but recently a costly system of harbor improvements, including extensive dredging and dock building, has been undertaken, and a city port has been created at Ensenada, 27 m. distant, on bay of the same name, giving a great impulse to the city's commerce. The chief exports are hides, beef, grain, wool, tallow, horns, and skins. Pop. (1904) 979,235.

Buffalo, capital of Erie Co., N. Y.; at the foot of Lake Erie and head of Niagara River; the W. terminus of the Erie Canal; in population and wealth the second city in the state. It has a navigable water front of about 7 m.; one of the finest harbors on the Lakes, formed by the Buffalo River, which is navigable for about 2 m. from its mouth. The entrance is protected by the largest breakwaters in the world. There are numerous piers, basins, and canals, and over 20 m. of dockage. The Niagara is here crossed by an iron truss railroad bridge. Buffalo has wide and beautiful streets, and a profusion of trees and shrubbery.

Buffalo is the great E. terminus of the lake traffic, especially of the grain, ore, coal, lumber, and live-stock trade. For the six months ending June, 1906, the receipts of grain transported on the Great Lakes amounted to 29,341,983 bushels; of flour, 201,968 net tons; iron ore, 1,351,834 gross tons; hard and soft coal shipped, 696,663 net tons; grain shipments by rail and canal, 6,403,061 bushels; vessels arrived and cleared, 1,978; net tonnage, 3,772,604. In 1905 there were 109 factories, with capital of \$137,023,114; 43,567 operatives and \$147,377,873 as value of products. Electrical power is obtained from Niagara Falls. The water supply is obtained from the Niagara River. Buffalo was a military post, 1812; sacked and burned by the British, 1813; became a city, 1832. A Pan-American Exposition was held here, 1901. Pop. (1905) 376,587.

Buffalo, either of two species of ruminants of the family *Bovidae*, the *Bubalus buffelus* and *B. caffer*. The former is a native of India, where it has been long domesticated; is used as a beast of burden in India and in Italy, where it was introduced abt. 600 A.D. It is larger and more powerful than an ox, and has a larger head in proportion to the

size of the body; has large crooked horns, which are curved first outward and downward, and next backward and upward. The Cape buffalo (*B. caffer*) is a native of S. Africa; has not been domesticated; measures about 8 ft. from the base of its horns to its tail, and is about 5½ ft. in height. It is dangerous, and will attack



CAPE BUFFALO.

men without provocation. For the American buffalo, see BISON. See also AUROCHS.

Buffon (bü-fōn'), **George Louis Leclerc** (Comte de), 1707-88; French naturalist; b. Montbar, Burgundy; in 1739 was elected to the Academy of Sciences and appointed intendant of the royal garden in Paris; published, 1749, three volumes of his "Natural History," in which he was assisted by Daubenton. Twelve other volumes of it appeared, 1749-67. He was admitted to the French Academy, 1753. Among his most admired works is the "Epochs of Nature." He received the title of Count de Buffon, 1776.

Bu'ford, John, 1826-63; U. S. army officer; b. Kentucky; graduated at West Point, 1848; served on frontier duty, in the Sioux expedition, at Blue Water in quelling the Kansas disturbance, and on the Utah expedition; in the Civil War he was in command of cavalry brigade in N. Virginia campaign, 1862; engaged at Madison Courthouse, Kelley's Ford, Thoroughfare Gap, and Manassas (wounded); chief of cavalry of the Army of the Potomac in Maryland campaign; engaged at South Mountain and Antietam; in Rappahannock campaign, commanding cavalry brigade, 1862-63; engaged at Fredericksburg, Stoneman's raid, and Beverly Ford; in command of a division of cavalry in the Pennsylvania campaign, 1863; at Gettysburg and numerous skirmishes in central Virginia, 1863; became major general of volunteers; died from the effects of exposure and wounds.

Bu'gia, people of Malaysia; chiefly inhabiting Celebes and Macassar; noted for their commercial enterprise; own many vessels employed in the navigation of the E. Indian seas; are muscular, middle sized, of a light-brown color; make cotton cloth, build durable sailing vessels, and are said to be skillful workers in copper and iron.

Bu'gle, a brass musical wind instrument; has been improved by keys so as to be capable of all the inflections of the scale. In its original form the bugle is the signal horn for the English infantry, as the trumpet for the cavalry. Five sounds only are required for the various calls. This instrument is never used in the orchestra.

Buhlwork (böl'wèrk), Germanized form of Boule or Boule work; a decorative inlaying

for cabinetwork, perfected by André Charles Boule (1642-1732), a French cabinetmaker. He used brass, tortoise shell, ivory, and gold, working out designs of flowers, landscapes, and even hunting scenes, and invented a process of multiplying copies of his designs and obtaining figures and matrices by one operation. The work is done with veneers.

Build'ing and Loan Associa'tion, a society established to enable persons of moderate means to become the owners of homes by a succession of small payments. The first of these associations was established at Birmingham, England, in 1781; in America, at Frankford, in 1831.

The capital of a building association is provided by the issue of shares ordinarily worth \$200 each, not sold outright, but paid for at the rate of \$1 a month. The money thus paid is loaned out, and the subscribers are credited with the interest. If the money is so invested as to earn six per cent above expenses, the shares will mature in one hundred and twenty-six months, or about ten and a half years; that is, one hundred and twenty-six monthly payments of \$1 each will entitle the holder, at the end of that time, to \$200.

In the older building societies the payments were all begun at the same date; all the shares matured at the same date, absolutely closing the affairs of the association. This complete winding up insured a plainness and straightforwardness of accounts which it was hard to insure in any other fashion. The system made it hard for new members to enter the association after it was once established. They could do so only by paying in a lump sum the amount which they would have contributed month by month, with the addition of the profits which such contributions would have earned during the time which had elapsed since the association was organized. Under the "terminating" system, the society is not arranged for winding up at a definite time, nor do all the shares mature at the same date. If a number of men want to come in a year after the society is started they are encouraged to do so; and instead of being compelled to pay back dues in a lump sum they are allowed to subscribe to new shares which will mature a year later than the old ones. In case the subscriber to a nonborrowing share is unable to keep up his payments he is generally allowed to withdraw and receive back the money that he has paid in, provided the society has funds available for that purpose.

A man who puts his money in a savings bank at four per cent until he accumulates a fund large enough to enable him to borrow the balance of what he needs at six per cent, with the right to make partial payments on the principal, gets his house cheaper than he can through the agency of any ordinary building society. These societies enable workmen to become owners of real estate sooner than any other means which has yet been devised. Besides the gain to the individual house owners and their families, there is a tremendous gain to the community in having the wide distribution of ownership of real estate.

Building Stone, stone suitable for building. The varieties most commonly employed may be grouped under the general names of granite, marble, limestone, and sandstone, though other rocks, such as the serpentines, traps, porphyries, and recent volcanics, are not infrequently utilized when their colors are suitable, or where, on account of locality or means of transportation, they are to be had at a less cost than other stone. The essential qualities which such stone should possess, named in the order of their importance are durability, permanency of color, crushing strength and elasticity, and cheapness.

Granite has always ranked as one of the strongest and most desirable of building materials, but its hardness has until recently proved a drawback to its use in other than the most massive structures. Machines for cutting, grinding, and polishing have, however, largely overcome this difficulty, and granite is now widely used not merely for house walls and massive masonry, but in turned and polished columns, pilasters, balustrades, monuments, and tombstones. Granites occur in all the states bordering upon the Appalachian Mountain system, but are more extensively quarried in Maine and Massachusetts than elsewhere. The most noted granites of the U. S. are those of Hallowell, Red Beach, Vinalhaven, Dix's and Hurricane islands, and adjacent localities on the coast of Maine, Concord, N. H., Quincy and Cape Ann., Mass., Westerly, R. I., Richmond, Va., Iron County, Mo., and E. St. Cloud, Minn.

The term "marble" as ordinarily used includes any stone composed essentially of carbonate of lime alone, or the carbonate of lime and magnesia in varying proportions, and which, owing to its color and texture, is sufficiently beautiful for a high grade of building material, or for monumental or decorative work. In color, marbles vary from pure white, through all shades of gray, to black; yellow, pink, brown, and red are not uncommon, the gray and black hues being, as a rule, due to carbonaceous matter, and the others to iron oxides. The principal sources of American marbles are at present the beds of Silurian limestone and dolomite which border the Appalachian Mountain system. Vermont produces some sixty per cent of the entire output. Coarse dolomite marbles suited for constructive purposes occur in W. Connecticut and Massachusetts, and in SE. New York. Tennessee is now the chief source in the U. S. for colored decorative marble. The principal foreign sources of marble are N. Italy, the French Pyrenees, Belgium, Germany, and Algeria; Spain and Portugal are also productive. The most noted of these are the white statuary marble of Carrara, the black and gold and Siena marbles of Italy.

Limestones also vary in color and texture, as well as in durability. They may be compact and amorphous, finely or coarsely crystalline, or fossiliferous. Some, like the Florida coquina, are mere aggregates of comminuted shells. The most important limestones for building are the oolites, from the subcarboniferous beds of S. Indiana and portions of Ken-

tucky; these are of a white or cream color, fine grained and readily wrought.

Sandstones are among the most variable of natural building materials. They are essentially consolidated sand, but their composition, texture, and color vary indefinitely. As a rule, the predominating constituent is quartz, in rounded or angular grains. Feldspar and minerals of the hornblende, pyroxene, or mica group are, however, common. The usual cementing or binding constituent is silica, carbonate of lime, iron oxide, or clayey matter. The prevailing hues are shades of gray, buff, drab, red, or brown, the coloring matter being mainly iron. A white color denotes the absence of iron. The red is due to anhydrous iron sesquioxide; brown to a hydrous sesquioxide; the gray color may be due to iron in the form of a protoxide carbonate. The favorite sandstones for constructive purposes in the U. S. are the Ohio freestones, or Berea grits, from the Waverly division of the subcarboniferous formations in Ohio, and the brown and red freestones from the Triassic formations of the Atlantic states and E. slopes of the Rocky Mountain range.

Trap includes a number of igneous rocks more accurately described as diabase, dolerite, basalt, melaphyr, diorite, and gabbro. These are little used for building or decoration, owing to their somber hue and poor working qualities. But they are very strong and often very durable. The Mesozoic traps of the Atlantic border are extensively used for road ballast and street pavements, and more rarely for bridge work and general construction purposes. The value of the production of different kinds of building stone in the U. S., 1905, was as follows: Granite, \$17,563,137; trap, \$3,074,554; sandstone, \$8,075,149; bluestone, \$1,931,625; marble, \$7,129,071; and limestone \$26,025,210—total, \$63,798,748. See CONCRETE CONSTRUCTION.

Bukovina (bô-kô-vě'nă), province of Austria; bounded N. by Galicia, E. and S. by Roumania, and W. by Hungary and Galicia; area, 4,035 sq. m.; was originally a part of Transylvania, with which it passed under Turkish rule, 1529; ceded to Austria, 1777; united with Galicia, 1786; organized as a separate crownland, 1849. Pop. (1901) 730,195.

Bulacan (bô-lă-kăn'), or **Bulican'**, town in Luzon, P. I., on a branch of the Pampanga Delta, about 15 m. from Manila; manufactures sugar and fabrics of silk and cotton; made a military post by the U. S. authorities, 1900. Pop. (1903) 11,589.

Bulak (bô-lăk'), town of Egypt; on the right bank of the Nile; 1 m. from Cairo; at the branching of the Pelusiatic arm of the Nile; formerly stood on an island. The vessels navigating the Nile discharge their cargoes at Bulak, which is the port of Cairo, and contains a customhouse. It has manufactures of cotton and silk, a government printing office, and a valuable museum of Egyptian antiquities.

Bulawayo (bô-lă-wi'ô), town of British S. Africa, commercial center of Matabeleland in

S. Rhodesia. British troops entered the town, 1893, after defeating the Matabele chief, Lobengula. Pop. abt. 5,000.

Bulb, in botany, a generally rounded or ovoid structure consisting of a short stem, upon which are attached many thickened bases of leaves, usually in concentric layers. Bulbs are usually subterranean, or partly so, and from the lower part of the short stem roots grow out and downward into the soil. The onion is a good example of a bulb. Bulbs and buds are similar in structure; each is but the quiescent state of a shoot, in which by the checked growth of the axis the leaves are developed in close proximity. Thickened stems are sometimes erroneously called bulbs, as in the crocus, gladiolus, etc., where they are more properly called *corms*.

Bul'bul, name of the Persian nightingale; sometimes used by English poets. The same name is given in India to a different bird, the *Pycnonotus hæmorrhous*. It is small, of brilliant plumage, and remarkable for its pugnacity and its lively manners. Its constant singing is pleasant, but hardly musical, at least not to be compared with that of the true nightingale.

Bulgaria (bŏl-gă'ri-ă), kingdom of Europe; bounded N. by the Danube, E. by the Black Sea, S. by the Balkans, and W. by Servia, principal towns Rustchuk (Russe), Plevna, Razgrad, Sevliovo, Rahova, Vratya, Varna, Widin, Sofia, and Schumla. The Bulgarians belong to the Greek Church, but for many years endeavored to become independent of the patriarchate of Constantinople, and to have all the Bulgarian dioceses of Turkey united under one Bulgarian exarch. The demand was granted by the Turkish Govt., 1870. The people are of the Finnish-Ugrian race, but adopted very early the Slavonian language. By the Treaty of Berlin, 1878, Bulgaria was made an autonomous and tributary principality under the Sultan of Turkey. In 1885 E. Roumelia was annexed to Bulgaria. Prince Alexander of Bulgaria abdicated September 7, 1886. Ferdinand, Duke of Saxony, was elected Prince of Bulgaria by the National Assembly, July 7, 1887, and assumed the government, August 14, 1887. On October 5, 1908, Bulgaria declared her independence and the prince assumed the title of king. Total area, 38,080 sq. m. Pop. (1905) 4,035,623, of which E. Roumelia had 1,174,535.

Bulk'head, a partition separating the cabins and staterooms on the same deck of a ship, as cabin bulkhead, wardroom bulkhead, etc. Water-tight bulkheads are partitions of iron dividing the holds of the modern steamship into compartments. Transverse and longitudinal bulkheads increase the structural strength of a ship, and, by confining a fire or a leak to one compartment, add to her safety. A collision bulkhead is a transverse partition in the fore body of a ship. Should the bow be stove in by a collision, it confines the water to the forward compartment. The name is also applied to a structure of wood or stone,

to hold back earth, as on a water front, in a mine, etc.

Bull, John, familiar name given to the English people; said to have been first used by Swift, but its first considerable application in literature was by Dr. Arbuthnot in his satire, "The History of John Bull," 1712.

Bull, Ole Bornemann, 1810-80; Norwegian violinist; b. Bergen; visited Paris in his youth, and afterwards performed in Italy and England with success. In 1845 he purchased a large tract in Pennsylvania, and founded the colony of Oleana. This failed and he returned to Europe, but later visited the U. S. several times.

Bull, the male of animals belonging to the family *Bovidæ* and genus *Bos*; also applied to the males of other animals, such as the elk, sea lion, seal, whale. See *BOVIDÆ*; *CATTLE*.) The name of a sign of the Zodiac, and of a constellation which does not coincide with the sign. (See *TAURUS*.) In conversation, a ridiculous speech defined by Sydney Smith as "an apparent congruity and a real incongruity of ideas suddenly discovered."

Bull. See *BEAR AND BULL*.

Bull'fight, Spanish amusement, originally introduced by the Moors; is a contest between bulls and men on foot and on horseback, which sometimes ends fatally for the latter, but generally in the slaughter of the former, after the infliction of great torture. The actors in the bull fight are generally professionals, but amateurs are sometimes permitted to take part. The fight is divided into three acts. In the first act the *picadors* take part, in the second the *chulos*, and the third act is reserved for the *matador*. The picadors, who are dressed like the knights of ancient times, are mounted and armed with lances (hence the name, from Spanish *pica*, a pike or lance.) They take their place at the center of the arena. The *chulos*, who are on foot, are dressed in colored cloaks. The *matador* is on foot, and carries a sword and a *muleta*—a stick with a piece of red silk fastened to it.

Bull'dog, variety of dog remarkable for its courage, faithfulness, persistency, and strength. The size of the neck and fore quarters is quite in excess of the other parts. The bulldog is one of the most fierce, and even dangerous, of his species. Its chief value at present is for crossing with other breeds. The greyhounds, the terrier, and the pointer, each have their courage and persistency improved by this cross, if judiciously made.

Bull'dozing, slang term of Louisiana origin, having a variable significance. Its first use was in the parishes of Feliciana and Baton Rouge, 1876, to describe the doings of a band of a dozen Regulators styled the "Union Stop," who undertook, in the absence of law, to check the stealing and killing of stock, which were destroying the cattle and hogs of that region. The punishment was with the bull whip—a hickory handle of 12 or 15 in. and a plaited thong of 3 to 5 ft. A dozen lashes (or the dozen composing the band) gave

the name to the process, or dose of strapping, and it was called "bulldozing" or "bulldozing." It was soon applied to all summary punishment not authorized by law. More recently it became a political term, particularly as applied to the influencing of negro voters by those of their own color; and generally to describe all kinds of intimidation, real or imaginary.

Buller (bôl'ér), **Sir Redvers Henry**, 1839-1908; English military officer; b. Devon; entered the army, 1858; served with distinction in China, the Ashanti War, the Zulu War, the Boer War, the Egyptian War of 1882, and the Sudan campaigns of 1884-85; Quartermaster General, 1887; Under Secretary for Ireland, 1887; Adjutant General, 1890-97; in command at Aldershot, 1898-99; commanded the British forces in S. Africa, 1899; relieved Ladysmith, March 1, 1900.

Bullet, a projectile of lead to be discharged from various kinds of small arms. For smooth-bore arms bullets are usually spherical, but for rifled musketry various forms of the elongated bullet are used. Most of these bullets have an expansive base, either hollow or plugged with wood, the design being to force the soft lead outward, so as to cause it to fit the grooves of the rifle, and thus give the bullet a rotation around its long axis during the motion forward. This rotation increases the range and precision. Bullets were formerly always cast, but now they are more frequently stamped in steel dies.

Bulletin, in diplomatics, a term equivalent to schedule, and variously applied to different public acts. In recent times often used to denote an official report, a dispatch of a military commander, and in a wider sense any public notice or announcement, especially of recent events. In France the ticket or slip of paper which each elector uses in voting at elections is called a bulletin.

Bullfinch (*Pyrrhula europæa*), European bird of the *Fringillidæ*; about the size of the common sparrow; often kept as a cage bird, especially by the Germans. It is easily trained. Its song is not naturally very agreeable, but it can be improved by education, and trained bullfinches are sold for high prices.

Bull, Gol'den, a decree of Charles IV, Emperor of Germany, published, 1356, in two diets held in succession at Nuremberg and Metz, in order to fix the laws in the election of emperor and to regulate the number and privileges of electors. It is preserved at Frankfurt-on-the-Main. Another golden bull, of Andrew II of Hungary, 1222, fixed the privileges of the nobles, and was regarded as a national constitution.

Bullinger (bôl'ing-ér), **Heinrich**, 1504-75; Swiss theologian; b. Bremgarten; coöperated with Zwingli in introducing the Reformation in Switzerland; succeeded him as pastor in Zurich, 1532; wrote with dignity against Luther in the controversy concerning the Lord's Supper, but he finally came to an agreement with Calvin; drew up the Second Hel-

vetic Confession, 1566, the most elaborate Reformed creed.

Bullion, gold or silver in mass, and hence gold or silver without reference to shape or form; ordinarily used of uncoined gold and silver, but is sometimes applied to coined metal when sold by the bulk. See COINAGE.

Bull'ock, **William A.**, 1813-87; American inventor; b. Greenville, N. Y.; constructed a planetary press, which worked with unmatched speed; improved his invention until he had produced a self-feeding, automatic-adjusting, and printed-sheet-delivering web press, turning out 30,000 newspapers, cut and folded, in an hour.

Bull, Pa'pal, ordinance or decree of the pope, equivalent to the edicts, proclamations, or letters patent of secular sovereigns, some of which were formerly called bulls. All bulls are written in Latin, except those addressed to the United Greek churches. They are generally designated by the first words of the text; thus the bull issued in 1536 against heretics was called the bull, "In Cœna Domini," and that directed against the Jansenists in 1713 was the bull, "Unigenitus." The publication of a bull is termed fulmination. Bulls are written on parchment, and a leaden seal is appended to every bull by means of a silken cord if the object of the bull be the granting of a favor; but if it be a matter of justice, the cord is of hemp.

Bull Run, stream in Virginia which unites with the Ocoquan River about 14 m. from the Potomac; scene of two battles in the Civil War. The first Battle of Bull Run, called by the Confederates the first Battle of Manassas, took place, July 21, 1861. A Federal army of about 30,000, mostly half-trained volunteers, under McDowell, was defeated by Confederates, about 31,000 strong, under Beauregard, losing 2,952 men, while the Confederate loss was 1,752. The second Battle of Bull Run (second Battle of Manassas), August 29-30, 1862, was between some 35,000 Federal troops, under Pope, and about 46,000 Confederate troops, under Lee, Longstreet, and "Stonewall" Jackson. The Federals were again defeated, losing about 20,000 in killed, wounded, and missing; Confederate loss, 8,400.

Bull's-eye, the technical name given to a glass lens used for the purpose of concentrating the light of a given center upon an object. It is also applied to a circular window of plain glass. On shipboard the bull's-eye is a small pulley in the form of a ring, with a rope spliced round the outer edge, and another sliding through a hole in the center. In rifle practice, the small black center in the circle on the target is called the bull's-eye. In astronomy, the bull's-eye is Aldebaran, a bright star in Taurus.

Bülow (bü'lö), **Bernhard Henry Martin Charles von** (Prince), 1849- ; German statesman; b. Klein Flottbeck, Holstein; son of Bernhard Ernest von Bülow, Prussian Minister of State and Secretary of State for Foreign Affairs of the German Empire; served in the Prussian Royal Hussars, 1870-

72; entered the diplomatic service, 1873, as *attaché* in the Foreign Office at Berlin; *attaché* at Rome, 1874-75; Secretary of Legation at Rome, St. Petersburg, and Vienna; *chargé d'affaires* at Athens, 1877; Secretary of the Berlin Congress, 1878; held secretaryships at Paris and St. Petersburg; minister at Bucharest, 1888-93; ambassador at Rome, 1893-97; Minister of State and Secretary of State for Foreign Affairs, 1897-1900; made a count, 1899; Imperial Chancellor, 1900, retaining the Foreign Office portfolio; made major general Seventh Hussars, 1905; given title of prince, 1905; member Prussian House of Lords, 1906; to check the growth and destructive power of Socialism and reactionary Clericalism, induced the emperor to dissolve the Reichstag, December, 1906. Resigned from his office as chancellor, July, 1909.

Bülow, Friedrich Wilhelm von (Baron), 1755-1816; German military officer; b. Falkenberg, Brandenburg; a lieutenant general at the opening of the war of independence, 1813; twice defeated Oudinot, and by his victory over Ney at Dennewitz, 1813, prevented the French from pushing onward to Berlin; in the battle of Leipzig, took a conspicuous part; then drove the French out of Westphalia, Holland, and Belgium, joining the allies in Paris, where the Prussian King made him Count of Dennewitz; also distinguished himself at Waterloo, finishing the campaign by occupying Montmartre at Paris.

Bülow, Hans Guido von, 1830-94; German musician; b. Dresden; Prof. of the Piano at the Conservatory of Music, Berlin, 1855; made concert tours in Germany and Russia, and acquired a great reputation as a pianist, removed, 1867, to Munich, where he became chapel master to the king; after that time made two concert tours in the U. S., and also acted as orchestra conductor in Berlin, Hamburg, and other German cities.

Bulwark, a rampart or bastion; an outwork for defense; that which secures against an enemy; a shelter or means of protection; on the parapet raised round the deck for the purpose of protecting men and goods from slipping overboard, and of excluding the waves from the deck. In ships of war the bulwark is sufficiently high and solid to afford the crew some protection against the shot of the enemy.

Bulwer (bôl'wér), **Edward George Earle Lytton** (BARON LYTTON), 1803-73; English novelist and dramatist; b. London; Lord Rector Univ. of Glasgow, 1858; Secretary of State for the Colonies, 1858; made a baronet, 1838; assumed the name of Bulwer-Lytton, 1844; made a peer, 1866; works include volumes of poems; "The Lady of Lyons" and "Riche-lieu"; dramas, "Money," a comedy; many novels, among which are "Pelham," "Eugene Aram," "Last Days of Pompeii," "Rienzi," "Zanoni," "Last of the Barons," "The Caxtons," "My Novel," "What Will He Do With It?" "A Strange Story."

Bulwer, Edward Robert. See LYTTON, EDWARD ROBERT BULWER-LYTTON.

Bulwer, William Henry Lytton Earle (Baron Dalling and Bulwer), 1801-71; English diplomat and author; brother of Bulwer-Lytton the novelist; b. London; elected to Parliament, 1830; ambassador to Madrid, 1843, where he opposed Narvaez, who ordered him home; was transferred to Washington, 1849, where he negotiated the Bulwer-Clayton treaty guaranteeing the neutrality of interoceanic routes across Central America; minister plenipotentiary at Constantinople, 1858; afterwards ennobled. Among his works are "France, Social and Literary," "Life of Lord Byron," and "The Monarchy of the Middle Classes."

Bulwer-Clayton Treaty. See CLAYTON-BULWER TREATY.

Buncombe (bûnk'ûm), district of N. Carolina. The phrase, "talking for Buncombe," often heard among politicians, was first used by a member of Congress from that district. During a long speech which he made, several members, who had not patience to listen, retired from the hall. He then told the remaining members that they also might go, for he "was only talking for Buncombe." Pop. (1900) 44,288.

Bundi (bôn'dé), native state, Rajputana, British India; area, 2,220 sq. m.; pop. (1901) 171,220; watered by the Chambia and Nij; principal crops, maize, wheat, pulse, and oil seeds; chief town, Bundi.

Bun'ion, or **Bun'yon**, a painful inflammation of the bursa or sac of the joint which connects the great toe with its metatarsal bone. The pressure of a shoe causes this bursa to inflame, and this may go on to suppuration. Rest and poulticing are generally sufficient to subdue the attack, and avoiding further pressure will prevent a recurrence.

Bun'ker Hill, rounded eminence in Charlestown section of Boston, Mass.; about 110 ft. high and connected by a ridge with another small eminence 700 yards distant called Breed's Hill; famous for the battle fought here between the British and American forces, June 17, 1775. The American redoubt was on Breed's Hill, but by common usage the event is known as the battle of Bunker Hill. A force of 4,000 British under Gens. Howe and Pigott, who later were reinforced by Gen. Clinton, made three attacks upon the positions here, which were defended by about 1,500 men. They were twice repulsed, but finally drove the Americans within the redoubt, where a hand-to-hand conflict occurred. Gen. Warren, who was with Prescott in the redoubt, fighting as a volunteer, was killed during the retreat of the Americans. The British loss in killed and wounded was about 1,050; the American, not over 450. A granite obelisk, 221 ft. high, now marks the scene on Breed's Hill, and is known as Bunker Hill Monument. Lafayette laid the corner stone, June 17, 1825, when, too, Daniel Webster delivered one of his most memorable orations. The monument was dedicated, June 17, 1843, in the presence of the President of the U. S. and his Cabinet, Daniel Webster being, as before, the orator of the occasion.

Bun'ner, Henry Cuyler, 1855-96; American journalist and author; b. Oswego, N. Y.; editor of *Puck* from 1877 until his death; published a volume of poems and several novels, "A Woman of Honor," "The Midge," "The Story of a New York House," "Short Sixes," etc.

Bun'sen, Robert Wilhelm, 1811-99; German chemist; b. Göttingen; succeeded Wöhler in the Polytechnic Institution of Cassel; Prof. of Chemistry at Breslau, 1851, and, 1852, at Heidelberg; author of several works, the most important being on gas analysis. He invented important apparatus, several of which bear his name, as the Bunsen battery, gas burner (by which perfect combustion is secured), photometer, filter pump, etc. His most brilliant discovery was that of spectrum analysis and the spectroscope. By its aid Bunsen discovered *cæsium* and *rubidium*. He also devised a new system of analysis by flame reactions.

Bun'yan, John, 1628-88; English writer; b. Elstour near Bedford; learned the trade of a tinker; was in the parliamentary army; joined the Nonconformists, 1653; was regularly recognized as a preacher and conducted services, often in London, but continued to practice his trade; was twice imprisoned for preaching, and while in Bedford Co. jail, 1675, wrote "Pilgrim's Progress," published in two parts, 1678, 1684. His other famous allegory, "The Holy War," appeared, 1682. His numerous works include "Grace Abounding to the Chief of Sinners," his spiritual autobiography, and "Life and Death of Mr. Badman."

Buonarot'ti. See MICHAELANGELO.

Buoy, a floating body usually intended as a mark for the guidance of mariners. It is made either of wood or metal, and is often hollow. Buoys are generally moored by chains to the bed of the channel, and are of various shapes, sizes, and colors to distinguish them one from another, and indicate to the mariner each a specific instruction. The bell buoy is a contrivance for rendering a buoy audible, whether it is visible or not; it is flat on top, where a bell is mounted, the clapper of which is set in vibration by undulations of the water. The Courtenay buoy is surmounted by a whistle connected with a hollow tube long enough to reach stiller water beneath. As the buoy rises and falls on the waves the water in the tube correspondingly changes, so that the air rushes in or out of the whistle as the air in the tube expands or is compressed. In laying submarine telegraphs, buoys are used when cables are cut and abandoned, during rough weather, afterwards to be picked up and repaired, when the work of laying the cable goes on as before the storm.

Bur'bage, Richard, abt. 1567-1619; English actor; inherited a share in the Blackfriars, and, with Shakespeare and others as partners, built the Globe Theater, where he played *Richard III* and other tragic rôles with great spirit.

Bur'bank, Luther, 1849-; American naturalist; b. Lancaster, Mass.; the originator of new varieties of fruits, vegetables, and flowers.

He moved to Santa Rosa in 1875 and established an experimental farm. By cross fertilization, selection, and cultivation under certain conditions he has produced new and improved varieties. He is the originator of the Burbank potato, the October Purple, Chalco, and Climax plums, Peachblow, Burbank and Santa Rosa roses, etc.

Bur'bot (*Lota lota*), a fish of the rivers and lakes of the arctic and subarctic regions of both hemispheres; is the only fresh-water species of the family *Gadidæ* or codfishes. It reaches a weight of 8 or 10 lbs. It has two dorsal fins, the second of which is very long, and a very long anal fin. Its flesh is white, firm, and is not highly esteemed as food. It is capable of living a long time out of water. It is also known in the U. S. as eel pout, cusk, and ling.

Burck'hardt, Johann Ludwig, 1784-1817; Swiss traveler; b. Kirchgarten, near Lausanne; entered the service of the African Association, 1809, to explore the interior of Africa; spent two years in Syria; traveled through Cairo and Nubia to Mecca; disguised as a Moslem *hâjî*, made a pilgrimage to Mt. Ararat and to Medina with peril to his life; works include "Travels in Nubia," "Travels in Syria and the Holy Land," "Travels in Arabia," and "Arabic Proverbs; or the Manners and Customs of the Modern Egyptians, Illustrated from their Proverbial Sayings."

Bur'den of Proof, the obligation or necessity of proving the fact in dispute in a court of justice. The general rule is that the burden rests upon the party who asserts the affirmative. If the proof by which a negative allegation may be disproved is peculiarly within the knowledge of the opposite party, a *prima facie* case is established by its simple assertion. In most civil cases judgment must be given for the party establishing a preponderance of evidence, but in criminal cases the accused must be acquitted unless the jury are satisfied of his guilt beyond a reasonable doubt; and the burden of proof is on the government throughout the whole case.

Burdett-Coutts (bér-dët'-kôts'), Angela Georgiana (Baroness), 1814-1906; English philanthropist; daughter of Sir Francis Burdett; granddaughter of Thomas Coutts, a London banker, whose second wife left her a fortune of £12,000,000, on condition that she should assume the name of Coutts; raised to the peerage by Queen Victoria, 1871, in recognition of her works of benevolence; married, 1881, William Lehman Ashmead Bartlett (b. New Brunswick, N. J., 1851), who took her name, whereby she forfeited some part of her inheritance.

Bur'dock (*Arctium lappa*), a plant of the family *Compositæ*; has globular involucre scales, each tipped with an abrupt and spreading, awl-shaped, hook-pointed appendage. This involucre, which is called a *bur*, becomes fastened to rough surfaces with which it comes in contact. The burdock is a native of Europe and naturalized in the U. S., growing as a

weed in waste places, fence corners, and near dwellings. It is used in medicine.

Bureau of American Republics, a bureau organized as a result of the Pan-American Congress in 1889; under the control of the Department of State, and comprises a committee, of which the Secretary of State is chairman, has one representative for each country belonging to the union. Its purposes are to disseminate information between the countries associated concerning commercial conditions, and to secure the adoption of common legal-tender silver coin. The bureau occupies a \$750,000 building in Washington, given by Andrew Carnegie.

Bürger, Gottfried August, 1747-94; German poet; b. near Halberstadt; works consist chiefly of ballads and songs. Among his best productions are "Lenore" and the "Wild Huntsman."

Burgess (bér'jës), John William, 1844-; American educator; b. Cornersville, Tenn.; admitted to the bar of Massachusetts, 1869; Prof. of English Literature and Political Economy at Knox College, Galesburg, Ill., 1869; Prof. of History and Political Science at Amherst College, 1873; Prof. of Political Science and Constitutional Law at Columbia Univ., 1876; lectured as Roosevelt Prof. at Friedrich Wilhelm Univ., Berlin, 1906.

Burglary, breaking and entering into a dwelling house of another or a church in the night time, with intent to commit a felony therein. It is not necessary, in order to constitute a dwelling house that there should be any person residing in the house at the time. It is held to be night when a person cannot by the light of the sun clearly discern the face of another. In some of the states the time is fixed by statute. The fact that the face can be seen by moonlight does not affect the question.

The word "breaking" is not to be construed so as to require any great degree of force or violence. Unlatching a door or raising a window is sufficient. If a door or window be left open, an entry through them would not be a breaking, though the act of coming down a chimney would be. The act of discharging a loaded pistol or gun through a door or the glass of a window with a felonious intent would be both a breaking and an entry. If a felony be actually committed, the intent may be inferred. But an intent to commit a trespass will not suffice. Burglary is sometimes by statute divided into degrees; some of these would include breaking and entry in the day-times, or into buildings other than dwelling houses and churches, or breaking out of a building, as well as into it. See ROBBERY.

Burgos (bör'gös), city of Spain; capital of province of same name; on the river Arlanzon; 140 m. N. of Madrid; former capital of Old Castile, and far more populous than now; was founded, 844 A.D., and has many antique buildings. The court was removed from Burgos to Madrid in the sixteenth century, after which the importance of the former declined. The

most remarkable edifice is the cathedral of brown stone, one of the noblest specimens of Gothic architecture in Europe; commenced, 1221. Burgos is the seat of an archbishop, and has a college and some manufactures of woolen and linen. Sout nearly annihilated the Spanish army here, November 10, 1808, and Wellington captured its fortress, 1813. Pop. (1900) 30,167.

Burgos, Laws of, for the regulation of Indian labor in America, promulgated at Burgos, Spain, December 27, 1512. They were the result of an attempt by the Dominicans of Hispaniola to protect the Indians; the monks were opposed by the colonists, and King Ferdinand referred the question to a special junta which provided that Indian laborers should have houses, land for planting, and a *peso* of gold annually to buy clothes; religious instruction was secured to them; regular inspectors of the mines were created, and it was forbidden that the Indian miners should be forced to work more than five months consecutively; every effort was to be made to attract the Indians by gentle means. These humane laws caused much dissatisfaction and soon became a dead letter.

Burgoyne (bér'goïn'), John, 1723-92; British general and dramatist; commanded a force which captured Alcántara, Spain, 1762; was sent to the American colonies, 1775; fought under Carleton to expel the insurgents from Canada; in summer of 1777, took command in Canada of an army of 8,000 men, ordered to enter New York State and advance to Albany to meet Clinton, who was to ascend the river, thus cutting the colonies in twain; was repulsed at Stillwater in September, and captured with his army at Saratoga, October, 1777, by Gen. Gates; returned home, 1778, and wrote a vindication of his campaign entitled "A State of the Expedition," 1780; wrote successful dramas called "The Maid of the Oaks," 1780; "Bon Ton" and "The Heiress," 1786.

Burgoyne, Sir John Fox, 1782-1871; British general; b. London; son of the preceding; served in the Peninsula, 1808-14; engineer in chief in the attack on New Orleans, 1814-15; Inspector General of Fortifications of England, 1845-58; second in command of British forces in the Crimea, 1854-55; baronet, 1856; field marshal, 1865.

Burgundy (bér'gün-dl), one of the most important of the former provinces of France; now forms the departments of Côte d'Or, Saône-et-Loire, Yonne, part of Ain, and part of Aube. The name was derived from a German tribe called in Latin *Burgundi* or *Burgundiones*, who settled in this part of Gaul about 408 A.D. Gondemar, King of Burgundy, was defeated and killed, 534, by the Franks, who then obtained possession of Burgundy. The kingdom, reestablished in 561, was much more extensive than the province of that name, and its extent varied in different periods. It included the provinces of Burgundy, Franche-Comté, Dauphiné, a part of Switzerland, Lyonnais, and nearly all the basin of the Rhône.

In 879 A.D. Burgundy renounced its allegiance to the Carolingian king, and became an independent state ruled by King Boso. It afterwards in part belonged to the kingdom of Arles (933-1032). Upper Burgundy was a kingdom from 888 to 933. In these ages there were often several lines of princes claiming the title of King of Burgundy, and ruling over parts of the country. John II of France made his son, Philip the Bold, duke, 1364. After this Burgundy became an important state, much of the time virtually independent. On the death of Charles the Bold, 1477, the ducal line became extinct, and the duchy was annexed to France.

Burgundy Pitch, resinous concrete exudation from the *Abies excelsa* or Norway fir. It is rendered commercial by melting it in hot water, by which process part of its volatile oil is separated from it. The Burgundy pitch of commerce comes chiefly from the neighborhood of Neufchâtel, Switzerland.

Burgundy Wines, the name of French wines produced in the former province of Burgundy, the best coming from the range of hills called Côte d'Or, between Dijon and Châlons. These hills are about 800 to 1,000 ft. high, and the finest vineyards are about half way up. The wines are celebrated for richness of flavor and perfume. The best red wines of Burgundy are called Clos-Vougeot, Chambertin, Romané-Conti, Volnay, Pomard, and Richebourg. The white wines of Burgundy are said to be the finest in France, but the quantity produced is less than that of the red.

Burhanpur (bér-ân-pôr'), city of Nimar district, Central Provinces, British India; ancient capital of the Kandsh; on the river Tap-ti; 309 m. NE. of Bombay; is one of the largest and best-built cities of the Deccan, and has a mosque built by Aurungzebe, and an old royal palace, nearly ruined. This city was taken by Akbar abt. 1600. It produces gold and silver thread for brocade. Pop. abt. 30,000.

Bu'ri, or **Bu're**, first of the gods of the Norse mythology. When the mythical cow Audhumla (whose name, from *audr*, desert, and *hum*, darkness, symbolizes the original chaotic darkness) began to lick the frost-covered rocks of the primeval chaos, there came forth a beautiful and mighty being in human form called Buri, whose son Bór (that is born, and hence, like the Latin *natus*, signifying a son) was the father of Odin.

Burial. See FUNERAL.

Buridan (bü-ré-dân'), **Jean**, abt. 1300, d. after 1358; French philosopher; b. Béthune, Artois; lectured at Paris; was a Nominalist; wrote commentaries on Aristotle; was instrumental in founding the Univ. of Vienna. The sophism according to which an ass would starve from incapacity to determine which to choose of two equally attractive bundles of hay is erroneously called "Buridan's Ass." It fully appears in the opening verses of the fourth canto of Dante's "Paradise," and somewhat differently in Aristotle.

Burke, Edmund, 1729-97; British statesman; b. Dublin; graduated and studied law in Dublin; began a literary career in London, 1750; member of Parliament, 1765, 1768, and 1774; distinguished in debates on the American Stamp Act, by his support of the colonies; delivered a remarkable speech on economical reform, 1780; began his great labor on E. Indian affairs, 1783; conducted the impeachment of Warren Hastings, 1786; and made the most memorable oratorical effort of his life in Westminster Hall, in the presence of an immense assembly, February 15, 1788. Although a verdict of acquittal was passed in 1795, the efforts of Burke led the way to great reforms in India. His works include "Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful," 1756; "Reflections on the French Revolution," 1790; and "Letters on a Regicide Peace," 1796-97.

Burke, John, 1786-1848; British genealogist; b. near Parsonstown, Tipperary, Ireland; settled in London; and published, besides other heraldic and genealogical works, a "Dictionary of the Peerage and Baronetage of the British Empire," 1826.

Burleigh, Lord. See CECIL, WILLIAM.

Burlingame, Anson, 1822-70; American diplomat; b. New Berlin, N. Y.; became a lawyer and resident of Boston; member of Congress, 1854-60; was challenged by Preston S. Brooks for denouncing the assault made on Senator Sumner, and selected rifles for the weapon, and Canada for the rendezvous, but Brooks refused to travel through the angry North; was sent as commissioner to China, 1861; and, 1867, ambassador from China to the U. S. and the great powers of Europe, negotiating treaties of amity and commerce; died, while engaged in the Chinese service, in St. Petersburg.

Burlington, capital of Des Moines Co., Iowa; on the Mississippi River; 207 m. WSW. of Chicago; popularly called the "Orchard City." The river here is broad, deep, and beautiful; many of the residences are on high bluffs which afford extensive views of river scenery. Limestone is quarried here and manufacturing is important. Pop. (1905) 25,318.

Burlington, capital of Chittenden Co., Vt.; on Lake Champlain, 40 m. W. of Montpelier; was first settled in 1775, but no permanent residences were made until after the Revolution; was incorporated as a city in 1865. The heaviest trade of the city is in lumber. There are large quarries of building stone, limestone, and fine marble within or near the city limits. The abundant water power of the Winooski is utilized for woolen and cotton mills, flour mills, machine shops, etc. The geographical position of the city, midway of the E. shore of Lake Champlain, and the facilities for transportation by rail and water make the whole valley of the lake tributary to it in the way of business. Pop. (1906) 21,070.

Bur'ma, the largest province of the British Indian Empire; bounded NW. by Assam and Manipur, W. by Hill Tipperah, Manipur, and the Bay of Bengal, which also forms its S.

boundary, E. by Siam, Tonquin, and China. Area, Lower Burma, 81,138 sq. m.; Upper Burma, 87,435; Shan States, 68,165; total, 236,738 sq. m. Total pop. (1901) 10,490,624. Provinces of Lower Burma are Arakan, Irawadi, Pegu, and Tenasserim, covering the entire seacoast. The Mergui Archipelago is part of, and lies off the lower coast of Tenasserim. Portions of old Burma have not yet been incorporated into British India, but are frontier territory.

The greater part of the surface is mountainous or hilly. The Irawadi and Salwin are the largest rivers; the former navigable for large vessels above Bhamo, 700 m. from the sea, and furnishing the highway of commerce to the Chinese border; the latter navigable for only 80 m. from the coast. Lakes are Thoo, Lah-gyin, and Kandaugee. The rainfall on the coast exceeds at places 200 in. a year, but diminishes rapidly as the country is ascended. The alluvial districts produce rice (the staple of the country), maize, millet, wheat, tobacco, and sugar (mostly produced from a variety of the palm), cocoa, and tea. Cotton is widely cultivated, but chiefly on uplands. The mango, orange, citron, yam, custard apple, papaya, capsicum, and plantain are common. The forests are magnificent, and comprise all Indian varieties of trees. The elephant, rhinoceros, tiger, wild hog, and several species of deer are hunted; fish are abundant, and aquatic birds are numerous. Domesticated animals are the ox, buffalo, horse, and a few elephants. Burma is rich in mineral products and famous for its rubies, sapphires, jade, and amber.

The inhabitants are chiefly Mongoloid, and have a monosyllabic, flexible speech, used for secular purposes, written with circular letters of Indian and Buddhist origin, but Pāli is the sacred language. In the eleventh century the Buddhists are known to have been established at Prome. European settlements began in the seventeenth century with French and English factories. In the middle of that century a native dynasty brought all Burma under one rule. In 1824, Ava, with Arakan and Tenasserim was ceded to Great Britain. The final conquest came in 1885, when King Thebaw proposed alliances with China. On November 28th the Burmese laid down their arms at Alva, and the next year all the dominions were annexed to the British Empire. Burma is now administered by a lieutenant governor, under the Viceroy of India. The seat of government is Rangoon, the next largest city is Mandalay, the last capital of the kingdom. Foreign trade is mainly in the hands of the English and Chinese. The chief exports are rice, teak, hides, rubies, sapphires, jade, amber, lac, and ivory.

Bur'naby, Frederick Gustavus, 1842-85; English soldier and traveler; b. Bedford; author of "A Ride to Khiva" (third edition), 1876; "On Horseback through Asia Minor" (seventh edition), 1877; "A Ride Across the Channel," 1882, an account of a balloon trip; killed in battle of Abu Klea, Nubia.

Bur'nand, Sir Francis Cowley, 1836- ; English journalist; studied for the Church;

became a Roman Catholic, and was called to the bar; in 1880-1906 was editor of *Punch*; author of numerous parodies and theatrical burlesques, the best known of which are his comedy, "The Colonel," a satire on the aesthetes; his travesty of Douglas Jerrold's "Black-eyed Susan," "Happy Thoughts," 1868; "More Happy Thoughts," 1871.

Burne-Jones, Sir Edward, 1833-98; English painter of figure subjects and designer of decorative work; b. Birmingham; was identified with the Pre-Raphaelite movement; noted more for his conceptions of his subjects and for his peculiar compositions than for technical merits; notable works, "Beguiling of Merlin," 1877, and "King Cophetua and the Beggar Maid," 1884.

Burnes, Sir Alexander, 1805-42; Scottish traveler and Orientalist; b. Montrose; entered the army of India in his youth, and by his linguistic knowledge gained rapid promotion; in 1832 started from Lahore to explore Central Asia, and visited Balkh, Bokhara, Astrabad, Teheran, etc.; returned to England, 1833, and published "Travels into Bokhara"; in 1838 was sent on a mission to Kabul, where he passed some years as political resident, and was murdered there by Afghan insurgents.

Bur'net, the popular name of plants of the genus *Poterium*, belonging to the family *Rosaceæ*. The great burnet (*P. officinale*) is cultivated in Germany as a forage plant, and yields a good crop on poor soils. A similar species grows wild in N. America. The common burnet (*P. sanguisorba*) furnishes valuable pasturage for sheep on the English downs. It is sometimes seen in American gardens, and is used in salads.

Burnett', Frances Eliza Hodgson, 1849- ; Anglo-American novelist; b. Manchester, England; came to the U. S. at the close of the Civil War, and lived in Knoxville, Tenn., until her marriage, 1873, to Dr. L. M. Burnett, from whom she was divorced, 1898; married Stephen Townsend, 1900. Her "Little Lord Fauntleroy," 1886, achieved great popularity. Among her novels are "That Lass o' Lowrie's," 1877; "Haworth's," 1879; "Louisiana," 1880; "Through One Administration," 1883; "A Lady of Quality," 1896; "The De Willoughby Claim," 1899; "A Little Princess," 1905; "The Shuttle," 1907; "The Dawn of a To-morrow," 1907.

Bur'ney, Charles, 1726-1814; English composer and author; b. Shrewsbury; wrote, besides other works, a "General History of Music from the Earliest Ages," a "Life of Händel," one of "Metastasio"; composed "Alfred," "Robin Hood," and "Queen Mab" for Drury Lane Theater; was the father of Madame d'Arbly; d. in Chelsea Hospital, where he was organist.

Burney, Frances. See D'ARBLAY, MADAME.

Burn'ham, Daniel Hudson, 1846- ; American architect; b. Henderson, N. Y.; studied and settled in Chicago; architect of the Rookery, Masonic Temple, the Temple, Great Northern Hotel, Railway Exchange, and other build-

ings there; new Wanamaker stores in New York City and Philadelphia; Mills Building, San Francisco, and bank, office, and commercial buildings in various cities; chief architect and director of works at World's Columbian Exposition; chairman national commission for beautifying Washington and of commissions for beautifying Cleveland and San Francisco.

Burnham, Sherburne Wesley, 1838- ; American astronomer; b. Thetford, Vt.; during the Civil War was a shorthand reporter at the army headquarters in New Orleans; later went to Chicago, where he gave all his spare time to microscopy and astronomy. In 1860 he mounted a telescope in his back yard, and made the first of his discoveries of double stars; in 1876 was acting director of the Dearborn Observatory, Chicago; assisted in the establishment of the Lick Observatory and made numerous observations by its famous telescope; and later was Prof. of Astronomy in the Yerkes Observatory of the Univ. of Chicago; awarded the gold medal of the Royal Astronomical Society of England, 1894, and the Lalande prize in astronomy of the Paris Academy of Sciences, 1904. He discovered and catalogued more double stars than were ever discovered by any one observer.

Burn'ing Glass'es and Burning Mir'rors, glasses or mirrors to collect the sun's rays which fall on them into a point or focus, and thereby produce intense heat. The rays may be concentrated by refraction or reflection; in the former case they must pass through a transparent refracting substance, as a lens; in the latter they fall on a concave surface of silvered glass or bright metal. The method of exciting heat or producing fire by the concentration of the sun's rays was known from antiquity, as is proved by the very ancient although doubtful story that Archimedes burned by means of mirrors the Roman fleet at Syracuse. Buffon, with 168 mirrors, each about 6 in. square, set fire to planks of beech 150 ft. distant, and this with the faint rays of the sun at Paris in the month of March.

Burn'ley, market town of Lancashire, England; on the Brun; near its entrance into the N. Calder; 20 m. N. of Manchester; has manufactures of cotton and woolen fabrics, calico-printing works, foundries, machine shops, tanneries, and rope walks. Its prosperity is partly derived from near-by collieries. Pop. (1905) 101,682.

Burns, Anthony, abt. 1830-62; American negro slave; b. Virginia. Escaping from slavery, he was arrested under the fugitive slave law in Boston, May 25, 1854, an event which created intense excitement. A meeting was held in Faneuil Hall to protest against his rendition; the courthouse was assaulted by a mob to rescue him; he was sent back South on a revenue cutter; afterwards gained his liberty; studied at Oberlin; became pastor of a Baptist church (colored) in St. Catherine, Canada.

Burns, John, 1858- ; English labor organizer and leader; b. London, in humble circumstances; entered a candle factory at age

of ten; afterwards apprenticed to an engineer at Millbank, and worked as foreman engineer for twelve months on the Niger in W. Africa; on his return made a six months' tour through Europe; addressed audiences of workmen for years, and was the most prominent labor agitator in Great Britain; in 1885 was the Socialist candidate for Parliament for the W. division of Nottingham, but was defeated; prominent in the agitation of the unemployed, 1886. In 1887 he contested the right of public meeting in Trafalgar Square, and suffered six weeks' imprisonment for resisting the police. During the dock strikes in London, 1889, he was one of the most influential leaders of the strikers, and was a member of the Mansion House committee of conciliation which brought about the end of the strike; was also prominent in the Scotch Railway strike, 1891. Mr. Burns became a member of the London County Council, and was first elected to Parliament, 1892. President Local Government Board, December, 1905.

Burns, Robert, 1759-96; Scottish poet; b. Ayr; son of a yeoman farmer, William Burness or Burnes; was early familiarized with the trials and hardships of the poor; inspired to write songs by the singing of a young girl associated with him in work in the harvest field; led an intemperate and immoral life; was highly honored by the friendship of literary men in Edinburgh; became the national poet of Scotland; engaged in farming at Ellisland, 1788; was subsequently an excise officer; removed, 1791, to Dumfries, where he died; published a volume of poems, 1786 (new editions, 1787, 1793).

Burns and Scalds, in medicine, injuries caused by dry heat (burns), or by moist heat, such as that of hot water or steam (scalds). In both cases the results are quite similar. In cases of the first degree there may be merely redness and slight inflammation of the skin. In those of higher degrees the skin is destroyed, and the underlying tissue and muscles are implicated. Where large parts of the body exceeding half of the whole surface are involved death is almost inevitable. The immediate effect of the burn is great shock, followed by complete collapse.

The treatment consists in the application of soothing lotions or ointments, the use of anodynes for the pain, and stimulants in case of threatened collapse. A mixture of lime water and sweet oil, known as Carron oil, is very useful. In slight burns the pain may be relieved by dusting baking soda upon the surface.

Burn'side, Ambrose Everett, 1824-87; U. S. military officer; b. Liberty, Ind.; graduated at West Point, 1847; served in war with Mexico, 1847-48; resigned, 1853; manufacturer at Bristol, R. I., 1853-58, of breech-loading rifles, which he had invented; appointed brigadier general, U. S. volunteers, 1861, and promoted to major general, 1862; in command of Department of N. Carolina, 1862; in Maryland campaign engaged at South Mountain and Antietam, in command of left wing; in general charge of Harper's Ferry, 1862; in command

of Army of Potomac, November 7, 1862, January 28, 1863; defeated at Fredericksburg; in command of Department of Ohio, 1863; occupied E. Tennessee after several actions, and sustained a siege at Knoxville; in command of Ninth Corps in Richmond campaign, 1864; resigned, 1865, from volunteer service; Governor of Rhode Island, 1866-69; U. S. Senator from Rhode Island, 1875-81.

Burnt Sienna (sē-ēn'ā), a pigment made by heating raw sienna to a high temperature. Raw sienna occurs in nature, and owes its color to the presence of compounds of iron. Both pigments are used in oil, water, and fresco painting.

Burnt Um'ber, a pigment made by heating raw umber to a high temperature. Umber was formerly obtained from Umbra, in the Papal States, whence its name. It is a compound of silica, iron, and manganese. Burnt umber is used in oil and water colors, and is highly valued.

Burr, Aaron, 1756-1836; politician and Vice President of the U. S.; b. Newark, N. J.; graduated at Princeton, 1772; joined the provincial army at Cambridge, Mass., 1775; served on the staffs of Arnold, Washington (whom he disliked), and Putnam, and commanding a brigade at Monmouth; resigned, 1779; practiced law at Albany, 1782, and in New York City, 1783; became Attorney General of New York, 1789; was a Republican U. S. Senator, 1791-97. In 1800 he and Jefferson each had seventy-three electoral votes for the office of President of the U. S. The choice was thus left to Congress, which, on the thirty-sixth ballot, chose Jefferson for President and Burr for Vice President. In 1804 he mortally wounded in a duel his rival Alexander Hamilton, and in consequence lost greatly in political and social influence, and soon after embarked in a wild attempt upon Mexico and, as was asserted, upon the SW. territories of the U. S., thereby involving in ruin his friend Blennerhassett. He was in 1807 tried at Richmond, Va., on a charge of treason, but was acquitted; d. on Staten Island.

Burrard In'let, narrow inlet in the SW. corner of British Columbia; 9 m. long; forms one of the best harbors on the Pacific coast. On its S. shore is Vancouver.

Bur'ritt, Elihu, 1811-1879; American linguist; called "The Learned Blacksmith"; b. New Britain, Conn.; worked for many years as a blacksmith, and became a self-taught master of many ancient and modern languages; as a public lecturer advocated temperance and peace in the U. S. and in England; works include "Sparks from the Anvil," "Walk from John o'Groat's to Land's End," "Chips from Many Blocks."

Burrroughs (būr'ōz), John, 1837-; American essayist and naturalist; b. Roxbury, N. Y.; was in the Treasury Department at Washington, 1863-72, and then a national bank examiner. Since 1873 has resided at W. Park on the Hudson, and has published many volumes, such as "Winter Sunshine,"

"Birds and Poets," "Locusts and Wild Honey," "Pepacton," "Fresh Fields," "Signs and Seasons," "Whitman, a Study," "Literary Values."

Bur'ton, Sir Richard Francis, 1821-90; British traveler and Orientalist; b. Hertford; of Scottish parentage; served many years in the E. Indian army; disguised as a Mussulman performed a perilous exploration of Arabia, 1853, and published "Personal Narrative of a Pilgrimage to El Medinah and Meccah"; served in British consulates from 1861 until his death; made extensive explorations in Central Africa, along the Kongo, in the highlands of Brazil, etc., and published "The Lake Regions of Central Africa," "Zanzibar," "The Gold Coast," etc.; also grammars of several E. Indian dialects, versions of the poems of Camoëns, and an important translation of the "Arabian Nights."

Burton, Robert, 1576-1640; English clergyman; b. Lindley, Leicester; Vicar of St. Thomas's, Oxford, 1616; after 1630 Rector of Segrave, keeping both benefices until his death; author of a quaint and popular work entitled "The Anatomy of Melancholy."

Burton-on-Trent, town of England; in Stafford; on the Trent; 11 m. SW. of Derby; has large breweries of ale; also iron works and cotton factories; is on the Grand Trunk Canal. Pop. (1905) 52,424.

Buru (bō'rō) island of Malaysia; 60 m. WNW. of Amboyna; area, 1,970 sq. m.; contains Mt. Dome, said to be 10,400 ft. high; Cajeli Bay, on the N. side, affords good anchorage. Pop. abt. 20,000, mostly Malays and Alfuros.

Burugird (bō-rō-jērd'), town of Persia; province of Irak-Ajeme; about 184 m. NW. of Ispahan; has an extensive trade in cotton goods. Pop. abt. 20,000.

Bur'y St. Ed'munds, or **St. Ed'mundsbury**, ancient borough of England; in Suffolk; on the river Larke; 26 m. NW. of Ipswich; Parliaments were held here, 1272, 1296, and 1446; has a large trade in wool, butter, grain, and cheese. Pop. abt. 16,500.

Bus'by, Richard, 1606-95; English schoolmaster; b. Luton, Northampton; was head master of Westminster School, 1640-95; is said to have educated a larger number of eminent men than any other teacher who ever lived.

Busento (bō-sēn'tō), river of Italy; province of Salerno; empties into the Gulf of Busento at Policastro. In its bed the Visigoth king, Alaric, was buried.

Bush'el, an English measure of capacity, containing 8 gals. or 4 pks. Each gallon holds 10 lbs. avoirdupois of distilled water, and measures 277.274 cu. in.; consequently the imperial bushel contains 80 lbs. of distilled water, and is equal to 2,218.192 cu. in. The old Winchester bushel contains 2,150.42 cu. in. The State of New York, by statute of 1829, adopted the imperial bushel, but in the revised statutes of 1851 this was abolished and the Winchester bushel substituted. By law in

some parts of the U. S., and in commercial usage, a bushel of grain and of other staple commodities is reckoned in pounds avoirdupois.

Bushire (bō-shēr'), seaport of Persia; on the Persian Gulf; 120 m. WSW. of Sheeraz; has a large trade with British India, from which it imports rice, indigo, sugar, and English cotton goods; chief exports, raw silk, shawls, horses, carpets, silk goods, grain, Sheeraz wine, pearls, dried fruits, etc. Pop. abt. 15,000.

Bush'men, or **Bosjesmans** (bōs'yēs-mān), roaming tribes of savages who live in S. Africa, along the Orange River; are very diminutive in stature, and of a dark-brown complexion; build no houses and have no tents; are malicious and intractable, and live by hunting and robbery.

Bush'nell, **Horace**, 1802-76; American clergyman and theologian; b. Litchfield, Conn.; settled over the North Church (Congregational), Hartford, Conn., 1833-59; was distinguished for the originality and boldness of his thinking, and for the brilliancy and vigor of his style; works include "Christian Nature," "God in Christ," "Nature and the Supernatural," "The Vicarious Sacrifice," "Forgiveness and Law."

Bush'whackers, in U. S. Civil War, men who rarely wore a uniform, and claimed to be peaceful farmers or herdsmen, but did not scruple to shoot from ambush a soldier while he was moving in fancied security.

Bus'iness Col'leges, schools in which men and women are trained for business careers, especially in stenography, typewriting, and book-keeping. Commercial teaching was first attempted in the U. S. in private schools; these have grown from scattered schools of little repute to well-organized institutions.

Bus'iria, in Greek mythology, a son of Neptune, and a king of Egypt, who sacrificed all the foreigners entering his dominions, and was killed by Hercules.

Bus'kin, covering for the leg or for the ankle and foot; a shoe reaching up to the middle of the calf and tightly laced. The word is used by English writers as a translation of Latin *cothurnus*, a high shoe worn by ancient tragic actors. The term is also used to denote the tragic drama or tragic style, in contradistinction to *soccus*, a sock or flat-soled shoe worn by comedians.

Bus'su Palm, *Manicaria saccifera* of the *Palmaceæ*; a tree 15 to 20 ft. high; native of the lower Amazon. The large leaves are used by the natives in building huts, while the spathes are transformed into receptacles for food or other articles.

Bustamente (bōs-tā-mān'tā), **Anastasio**, 1780-1853; Mexican revolutionist and statesman; b. Tiquilpan, Michoacan; entered the Spanish army as a subaltern, 1808; in 1821 joined Iturbide, commanded a division in the march on Mexico, and was a member of the provisional junta before Iturbide was declared em-

peror; was Vice President, 1829, in the Guerrero administration, and commanded the army; revolted against Guerrero; was acting President of Mexico, 1830. In 1832 Santa Anna headed a revolt against him and forced him to resign; President of Mexico, 1837-42; took part in the war with the U. S., and served with the army until 1848.

Bus'tard, bird of the genus *Otis* and order *Grallæ*; has three toes, all directed forward, long naked legs, and bill of moderate length. They inhabit open plains, and although capable of flying, often endeavor to escape by running. The great bustard (*O. tarda*) is the largest of European land birds, and sometimes weighs 30 lbs. The plumage is of a pale chestnut



AUSTRALIAN BUSTARD.

color, variegated with black and white. The male has on each side of the neck a tuft nearly 9 in. long, under which is a spot of naked skin, and in the throat a sac capable of holding 3 or 4 pints of water. Their flesh is good as food. The little bustard (*O. tetraz*) is common in S. Europe and N. Africa. S. Africa produces the Kori bustard, 5 ft. high or more. Macqueen's bustard is a fine Asiatic bird.

Bute (būt), **John Patrick Crichton-Stuart** (third Marquis of), 1847-1900; British nobleman; b. Mountstuart; Mayor of Cardiff, Wales, 1891-92, invested over \$5,000,000 in the canal, docks, and harbor; Lord Lieutenant of Buteshire, Scotland, 1892-1900; Lord Rector of St. Andrews' Univ., 1892-98; owned about 117,000 acres; became Roman Catholic, 1868; published a translation of the Roman "Breviary," etc.

Bute, **John Stuart** (Earl of), 1713-92; British statesman; b. Scotland; became groom of the stole to the Prince of Wales, afterwards George III, over whom he acquired a great influence; one of the principal Secretaries of State, 1761-62; Prime Minister, 1762-63. His policy was peace with France and royal absolutism at home. He resigned because of his unpopularity.

Bute, island of Scotland; in the Frith of Clyde; separated from the mainland by a narrow strait, about 1 m. wide, called the Kyles of Bute; is about 15 m. long; area, 60 sq. m.; chief town, Rothesay.

Butler, Alban, 1710-73; English Roman Catholic divine; b. Appletree, Northampton; Prof. at Douay, France; later President of the English Catholic College of St. Omer; best known by his "Lives of the Fathers, Martyrs, and other Principal Saints."

Butler, Benjamin Franklin, 1818-93; American lawyer, general, and politician; b. Deerfield, N. H.; practiced law at Lowell, Mass., and served in the State Legislature and Senate; brigadier general state militia; commanded Sixth Massachusetts Regiment at beginning of Civil War; aided in preventing the seizure of Washington by the Confederates; commanded the Army of the James; defeated at Big Bethel, 1861; while in command at Fort Monroe, 1861, refused to send back runaway slaves on the ground that they were contraband of war; took part in the expedition against New Orleans, 1862; military governor there, May to December, 1862; commander Department of Virginia and North Carolina, 1863; member of Congress, 1867-75 and 1877-79; Governor of Massachusetts, 1883; "Greenback" candidate for the presidency, 1884; published "Autobiography and Personal Reminiscences."

Butler, Frances Anne Kemble. See KEMBLE.

Butler, Samuel, 1612-80; English poet; b. Worcester; liberally educated, and became in early youth clerk to a justice of the peace; afterwards entered the service of Sir Samuel Luke; is supposed to be the prototype of Hudibras; published, 1663-78, "Hudibras," a witty poem satirizing the Puritans.

Butt, Isaac, 1813-79; Irish lawyer; b. Donegal Co.; acted as counsel for Smith O'Brien and others in the Irish state trials of 1848, and 1865 for several of the Fenians; represented Youghal in Parliament, 1852-65, and 1871 was returned for Limerick, becoming the leader of the "Home Rulers"; published a "History of the Kingdom of Italy," "Chapters of College Romance," etc.

Butte (büt), capital of Silver Bow Co., Mont.; settled 1863 as a gold placer camp. Within 4 m. of the courthouse are over 4,000 mining claims—gold, silver, and copper, including the Anaconda copper mines; annual output of all ores valued at \$40,000,000. It has a State School of Mines and large copper smelters. Pop. (1906) 43,624.

But'ter, a fatty substance extracted from milk. In ancient times butter was used very little as a food, and in many foreign countries to-day it is used but sparingly, olive oil taking its place. Butter is usually made from cow's milk, either from whole milk or from cream, but it is more convenient to separate the cream. This separation may be effected by any one of three ways, all based upon the fact of the difference in specific gravity between the fat globules and the milk serum:

(1) The oldest method is to set the milk in shallow pans from 2½ to 4 in. deep, at a temperature not above 60° F. In from thirty-six to forty-eight hours the cream will have risen to the top, and may be skimmed. (2) The difficulty of keeping the milk sweet long enough for a complete separation led to the practice of placing the warm milk in deep cans set or even submerged in water as near the temperature of melted ice as possible. (3) At present cream separation is effected by the use of machines operating by centrifugal force. A strong steel bowl or cylinder is arranged to revolve with great rapidity. The milk, introduced at the center of the cylinder, is carried to the sides by centrifugal force, which, acting with greater force upon the heavier particles, separates the milk in the bowl into a layer of skim milk next the wall and a layer of cream nearer the center. Either part may be drawn off through properly placed outlets.

Cream is sometimes churned into butter as soon as removed from the milk, and it is then known as sweet-cream butter, but it is more usual to permit it to develop a mild degree of acidity. By agitating the cream at a low temperature in a vessel called a churn the fat globules are united and separated from the watery serum, called buttermilk. When the globules have united into masses the size of a kernel of wheat, the churning is stopped; the butter, being lighter, rises to the top, and the buttermilk is drawn off. All traces of the buttermilk are removed from the butter by washing it in water at 45° to 50° F., the butter is then worked thoroughly with a wooden paddle to remove the surplus moisture, and salt is added at the same time. The more completely the buttermilk is removed the greater the keeping qualities of the butter. The color of the butter depends not only upon the breed, but also upon the food of the cow. The poorer qualities are frequently colored artificially, and preservatives are often used. The texture depends upon the size of granules, when churning is stopped, and upon care in working. Butter of good quality should have a composition about as follows:

Fat	84 per cent;
Casein	2 " "
Ash (including salt) ..	3 " "
Water	11 " "
<hr/>	
Total	100

The average yield of butter is 1 lb. from 22 to 25 lbs. of milk, and the average yield of the cow of the U. S., from 120 to 150 lbs. of butter per annum. The butter-producing capacity has been greatly stimulated by the establishment of creameries, where butter is made in quantities from the cream from various farms. This minimizes the cost of production, tends to produce butter of a more uniform quality, and gives the greatest recompense in money to the farmer.

Artificial butter is usually known in market as oleomargarine, butterine, or suine, according to the substance upon which it is based. Oleomargarine is a cheap and whole-



AZURE
Lycina pseudisignata, N. Y.
Male - Upper side



SULPHUR
Catopria sennae, Texas
Male - Upper side



BLUE EMPEROR
Limenitis salpex, Virginia
Male - Upper side



AMERICAN COPPER
Chrysophanus hypoleus, Mass.
Female - Upper side



ORANGE
Eurema nicippe, Virginia
Male - Upper side



MILKWEED OR MONARCH
Danaus plexippus, Mass.
Male - Upper side



MOURNING-CLOAK
Vanessa antiope, Mass.
Male - Upper side



BLACK SWALLOWTAIL
Papilio astorius, Mass.
Male - Upper side



TIGER SWALLOWTAIL
Papilio turnus, Mass.
Male - Under side



PAINTED BEAUTY OR HUNTER'S
Pyraus huntera, Mass.



RED ADMIRAL
Pyraus atalanta, Mass.

BUTTERFLIES OF NORTH AMERICA



SALT-MARSH
Leucocrota acrima, N. Y.



RED UNDERWING
Catocala cara, N. Y.



HUMMING-BIRD
Hemaris thysbe, N. Y.



BELLA
Utothisis bella, N. Y.



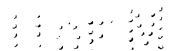
IO
Automeris io



TWIN-SPOTTED SPHINX
Smerinthus geminatus

MOTHS OF NORTH AMERICA

Scale, $\frac{5}{8}$ natural size



some article of food, its composition being very similar to that of natural butter. Vegetable butters are names applied to vegetable fats, such as that of the palm, cacao, and coconut. Metallic butter is in chemistry the name applied to certain oily compounds which resemble butter, as butter of zinc, tin, etc. See CHEESE; MILK.

Butter Trees, species of E. Indian and African trees of the genus *Bassia* and family *Sapotaceæ*, so named from the butterlike fat obtained from their seeds, and used as food; other fat-yielding trees bear this name.

Butterfield, Daniel, 1831-1901; American military officer; b. Utica, N. Y.; colonel of a militia regiment which he led to Washington and to Patterson's Shenandoah army on the breaking out of the Civil War; made brigadier general of volunteers, 1861; major general, 1862, and at the same time colonel of the Fifth U. S. Infantry; chief of Hooker's staff at Chancellorsville and Lookout Mountain, and in the campaign to Atlanta; breveted major general, U. S. army; resigned, 1869; U. S. Subtreasurer in New York.

Butterfly, popular name of the *Rhopalocera* or day-flying *lepidoptera*; distinguished from *moths* by diurnal habits, enlarged or clubbed antennæ, and by holding the wings folded vertically over the back when at rest; undergo a complete metamorphosis; have four wings, and a tongue changed into a suctorial organ. Butterflies are usually divided into five families. In the *Hesperidæ*, called skippers from their jerky flight, the antennæ are bent or hooked at the tip. These are mostly small, dark-colored forms, with large abdomens, more



ANTIOPE BUTTERFLY (*VANESSA ANTIOPA*).

like those of moths than of other butterflies. The *Papilionidæ* includes the swallowtailed butterflies, large forms of remarkable beauty, of which about twenty-five species occur in the U. S. The *Pieridæ* are smaller forms, white, yellow, or orange in color. Here belong the cabbage butterflies. The largest fam-

ily is the *Nymphalidæ*, the members of which vie with the swallowtails in size. In these the forelegs are so reduced in size that they are of no use in walking. Most striking of these are the large *Morphos* of Brazil, with an eyelike spot on each hind wing. Some species of *Nymphalidæ* have a wide distribu-



PEACOCK BUTTERFLY (*VANESSA IO*).

tion. Thus the mourning cloak or Camberwell beauty (*Vanessa antiopa*) is common to the N. temperate regions of both hemispheres, while the *V. cardui* occurs in all parts of the globe except S. America and the arctic regions. In spite of their beauty, butterflies must be regarded as pests, since their larvæ feed upon vegetation, and sometimes occur in such numbers as to do great damage.

Butterine. See BUTTER.

Buttermilk, that part of milk which remains after the butter has been separated from it; contains casein, sugar, water, and all the ingredients of milk, except the greater part of oily matter.

Butternut, or **White Wal'nut** (*Juglans cinerea*), and its fruit, which is indigenous in the U. S.; tree grows from 50 to 75 ft.; with gray bark and widely spreading branches; fruit, oblong and clammy, and contains an oily, eatable kernel; wood exceedingly valuable in the arts.

Butterwort, herbaceous plant of the genus *Pinguicula* and family *Lentibulariaceæ*. The *P. vulgaris* is a small stemless perennial, growing in marshes and on wet rocks in Europe and the U. S. It has the power of coagulating milk, and is used for that purpose by the Laplanders.

Button, article used for the fastening of clothing and for ornament; is also applied in carpentry to a flat oblong piece of wood or metal, turning on a nail or screw, to fasten doors and the like; and in assaying to a round mass of metal remaining in the cupel after fusion. In China the knob of gold or of some

precious stone worn at the top of the official hat is called a button, and is used to indicate rank. Buttons were first applied to dresses (probably in the thirteenth or fourteenth century) for ornament only, but later the buttonhole, an expansion of the idea of the loop, was invented, and the button became indispensable. In the beginning of the seventeenth century the making of buttons had attained some importance in England, Birmingham being then, as now, its principal seat. These buttons were of cloth, covering a wooden disk, of gold, steel, and ivory. Gilt buttons came into use soon after the accession of George III, 1760. From 1760 to the present, button making has been a growing industry in Great Britain, France, Switzerland, and the U. S. Buttons may be classed under three heads—viz., shank buttons, hole buttons, and covered buttons—but each kind is made of a variety of materials and a great diversity of forms.

But'tonwood. See PLANE TREE.

But'tress, projection built against a wall or other structure to strengthen it, especially where exposed to a horizontal thrust or pressure, as in terrace walls or in walls supporting heavy vaults or roofs. The buttress never became an architectural feature until the introduction of vaulting by the Romans compelled them to thicken the masonry at the points where the thrust was exerted, and to carry the resisting mass above the roofs of the wings of the building, as in the great halls of the *thermæ*. The Gothic architects developed from this device the flying buttress, in which a half arch, springing from a heavy pinnacled buttress on the line of the outer side-aisle wall, rises to the level of the nave-vaulting above the clerestory, and transfers its enormous thrust downward to the exterior buttress.

Butyric (bū-tīr'ik) **Ac'id,** occurs in the combination with glycerin as a fat in butter, and is one of the members of the series of fatty acids. Rancid butter contains it in the free condition together with other acids, and the peculiar odor and taste of such butter are due, to some extent, to the presence of these acids.

Butyric E'ther, is made by treating a mixture of butyric acid and alcohol with vitriol and heating. The ether separates as a layer that can be removed and purified. Under the name of pineapple oil, it is used in perfumery.

Buxbaumia (bōx-bām'yä), genus of mosses, of which only two species are known. *Buxbaumia aphylla* occurs in Europe and America, and is apparently destitute of leaves; the part of it visible above the ground is merely the little capsule, surrounded with minute scales.

Bux'ton, town and watering place of Derby Co., England; 32 m. NW. of Derby; here are calcareous and chalybeate springs, which are popular resorts. The baths are regarded as among the finest in Europe. The inhabitants make ornaments from alabaster and spar, and excellent lime is burned here. Pop. (1901) 10,181.

Buys-Ballot (bois-bä'lō), **Christophorus Henricus Didericus,** 1817-90; Dutch meteorologist; b. Kloetinge, Zealand; author of the "Buys-Ballot's Law," expressing the relations of the wind directions to the position of the storm center; Prof. in the Univ. of Utrecht, 1847-87.

Buz'zard, bird of the genus *Buteo*, order *Raptores*, family *Falconidæ*; resembles the eagle and falcon in form, but inferior in size and courage. The common buzzard (*B. vulgaris*), a native of Europe, measures nearly



EUROPEAN BUZZARD.

4 ft. from tip to tip of the wings. The rough-legged buzzard (*Archibuteo lagopus*) is widely distributed in Europe and Africa, and is found in N. America. Among the other species of this genus is the red-tailed, or chicken, hawk, of the U. S. (*B. borealis*), which often kills poultry. The American bird called turkey buzzard (*q.v.*) belongs to the genus *Cathartes*.

Buzzard's Bay, in the S. of Massachusetts; 30 m. long; average width 7 m.; contains the harbors of New Bedford, Fairhaven, and Wareham; is sheltered from the ocean by the Elizabeth islands.

Byb'los, or **Byb'lus,** an ancient city of Phœnicia; on the Mediterranean; about 22 m. NNE. of Berytus; called *Giblah* by the Hebrew writers; was near the base of Mt. Lebanon, and was said to be the native place of Adonis or Thammuz. This site is occupied by the modern town of Jubel and ruins of a Roman theater.

Byblos, an ancient town in the delta of Egypt; celebrated for its papyrus, the chief writing material of the civilized world. It stood in a marshy tract which produced in abundance the byblus or papyrus plant.

By-laws, originally laws (now called ordinances) made by a community or municipal corporation for local government; by extension, laws by any corporation, or unincorporated association with the consent of its members, for its own government. The power to make by-laws is incidental to a corporation. Where the charter is silent, the power apper-

tains to the corporation itself, except in the case of charitable corporations which have no such implied authority. By-laws must be reasonable and consistent with law, and be enacted within the state where the charter is in force. A written entry is not essential to their validity, and their existence may be established by custom. The by-laws of a municipal corporation govern all persons within its jurisdiction; are enacted in the exercise of a quasi-legislative capacity, and the corporation is not liable for damages resulting from the acts of citizens by whom they are broken.

Byng (bing) In'let, port of entry of Ontario, Canada; on the N. side of Georgian Bay, Lake Huron; has extensive sawmills; is visited in winter by dog sledges, and in summer by steamers. Pop. abt. 200.

By'ron, George Gordon Noel (Lord), 1788-1824; English poet; b. London; grandson of John Byron, a noted admiral. When he was ten years old he succeeded to the estate and title of his granduncle, William, fifth Lord Byron, who had resided at Newstead Abbey. The poet had a congenital deformity of his foot, which rendered him lame, and which was during his whole life a mortification to him. While at Cambridge he published a volume of poems, "Hours of Idleness," which was criticised in the *Edinburgh Review*. This critique was written by Mr. (afterwards Lord) Brougham, but Byron always supposed that Jeffrey was the author. In retaliation he wrote "English Bards and Scotch Reviewers," which may be said to have laid the foundation of his fame. In 1809-11 he traveled through Spain, Portugal, European Turkey, and Greece, and on his return to England published the first two cantos of "Childe Harold's Pilgrimage," which were received with extraordinary favor. He soon after took his seat in the British House of Peers. Within the next two or three years he produced several minor poems of exquisite beauty, "The Giaour," "The Bride of Abydos," "The Corsair," "Lara," "The Siege of Corinth," "Parisina," and "The Prisoner of Chillon." In 1815 he was married to Isabella Millbanke, only daughter of Sir Ralph Millbanke, afterwards Noel. Lady Byron gave birth to a daughter, Ada, who became afterwards the Countess of Lovelace. She was Byron's only legitimate child. Not long after her birth his wife left him, taking the child with her. He left England in 1816, resolved never to return, and resided near Geneva. Here he wrote the third canto of "Childe Harold"; afterwards abode some time in Venice; next visited Ravenna, where he formed a liaison with the Countess of Guiccioli. While in Italy, Byron wrote several of his most admired poems, including the fourth canto of "Childe Harold," "Mazeppa," "Manfred," "Cain, a Mystery," "Marino Faliero," "The Two Foscari," "Sardanapalus," "Werner," and "Don Juan." He espoused the cause of Greek independence, and, 1823, passed over from Italy to Cephalonia, where he spent several months. In the early part of 1824 he arrived at Missolonghi, where he died from a severe cold.

Byron, John, 1723-86; British naval officer; grandfather of the poet; son of the fourth Lord Byron; b. Newstead; served in Anson's expedition, 1740; also against Louisburg, 1760; circumnavigated the globe, 1764-66; fought D'Estaing off Granada, 1779, in the American Revolution; was long known in the navy as Foul Weather Jack, on account of the ill luck attending his early service.

Byzantine (bi-zăn'tin). See **BEZANT**.

Byzantine Art, the peculiar phase of art-development which originated in Byzantium, or Constantinople, and developed out of Roman traditions, modified by the Greek taste and a liberal admixture of Oriental elements. It is the first distinctively Christian national art; is especially rich in decorative detail and in the use of color, and displays the failings as well as the merits incident to its transitional character. It flourished from the time of Constantine, 330 A.D., nearly to the fall of Constantinople in 1204, by which time, however, it had lost its original vigor and perfection. Its architecture was based on a mingling of Roman and Oriental constructive principles, treated with Greek freedom, but it gave birth to few monuments of great size. Its noblest production, the Church of the St. Sophia in Constantinople, now a mosque, built in 532-38, under Justinian, was the first great pendentive-domed church ever erected, and still remains one of the most imposing and beautiful structures in existence, resplendent with its unrivaled mosaics, superb columns of jasper and porphyry, and its majestic outlines. St. Mark's in Venice, built nearly five hundred years later by Byzantine architects, is an example of a later phase of Byzantine architecture. The dome is a distinctive feature of all Byzantine religious architecture. The most highly developed of Byzantine arts was that of mosaic; but ivory carving, the illumination of MSS., and the production of splendid fabrics, were almost equally advanced. In Russia and Greece the traditions of Byzantine art are not yet wholly extinct. See **ARCHITECTURE**.

Byzantine Em'pire, also called **EASTERN** or **GREEK EMPIRE**, name of a former empire of Europe which came into existence, 395 A.D., on the death of the Roman Emperor, Theodosius the Great, who divided his empire between his sons, Arcadius and Honorius. While the latter received the W. half as his portion, Arcadius became ruler of the E. empire, then comprising Syria, Asia Minor, Pontus, Egypt, Thrace, Mæsia, Macedonia, Crete, and Greece, with the capital at Constantinople. The history of the Byzantine Empire extends from 395 A.D. to 1453. Arcadius was followed by his seven-year-old son, Theodosius II, 408-50, for whom a prefect ruled with wisdom and strength. In 415 he took his sister Pulcheria as coregent, who from that time took charge of the entire administration. Under Justinian, 527-65, the Byzantine Empire gained influence and power among other nations, while interior dissensions were quelled effectually. Leo III wrested Phrygia from the Arabs, but lost the last remnant of territory in Italy. **Basilius I.**

Macedo, the founder of the Macedonian dynasty, ascended the throne, 867, and was succeeded by his son, Leo VI, who called upon the Turks to aid him against the Saracens, and thus opened the way for the Turks. After the extinction of the Macedonian dynasty, 1057, Isaac Comnenus was raised to the throne by the unanimous vote of the army. Alexius I, who began to rule, 1081, increased the area of the empire considerably. The dynasty of the Comnenian emperors continued until 1204, when Constantinople was taken by the French and Venetians (called the Latins), who then became masters of the whole empire. They divided it into four parts, giving the first with the capital to Baldwin, Count of Flanders, who was made emperor. Baldwin was taken prisoner by the Bulgarians, and died in 1206. His brother Henry ruled till 1216, when the empire became a prey to utter anarchy. The dynasty of the Palæologi began with Michael VIII. Palæologus, who, by the help of the Genoese captured Constantinople, 1261. Andronicus III, a great grandson of Michael, became emperor, 1328. During his reign the Turks took Nicæa and Nicomedia and devastated the European coasts. In the reign of his son, Johannes V, the Turks began to gain ground in Europe, and, 1362, Sultan Amurath had made Adrianople his capital. Under the following rulers the empire rapidly declined, until, 1453, with the capture of Constantinople by Mohammed II and the death of Constantine XI, the Byzantine Empire came to an end. See WESTERN EMPIRE.

Byzantine Historians, Greek writers on the history of the Byzantine Empire. They are historians proper and chroniclers. The historians deal with contemporaneous events and special epochs, follow classical models, and write for a cultivated public. The chroniclers deal with universal history, write for the peo-

ple, and dwell on matters that appeal to the popular taste, such as plague, pestilence, and famine, comets and earthquakes, great buildings, and famous chariot races.

Byzantine Recension, Greek text of the New Testament; used in Constantinople after it became a metropolitan see in the E. Church; used as the basis of the old Slavic version. It corresponded nearly with the present "received text" and with many existing MSS.

Byzantium (bī-zān'shī-ūm), ancient Greek city; situated on the Thracian Bosphorus, and on the site of Constantinople; founded by a colony of Megarians, 667 B.C.; increased rapidly, and became an important commercial city. Byzantium was probably either a kingdom or the seat of a tyrannus; afterwards it became an aristocracy, and later a crude democracy. The name Golden Horn, still applied to a part of the channel of Constantinople, was probably derived from the revenue from its fisheries. The Byzantines also levied toll on vessels passing from sea to sea, and derived profit from rich corn fields not far from the city. Having been captured by a general of Darius Hystaspis, it was liberated by Pausanias abt. 478 B.C. A few years later Byzantium became an ally or tributary of Athens, against which it revolted, 440 B.C.; besieged and taken by Alcibiades, 408. The Byzantines, unable to resist the Gauls, agreed abt. 279 B.C. to pay them an annual tribute. Septimius Severus captured it, 196 A.D. after a resistance of three years; reduced it almost to ruin, but afterwards relented and partially restored it. The name of *Augusta Antonina* was given to it in his time. In 330 A.D. Constantine the Great selected it as his capital, and founded a new city, which he intended should rival Rome, and to which he gave the name of New Rome. See CONSTANTINOPLE.

C

C, third letter in modern European alphabets derived from the Roman characters. In sound it is variable. In Latin it probably represented the sound of *k* in all positions, as it does in Anglo-Saxon and Welsh. In Polish and Bohemian, unmarked, it sounds like *ts*. In other languages, before *a*, *o*, and *u*, it is pronounced *k*; before *e*, *i*, and their representatives, in English, French, and Portuguese, it is pronounced *s* (in English, in a few cases, also *z*); in Italian, *ch* as in *child*; in Spanish, *th* as in *thin*; in German, *ts*. See ABBREVIATIONS.

C, in music, the first note of the natural diatonic scale, so called because it requires neither flats nor sharps in its signature. In the ancient Greek system of tonality the scale of C was called Ionic.

Caaba (kā-ā'bā). See KAABA.

Cabal', a secret council formed under the reign of Charles II (1667); consisted of the

following members: Sir Thomas, afterwards Lord Clifford, Lord Arlington, the Duke of Buckingham, Lord Ashley, afterwards Earl of Shaftesbury, and the Earl of Lauderdale. The Cabal was dissolved in 1674. The prevailing opinion that the word was formed from the initials of the names of its members is perhaps erroneous, as it had been used before to denote a secret cabinet, and is said to be derived from the Hebrew Cabbala.

Cabala (kāb'ā-lā), or **Kab'alah**, ancient Jewish system of religious philosophy or theosophy, which attempted to explain the nature of God and the universe. Some of its writers taught that God has neither will, intention, desire, nor action, but that ten *Sephiroth*, or intelligences, emanated from God. As God became active in these *Sephiroth*, so these become externally manifested in the universe. The Cabala teaches the doctrine of the transmigration of souls. It probably was influenced

by Neo-Platonism. According to recent authorities it originated among Jewish thinkers of the tenth century.

Caballero (kă-bäl-yä'rō), Fernan (pseudonym of CÄCILIA BÖHL VON FABER), 1796-1877; Spanish novelist; b. of German parents resident in Cadiz. She made a wide reputation by her stories describing the local customs of various parts of Spain. Among her novels are "La Gaviota," "Un Verano en Bornos," "Pobre Dolores," "Clemencia," and the tales called "Relaciones" and "Cuadros de Costumbres."

Cabañas (kă-bän'yäs), port of Cuba, Pinar del Rio province, W. of Havana; bay resembles that of Havana; its narrow entrance is overlooked by Fort Reina Amalia. Pop. (1899) 1,017.

Cabanel (kă-bä-nél'), Alexandre, 1823-80; French painter of genre, history, and portraits; b. Montpellier; for many years a Prof. of Painting in the Ecole des Beaux-Arts, and among his pupils are some of the most famous French artists. His "Death of Moses" is in the Corcoran Gallery at Washington; his portrait of Miss C. L. Wolfe is in the Metropolitan Museum, New York City; and five of his works, including the "Apotheosis of St. Louis" and the "Birth of Venus," are in the Luxembourg Gallery, Paris. In the Panthéon at Paris are his frescoes depicting the life and education of St. Louis.

Cabanis (kă-bä-nēs'), Pierre Jean George, 1757-1808; French philosopher and physician; b. Cosnac, Charente-Inférieure; Prof. of Medicine in Paris, 1797; principal work, the "Relations between the Physical System and Mental Faculties of Man," in which he maintained that "the brain secretes thought as the liver secretes bile."

Cabbage, a garden esculent of the mustard family; cultivated in some of its forms from prehistoric times. It is a native of Europe, where the wild plant is still to be found upon certain seacoasts. *Brassica oleracea*, the species to which the cabbage belongs, is supposed to have given rise to the cauliflower, kales, and Brussels sprouts, and some botanists even suppose that some of the turnips have had a similar origin. The cabbage is an important crop in temperate climates. Cabbages demand a deep and rich soil, and one which is not liable to injury from drought. Over 100 varieties are now known and cultivated in the U. S.

Cabet (kă-bä'), Étienne, 1788-1856; French socialist; b. Dijon; a radical democrat in politics and a leader of the Carbonari; in 1842 published a romantic work called "Travels in Icaria," popular among the workingmen of Paris; planted, 1846, a colony on the communist system on the Red River, Texas, from which he and his followers removed, 1849, to Nauvoo, Ill., after that town had been deserted by the Mormons. His colony, which had never enjoyed much prosperity, was broken up, 1857.

Cabeza de Va'ca. See VACA, ALVAR NUÑEZ, etc.

Cabinet, specifically, a body of counselors, generally composed of the heads of executive departments, on which the responsibility of government devolves. The name is taken from the cabinet or private apartment where a king was accustomed to meet his privy council in secret conference. In the U. S. the cabinet is composed of the chiefs of the executive departments created by acts of Congress, *viz.*, State, Treasury, War, Justice, Post Office, Navy, Interior, Agriculture, and Commerce and Labor, each under a secretary. The secretaries are appointed by the President, subject to confirmation by the Senate. Cabinet officers do not sit in Congress. Their meeting as advisers of the President is unknown to the law or constitution, and their conclusions in Cabinet have no binding force, except that a dissenting member would resign office if he could not conform. By Act of 1886 members of the Cabinet in the order named, except the Secretary of Agriculture, succeed to the performance of chief executive functions when by removal, death, resignation, or disability, the offices of President and Vice President are both vacant, until the disability is removed or a President is elected. In this event Congress must be assembled within twenty days.

Cabiri (kă-bi'ri), or **Cabei'ri**, ancient divinities worshiped in Samothrace, Phœnicia, Greece, and other countries. Their worship was performed with much solemnity and mystery. The earliest mention of them is in a drama by Æschylus, entitled "Kabeiros."

Cable, George Washington, 1844- ; American novelist; b. New Orleans; served in the C. S. army, after which he returned to New Orleans; engaged in surveying, journalism, and various mercantile occupations until 1879, when he began to devote himself wholly to literature. His fictions relate mainly to Louisiana life, and illustrate Creole dialect and character, include "Old Creole Days," "The Grandissimes," "Madame Delphine," "Dr. Sevier," "Bonaventure," "Strange True Stories of Louisiana," "John March, Southerner"; other works, "The Silent South," "The Negro Question."

Cable, a rope or a chain mostly employed on shipboard to connect the ship with her anchors. The name is often applied to wire ropes, especially such as are used in suspension bridges and to submarine telegraph lines, etc. Rope cables are made of the best hemp, of manila, or of coir. The circumference varies from about 12 in. to 26. A number of yarns are twisted to form a lissum; three lissums twisted in an opposite direction form a strand; and three strands twisted in the direction of the yarns in a lissum form a cable. The strength of a cable varies according to the square of the diameter. On shipboard, cables receive the names of sheet cables, bower cables, etc., according to the anchor to which they are attached. Hempen cables have been superseded by chain. Chain cables consist of links the length of each of which is about six diameters of the iron of which it is made, and the breadth about three and a half diameters.

Cable, Electric, conductor for electric current, in which protection from injury is provided for by surrounding the insulating coat with a sheath or armor. Cables for use underground, where the chief sources of injury



UNDERGROUND CABLE, CONTAINING SIX-STRANDED CONDUCTORS FOR ELECTRIC LIGHTING.



SUBMARINE CABLE, WITH ONE-STRANDED CONDUCTOR.

are of a chemical nature, are commonly surrounded with lead. Submarine cables, subject to abrasion, are incased in steel wire. For greater flexibility, cables, even when they contain but a single circuit, are usually made up of many strands. See TELEGRAPH.

Cabot (kăb'ôt), John, foreign merchant of Bristol, England, who was placed in command of a fleet of five vessels, which sailed in 1497. They reached the coast of Newfoundland on June 24th, and were in England again in August. Nothing was heard of him after 1498, and he is supposed to have died about that time.

Cabot, Sebastian, 1477-1557; English navigator; son of the preceding; b. Bristol; is supposed to have been with his father in the voyage of 1497, and there are some indications that he visited the N. American coast in 1503; commanded, 1517, an English expedition in search of a NW. passage, discovering the entrance of Hudson Bay and penetrating to latitude 67° 30' N.; invited by Charles V to Spain, was made Grand Pilot of Castile, 1518, and in this capacity commanded four ships which sailed, 1528, to follow Magellan's route to the Moluccas; touching on the coast of Brazil, entered the Plata, ascended the Paraná and Paraguay to the site of Ascension, and built the fort of Espirito Santo on the Paraná, thus founding the Spanish colonies in this region; returned, 1530, leaving a garrison; remained in the Spanish service until the end of 1546, when he went to England. Edward VI granted him a pension, and he was influential in promoting English commercial enterprises, especially to the Baltic.

Cabral (kă-bră'l'), Pedro Alvarez, or Pedralvez, abt. 1460-1526; Portuguese navigator; in 1500 commanded a fleet to follow the route to India, which had been opened by Vasco da Gama; kept far out in the Atlantic, and thus, April 22d, discovered the Brazilian coast about latitude 16° 20' S.; continuing his route, proceeded to Mozambique and Calicut; made an alliance with the sovereign of Cochin, loaded his vessels with spices, and reached Lisbon,

July 23, 1501. Of his subsequent life nothing is known.

Cabul'. See KABUL.

Cacao (kă-kă'ô), fruit of the *Theobroma cacao*, a tree of tropical America; of the family *Sterculiaceæ*. Chocolate and cocoa are made of the roasted oily kernels of the cacao nut, which also yields cacao butter. Must not be confounded with the cocoanut tree, nor with the coca of Peru.



CACAO.

Caceres (kă'thă-rës), Andres Avelino, 1838-; Peruvian soldier and statesman; b. Ayacucho; served under Castilla and Prado; in the war with Chile, 1879-83, became a brigadier general; second Vice President in the provisional Calderon Govt., 1883; subsequently acting President of Peru; declared against Iglesias whom the Chileans had made President at Lima; captured the city; President of Peru, 1886-91; minister to France and Spain, 1891-94; again President, 1894-95; overthrown by ex-Dictator Pierola in latter year.

Caceres, Ramon, Santo Domingo statesman; was a farmer and freight carrier; assassinated Ulysses Hereaux, President and tyrant of Santo Domingo, 1899; placed Carlos F. Morales in the presidential chair, and became Vice President; in consequence of civil war precipitated by Morales and the latter's departure from the capital, 1905, was called on to preside over the government; defeated Morales, who fled the country.

Cáceres, town of Spain; capital of province of same name; 25 m. W. by N. from Trujillo; manufactures of linens, woolen goods, hats, soap, wine, etc. Pop. (1900) 15,000.

Cachalot (kăsh'ă-lôt). See WHALE.

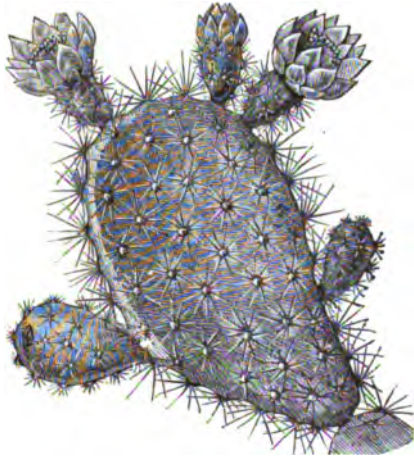
Cache (kăsh), French word signifying a hiding place; in U. S., name given in the West to subterranean holes in which travelers and trappers hid provisions and other property, to preserve them from the Indians and wild animals; also applied to marked mounds of stone in arctic regions, within which whalers and

explorers have deposited supplies of food for the use of distressed mariners.

Cachet (kā-shā'), *Lettres de*. See *LETTRES DE CACHET*.

Cacholong (kāsh'ō-lōng), or **Pearl O'pal**, milk-white variety of opal, allied to hydrophane; is opaque and pearly, has a conchoidal fracture, and sometimes has a reddish tinge; name derived from the river Cach, in Bucharía, where it was discovered.

Cactus Fam'ily (*Cactaceæ*), dicotyledonous herbs, shrubs, or trees; leaves minute or wanting (in a few cases with ample leaves); stamens numerous; floral leaves (sepals and petals) usually many; related to the myrtles, evening primroses, mentzelias, etc. About



CACTUS AUNA.

1,000 species have been described, all natives of the New World, with a single exception. Some species have become naturalized in the Old World. The most important genera are *Mammillaria*, with spheroidal stems covered with tubercles; *Echinocactus*, with spheroidal stems vertically ribbed; *Cereus*, with elongated, ribbed stems; *Opuntia*, with flattened, articulated stems.

Cactus Wrens, wrens of the genus *Campylorhynchus*; found in Texas, Arizona, Mexico, and Central America; live among cactuses on which they build their nests.

Cadahalso (kā-dāl'sō), **José de**, 1741-82; Spanish poet and dramatist; b. Cadiz; made his début with "Sancho Garcia," a tragedy, 1771, followed with "Eruditos á la Violeta," a satirical epic. A volume of poems appeared, 1773, and after his death his "Moorish Letters," written on the model of "Lettres Persanes"; served in the army and was killed at the siege of Gibraltar.

Caddoes (kād'dōs), a family of N. American Indians; divided into N., middle, and S. groups; comprising the Arikara, Pawnee, Wichita, Kichai, and Caddo tribes; number abt. 2,000; scattered among reservations in N. Dakota and Oklahoma.

Cade (kād), **Jack**, d. 1450; Irish rebel; called himself "Mortimer"; cousin of the Duke of York; leader of an insurrection in Kent, June, 1450; marched with 16,000 insurgents toward London, and encamped on Blackheath. Among their motives for rebellion was oppressive taxation. Having defeated a royal army, he entered London, in which he maintained strict order, but caused Lord Say, a royal favorite, to be put to death. His followers were induced to disperse by a promise of pardon. Cade fled, but was pursued and killed.

Ca'dency, in heraldry, the method of distinguishing the escutcheon of one person from that of others who are entitled to bear the same escutcheon, as with the different sons of one father. No one of these would be entitled during the father's lifetime to bear exactly the same escutcheon as he, and their escutcheons are accordingly differentiated by marks of cadency. During the early Middle Ages cadency, like other differencing, was often effected by a complete change, as in the tincture of the field or of the bearing. In later times it became customary to add some small bearing, and this system is still in force.

Cadenza (kā-dén'zā), in music, an ornamental succession of notes in the nature of a flourish, introduced just prior to a final close. Also appears in concertos and concert pieces for piano, violin, etc., at considerable length as a display point for the solo performer, making use of the principal themes of the work. This was formerly expected to be impromptu. Since Beethoven, most composers have written their own cadenzas, leaving nothing to the will of the performer.

Cadet', a younger son, younger brother; a military officer who is junior to another is a cadet in respect to him. The term is also applied in France and other countries to a student of the art of war and military science. The students of the Military Academy at West Point, N. Y., are called cadets, as are those of the Naval Academy at Annapolis. There are also medical cadets, recognized as of a distinct rank in the U. S. Army Regulations.

Cadi (kā'di), Arabic word signifying judge or jurist; the title of an inferior judge among the Mohammedans. He must be chosen from the ranks of the priesthood, as the Koran constitutes the code of laws.

Cadiz (kā'diz), ancient *Gades*; city and seaport of Spain; capital of province of same name; on the Atlantic Ocean; 94 m. S. by W. of Seville; on a long, narrow isthmus surrounded by water on three sides, having on the N. and NE. an inlet called the Bay of Cadiz, which forms a good and capacious harbor. It is accessible from the mainland by a tongue of land, which in some places is only 200 yards wide, and is strongly defended by several forts. Among the principal edifices are two cathedrals, the lighthouse of San Sebastian, 172 ft. high, and a hospital called Casa de Misericordia. The convent of the Capuchins possesses two pictures by Murillo. The city contains theaters, a medical school, botanic garden, and academy of fine arts.

Manufactures mantillas, fans, glass, soap, cotton and silk stuffs, hats, etc. Cadiz is one of the oldest towns of Europe; founded by the Phœnicians, who called it Gades, probably before the foundation of Rome. The Carthaginians took it during the first Punic War, but the Romans obtained possession, 208 B.C., after which it became a city of great wealth and importance. It was taken and pillaged by the Earl of Essex, 1596; blockaded, 1656, by Admiral Blake; besieged by the French, 1810-12, when the victories of Wellington rescued it. Pop. (1900) 69,382.

Cadmium (kād'mī-ŭm), metallic element discovered by Stromeyer, 1818, and about the same time by Hermann; is frequently associated with zinc, and derives its name from the ore cadmia. It is lustrous, takes a fine polish, and has a fibrous fracture. It tarnishes very slightly in the air, and only burns at a high heat. It occurs as the sulphide "greenockite" at Bishopstown, Renfrew, Scotland, and incidentally as a constituent of various zinc ores, as the carbonate, silicate, etc. Cadmium is prepared by collecting the first products of distillation from the zinc ores containing it, and subjecting them, when mixed with charcoal, to two successive distillations in iron retorts at a low red heat. Its chief application in the arts is in the form of the sulphide known as cadmium yellow and *jaune brillant*, which is used for coloring soaps, and in paints, etc. The iodide and bromide of cadmium are used in photography. The metal is used to form a fusible alloy with lead, tin, and bismuth for filling teeth.

Cadmus, in classical mythology, a son of Agenor, King of Sidon; a brother of Europa. After Europa had been carried off by Jupiter, Cadmus was sent in quest of her. He founded Thebes, originally called Cadmeia, in Bœotia; sowed the dragon's teeth that sprang up into armed men; invented sixteen letters of the Greek alphabet, or introduced them from Phœnicia into Greece; the first who worked the mines of Mt. Pangæon.

Caduceus (kā-dū'sē-ŭs), in classic mythology, the symbol and winged staff of Mercury (Hermes), to whom it was presented by Apollo; also applied to a staff or rod of laurel or olive carried by ambassadors and heralds as a symbol of peace. It had the figures of two serpents twisted around it. Among the moderns the caduceus is used as an emblem of commerce, over which Mercury was supposed to preside. Still more frequently it is the emblem of health and the healing art.

Cæcilius Statius (sē-sil'i-ŭs stā'ti-ŭs), d. 168 B.C.; Roman comic poet of high reputation; b. Milan; friend of Ennius; wrote nearly forty comedies, of which only fragments are extant; regarded by ancient critics as a comic poet of the first rank.

Cæcum (sē'kŭm), sac or branch of an intestine having only one opening. In man there is only one cæcum, not very large, at the beginning of the colon, being that portion into which the small intestine opens. It terminates in the *appendix vermiformis*.

Cædmon (kéd'mŏn), d. abt. 680 A.D.; Anglo-Saxon poet; originally a cowherd attached to the monastery of Whitby, England; when somewhat advanced in life he suddenly revealed poetic powers, became a monk in Whitby, and composed, professedly under divine inspiration, poems on religious subjects and paraphrases of portions of Genesis, Exodus, and Daniel, which are thought to have influenced Milton in the composition of "Paradise Lost." Some of these are the oldest extant specimens of Anglo-Saxon metrical composition.

Caen (kŏn), city of France; capital of department of Calvados; on the Orne River; 148 m. WNW. from Paris; formerly the capital of Lower Normandy; noble specimens of ancient Norman architecture. The houses are generally built of cream-colored freestone quarried in the vicinity and called Caen stone. Among its edifices are the Church of La Trinité, or Abbaye-aux-Dames, founded by Queen Matilda in the eleventh century; the castle, commenced by William I, and finished by his son Henry I, which was partially destroyed, 1793. Caen is celebrated for manufacture of Angora and woolen gloves; an important place as early as 912, when it became subject to the Normans; residence of William, Duke of Normandy, before he conquered England. In 1346 pillaged by Edward III of England. Pop. (1901) 38,072.

Cænogenesis (sēn-ŏ-jěn'ē-sis), in biology, the changes which may occur in embryological development which differ from the ancestral development, these changes being adaptations to new conditions; used in contradistinction to palingenesis, the repetition in the individual development of the stages of ancestral development caused by inheritance.

Caerleon (kēr-lē'ŏn), town in Monmouth, England, on the Usk; 3 m. NE. of Newport; seat of the mythic court of King Arthur, and a space 222 by 192 ft. has received the name of Arthur's Round Table; but it was probably a Roman amphitheater. Pop. (1901) 1,367.

Cæsar (sē'zār), cognomen of a patrician Roman family of the Julia gens; one of the most ancient in the state; claimed a descent from Iulus, a son of Æneas. The first member mentioned in history is Sextus Julius Cæsar, who was prætor, 208 B.C. After the family had become extinct (at the death of Nero), the succeeding emperors of Rome assumed the name of Cæsar as a title. It subsequently became the title of the heir presumptive to the throne.

Cæsar, Julius, or, more fully, Caius Julius Cæsar, 100-44 B.C.; Roman general and statesman; b. Rome; belonged to the Julian tribe; served in the Roman army in Asia Minor; elected quæstor, 68; ædile, 65; pontifex maximus, 63; accused of being accessory to the conspiracy against Cataline and narrowly escaped death; made prætor, 62; sent to Spain as proprætor, 61, distinguished himself as a magistrate and general, and was saluted as imperator by the army; elected consul, 60; formed the first triumvirate with Pompey and Crassus, 60; was given the government of

Cisalpine and Transalpine Gaul; ended successful wars with the Helvetii, 58, and with Ariovistus, the king of the powerful German nation, established in Gaul; invaded Britain, 55, and fixed the tribute the Britons were to pay to Rome; crossed the Rhine and defeated Vercingetorix, chief of the Arverni in Gaul, 52; ordered by the Senate, backed by Pompey and the patricians, to disband his army or be considered a public enemy; with 5,000 infantry and 300 cavalry crossed the Rubicon River, then marking the limit between Italy and Cisalpine Gaul, 49; occupied Rome and pursued the fleeing Pompey to Brundisium, but was unable to follow him by sea for lack of ships; marched into Spain, took Marseilles, and forced an army under Pompey's lieutenants to sue for peace; led his army into Greece, was defeated by Pompey, but at Pharsalia, with 43,000 troops opposed to 52,000, crushed the latter, 48; followed Pompey to Egypt, where he supported the pretensions of Cleopatra to the throne; destroyed the army of Pharnaces, King of Pontus, at Zela, 47, and sent to the Senate his celebrated letter of three words only—"Veni, vidi, vici"; defeated the Pompeian forces at Thapsus, near Carthage, 46; returned to Italy; marched into Spain and defeated an army under Pompey's sons; was made imperator, by the Senate, for life; also dictator, *præfectus morum*, and *pontifex maximus*; refused a royal crown, because it displeased the people; procured the enactment of salutary laws and reformed the calendar; having no legitimate children, adopted a grand-nephew, Octavius; excited hostility by his evident desire to be king; assassinated in the Senate, March 15, 44, by Brutus, Cassius, and others, falling at the foot of Pompey's statue; wrote seven books of "Commentaries" on the Gallic War, and three relating to the civil war; is considered superior in genius to every other commander in history, excepting perhaps Hannibal.

Cæsarea (sēs-ä-ré'ä), two ancient cities: (1) in Judea, on the Mediterranean, 55 m. NNW. of Jerusalem; founded by Herod the Great; built around an artificial harbor; seat of the Roman procurators and of the titular kings of Judea; taken by the Saracens and, 1101, by the crusaders; now in ruins; (2) in Cappadocia, at the foot of Mt. Argæus; originally its capital, called Mazaca; named Cæsarea after the Roman conquest, and later Eusebia; depopulated by Tigranes for his city Tigranocerta; afterwards had 400,000 inhabitants.

Cæsarea Philip'pi, ancient town of Palestine; about 20 m. N. of the Sea of Galilee, and 45 m. WSW. of Damascus; mentioned in Matthew xvi, 13; site now occupied by the village of Baniyas, in which some ancient ruins are visible; inscriptions show that the god Pan once had a sanctuary here; was embellished by Herod and his son Philip.

Caffeine (käf-fé'in), called also THEINE and GUABANINE, alkaloid in coffee, tea, Paraguay tea, and guarana; discovered by Runge, 1820, and almost simultaneously by Pelletier, Caventou, and Robiquet. Caffeine occurs in the

raw and also in the roasted coffee, the amount varying with the variety of coffee, the ripeness of the sample, the season of the harvest, etc. The mean amount of caffeine, as determined by Stenhouse in samples of various coffees, was 0.8 to 1 per cent. Domingo coffee contains the least and Martinique coffee the most caffeine. Tea contains somewhat more caffeine than coffee, 2.5 to 3.4 per cent. It has been found in hyson tea, 2.2 to 4.1 in gunpowder tea, and 0.9 to 2.1 per cent in various black teas. Caffeine is used in medicine as a powerful stimulant to the respiration and circulation, and it increases the rapidity of thought. It is valuable as a drug in certain cases of cardiac and renal disease, and in opium poisoning.

Caffraria (käf-frä'ri-ä). See KAFFRARIA.

Cagayán (kä-gt-än') Su'lu, island in the Philippines; largest and only inhabited one of fourteen, known as the Cagayán, Sulu group; SW. of Mindanao; area, 43 sq. m.; pop. abt. 3,500; surface, mountainous; chief products, tobacco and sugar; has pearl and shell fisheries; was inadvertently excluded when the treaty of peace with Spain was made; subsequently bought with Sibitu by the U. S. for \$100,000.

Cagliari (käl-yä'rë), Paolo. See VERONESE.

Cagliari, city of Sardinia; capital of province of same name; on bay on the S. coast; has a large and secure harbor, defended by several forts; is the emporium through which nearly all the foreign trade of the island passes; has manufactures of cotton fabrics, soap, gunpowder, leather, and furniture; exports grain, wine, oil, salt, saffron, and rags. Pop. (1901) 53,747.

Cagliostro (käl-yös'trö), Alexander (Count of), real name GIUSEPPI BALSAMO, 1743-95; Italian charlatan; b. Palermo; learned a little chemistry and medicine in a monastery, where he was assistant apothecary; assumed the title of count; became a Freemason; traveled through many countries, professing to be a physician and alchemist, and raising money by quackery and other impostures. Abt. 1780 he visited Paris, where he made many dupes among the higher classes, and revived an old Egyptian Masonic order, of which he became grand kophta; was patronized by Cardinal de Rohan, with whom he was implicated in the affair of the "diamond necklace," and was imprisoned in the Bastille, 1785; liberated in 1786, he visited England, where he obtained little success; afterwards went to Rome, where he was arrested, 1789, as a Freemason, and condemned to imprisonment for life; d. in the fortress San Leone, near Urbino.

Cagots (kä-gös'), despised race of social outcasts (resembling in some respects the gypsies), who have wandered over parts of France for centuries, and were considered descendants of the Visigoths. Before the French Revolution they were bound by law to wear a peculiar dress, to live apart, to labor in none but menial occupations, and only to enter churches by a special door in each. The Revolution relieved

them from all legal disabilities, but could not release them at once from social outlawry and general detestation.

Cahors (kā-ōr'), town of France; capital of the department of Lot; on the river Lot; 57 m. N. of Toulouse; has manufactures of glass, paper, woollen goods, etc., and remains of a Roman aqueduct. Pop. (1900) 15,369.

Caiphās (kā'yā-fās), Jewish high priest, to whom Annas sent Jesus, and who, lacking the power of capital punishment, sent him to Pilate, who condemned him to death.

Cain (kān), eldest son of Adam and Eve; cultivator of the soil; slew his brother Abel in a fit of jealousy, caused by the rejection of his own sacrifice and the acceptance of his brother's; was condemned to be a fugitive on the earth; retired to Nod, and built a city called Enoch, after the name of his eldest son.

Caine, Thomas Henry Hall, 1853-; English novelist; b. Runcorne, Cheshire, of Manx parentage; began as an architect in Liverpool; contributed to the *Liverpool Mercury* and to the *London Athenæum* and *Academy*; lived in London with Dante Gabriel Rossetti till the latter's death, 1882; made his permanent home in the Isle of Man abt. 1892; elected to the House of Keys (the parliament of the island), 1901; traveled in Russia in behalf of the persecuted Jews, 1892, and in the U. S. and Canada, 1895; chief works "Sonnets of Three Centuries," "Recollections of Rossetti," "The Shadow of a Crime," "A Son of Hagar," "The Deemster," "The Bondman," "The Scapegoat," "The Manxman," "The Christian," "The Eternal City," "The Prodigal Son," "The White Christ," "Drink," several of which have been dramatized; also several plays.

Cain'ites, or Cain'ians, Gnostic sect of second century, who maintained that Cain was superior to Abel, since the latter was easily overcome by him; also revered Judas and all the worst characters in the Bible.

Cairn (cārn), artificial and conical heaps of unhewn stones, frequently found in Europe on tops of hills. Many cairns found near the circles of unhewn stone pillars are called druidical. In some cases, heaps of stones are girdled round by large unhewn stones set upright in the ground. It appears that the majority of them were raised as sepulchers and monuments for the dead. Human bones are often found buried under them, together with stone hammers, flint arrowheads, flint axes, bronze weapons, etc. In Scotland and Ireland occur large cairns called "chambered cairns." The most remarkable of these is at New Grange, on the river Boyne, near Drogheda. It is 400 paces in circumference and about 80 ft. high, and is supposed to contain about 180,000 tons of stones.

Cairn'gorm Stones, name given by jewelers to brown or yellow quartz or rock crystal found at Cairngorm, Aberdeen, Scotland; color is produced by a little oxide of iron, or manga-

nese; yellow variety is often called topaz, but is inferior to the true topaz in hardness and brilliancy.

Cairo (kī'rō), called by the Arabs AL MASH or MUSE, capital of modern Egypt; on the Nile; 5 m. S. of the Delta; bounded on the E. by the ridge of Mokattam, and surrounded by stone walls with antique battlements; divided into quarters, occupied respectively by the Mussulmans, the Jews, the Christians, etc., separated by gates, closed at night. The character of the town is still mainly Arabic. There are over 400 mosques with domes and minarets of singular grace and elegance. The trade of Cairo is large, and bazaars and markets are numerous. In the vicinity are the palace of the viceroy, the obelisk of Heliopolis, the Nilometer on the island of Rodah, a graduated column indicating the height of the inundations of the Nile, and the great pyramids of Gizeh, about 15 m. SW. of the city. Cairo, supposed to occupy the site of the ancient *Latopolis*, was founded by the Arabs abt. 970 A.D.; ruled by the Fatimite caliphs until 1171, when Saladin became master of Egypt; was the capital of the sultans of Egypt until it was captured by the Turks, 1517. Pop. (1897) 570,062.

Caisson (kās'sōn), in architecture, a coffer, or a sunken panel in a flat or vaulted ceiling, or in the soffit of a cornice. In civil engineering, an inclosure or large vessel in which the foundations of the piers of a bridge are built and gradually lowered to the bottom of a stream. Caisson is also a name given to a tumbril or ammunition cart used in the artillery service. In maritime affairs it is applied to an apparatus for lifting a vessel out of the water for repairs or inspection. It is usually a hollow structure which contains an air chamber, and is sunk by letting water into it. After it has been placed under the vessel the water is pumped out, and the caisson rises with the vessel.

Caisson Disease. See BENDS.

Ca'ius. See GAIUS.

Cajamarca (kā-hā-mār'kā), or **Caxamar'ca**, town of Peru; capital of department of same name; near the E. foot of the Andes; about 83 m. NNE. of Trujillo; has manufactures of cutlery and woollen cloth; silver mines in vicinity; celebrated in the history of the Spanish conquest; ruined palace in which Pizarro confined the Inca Atahualpa is still seen. Pop. (1896) 12,000.

Cal'abar Bean, seed of *Physostigma venenosum*, family *Leguminosæ*; a twining plant of W. Africa; suborder *Papilionaceæ*. The bean is very poisonous; is used in small amounts, to cause contraction of the pupil of the eye; has the opposite of the effect of belladonna. It is a powerful depressant to nervous action.

Calabash. See BOTTLE GOURD.

Cal'abash Tree, an evergreen tree of the *Bigonia* family. It is notable for its large fruits, a foot in diameter, which remind one of the calabash or bottle gourd. The common species

(*C. cujeti*) is a native of tropical America, where the hard shells of the fruits are used as domestic utensils or carved into ornamental vessels. Its tough wood is useful for various purposes. The genus *Crescentia* contains fourteen species, all natives of tropical America.

Calabria (kā-lā'brī-ā), ancient *Bruttium*, region of S. Italy, S. part of the former kingdom of Naples; a peninsula inclosed by the sea on all sides except the N., separated from Sicily by the Strait of Messina; area, 5,819 sq. m.; divided into three provinces, Cosenza, Reggio, Calabria, and Catanzaro; traversed by the Apennines; subject to earthquakes. Calabria has fisheries of the tunny, swordfish, anchovy, and mullet; chief towns, Cosenza, Reggio, and Catanzaro. Pop. (1905) 1,398,336. Also the ancient name of the part of Italy coinciding nearly with the modern province of Lecce.

Calahorra (kā-lā-ōr'rā), town of Spain, province of Logroño; on the Ebro; 19 m. ESE. of Logroño; has a cathedral and some ancient remains. Quintilian was born here. Calagurris was taken by Pompey or Afranius abt. 78 B.C., after a long and famous siege. The sufferings of the inhabitants were extreme; hence the Romans gave the name Calagurritan famine to any severe famine.

Calais (kā-lā'), seaport of France; department of Pas-de-Calais; on the Strait of Dover; 19 m. NE. of Boulogne; town and harbor defended by a castle and several forts; town has Gothic cathedral and manufactures of bobbinet, hosiery, soap, leather, etc. In 1347 was taken after a long siege by Edward III of England. Held by the English until 1558, when it was taken by the Duke of Guise. The terminus of the proposed tunnel beneath the English Channel is near the village of Sangatte, 6 m. W. of Calais. Pop. (1901) 59,743.

Cal'amander-wood, a valuable cabinet wood which resembles rosewood, but is more beautiful and durable. It is produced by the *Diospyrus hirsuta*, a tree of the family *Ebenaceæ*; native of Ceylon and S. Hindustan; belongs to the same genus as the ebony and persimmon tree. This wood is very dense, takes an exquisite polish, and exhibits great richness and variety of colors, among which is chocolate or fawn color. It is said to be so hard that it cannot be worked with edge tools. The tree has become rare in consequence of the wasteful operations of the Dutch and British. Several similar species are found in the Indian Archipelago.

Calamianes (kā-lā-mī-ā'nēs), islands between Palawan and Mindoro in the Philippines. They are mountainous and abound in valuable timber; rice, wool, cacao, beeswax, and edible birds' nests are the chief products. The climate is hot and unhealthy. The chief islands are Busuanga, Calamian, and Linacapan. Total area 3,677 sq. m. Pop. (1904) abt. 17,000.

Cal'amine. See ZINC.

Cal'amus, genus of *Palmaeæ* which yields a great part of the canes and rattans used for

the seats of chairs and other purposes. Among the species of this genus are *C. rotang* and *C. viminalis*, natives of tropical Asia. *C. rudentium* has been found 500 ft. long. *C. draco* yields the best dragon's blood.

Calando (kā-lān'dō), in music, signifies diminishing gradually from forte to piano, and differs from *decrecendo* and *diminuendo*, as the tempo at the same time is slightly retarded, but not so much as in *ritardando*.

Calanus, ancient Hindu philosopher; one of those whom the Greeks called Gymnosophists. According to Plutarch, his proper name was Sphines. He passed some time in the camp of Alexander in India. Having become sick at Pasargadae, he was at his own request burned alive.

Calatayud (kā-lā-tā-yōd'), town of Spain; province of Saragossa; on the Jalon; 45 m. SW. of Saragossa; has manufactures of linen and woolen fabrics, paper, leather, etc. About 2 m. E. is the site of the ancient *Bilbilis*, from the ruins of which Calatayud was mostly built. Pop. (1900) 11,526.

Calatra'va la Viega (-lā vā-ā'khā), or Old Calatrava, ruined city of Spain; on the Guadiana River; 12 m. NE. of Ciudad Real. Its defense against the Moors, 1158, is famous as having originated the order of the Knights of Calatrava.

Calatrava, Order of, founded, 1158, by Sancho III of Castile, and confirmed by Pope Alexander III, 1158. For a long period the war against the Moors was carried on almost entirely by the Knights of Calatrava. In 1197 the order was nearly exterminated through rashness in war; transferred its seat to Salvatierra, and grew to opulence. Since 1808 the order has been one of merit.

Calcareous (kāl-kā-rē-tis) **Spar**, or Calc Spar, common name of crystallized carbonate of lime; composed, when pure, of forty-four per cent of carbonic acid and fifty-six of lime. It is one of the most abundant of minerals, and is found in every part of the world. In a pure state it is colorless and transparent, but it often contains impurities which render it red, green, brown, yellow, etc. Andreasberg, in the Hartz, and the Derbyshire lead mines are noted for fine large crystals. Some very fine crystals are from the Rossie lead mine of New York. The purest and most limpid variety of this crystal is called Iceland spar, which is found in Iceland, and exhibits double refraction in a remarkable degree.

Calcasieu (kāl'kā-shō), river of Louisiana; rises in the W. part of the state; flows in a SSW. direction through the Calcasieu parish, and enters the Gulf of Mexico; length estimated at 200 m., including Calcasieu Lake, an expansion of the river; lake about 18 m. long.

Calceolaria (kāl-sē-ō-lā'rī-ā), genus of plants of the family *Scrophulariaceæ*, natives of S. America. They grow mostly on the Andes more than 9,500 ft. above the sea level; are herbaceous plants or shrubs with beautiful flowers. The corolla is two-lipped, and the

lower lip is inflated, so as to form a bag which resembles a slipper. They are so abundant in some parts of Chile and Peru as to give a peculiar aspect to the scenery. Many species are cultivated by florists in Europe and the U. S., and are easily propagated by cuttings. Some of the species are used in S. America for dyeing.

Calchas (kāl'kās), Greek soothsayer who was present at the siege of Troy and demanded the sacrifice of Iphigenia; d. from vexation because Mopsus, another soothsayer, surpassed him in prophecy.

Calcium, very widely distributed and abundant metal (symbol Ca, and atomic weight 40). Its more common forms are limestone, chalk, marble, apatite, and gypsum; isolated by Sir Humphry Davy, 1808. It is a yellowish-white, malleable metal. Among its compounds are lime and plaster of Paris.

Calcium Carbide, compound of calcium and carbon (CaC_2), used generally for the production of acetylene and the reduction of iron; is a hard, bluish-black (occasionally reddish-brown), clear crystalline body, impervious to light, and insoluble in all known solvents; came into prominence, 1894. Acetylene gas is produced by bringing calcium carbide into contact with water.

Calcium Light. See DRUMMOND LIGHT.

Cal'culating Machine', a device which performs mechanically the various arithmetical operations, such as adding, subtracting, multiplying, dividing, square and cube root. Among the simplest forms of such machines are the "Abacus," still in use by the Chinese, and the well-known slide rule, as well as primitive devices which preceded written arithmetic.

Pascal's machine (1642) for accounting operations consisted of wheels and cylinders. On the convex surfaces of the latter were inscribed the ten digits and the numbers adapted for adding and subtracting *livres, sous, deniers*. The cylinders were so connected by the wheels that a revolution of one wheel produced, according to the kind of operation, ten, twelve, or twenty revolutions of the other wheels. The first cylinder was revolved by hand to the extent called for by the kind of operation and the starting figures, whence the others moved so as to give the proper result. A machine for performing series of arithmetical computations was invented (1834-53) by two Swedes named Scheutz. There is an example of it at the Dudley Observatory, Albany, N. Y. It calculates to fifteen places of decimals, imprinting on lead the result to eight places at the rate of twenty figures a minute. By taking out certain wheels and putting others in, it will calculate and record in pounds, shillings, and pence; in degrees, minutes and seconds; in tons, hundredweights and pounds, and in other modes of notation. The main purpose of this machine was to facilitate and secure from error the computation of logarithmic and other tables; it obtains the successive tabular results by substituting, in an invariable formula, the consecutive numbers of a uniformly increasing series. The same was the general

plan of the more complicated and practically unsuccessful "difference engine" of Babbage (1822-43).

Adding machines have been greatly perfected in the past few years, and are now in general use in large numbers in government offices, banks, clearing houses, and almost every other line of business. Many of the cash registers now in such general use have automatic adding attachments. Other machines now perfected and on the market not only add and subtract, but perform other mathematical calculations in multiplication, division, cube root, and square root.

Cal'culus (Latin pebble, dimin. of *calx*, stone). The term is derived from the ancient use of pebbles as counters or for making computations, and it, in general, denotes some particular method of performing mathematical investigations. In modern usage it is applied to mathematical methods of peculiar power involving unusual refinements of reasoning, or reference to relations of magnitude, which may be styled "transcendental." But, preëminently, by the word calculus is denoted the Infinitesimal Calculus, including under this head the complementary branches of "Differential and Integral." The lower or common analysis contains the rules necessary to calculate quantities of any definite magnitude whatever. But quantities are sometimes considered as varying in magnitude, or as having arrived at a given state of magnitude by successive variations. This gives rise to the higher analysis, which is of the greatest use in the physico-mathematical sciences. Two objects are here proposed: First, to descend from quantities to their elements. The method of effecting this is called the differential calculus. Second, to ascend from the elements of quantities to the quantities themselves. This method is called the integral calculus. Both of these methods are included under the general name infinitesimal or transcendental analysis. Those quantities which retain the same value are called constant; those whose values are varying are called variable. When variable quantities are so connected that the value of one of them is determined by the value ascribed to the others, that variable quantity is said to be a function of the others. A quantity is infinitely great or infinitely small, with regard to another, when it is not possible to assign any quantity sufficiently large or sufficiently small to express the ratio of the two. When we consider a variable quantity as increasing by infinitely small degrees, if we wish to know the value of these increments, the most natural mode is to determine the value of this quantity for any given period, as a second of time, and the value of the same for the period immediately following. This difference is called the differential of the quantity. The integral calculus, as has been already stated, is the reverse of the differential calculus. There is no variable quantity expressed algebraically of which we cannot find the differential; but there are differential quantities which we cannot integrate: some because they could not have resulted from differentiation; others because means have not yet been dis-

covered of integrating them. Newton was the first discoverer of the principles of the infinitesimal calculus, having pointed them out in a treatise written before 1669, but not published till many years after. Leibnitz, meanwhile, made the same discovery, and published it before Newton, with a much better notation, which is now universally adopted.

Calculus, or **Stone**, a hard concretion formed from the deposition of saline or other substances in various parts of the body. The most frequent position for calculi is the urinary tract, either in the pelvis of the kidney or in the bladder; but they are also found quite commonly in the gall bladder or biliary ducts, and more rarely in other hollow tubes or viscera.

Calcut'ta, capital of British India; province of Bengal; on the Hugli (here a mile wide), an arm of the Ganges; about 75 m. from the sea; extends along the river about 6 m. In the S. part of the city, called Chowringhi, are the European residences. To the SW. is Fort William, the largest fortress in the British dominions, requiring a garrison of 10,000 men. Beyond Chowringhi is the native or "Black Town," mostly consisting of mud or bamboo cabins and narrow, dirty streets. The port extends for 10 m. along the bank of the river, and there is easy water communication with the whole basin of the Ganges and the Brahmaputra. The sewage system is admirable, and Calcutta is now the most healthful city in India. The Hugli is navigable for vessels of the largest tonnage. The chief exports are opium, raw cotton, jute, grain, and hides. Down to 1686 Calcutta was a miserable village. In that year English merchants settled at Sutanati, which now forms a part of the city. From this and two other villages the East India Company formed a settlement, 1700. In 1756 Fort William was captured and the city sacked by the Nawab of Bengal. The Europeans who remained were imprisoned in the Black Hole. In 1757 the British under Clive again took possession. Pop. (1901) with suburbs 1,125,400.

Cal'das, or **Calde'tas**, Spanish term applied to warm springs, and forming part of the name of many places in Spain, Portugal, etc.

Caldecott (käl'dë-köt), **Randolph**, 1846-86; English artist; b. Chester; excelled in depicting country life and in sketching animals; contributed to *Punch* and the *Graphic*; illustrated a series of "Caldecott's Picture Books," Irving's "Old Christmas," "Bracebridge Hall," Blackburn's "Breton Folk," Mrs. Ewing's "Daddy Darwin's Dovecote" and "Jackanapes."

Calderon de la Barca (käl-dä-rön' dä lä bär'-kä), **Pedro**, 1600-81; Spanish dramatist; b. Madrid; entered the army, 1625, and served in Italy and the Netherlands. Philip IV called him, 1635, to Madrid to supply plays for the court, and made him Knight of the Order of Santiago. In 1650 he entered a religious confraternity; in 1653 was made one of the chaplains of the Chapel of the Kings at Toledo;

1663, returned to Madrid as one of the king's honorary chaplains; was elected to the Congregation of St. Peter. His distinction lies in the novelty and ingenuity of his plots, the fervor of his emotions, the richness of his imagery, and the copiousness of his productions. His 400 plays may be divided into six classes: (1) Religious dramas, e.g., "The Wonder-working Magician," "The Constant Prince," "Life is a Dream"; (2) mythological dramas, e.g., "Echo and Narcissus," "The Bridge of Mantible"; (3) historical dramas, e.g., "The Alcalde de Zalamea,"; (4) comedies of intrigue, e.g., "A House with Two Doors is Hard to Keep"; (5) romantic dramas; and (6) "The Autos Sacramentales," a dramatic form which had grown out of the mediæval miracle plays.

Calderon y Beltran', **Fernando**, 1809-45; Mexican poet and dramatist; regarded by Mexicans as one of their best lyric writers. His dramas also have been successful.

Caledonia (käl-ë-dö'ni-ä), Roman name of that part of Britain N. of the Friths of Forth and Clyde; included only the highlands of modern Scotland. Tacitus describes the natives as having red or sandy hair, as living in tents without cities, as addicted to predatory warfare, and fighting in chariots. The Romans made unsuccessful efforts to subdue them. Agricola defeated them, 84 A.D.; but, 85 A.D. was recalled to Rome, and soon after the Caledonians again harassed the Roman colonies. To defend themselves the Romans built, 139 A.D., the Wall of Antoninus from the Frith of the Forth to that of the Clyde, 31 m. In 208 Severus entered Caledonia, but by disease, fatigue, and the perpetual guerrilla warfare waged against him he lost 50,000 men, and had to retreat. A century later the Picts are first heard of, and in 367 Valentinian I sent his lieutenants to defend the Britons against the Caledonians and the Picts. He succeeded, and once more laid the country between the Wall of Antoninus and of Hadrian under Roman rule.

Caledonian Canal', in Scotland; connects the Atlantic Ocean with the North Sea near Inverness; is 61½ m. in length, and formed by cuts 120 ft. broad at the surface, 50 ft. at the bottom, and 17 ft. deep, connecting lochs Ness, Oich, Lochy, and Eli; combined length of artificial portions, 23 m.; saves vessels the stormy passage by the Hebrides, which takes nine or ten days longer. Ships of 600 tons can pass through. The highest part is Loch Oich, 94 ft. above the sea level.

Cal'endar, any systematic and comprehensive method of dividing, distributing, and reckoning time; also a book or table exhibiting such a method. There are two natural divisions of time—the day and the year. The month seems to have been suggested by the period of the moon's revolution (twenty-nine and a half days nearly). The week is, approximately, one quarter of a lunation. It is found in the Oriental and Egyptian calendars, and in that of the Israelites, but it was not known to the Greeks or the Romans. The Greeks instead

employed *decades* of ten days each, and the Romans periods of *eight* days, the last of which was called *nundinae*, or ninth day; the count including both the *nundine* before and that at the end of the period. The first day of the month was always called *kalendae*, *calends*; the fifth or seventh, *nonae*, *nones*; and the thirteenth or fifteenth, *idus*, *ides*. The *nones* were the seventh, and the *ides* the fifteenth in March, May, July, and October, the first, third, fifth, and eighth months of the Roman year, in the remaining months they fell on the fifth and thirteenth. Any other day was denoted by its distance backward from one of these points, the reference day itself counting one.

The Egyptian year had twelve months of thirty days each, and counted five unallotted days at the end. It was too short by nearly a quarter of a day. The Greek year consisted of twelve lunar months of thirty and twenty-nine days alternately. This made the length of the year three hundred and fifty-four days, or eleven and a quarter days too small. The earliest Roman year, attributed to Romulus, had only ten months, of which the first, third, fifth, and eighth had thirty-one days, and the rest thirty each. This year of only three hundred and four days was shorter than the natural year by about one sixth.

Julius Cæsar abolished the lunar year; re-constructed the months, giving thirty-one days each to the first, third, fifth, seventh, ninth, and eleventh, and thirty days each to the rest, except February, which had ordinarily twenty-nine only, but every fourth year, thirty.

The Julian year consisted of three hundred and sixty-five and one quarter days, and exceeded by eleven minutes 13.95 seconds the solar year, of three hundred and sixty-five days five hours forty-eight minutes 46.05 seconds. In consequence of this the equinox, in the course of a few centuries, fell back sensibly. In the time of Julius Cæsar it corresponded to March 25th; in the sixteenth century it had retrograded to the 11th. Pope Gregory XIII in 1582, by suppressing ten days in the calendar, restored the equinox to March 21st, the day on which it fell at the time of the Council of Nice in 325. The Gregorian rule may be expressed as follows: Every year of which the number is divisible by 4 is a leap year, excepting the centesimal years, which are only leap years when divisible by 400. The length of the mean year thus fixed is three hundred and sixty-five days, five hours, forty-nine minutes, twelve seconds, which exceeds the true solar year by 29.95 seconds.

The new calendar was received immediately or shortly after its promulgation by all Roman Catholic countries. The Protestant states of Germany and the Kingdom of Denmark adhered to the Julian calendar till 1700; and in England the alteration was successfully opposed by popular prejudices till 1752. In that year the Julian calendar, or *old style*, as it was called, was abolished by act of Parliament. The *old style* is still adhered to in Russia and the countries following the communion of the Greek Church; the difference of date in the present century amounts to thirteen days.

A new reform of the calendar was introduced in France during the Revolution by a decree of the National Convention passed November 24, 1793, and observed until December 31, 1805, when the Gregorian calendar was resumed. The year was divided into twelve months, each of thirty days, leaving, in ordinary years, five days necessary to complete the year, and in leap year six. These days were placed at the end of the last month, and under the name *jours complémentaires* were celebrated as festivals. Each period of four years terminating in a leap year was also called a *Franciade*. The leap year was also called an Olympic year.

Cal'endering, imparting a smooth polished or glazed surface to linen and cotton goods, paper, etc., by passing between two or more closely set rolls or cylinders which are caused to revolve. The domestic mangle is the simplest form of calendering machine.

Cal'ends, the day on which the pontiff proclaims the *nones*, fixing the calendar. The first day of each Roman month, it was the duty of one of the minor priests, on the first appearance of each new moon, to summon the plebeians to a place in the Capitol near the Curia Calabria, and there to announce the number of days before the *nones* (always five or seven, including the day of calling and the day of the *nones* itself), by so many times repeating the word *calo*.

Cal'gary, a growing city in province of Alberta, Canada; on main line of the Canadian Pacific Railroad and on Bow River; 840 m. W. of Winnipeg, and 642 E. of Vancouver; has extensive railroad shops; is the center of a large agricultural and cattle-ranching district, and an important wholesale and distributing point and financial center; a post of the Northwest mounted police, established 1875; organized as a town, 1884. Pop. 23,500.

Cal'houn (käl-hôn'), John Caldwell, 1782-1850; American statesman; b. Abbeville District, S. C.; admitted to the bar, 1807; member of State Assembly, 1808-9; of Congress, 1811-17; Secretary of War, 1817-25; Vice President of the U. S., 1825-32; U. S. Senator, 1833-43; Secretary of State, 1844-45; and U. S. Senator from 1845 till his death. He approved the Missouri Compromise; advocated free trade and the sovereignty of the states; author of the "South Carolina Exposition," which affirmed that any state could nullify any Act of Congress it deemed unconstitutional; and promoted the annexation of Texas. Among his writings are two posthumous works—one, a "Disquisition on Government," the other, "A Discourse on the Constitution and Government of the United States."

Caliber, or **Calibre** (käl'y-bër), French word much used in English; the diameter of the bore of a gun or any firearm. It is usually measured and described in inches or parts of inches. The cannon in which solid shot is used are often denoted by the weight of each shot, as a 24-pounder, but mortars which throw shells or hollow shot are usually designated by such terms as a 13-in. mortar, etc.

Cal'ico, kind of cotton cloth; named from Calicut, where it was first made; imported into England by the E. India Company, 1631. Patterns may be printed on cotton cloth, either in colors, or in mordants, which become colors when dyed. Calico printing originated in India and Egypt in very ancient times, was imported into Holland by the Dutch E. India Company, and passed into Germany. It was introduced into England during the seventeenth century.

Among the operations involved in calico printing are singeing, bleaching, calendering, and printing. Singeing is the removal of the fibrous nap from the cloth. The cloth is passed over a red-hot plate or through a hot roller machine. It is then bleached and washed in water. To make the cloth smooth it is passed between very heavy rolls, called calenders. The colors are fixed upon the cloth by aid of mordants, substances which have an affinity for both fiber and color.

Patterns are produced by: (1) Direct printing, which is accomplished by mixing the desired color with the proper mordant and then printing. (2) Combined printing and dyeing, which consists in, first printing with one or more mordants, and then dyeing with mordant dyes. (3) Discharge style printing, in which either the mordant, fixing agent, or dye may be dissolved or discharged, yielding a white or colored effect, as the case may be. (4) Reserve style printing, in which various substances printed on the fabric are employed to prevent either absorption or development of the colors subsequently applied by padding or dyeing. The mordants and colors are applied to cloth either by wooden blocks or cylinders with raised patterns, or by copper plates or cylinders with sunken patterns. Each color or tint requires a separate block, plate, or cylinder. Blocks are applied by hand or by presses. The Perrotine Press prints a limited number of colors from cast metal plates carrying the design in relief. The introduction of the copper cylinder press, printing in multiple color from engraved pattern, led to great development in calico printing. A single-color press will print 180 pieces of 60 to 70 yds. in ten hours; a multiple-color press will print but 40 pieces a day.

Cal'icut, seaport of British India; presidency of Madras; on the Indian Ocean; 102 m. SW. of Seringapatam; was the first place in India visited by Vasco da Gama, who arrived here, May, 1498; was then a populous and important city; town gave name to calico through the Portuguese. Pop. (1901) 76,981.

California, largest of the Pacific Coast States, popularly **THE GOLDEN STATE**; state flower, *eschscholtzia* (California poppy). It is bounded N. by Oregon; E. by Nevada and Arizona; S. by Lower California; greatest length, 769 m.; average breadth, 200 m.; area, 158,360 sq. m. Pop. (1906) 1,648,049. Two mountain ranges run the whole length of the state. The Coast Range and its branches spread out in S. California in a confused mass extending across the state, and includes the San Bernardino, San Jacinto, and other chains.

The great E. range, the Sierra Nevada, forms a part of the boundary between California and Nevada; the highest peaks are in this range, including Whitney, 14,898 ft.; Shasta, 14,440 ft., and Tyndall, 14,386 ft. The Sacramento-San Joaquin Valley, about 400 m. long and from 40 to 100 m. in width, lies between these mountain ranges. The most picturesque and remarkable of the valleys of California are the Yosemite and the Tuolumne. E. of the Sierras is a series of lakes extending nearly the whole length of the state, some being alkaline, others salt, others dry most of the year. In the SE. and SSE. there are deep depressions (former lakes), like the Death Valley, 400 ft. below sea level. In the Sacramento-San Joaquin Valley are lakes, of which Clear, Tu-



SEAL OF CALIFORNIA.

lare, and Kern are the largest. There is only one navigable river which discharges its waters directly into the ocean, the Salinas, at the Bay of Monterey. Two other important navigable rivers are the San Joaquin and the Sacramento. The largest harbors are San Francisco, San Diego, San Pedro, San Luis Obispo, Monterey Bay, and Eureka.

Gold and silver have been found in paying quantities in many places, also copper, quicksilver, platinum and tin, lead, iron, borax, salt, soda, sulphur, gypsum, and petroleum. There are 48 genera and 105 species of forest trees, including sequoias or giant redwoods. There are 116 species of mammals, 27 of which are carnivorous; they include the grizzly, black, and brown bear, California otter and sea otter, cougar, jaguar, lynx, gray wolf, coyote, fox, sea lion, seal, and sea elephant. The elk, deer, American antelope, and big horn are also found. There are 350 species of birds native to California, and many reptiles, but only one poisonous serpent, the rattlesnake. The fish are of 240 species, of which 185 are edible.

The bay and coast climate has a small range of temperature; extremes only 53° apart; no intense heat, and frost very rare; average annual rainfall, 27.3 in. The great interior valley has an average winter temperature lower than the coast, though the minimum temperature is about the same; frosts are rare and summer heat very high; mean annual range, 23.6°; average annual rainfall, 21.50 in. The

Sierra Nevada slope has considerable snow and much rain; cool summers; winters often severe. The Great Merced, Kern, Fresno, and Tulare irrigation canals irrigate 1,360,000 acres of fertile land and furnish water power, receiving an inexhaustible supply from the Kern, King, and Merced rivers. The irrigation system is widely extended every year; about one tenth part is done by artesian wells of an average depth of less than 300 ft. The number of farms, 1900, was 72,542; acreage, 28,828,951; value of farms, buildings, etc., \$707,912,960; value farm products, \$796,527,000. In 1906 the acreage devoted to corn, wheat, oats, barley, and rye exceeded 3,045,059 acres; the aggregate product was 97,643,269 bush.; value of, \$49,792,794; the value of farm animals, \$92,307,155. California is admirably adapted for cultivation of grapes and all fruits. Raisins, oranges, lemons, prunes, peaches, apricots, pears, plums, nectarines are shipped in large quantities. In 1905 there were 6,839 manufacturing establishments; capital, \$282,647,201; value of products, \$367,218,495. The products include mining and agricultural machinery, lumber for building, and ornamental woods, tanned and dressed leather and leather manufactures, woolen goods, flour, silk, fiber and fabrics, wine, brandy, and other vinous liquors. The canning of salmon and of fruits and vegetables is an important industry. The value of mineral products, 1905, was \$43,406,258, including gold, \$18,898,545, and petroleum, \$8,201,846. The assessed valuation of realty, 1906, was \$1,243,809,932; total assessed valuation, including railways, \$1,594,781,905; state debt, \$2,911,077. The numerous educational institutions include Leland Stanford Junior Univ., at Palo Alto; the Univ. of California, at Berkeley; Univ. of S. California, at Los Angeles.

The coast of California was discovered by Cabrillo, a Portuguese navigator, 1542. In 1578 Sir Francis Drake took possession of the country, calling it New Albion. In 1769-76 Franciscan Fathers planted twenty-one missions in the country. After the downfall of the Spanish power in Mexico, there was a rush of immigrants to California. In 1846 Commodore Stockton took possession of California in the name of the U. S. and drove out the Mexican forces. A provisional government was then formed. Gold was discovered there in 1848, and caused an instant rush from all parts of the U. S. to California. In 1849 a constitution was framed and ratified, and in 1850 (September 9th) the state was admitted to the Union.

California, Gulf of, or Sea of Cortes, an arm of the Pacific Ocean; separates Lower California from Sinaloa and Sonora; is about 700 m. long, and 40 to 100 m. wide.

California, Lower or Old, long, narrow peninsula, constituting a territory of Mexico; bounded NE. by the Gulf of California and SW. by the Pacific Ocean; about 750 m. long, and varies in width from 30 to 150 m.; is a mountainous, arid region of volcanic formation, having a sparse population. Its pearl fisheries in the gulf and whale fisheries on

the W. coast have some value; other industries are silver mining, salt from Carmen Island, orchil from the interior, and the wines of El Patronico; capital, La Paz; discovered by Grijalva, 1534; area, 58,328 sq. m. Pop. (1900) 47,624.

California, University of, coeducational and nonsectarian institution, established by act of Legislature, 1868; main buildings at Berkeley, Cal., professional schools in San Francisco, astronomical department and Lick Observatory at Mt. Hamilton, Santa Clara Co.; over 300 instructors and 3,300 students in all departments; grounds and buildings valued at \$2,000,000, productive funds exceeding \$3,000,000, libraries aggregating over 200,000 volumes; agricultural experiment department with four main and several substations; the Flood mansion and grounds at Menlo Park, donated, 1898, for a commercial college endowment.

Caligula (kă-lig'ū-lă), Caius Cæsar, 12-41 A.D.; Roman emperor; b. Antium; son of Germanicus and Agrippina, granddaughter of Augustus; succeeded to the throne, 37 A.D., on the death of Tiberius; reign was at first mild and popular, but soon showed himself a monster of cruelty, banishing or murdering most of his kindred, taxing, robbing, and executing his subjects with capricious frequency; invested his horse with the priesthood and a consulship; was assassinated in Rome after a plundering expedition into Gaul.

Caliph (kă'lif), Arabian "successor," spiritual and temporal head of orthodox Mohammedanism—the successor of Mohammed. Usually classed as follows (1) The four Arabian caliphs of Medina, 632-61 A.D.; (2) the fourteen Ommyiades of Damascus, 661-750; (3) the thirty-seven Abbasides of Bagdad, 750-1258; besides these there were rival caliphates; (4) in Egypt the Fatimites, fourteen in number, 909-1171; and (5) in Cordova, 756-1031, there were twenty-two successive caliphs (Ommyiades) who had authority in Spain and NW. Africa. The caliphate of Persia, representing the Shiite, or protestant wing of Mohammedanism, dates from 1502; the caliphate of the Sultan of Turkey dates from 1517. Besides these caliphates there were, between the ninth and thirteenth centuries, thirteen Mohammedan dynasties—eight in Central Asia, three in W. Asia, and two in Africa.

Calisaya (käl-i-sä'yä). See CINCHONA.

Calisthenics, a system of exercises designed to impart grace of movement and physical strength at the same time. These exercises are better adapted to girls than ordinary gymnastics, as they do not subject the muscles to so violent a tension. The apparatus used in these exercises consists of a light wooden staff about 4 ft. long, a pair of light dumb-bells, parallel bars, two square weights, and a short roller fixed in sockets near the top of an open doorway. See GYMNASTICS AND PHYSICAL CULTURE.

Calixtines (kă-lix'tins), a party of the Husites, who insisted on giving the cup (calyx)

in the Eucharist to all who were not guilty of mortal sins; defeated the Taborites (the other branch of the Hussites) in a battle at Lippau, 1434.

Calix'tus, the name of three popes. **CALIXTUS I**, SAINT, d. 223; succeeded Zephyrinus 219 A.D.; supposed to have suffered martyrdom.—**CALIXTUS II** (GUDDO, Count of Burgundy), d. 1124; succeeded Galasius II in 1119. He concluded the Concordat of Worms with the Emperor Henry V, which ended the difficulty with respect to investitures.—**CALIXTUS III** (ALONZO BORGIA), 1379-1458; b. Valencia; succeeded Nicholas V in 1455. He attempted to institute a crusade, without success. An antipope created by Frederick Barbarossa set up in 1168 under the name of Calixtus III, and opposed Alexander III for nine years.

Call'a, a genus of plants of the family *Araceæ*; characterized by a flat spathe, within which is a cylindrical spadix covered with naked flowers, appearing as a mere mixture of stamens and pistils. The *Calla palustris*



CALLA ÆTHIOPICA.

is a native of Europe and the U. S., growing in swamps and bogs, and is cooked for food by the Laplanders. The common "calla" of the greenhouses, often called *C. æthiopica*, is properly *Richardia africana*, a native of S. Africa.

Callao (käl-lä'ö), fortified town of Peru; on the Pacific Ocean; 6 m. W. of Lima, of which it is the port; has a commodious quay and a fine fortress; harbor or roadstead, sheltered by the island of San Lorenzo, is the best on the coast of Peru; chief exports, specie, copper, cotton, hides, and bark; destroyed by earthquake, 1746. Pop. abt. 31,000.

Callicrates (käl-lic'rä-tëz), Greek architect, flourished about the middle of the fifth century B.C.; contemporary of Pericles; assisted Ictinus in the erection of the Parthenon at Athens.

Callicrat'idias, d. 406 B.C.; Spartan general; commanded the fleet, 406 B.C.; defeated the Athenian general, Conon, and blockaded him

at Mitylene. The Athenians sent to the relief of Conon another fleet, which defeated the Spartans at Arginusæ, 406 B.C.; where Calli-cratidas was killed.

Callimachus (käl-lim'ä-küs), Greek artist; exact epoch unknown; especially celebrated as the supposed inventor of the Corinthian capital.

Calliope (käl-l'ö-pë), one of nine muses; presided over epic poetry; said to be the mother of Orpheus and Linus; represented as holding a tablet or closely rolled parchment in



CALLIOPE.

her hand. Also the name of a musical instrument consisting of a series of steam whistles, pitched to produce the notes of a scale and operated by a keyboard. Also the name of an asteroid, discovered in 1852.

Callirrhoe (kä-lir'ö-ë). See EDESSA.

Callisthenes (kä-lis'thë-nëz), abt. 365-28 B.C.; Greek historian; b. Olynthus, Thrace; a relative and pupil of Aristotle; accompanied Alexander against Persia, 334 B.C., and gained the favor of that prince, but afterwards offended him by his boldness of speech, and was put to death on a charge of treason; left a history of Alexander's expedition against Persia, of which only fragments remain.

Callis'tratus, Athenian orator, lived abt. 380-360 B.C., and whose success excited the emulation of Demosthenes and induced him to cultivate oratory.

Callot (kä-lö'), Jacques, 1592-1635; French engraver; b. Nancy; studied at Rome, and attained great excellence, chiefly as an etcher and designer; patronized by Richelieu and Louis XIII, for whom he executed battle pieces; notable works, the series of etchings, "Les Misères de la Guerre."

Cal'us, the inflammatory exudation by which fractures of bones are repaired. Very soon after the formation of a fracture a varying amount of gelatinous material, exuded from the ends of the bone, unites the fragments at the point of fracture. In the case of long bones the cavity within is filled with callus, and

there is a more or less abundant deposit exteriorly. If irritation occur from friction of the fractured surfaces the amount of callus may be considerably increased, and large tumorlike swellings may result at the seat of fracture. The complete healing of the fracture occurs by the conversion of the callus into true bone; to this process the common expression "knitting" is applied. The name callus is also given to hardened portions of cuticle resulting from friction or pressure.

Cal'mar. See KALMAR.

Calms. The *equatorial calms* are a belt of calms, variable winds, sudden squalls, and tornadoes, and almost daily thunder showers, situated about and somewhat N. of the equator, 4° to 6° of latitude in breadth, and separating the two bodies of NE. and SE. trade winds. This is the region where the heated air at the equator ascends to return from the height of the atmosphere toward the poles. The *calms of the tropics of Cancer and Capricorn* are two belts of calms and light winds, almost rainless, situated in the neighborhood of, but outside, the tropics. They are found at the polar limit of the trade winds, which they separate from the region of variable winds of the temperate zones. Each belt occupies but a few degrees in latitude, but the position and limits of both are less defined than those of the equatorial belt. The region of the calms of Cancer, in the Atlantic, is called by mariners the *horse latitudes*. It is said that in colonial times the numerous vessels freighted with horses from New England for the W. Indies were often long detained in these dreaded calms, under the burning rays of the sun of these latitudes, causing a great mortality among their living freight. Hence the name.

Cal'mucks, or Kal'mucks, Mongolian people inhabiting large regions of the Chinese and Russian dominions. There are four tribes: the Choshots, ruled by descendants of Gengis Khan; the Sungars, in the seventeenth and eighteenth centuries, masters of the other races; oppressed by the Chinese, they migrated in great numbers, 1758, to Russia, but, finding the new yoke still more grievous, returned, 1770, to Sungaria; the Derbets, who dwell in the valleys of the Don and Ili; the Torgots, formerly united with Sungars. The former, 1616, removed to the plains of the Volga, but a large part returned to their native regions. The Calmucks are nomadic. Their wealth consists in herds of horses, camels, sheep, and cattle. In Russia there are at present about 85,000, most of whom are found in Astrakhan, and are Lamaists. The European Calmucks are mostly Buddhists, but some are Moham-medans and some Christians.

Cal'omel, the *Hydrargyri chloridum mite*, the mild chloride of mercury; sometimes called the subchloride of mercury or mild mercurous chloride. It consists of a white, impalpable powder, without taste or odor. It is insoluble in alcohol, ether, or water, and in dilute acids which are cold. It is used in medicine chiefly for the purpose of stimulating the liver, espe-

cially in respect to its secretion of bile. The ordinary dose is 1 grain, divided into powders of $\frac{1}{10}$ or $\frac{1}{4}$ of a grain, particularly if added to a little bicarbonate of sodium. Persistent administration of calomel will speedily result in excessive salivation, with tenderness of the mouth and gums.

Caloric Engine. See HOT-AIR ENGINE.

Cal'orie, or Cal'ory, amount of heat necessary to raise 1 kilog. of water from 0° C. to 1° C. For measurements of small quantities of heat, the gramme-calorie, or lesser calorie, is used. This is the heat which will raise 1 gm. of water from 0° C. to 1° C.

Calorim'eter, instrument for the measurement of heat. To measurements involving differences of temperature merely, the term *thermometry* is applied. Calorimetry has to do with the quantity of heat developed when energy is expended, or with the quantity of heat which disappears when work is done. The following are the best-known types of calorimeters: (1) Ice calorimeters, in which the heat of fusion of ice affords the means of measurement; (2) water calorimeters, in which the change of temperature of a known mass of water measures the heat developed or expended in the operation under investigation; (3) steam calorimeters, in which the heat of vaporization of water or of some other liquid furnishes the determination in question.

Calorimo'tor, form of voltaic cell invented by Dr. Hare (1822); is a zinc-copper element with very large plates compactly rolled together, as in the secondary batteries of Planté. On account of the small internal resistance marked heating effects could be produced in short wires; whence the name.

Calottistes (kă-lô-těst'), association of French wits and satirists under Louis XIV; so called from their custom of sending to a public character who had made himself ridiculous a patent, authorizing him to wear the *calotte*, a small cap, to protect the weak part of his head.

Caloy'ers, or Calog'e'ri, monks of the Greek Church. They mostly follow the rule of St. Basil, but those at Mt. Sinai and Mt. Lebanon follow the rule of St. Anthony; from the caloyers the bishops and patriarchs are chosen. Among their numerous monasteries those of Mt. Sinai in Asia and Mt. Athos in Europe are the most celebrated.

Calpurnia (kăl-pér'nē-ă), fourth wife of Julius Cæsar; married to him, 59 B.C.; was a daughter of L. Calpurnius Piso, consul, 58 B.C.; urged her husband not to leave home on the day of his assassination, the ides of March, 44 B.C.

Caltagirone (kăl-tă-jě-rō'nă), city of Sicily; province of Catania; on the slope of a hill about 32 m. SW. of Catania; fortified by the Saracens; the see of a bishop, and has a college, hospital, several convents, and manufactures of cotton fabrics and pottery; inhabitants esteemed the best workmen in Sicily in the useful arts. Pop. (1901) 34,239.

Caltanissetta (käl-tä-nē-sēt'tä), fortified town of Sicily; capital of province of same name; has mineral springs and extensive sulphur works; supposed to be the site of the ancient *Nissæ*. Pop. (1901) 43,303.

Calumet (käl'û-mêt), township in Houghton Co., Mich.; 15 m. N. of Houghton; contains villages of Laurium and Red Jacket; seat of the Calumet and Hecla copper mine, the richest in the world; record production of over 100,000,000 lbs. reported for 1905. Pop. (1904) 28,587.

Calumet, pipe of peace used by the N. American Indians in the ratification of treaties;



CALUMET.

has a long stem made of hollow reed and ornamented with feathers. Some tribes think that a treaty is not valid or complete until both parties have smoked the calumet together.

Cal'vart, Cal'vaert, or Cal'vert, Denis, known also as **DIONISIO FIAMINGO**, 1555-1619; Belgian painter; b. Antwerp; went to Italy in his youth; studied with Fontana and Sabbatini, and established a school of painting at Bologna, which afterwards became very celebrated; best paintings, "St. Michael" and "Purgatory." Guido, Domenichino, and Albani were among his pupils.

Cal'vary, Mt., scene of Christ's crucifixion. The words occur but once in the Authorized Version of the New Testament (Luke xxiii, 33). The term is derived from a Greek word meaning "skull." The Hebrew word *Golgotha* has the same meaning. Identification of the spot is difficult. Of six hypotheses, the one now most favored is that which puts the crucifixion on the hill outside of the present Damascus Gate, on the N. side of Jerusalem. Recent explorations help this hypothesis.

Cal'vert, George and Cecil. See **BALTIMORE, LORD**.

Calvert, Sir Henry, 1763-1826; British general; descendant of the Calverts of Hertford, England; served in N. America under Clinton, Howe, and Cornwallis; taken prisoner at Yorktown, 1781; served in the Netherlands, 1794, as aide-de-camp to the Duke of York; adjutant general, 1799; aided in organizing the military colleges at High Wycombe and Marlow; major general, 1803, baronet, 1818, and general abt. 1821.

Calvert, Leonard, abt. 1606-47; first Governor of Maryland; b. England; brother of Cecil, second Lord Baltimore; led an expedition of mixed religionists in two vessels from Cowes (November 22, 1633) to an island in the Potomac River (March 25, 1634); founded St. Mary's City, of which little remains;

had obstinate contests with Claiborne, who held possession of Kent Island in Chesapeake Bay, and confiscated his property; attempted to found a landed aristocracy, but was defeated by the operation of the democratic features of the charter; went to England, 1643, for instructions; returned the next year to find Claiborne, with new adherents, in possession; was forced into refuge in Virginia; regained his province, 1647, but survived only a few months.

Cal'vin, John, 1509-64; a leader of the Reformation; b. Noyon, France; educated for the Church, and sent to Orleans to study law. From Orleans went to Bourges. After 1530 he devoted himself wholly to theology, formally joined the Reformation, and published at his own expense an edition of Seneca's "De Clementia," with the view of moving Francis I to milder measures. He was compelled to flee from Paris, 1533, on account of a sermon on justification by faith, and found refuge with Queen Margaret of Navarre at Nerac. In 1535 he retired to Strassburg, and then went to Basel. In 1536 appeared at Basel, in Latin, the "Institutes of the Christian Religion," in defense of the French reformers, basing a system of theology on the sovereignty of the will of God, and including the doctrines of predestination, election, and reprobation. From Basel he sought refuge at the court of the Duchess Renée, daughter of Louis XII, at Ferrara. Later he went to Geneva, where he, in conjunction with Farel and Viret, undertook the work of organizing church affairs, and composed a catechism and confession of faith. In April, 1538, the council at Geneva banished Calvin and Farel. Calvin went to Strassburg, but returned to Geneva in September, 1541, with the understanding that his discipline was to be enforced. His ideal was a church in which reform should embrace not only doctrine and ritual, but the whole life. The state was to aid, not rule, although both Church and state should concur in the sphere of morals. The presbyterial system was then inaugurated, and became a model for reformed churches, and was for a time eminently successful. Calvin maintained his influence till his death. The most important part of his labors was in connection with the Academy of Geneva, which place became a focus for the reformed faith. Students flocked there from Scotland, Holland, and Germany, and Calvinism spread throughout Europe. Calvin's labors were ceaseless and prodigious. He was the counselor of all the reformed churches; his correspondence was immense; he wrote commentaries on nearly the whole Bible, and numerous other works.

Cal'vinism, a term used to designate (like Pelagianism and Lutheranism), not the opinions of an individual, but a mode of religious thought or a system of religious doctrines, of which the person whose name it bears was an eminent expounder. It is synonymous with "the Reformed Theology." There have from the beginning coexisted in the Christian Church three well-marked and distinct systems of doctrine, under one or the other of which nearly every form of theological thought may be sub-

sumed. Of these, Pelagianism denies the native guilt, pollution, and moral impotence of man, and makes him independent of the supernatural assistance of God. At the other pole is the Calvinism, which emphasizes the guilt and impotence of man, exalts God, and refers salvation absolutely to the infinite love and undeserved favor of God working in harmony with His justice, sovereignly selecting its objects, and saving them by the almighty power of grace. Between these comes the manifold and elastic system of compromise, known in one of its earlier forms as Semi-Pelagianism, and in a more modern type as Arminianism, which admits man's original pollution, but denies his native guilt, regards redemption as a compensation for innate and consequently irresponsible disabilities, and refers the moral restoration of the individual to the coöperation of the human with the Divine energy, the determining factor being the human will. The five cardinal points of Calvinism are absolute predestination, particular redemption, total depravity, irresistible grace, and the perseverance of the saints. But if a single distinguishing principle is to be discriminated among these, it will not be found in "predestination," but rather in "irresistible grace." See **FORORDINATION**; **PREDESTINATION**.

Calvinis'tic Meth'odists, body of Methodists in Great Britain which originated in a difference between Whitefield and Wesley respecting Calvinistic doctrines, and is in three divisions; (1) Lady Huntingdon's Connection, dating from 1748; (2) Whitefield's Connection, dating from 1741; (3) Welsh Methodists, from abt. 1750.

Calycan'thus, a genus of plants of the family *Calcanthaceæ*; allied to *Ranunculaceæ*. It comprises only a few known species, which are natives of the U. S. and Japan, and are shrubs with square stems. The flowers, bark, and leaves are fragrant and aromatic. The *Calycanthus floridus*, a native of Carolina, called Carolina allspice and sweet-scented shrub, is cultivated in many gardens of the U. S. Its flowers are of a lurid purple or rich brown color.

Calydon (käl'i-dön), ancient and celebrated city of Ætolia; on the Evenus, a few miles from its entrance into the sea; often mentioned by Homer, and continued to be an important city in the historical period.

Calydo'nian Hunt, The, in classic mythology, a celebrated enterprise against a wild boar which ravaged the dominions of Ceneus, King of Calydon. Among the heroes who took part in this hunt were Meleager, Theseus, Jason, Nestor, and the heroine Atalanta, who drew the first blood.

Calypso (kä-lip'sö), beautiful nymph and demigoddess of classic mythology; a daughter of Atlas; reigned over the island of Ogygia, on which Ulysses landed after he had been shipwrecked. She treated him kindly, and tempted him to marry her with a promise of immortality, which he declined for the sake of Penelope; but she detained him by her arts

seven years, bore him two sons, and died of grief at his going away.

Ca'lyx, plural **Calyces** (käl'i-séz), in botany, the flower cup, or outermost of the proper floral envelopes, or of the circles of modified leaves which surround the organs of reproduction, and with them constitute the flower. The leaves or separate parts of the calyx are called sepals. They are generally green, but in some cases are richly colored and petaloid, as in the *Mirabilis*, *Salvia splendens*, and *Fuchsia*. The calyx serves to protect the interior organs. If it falls off before the corolla, it is called caducous, and if it remains until the fruit is ripe it is called persistent. When the calyx is adherent to the sides of the ovary it is superior, and when quite free from the sides of the ovary it is inferior.

Cam, or **Gran'ta**, river of England; rises in Essex; flows NE. through Cambridge; enters the Ouse 3½ m. above Ely; length about 40 m.; is navigable from its mouth to Cambridge; is a classic stream, through its associations with Cambridge Univ.

Cam, in machinery, a contrivance for converting a uniform rotary motion into a varied rectilinear motion. The end of a rod which is free to move only in the direction of its length is held in contact, by the action of a spring or weight, with the edge of an irregularly shaped mass which revolves uniformly upon an axis. A varied motion is thus communicated to the rod, which carries with it the machinery by which the motion is to be applied.

Caman'chea. See **COMANCHES**.

Camarilla (kä-mä-räl'yä), in Spanish, the private chamber or cabinet for the King of Spain, or to his courtiers and confidential advisers, who usually had great power and exerted a pernicious influence. The term is also used in other European countries and languages to denote the influence of courtiers and secret counselors, counteracting the opinions and policy of the legitimate ministers.

Camarina (kä-mä-rä'nä), once celebrated Greek city of Sicily; on the S. coast; about 20 m. E. of Gela; founded by Syracusans, 599 B.C.; no trace of it now exists.

Camaieu (kä-mä'yö), or **Mon'ochrome**, French terms used to denote a painting in a single color. Pictures of several tints, which do not represent the natural colors of objects, are said to be *en camaieu*; may be properly applied to drawings in India ink and red chalk, as well as to engravings.

Cambacères (köh-bä-sä-rés'), **Jean Jacques Régis** (Duke of Parma), 1753-1824; French statesman; b. Montpellier; was elected, 1792, to the National Convention; after the death of Robespierre, 1794, was President of the Committee of Public Safety, and opposed the continuance of the Reign of Terror; member of the Institute abt. 1796; about the end of 1799 was appointed Second Consul by Bonaparte; took a prominent part in the redaction

of the civil code; under the Empire was Arch-chancellor and President of the Council of State, and, 1808, was entitled Duke of Parma. During the Hundred Days he was Napoleon's Minister of Justice.

Cambay', seaport of Hindustan; at the head of the Gulf of Cambay; 82 m. NNW. of Surat; capital of a small native state of the same name; has a fine mosque, several Hindu temples, and a curious subterranean Buddhist temple. Ruined palaces and mosques attest the former magnificence and extent of this town. Pop. (1901) 36,000.

Cambay, Gulf of, inlet of the Arabian Sea; in the W. part of Hindustan; is about 75 m. long, and extends in a nearly N. and S. direction; width of entrance, the widest part, 32 m. or more; receives the Nerbudda, Tapti, Mahi, and Sabbermutti rivers; tide here very rapid, and rises about 30 ft.

Cam'ber, applied by builders to the slight degree of arching which is usually given to beams or other parts of a frame in order to compensate the settlement of the various parts or the subsidence of the joints. Camber in shipbuilding signifies a curvature upward, or a convexity. A deck is said to be cambered when it is higher amidships than at the bow or stern.

Cam'bium, in botany, a supposed mucilaginous, viscid substance secreted between the liber (inner bark) and album (outer wood) of exogenous (dicotyledonous) trees and other plants in early spring. There is, however, no such substance, hence the term is a misnomer. The supposed mucilaginous substance has long been known to be a layer of very thin-walled cells, which are easily ruptured. By their growth they produce on the one hand cells of the new layer of wood, and on the other of the bark.

Cambo'dia, a country known under three names: *Kampootcha*, *Youdra Skan*, and *Khamain*; a French province, on the middle Mekong River, with Siam on the N. and W., Annam on the E., and French Cochin China and the Bay of Siam on the S. Area, 37,400 sq. m. Pop. abt. 1,500,000. The mountains are not of great height, and the only important river is the Mekong. Ivory, timber, silk, and salt fish are among the exports. It is rich in every species of mineral and vegetable wealth. Elephants, lions, tigers, and wild buffaloes, deer, hogs, goats, and wild fowl abound. The finest gamboge is produced by the tree *Garcinia gambogoides*.

Abt. 1540 the Cambodians attacked the ancient seaport towns of Siam. The Siamese thereupon took possession of the ancient capital of Cambodia, and remained masters of the citadel until the country became tributary to Siam. During the last part of the eighteenth century Cambodia fell under the control of the Annamites, and, in 1809, divided its provinces between themselves and the Siamese.

In 1471 it was reunited to the great province of Tonquin. In the sixteenth century it broke away, and in 1774, after a long war,

Tonquin was reduced to submission and incorporated it with the kingdom of Annam. At that time the Portuguese, Dutch, and English had factories in the country, but the Cambodian Govt. was completely independent of European influence. Meanwhile, the country was sorely pressed by Siam and Cochin China. The emperor, needing support, offered to place himself under the protection of France. French officers went to the new kingdom in the East, disciplined its armies, and took a share in the government. In 1820 the old-school Buddhists, in order to revenge the indiscriminate pillage of the French officers, instituted a ferocious persecution of the Christians. French fleets were at once sent out to demand indemnities and protect the Roman Catholic missionaries. Cambodia in 1863 agreed by treaty to a French protectorate. Its present status, however, is regulated by a convention dated June 17, 1894. The government is carried on in the name of the king, but the French resident presides over the council of state.

Cambray', fortified city of France; department of Nord; on the Scheldt; 45 m. NNE. of St. Quentin; the seat of an archbishop; celebrated for its fine linens, called cambrics; an ancient city, with gabled houses, handsome streets; surrounded by a wall with ancient towers and gates; has manufactures of laces, tulle, leather, soap, etc. Pop. (1900) 26,586.

Cambria (kām'brī-ä), ancient and Latin name of Wales, which the Romans called Britannia Secunda; from *Cymry*, as the Welsh people have always called themselves.

Cam'brian Pe'riod, earliest division of geologic time characterized by a well-preserved fauna. Cambrian was first applied by Sedgwick to a system of rocks in N. Wales (*Cambria*), and subsequently adopted for the corresponding time division. In the U. S. rocks of this period have been found in New England, New York, thence through the Appalachian mountain belt, in the states bordering on Lake Superior, in Missouri, in Texas, and at many points in the Cordilleran region. The Cambrian faunas are the oldest known, but they include highly organized species, and do not exhibit the beginnings of life.

Cambridge (kām'brīj), capital of Cambridge Co., England; on both sides of the river Cam; 48 m. NNE. of London; is the seat of one of the great universities of England. Among the remarkable buildings are Trinity Church and the Church of the Holy Sepulchre, which was built in the reign of Henry I, and has a round tower. It is said that Cambridge was destroyed by the Danes, 871 A.D. The Doomsday Book mentions it as an important place under the name of *Grentebrige*. It obtained a charter from King John, 1200. Pop. (1901) 38,379. See CAMBRIDGE, UNIVERSITY OF.

Cambridge, city of Massachusetts; one of the capitals of Middlesex Co.; on the Charles River, here about 1 m. wide, and separates Cambridge from Boston. Cambridge, though incorporated as one city, was formerly divided into several villages, the local names of which

still survive (Old Cambridge, Cambridgeport, E. Cambridge, and N. Cambridge); Harvard Univ. is in Old Cambridge. Cambridgeport and E. Cambridge contain many mercantile houses and manufactories, mostly of glass, furniture, organs, steam engines, and boilers. The city hall is in Cambridgeport. The city was founded, 1631, under the name of Newtown, and was much favored by the General Court, which, 1636, appropriated £400 to locate here a school, which became Harvard Univ. Pop. (1905) 97,426.

Cambridge Plat'form, system of church government drawn up by a synod at Cambridge, in the colony of Massachusetts Bay, 1648. The Congregational churches of New England at that time differed as to discipline. The synod reaffirmed the doctrines taught in the Westminster Confession, but recommended a form of church discipline substantially the same as that which now prevails in the Congregational churches.

Cambridge Pla'tonists, epithet given to Peter Sterry, the founder of the school, Ralph Cudworth, and others, who applied in the seventeenth century Platonic ideas to theology. They belonged to Emmanuel College, Cambridge, the Puritan college of the university.

Cambridge, Univer'sity of, one of the two ancient universities of England; had its beginning, 1110, when Joffrid, Abbot of Croyland, sent to his manor of Cottenham, near Cambridge, Gislebert, a Professor in Divinity with three other learned monks. They in a short time drew together a number of scholars. Abt. 1257 students began to live together in hostels, under a principal, at their own charges. The hostels were named after saints or the churches which they adjoined, or the persons who built them. They were the beginning of the college system, which distinguishes Oxford and Cambridge. Before the close of the sixteenth century nearly all the foundations which now constitute the university were endowed. There had been, from very early times, religious houses, which were in many cases united with collegiate foundations. The friars who lived in these convents kept their "acts" or exercises for degrees like other university men.

The governing body is a senate, which consists of graduates. All university laws are approved by the council, consisting of the vice chancellor and sixteen members of the senate before they are submitted to the senate. The executive powers are a chancellor, high steward, vice chancellor, commissary, and assessor. Dissenters are not excluded from taking degrees, except in divinity.

There are four classes or orders of students—fellow-commoners and noblemen, pensioners, sizars, and scholars on the foundation of their college. The first are so called from their dining at the fellows' table; they wear silk or embroidered gowns and pay heavier fees. The pensioners are the students not on the foundation, who pay for their own commons and for their chambers. The sizars are the poorer students, who are admitted at lower charges

than the pensioners, but wear the same dress, and no longer perform menial offices, as they once did. The examinations necessary for the degree of bachelor are the "Previous" ("Little Go"), "General," and "Special." Candidates for honors have to pass an additional examination in mathematics, French, or German, with their "Previous." The Triposes, which for honor candidates take the place of the "General" and "Special," are classical, mathematical, history, law, theology, moral science, mechanical science, natural science, Oriental languages, economics, and political science. The privilege of sending two members to Parliament, granted by James I, is still enjoyed. There are seventeen colleges, the oldest being Peterhouse (1257), the youngest, Downing (1800), and one hostel (1882). Trinity (1546) has the largest gross income (£77,545). Emmanuel (1548) was a cradle of Puritanism. Women are admitted to the examinations for honors and reside mostly in Newnham and Girton colleges. The number of undergraduates (1905) was 3,054.

Cambyses (kām-bī'sēz), d. 522 B.C.; King of the Medes and Persians; son of Cyrus the Great, whom he succeeded abt. 530 B.C.; invaded Egypt, 525; defeated Psammenitus, its king; captured Memphis; led an army to Ethiopia, but compelled by famine to retire; afterwards indulged in acts of tyranny and cruelty in Egypt, so that many believed him to be insane.

Cam'den, Charles Pratt (first Earl of), 1713-94; English statesman; b. Devon, became Attorney-general abt. 1758; Chief Justice of the Court of Common Pleas, 1762. His decision in the trial of John Wilkes, against the legality of general warrants, rendered him very popular; Lord Chancellor, 1765-70; afterwards distinguished himself as a champion of constitutional liberty, and acted with Lord Chatham in opposition to the American policy of Lord North; President of the Council, 1783; created Earl Camden, 1786.

Camden, capital of Camden Co., N. J.; on the Delaware River opposite Philadelphia; ship building is an important industry. Pop. (1905) 83,363.

Camden, city in South Carolina, capital of Kershaw Co.; on the Wateree River; 33 m. N.E. of Columbia; has annual receipts of about 30,000 bales. Gates was defeated here, 1780, by Cornwallis, and, 1781, Gen. Greene was defeated by Lord Rawdon at Hobkirk's Hill, near Camden. During the Civil War Camden was captured, 1865, by the Federal forces under Sherman; nearly all the business portion of the town was burned. Pop. (1900) 2,441.

Camden Soci'ety, association organized, 1838, in London to publish the MSS. of old British authors, historical documents, old records, and other matter of antiquarian, literary, or historical interest relating to England.

Cam'el, common name for two species of ruminants, genus *Camelus*; although often used for the two-humped or bactrian camel

only. The single-humped camel, or dromedary (*q.v.*), *C. dromedarius*, is found in N. Africa, Syria, and Arabia. The two-humped or bactrian camel, *C. bactrianus*, ranges from the Black Sea into Siberia, Tibet, and China. Besides having two humps, it is further distinguished from the dromedary by its slightly



BACTRIAN CAMEL.

larger size. The wall of the first division of the camel's stomach is remarkable for the presence of numbers of large cells, like small pockets, into which water enters when the animal drinks. These cells retain the water for some time, and constitute the reservoir which enables a camel to go without drinking for a considerable period. The large surface offered by the sole of the spongy foot adapts it for



ARABIAN CAMEL.

walking in sand, and this, coupled with the ability to endure long-continued thirst, fits the camel for life in sandy deserts. It is still further able to undergo privation, because it is able to subsist to some extent on the store of fat laid up in the hump. A camel can carry 500 to 1,000 lbs. or more for short dis-

tances, at a rate of 2½ to 3 m. an hour. Some breeds of dromedaries cover as much as 75 m. in twelve hours. The camel is obstinate and malicious, its intelligence small, and its cowardice great. The males fight and bite each other viciously. Camels will complain bitterly while being loaded, and will spit upon persons they dislike. They have been used to a considerable extent in warfare, camel corps being attached to the British army in India, and they proved valuable in the Sudan campaign. Besides being used as a beast of burden, the hair of the camel is woven into cloth, the hide is made into leather, and the dried dung used for fuel.

CAMEL is also a term used to denote a contrivance by which ships are floated over sandbars and shoals, or sunken ships are raised. A long caisson, or camel, nearly filled with water, is fastened to each side of the ship; when the water is pumped out, the caissons rise and lift the ship with them. This is essentially the principle of all floating docks.

Camellia, genus of evergreen plants of the *Thea* family; natives of China, India, and Japan; extensively cultivated in greenhouses for the beauty of their flowers. The most admired species is the *C. japonica*, a shrub which has large, polypetalous flowers, which resemble a rose. In the wild state it bears red and single flowers, but the flowers of the cultivated varieties are generally double. Among their various colors are red, white, and yellow. Many of the varieties originated in China or Japan, and others have been raised by European and American florists.

Camelopard. See GIRAFFE.

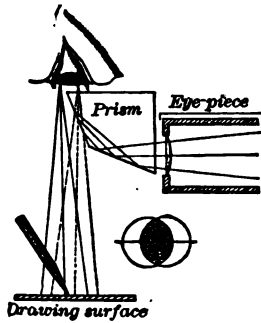
Camelopardalis (kā-mēl-ōp-ār-dā'lis) (the "Giraffe"), constellation near the celestial pole; contains only sparsely scattered stars; is between Cassiopeia, Perseus, Ursa Major, etc.

Camel's Hair is used by the Arabs and Persians, who weave it into stuff for tents and clothing. A fine quality of camel's hair is imported from Persia, and is used to make pencils for artists. Camel's hair was extensively worn by monastics in the Middle Ages for the mortification of the body. It was harsh and rough. Camel's hair is woven to some extent in Europe, but most of the goods now so called are of wool.

Came'næ, general name of four prophetic nymphs of Roman mythology—Antevorta, Postvorta, Carmenta, and Egeria. The nine muses were also called *Camenæ* by the Latin poets.

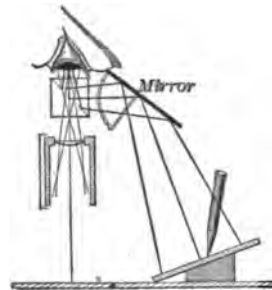
Cameo (kām'ē-ō), gems carved in relief, especially in diminutive pieces of sculpture, often of semiprecious stones having two strata or layers of different colors, the uppermost of which is partly removed so as to expose the lower stratum, which forms the background of the figure. Shell cameos are made from such shells as have layers of differently colored materials, such as the conch shells of the Bahamas.

Camera Lucida (*kām'ē-rā lū'si-dā*), apparatus for bringing into a single field of view



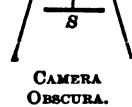
CAMERA LUCIDA FOR HORIZONTAL MICROSCOPE.

drawing surface by direct
microscopic image by total



CAMERA LUCIDA FOR VERTICAL MICROSCOPE.

olution about a vertical axis. Rays passing the lens are brought to focus upon the plane surface *S*, where will be seen an image of that portion of the landscape toward which the hood is directed. The photographic camera has almost completely supplanted the delineating camera.



CAMERA OBSCURA.

light and occupy little space when closed. In front is fixed the lens, and at the back is a screen of ground glass for focusing the image by an arrangement which serves to shorten or lengthen the camera body. With the camera are one or more plate holders, usually carrying two plates back to back, and which fit the back of the camera so that the film of one of the plates may occupy exactly the position of the focusing screen. The plates in the plate holder are protected from the light by a slide which is withdrawn during the exposure. Light is admitted for the exposure either by uncapping and capping the lens tube, or by means of a mechanical shutter

fitted to the tube, which is controlled by a pneumatic bulb, or released by pressing a button.

The perfection of the dry plate and the improvement of the hand camera, a small box with mechanical adjustment for focusing, and a finder, consisting of a small auxiliary lens and ground-glass screen for ascertaining the position of the image, have made amateur photographing an interesting and instructive pastime. In these cameras, many of which fold into so small a space as to fit the pocket, the film is on a flexible support, celluloid, in a continuous roll wound on two spools at the back. After an exposure the film is reeled from one spool to the other, a mechanical check indicating when a proper amount of fresh surface is brought into position. See PHOTOGRAPHY.

Cam'eron, Donald, of Lochiel (*lō-kēl'*), d. 1748; Highland Scottish chief who fought for the Pretender, 1745; b. Achnacarrrie, Lochiel; wounded at Culloden, and escaped to France, 1746; the subject of Campbell's poem, "Lochiel's Warning."

Cameron, Richard, d. 1680; Scottish minister; b. Falkland; considered the founder of the Cameronians or Covenanters, i.e., Reformed Presbyterians; was not a university-trained man, but was gifted with eloquence; opposed the endeavor to establish the Episcopal Church in Scotland.

Cameron, Simon, 1799-1889; American legislator; b. Lancaster Co., Pa.; learned the printer's trade; edited papers in Doylestown and Harrisburg; then interested in the mineral industries and railway development of the region; elected U. S. Senator by the Democrats, 1845; having joined the Republican Party was reelected, 1856; Secretary of War, March, 1861, to January, 1862, and as such advocated the military employment of slaves; was minister to Russia, 1862-63; again in the Senate, 1866-77, when he resigned. His control of his party in Pennsylvania was nearly absolute.

Cameron, Verney Lovett, 1844-94; English traveler; b. Weymouth, Dorset; entered the navy, 1857; commander, 1879; conducted, under the auspices of the Royal Geographical Society, a comprehensive exploration of the interior of Africa, and made discoveries around the Great Lakes, 1872-76; made a journey through Asia Minor and Persia, to ascertain whether a railway could be built from the Mediterranean to India, 1878; with Sir Richard Burton, made explorations in the African interior from the Gold Coast, 1882; published "Across Africa," 1876; "Our Future Highway," 1880; "To the Gold Coast for Gold," 1883, with Burton; and books for boys.

Camero'nians, the followers of Richard Cameron, who in 1680 made a public declaration that Charles II, by his suppression of civil and religious liberty, has forfeited all right to the crown. They were also called Covenanters, from their having demanded the strict observance of the Solemn League and Covenant received by the Parliament in 1643. The

Cameronians still exist, both in Great Britain and in America, under the name of Reformed Presbyterians.

Cameroon'. See **KAMERUN**.

Camil'la, fabulous Italian virgin celebrated for swiftness of foot; a daughter of the Volscian king, Metabus; aided Turnus against *Aeneas*.

Camil'us, Marcus Furius, d. 365 B.C.; Roman dictator and patrician; tribune, 403 B.C.; chosen dictator, 396; abt. 390 was exiled; when Brennus and the Gauls captured Rome, 390 B.C., was recalled and appointed dictator.

Camisards (kām-i-zārd'), insurgent French Protestants who lived in the Cévennes in the first decade of the eighteenth century; named from the *camis* or loose outer garment which they wore. They strove to obtain the religious liberty which had been sacrificed by the Revocation of the Edict of Nantes, and they fought under the pressure of a religious hysteria which made them almost invincible. They were crushed in 1705.

Cam'let, a fabric originally made of camel's hair; in more recent times of the hair of the Angora goat. It is also made of wool, or a mixture of wool with other materials. Camlets are mentioned in Marco Polo's narrative as among the articles manufactured in Tibet.

Camoëns (kām'ō-ēns), Luis de, 1524-80; Portugal's greatest epic and lyric poet; b. of a noble family, probably at Coimbra, whence he went to Lisbon, where he was received at court, and by his uncommon attainments bade fair to win rapid advancement. But the enmity engendered by his suit for Donna Catharina de Ataide, a noble lady in attendance upon the queen, caused his banishment. He joined the army of Africa at Ceuta; returned to Lisbon, 1550, but owing to imprudent conduct was forced to embark for India, 1553. A satire against the corruption of the Portuguese in India caused his banishment from Goa to Macao, 1556. While in Macao he is supposed to have written the first six cantos of his great epic poem, "The Lusiads," commemorating the great achievements of the Portuguese nation. In 1560 he was back in Goa; in 1570 returned to his native land; died in poverty.

Camomile (kām'ō-mil), or **Chamomile**, a name given to several herbs of the family *Compositæ*, but especially to *Anthemis nobilis* and *Matricaria chamomilla*. Both European herbs are nearly identical in order and properties, though the latter is milder. The one first mentioned is common in gardens in the U. S. Camomile is much used in domestic medicine, has tonic, stimulant, and diaphoretic powers. The camomile flowers imported from Great Britain are of the first, those from Germany of the second, species.

Camorra (kām-ōr'ra), a secret society of outlaws and robbers called *Camorristi* who infested the former kingdom of Naples; addicted to public extortion and violent crimes, and could be hired to commit murder. The soci-

ety was thoroughly organized and subject to strict discipline. Francis II vainly endeavored to suppress them. They aided the Garibaldians in expelling the Bourbons from Naples, but continued their depredations under the new government of Italy.

Camp, in a general sense the ground (constructions included) upon which tents, huts, etc., are erected for the shelter of any collection of human beings; in a military sense, that occupied by an army under tents or temporary shelter in the field. It is usually distinguished from *bivouac* by the use of shelter (such as tents), as distinguished from passing the night in the open air. More exclusively yet, the ground and shelter of an army in *tents*; but in the Army Regulations of the U. S. a camp is the place where troops are established in tents, in huts, or in bivouac. Roman camps were constructed in the heart of invaded countries to secure for the troops a place of retreat, to control the district, to provide secure depots for provisions of all kinds, and to protect the communications with the frontier. A Roman army might occupy its camp several winters. In the meantime it sallied forth to resume its operations. An intrenched camp is a fortified position of greater or less extent, usually of field works to be occupied during a campaign or the duration of a war.

Camp Meet'ings, religious gatherings, with preaching, in the open air, and prayer meetings during night, generally lasting for several days and held in groves or secluded places, where shelter is provided for the people present, in tents or temporary houses. The first camp meeting was probably that held, 1790, on the banks of the Red River, Kentucky, and conducted by a Presbyterian and a Methodist minister. The Presbyterian Church afterwards abandoned the institution, while the Methodist Church developed it by buying suitable grounds and erecting the necessary buildings. In England camp meetings were first introduced by Lorenzo Dow in 1807. They were disapproved by the Wesleyan Conference of the same year, but the disapproval led to the foundation of the Primitive Methodist denomination.

Campanella (kām-pā-nē'l'la), **Tommaso**, 1568-1639; Italian philosopher and Dominican monk; b. Stilo, Calabria; published, in Naples, 1591, "Philosophy Demonstrated by the Senses," which gave offense to the partisans of Aristotle; imprisoned on a charge of heresy and conspiracy against the Spanish Govt. about twenty-seven years; retired to France, 1634, in order to avoid the renewed persecution of the Spaniards. Among his important works are "The City of the Sun, or the Idea of a Philosophic Republic," "The Five Parts of Rational Philosophy," and "Discourse on the Spanish Monarchy."

Campania (kām-pā'nyā), province of ancient Italy; bounded NE. by Samnium, E. and S. by Lucania, SW. by the Mediterranean, and NW. by Latium. The Apennines extended along the NE. border; between them and the sea was an extensive plain, the *Regio felix*;

traversed by the Appian Way (*Via Appia*), the greatest road of ancient Italy. Its principal cities were Capua, Pompeii, Neapolis (Naples), Cumæ, Salernum, and Herculaneum; embraces the modern provinces of Benevento, Naples, Principato Citeriore, Principato Ulteriore, and Terre di Lavoro.

Campanile (käm-pä-nē'lā), bell tower; especially a detached belfry adjacent to a church.



GIOTTO'S
TOWER.

Italy possesses many such, some dating from the eighth century. They are often of brick, square in ground plan and capped by a low spire. The campanile of St. Mark in Venice, which collapsed, 1902, the leaning tower of Pisa, the exquisite marble tower of Giotto at Florence, and the Giralda at Seville, Spain, are representative examples.

Campanini (käm-pä-nē'nē), Italo, 1846-96; Italian opera singer; b. Parma; worked as a blacksmith; served as a soldier under Garibaldi; failed on his first appearance in opera, but later became a great tenor; sang in concert, oratorio, and opera in Europe and the U. S.

Campbell (käm'bēl), Alexander, 1788-1866; Irish theologian; b. Antrim Co.; migrated to Pennsylvania, 1809, settling at Washington; with his father, Thomas Campbell, also a minister, originated the movement which led to the rise of the Disciples of Christ; published a monthly magazine, 1823-63; wrote numerous works on religious subjects; founded Bethany College, W. Virginia, and was president, 1841-66.

Campbell, Sir Alexander, 1821-92; Canadian statesman; b. York, England; removed to Canada when a boy; Dean of the Faculty of Law in Queen's Univ., 1860; Speaker of the Legislative Council, 1863; Commissioner of Crown Lands and member of Executive Council, 1864-67; member of the Quebec Conference, 1864; Postmaster-General, 1867-73, when he became Minister of the Interior; Postmaster-General, 1878; Minister of Militia and Defense, 1880; Postmaster-General, 1880; Minister of Justice, 1881; and again Postmaster-General, 1885-87; called to the Senate 1867; leader of the government in that body, 1879-87; knighted, 1879; Chairman of the Commission to Revise the Statutes of Canada, 1883; Lieutenant Governor of Ontario, 1887; represented Canada in the Imperial Federation Conference in London, 1887.

Campbell, Sir Colin (Lord Clyde), 1792-1863; British general; b. Glasgow, Scotland; served in the Peninsular War, 1809-14; in China, 1842; in the Sikh War, 1848; led the Highland Brigade at Alma and Balaklava, where his brilliant repulses of attacks were

of highest tactical value; major general and Knight Grand Cross of the Bath, 1855; commander of the army in India, then fighting against the mutinous Sepoys, 1857; relieved Lucknow and, December 20, 1858, announced the end of the revolt; raised to the peerage as Baron Clyde, 1858; on his return home was made field marshal; buried in Westminster Abbey.

Campbell, Sir George, 1824-92; British statesman; b. Scotland; entered the civil service of India, 1842; held various offices in the Govt. of India; author of "Modern India," 1852; "India as It May Be," "Handy Book of the Eastern Question," 1876; "White and Black in the United States," and "The British Empire," 1889.

Campbell, John (Lord), 1779-1861; Lord Chancellor of England; b. Fife, Scotland; in 1830 became a Whig member of Parliament, and in 1834 attorney-general; Chancellor of Ireland and a peer of the United Kingdom, 1841; Chief Justice Court of Queen's Bench, 1850; Lord Chancellor of England, 1859; published "Lives of the Lord Chancellors and Keepers of the Great Seal of England" and "Lives of the Chief Justices of England."

Campbell, John Archibald, 1811-89; American jurist; b. Washington, Ga.; removed to Alabama, where he practiced; Associate Justice U. S. Supreme Court, 1853-61; afterwards Secretary of War of the Confederate States; one of the commissioners appointed to meet Lincoln and Seward at the Fort Monroe Conference, 1865; after the fall of Richmond was arrested and imprisoned for some time; later resumed the practice of law.

Campbell, Reginald John, 1867- ; English Congregational minister; b. London; entered ministry, 1895; succeeded Dr. Joseph Parker as minister of the famous City Temple, London, 1903; became recognized as the head of the English Nonconformists and the apostle of what was denominated the New theology, based, as he claimed, on the immanence of God; chief publication, "A Faith for To-day," 1900.

Campbell, Thomas, 1777-1844; Scottish poet; b. Glasgow; produced, 1799, his didactic poem, "The Pleasures of Hope"; witnessed the battle of Hohenlinden, 1800, on which he composed a lyrical poem; soon afterwards published poems entitled "The Exile of Erin" and "Ye Mariners of England"; removed to London, 1803, and adopted literature as a profession, receiving a pension from the government; in 1809 produced "Gertrude of Wyoming"; lord rector of the Univ. of Glasgow, 1827; published, besides other works in prose, "Life and Times of Petrarch" and "Life of Frederick the Great." Among his finest poems is "The Battle of the Baltic"; buried in Westminster Abbey.

Campbell, William Wilfred, 1861- ; Canadian poet; b. Berlin, Ontario; ordained in the Church of England, 1885; retired from the ministry, 1891, and entered the civil service in Ottawa; contributed to the *Atlantic Month-*

ly, the *Century*, and *Harper's Magazine*; wrote poems on the lake region, from which he became known as the Poet of the Lakes; works include "Lake Lyrics and other Poems," "The Dread Voyage," and "Mordred" and "Hildebrand," tragedies.

Campbell-Bannerman, Henry, 1836-1908; British statesman; second son of Sir James Campbell of Stracathro; assumed the name of Bannerman, 1872, in compliance with the wish of his uncle; entered Parliament, 1868; financial secretary at the War Office, 1871-74 and 1880-82; secretary to the Admiralty, 1882; Chief Secretary for Ireland, 1884-86; Secretary of State for War in 1886 and 1892-95; leader of Liberals in House of Commons, 1899, 1901, 1903, 1904, 1905; First Lord of the Treasury and Prime Minister, December, 1905.

Campbellites. See DISCIPLES OF CHRIST.

Campbell's Station, location in Knox Co., Tenn., where Burnside's army was attacked, November 16, 1863, by the Confederates under Longstreet; engagement lasted from noon till dark, the Confederates being repulsed.

Campêche (kām-pā'chā), state of Mexico; bounded N. by Yucatan (of which it includes the W. part), E. by the Caribbean Sea, S. by Belize and Guatemala, and W. by the Gulf of Campêche; area, 18,087 sq. m.; pop. (1900) 86,542; chief towns, Campêche (capital), Calchini, Carmen, Bolonchen, and Hechelchakan.

Camp'per, Pieter, 1722-89; Dutch scientist; b. Leyden; Prof. of Medicine at Franeker, Amsterdam, and Groningen, successively. His papers on anatomy, surgery, obstetrics, and medical jurisprudence are numerous and valuable. In 1761 he discovered the auditory organs of fishes, and, 1771, the presence of air in the bones of birds.

Camperdown', village of Holland; 27 m. NW. of Amsterdam; famous for the victory gained off its coast by the British under Admiral Duncan, over the Dutch, commanded by Admiral de Winter, October 11, 1797.

Camphene (kām'fēn), purified oil of turpentine, obtained by rectifying it over dry chloride of lime. Camphene was formerly burned in lamps, but, many fatal accidents having resulted from its use, it has been superseded by petroleum.

Camphor (kām'fēr), stearoptene or crude volatile oil possessing the nature of a ketone and obtained from *Cinnamomun camphora*, a laurel from 25 to 30 ft. in height, with evergreen, shiny leaves. Every part of the tree possesses a camphoraceous odor and taste, but gum camphor is obtained from the root, trunk, and limbs by hacking them into chips and then boiling them with water in a covered vessel lined with straw; on this straw the gum camphor condenses. The camphor of commerce is obtained chiefly in Japan and Formosa.

Campinas (kām-pē'fās), or **São Carlos** (sowā kār'lōs), city of Brazil; State of São Paulo; about 65 m. N. of São Paulo; much sugar is produced here.

Cam'po-Form'io, village of Italy; in Friuli; 66 m. NE. of Venice; where a treaty of peace was concluded between Austria and the French republic, October 17, 1797. Austria ceded the Netherlands and recognized the independence of the Cisalpine republic, including Milan, Mantua, and other parts of Austrian Italy. In return the French gave up a part of Venetia, with the capital, Istria, and Dalmatia to Austria.

Campo San'to, the name given to cemeteries in Italy. The most famous are at Pisa and at Genoa. That of Pisa dates from the twelfth century and has on its walls frescoes of the fourteenth century of great interest in the history of art. That at Genoa is famous for its sculptures.

Cam'pos, Martinez. See MARTINEZ CAMPOS.

Campus, Latin, a plain, an open field, any level surface, as of the sea; was sometimes used to denote a field of battle, and was applied figuratively to a subject of discourse, a field of debate or speculation. The grounds about college buildings are sometimes called the campus.

Campus Mar'tius (the field of Mars), a plain and open field of ancient Rome; on the left bank of the Tiber, outside the walls of the city; the place in which the Roman youth performed military exercises and evolutions, and in which the *comitia* assembled for the purpose of enacting laws and electing magistrates; later used as a public park or pleasure ground.

Campveer (kämp-vär'), decayed maritime town of the Netherlands; province of Zeeland; on the NE. coast of Walcheren; has a beautiful cathedral; was the Scotch "Staple-port"; owing to a marriage of the Lord of Campveer to a daughter of James I, was transferred from Bruges to Campveer, 1444, after which this town had peculiar trading relations with Scotland for several centuries.

Cana (kā'nā), village of Galilee; scene of Christ's first miracle (John ii). Its site is supposed to be indicated by ruins 6 m. N. of Nazareth. The natives call this place *Cana-el-Jell*.

Canaan (kā'nān), the youngest son of Ham (Gen. ix, 18); of the tribe descending from him; and, most frequently, of the land inhabited by that tribe—the "land of Canaan" (Gen. ix, 31), in which sense it denotes the region between the Jordan and the Mediterranean, from the Negebh in the S. to Phœnicia in the N. The rulers of the Canaanites, 1400 B.C., used Babylonian as the official language, which would seem to prove that the Babylonians had previously conquered the country. Like the Phœnicians, they were a commercial people. They had, moreover, cities with walls and gates (Josh. x, 20), fortresses on the heights, and formidable chariots of iron (Josh. xi, 4). One of their cities was called Kirjathsepher, the city of books (Judg. i, 11). They were divided into several tribes, each governed by a king and a council of elders.

The country was, 1400 B.C., a dependency of Egypt. The people worshiped Baal and Asartate, practiced witchcraft and magic, and were idolatrous, superstitious, and licentious.

Canada Balsam, a turpentine or oleoresin obtained from the *Abies balsamea*, a species of fir which grows in Canada and the U. S.; also called balsam fir. It is a pale yellow, transparent liquid, having a peculiar and agreeable odor and an acid taste. When it exudes from the bark it has the consistence of honey, but by age and exposure to air it becomes solid. It was formerly used in medicine as a stimulant to check mucous discharges, and as a dressing for ulcers, but is now seldom used. It is valuable for a variety of purposes in the arts, in photography, in mounting objects for the microscope, and as an ingredient in varnishes.

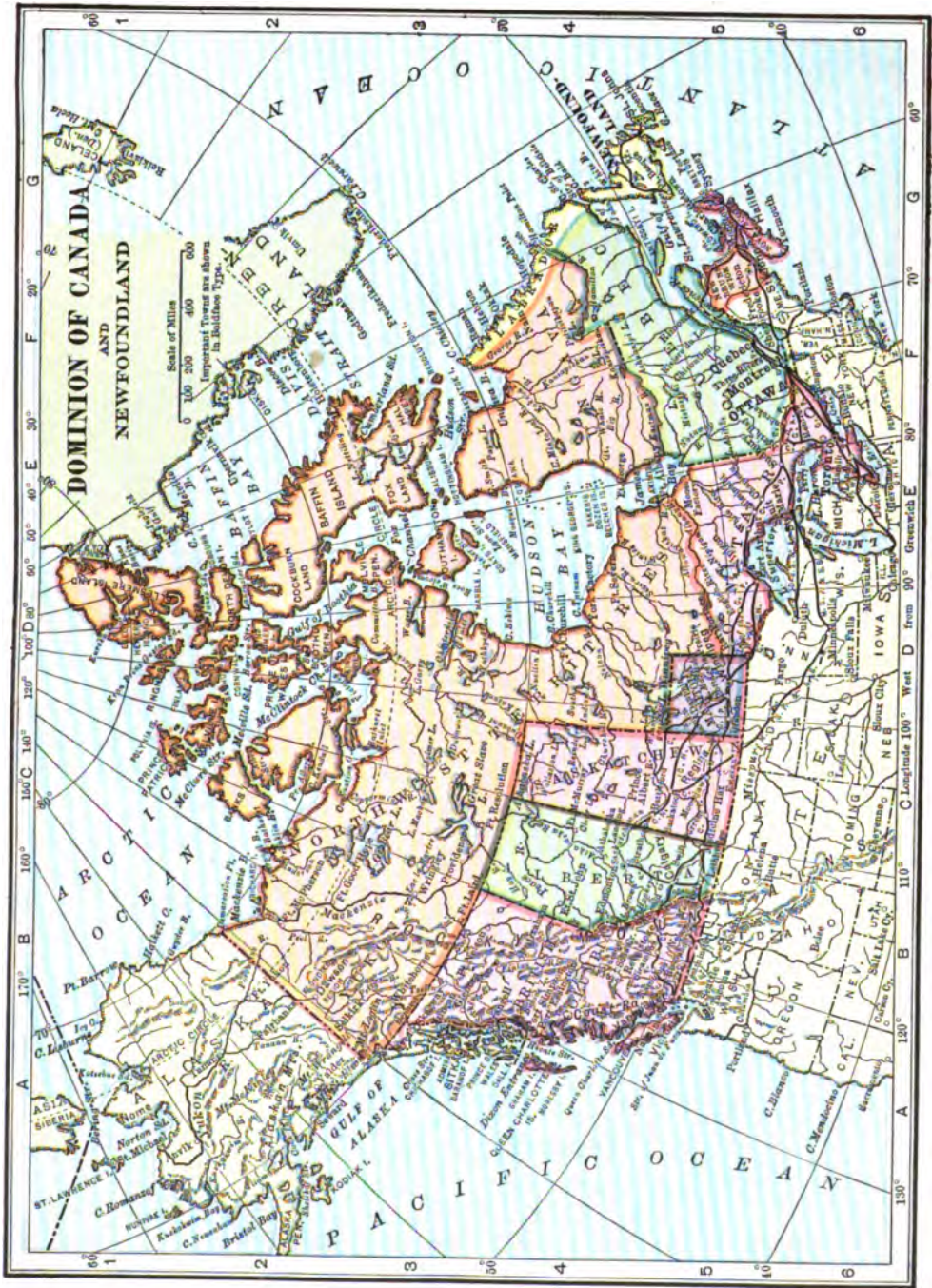
Canada, Dominion of, all the British possessions in N. America, except Newfoundland and its dependency in Labrador, lying N. and N.E. of the U. S.; bounded on the N. by the Arctic Ocean, E. by Baffin Bay, Davis Strait, Labrador, and the Atlantic Ocean, S. by the Great Lakes and the parallel of 45° N. lat. E. of the Lakes and that of 49° N. lat. W. of them, NW. by Alaska, and W. by the Pacific Ocean; area, 3,729,665 sq. m., of which 125,756 are water. Pop. abt. 7,184,000, of whom 2,000,000 speak French and 110,205 are Indians. The Dominion comprises the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, British Columbia, Alberta, Saskatchewan, and the districts of Keewatin, Yukon, Mackenzie, Ungava and Franklin. Four cities have populations exceeding 100,000: Montreal, Toronto, Winnipeg, and Vancouver. The coast line is broken on the E. by the Gulf of St. Lawrence, the Bay of Fundy, and the Bay of Chaleur; on the N. by Hudson Bay, Baffin Bay, and on the W. by the Juan de Fuca Strait, the Gulf of Georgia, and Queen Charlotte Sound. The principal mountains are the Rocky Mountains, extending from the Arctic Ocean to the U. S. on the W. (highest peak, Mt. Hooker, 16,760 ft.); the Cascade Mountains, between the Rockies and the Pacific Ocean; the Notre Dame Mountains, in Quebec; and the North and South Mountains and the Cobequid Mountains, both in Nova Scotia; the Selkirk range, between the Rocky Mountains and the coast, with a larger glacial region than Switzerland; the Laurentian Mountains, from the seacoast of Labrador to the Arctic Ocean, 3,000 m., believed to be the oldest on the globe. Vancouver and Queen Charlotte, on the W.; Prince Edward, Cape Breton, and Anticosti, on the E.; and the chain along the entire N. coast, known as the Arctic Archipelago, are the principal islands. The N. part, from the Rocky Mountains to Hudson Bay, is heavily wooded, contains large auriferous deposits, and is still the fur preserve of the world. The principal river is the St. Lawrence, through which, lakes Superior, Huron, Erie, and Ontario, lying partly within the Dominion, find their outlet to the sea. Its principal tributaries are the Ottawa, St. Maurice, and the Saguenay. The Restigouche, Miramichi, and Richibucto, like

the St. Lawrence, empty into the Gulf of St. Lawrence. The St. John, forming part of the boundary of Maine, the St. Croix, Petiteodiac, and Kennebecasis flow into the Bay of Fundy. The Mackenzie, whose river system is, next to the Mississippi, the most considerable in N. America, is formed by the Athabasca, a river rising in the Rocky Mountain region, and the longer Peace River, which rises in British Columbia. The united streams are now called Slave River until Great Slave Lake is reached; from there the stream, under the name of Mackenzie, flows into the Arctic Ocean, the total length of the connected rivers being 2,300 m.



Other important rivers emptying into the Arctic are the Coppermine and Great Fish. Hudson Bay receives the Churchill, Nelson, and Severn; James Bay, the Albany and Abittibi. The Saskatchewan, Red River of the North, and Winnipeg empty into Lake Winnipeg. The chief rivers of the Pacific coast are the Frazer, Kootenay, and N. branches of the Columbia, which unite near the SE. boundary of British Columbia, and the upper waters of the Yukon, the principal affluent of which is Pelly River. The lakes of large size wholly within the Dominion include Great Bear, 10,000 sq. m.; Great Slave, 10,100; Winnipeg, 9,000; Athabasca, 2,800.

The climate of Ontario is considerably modified by the influence of the Great Lakes; that of British Columbia is more equable than that of the Atlantic in corresponding latitudes. The mean summer temperature in ninety-nine places shows a range from 48.7° to 69°, and the mean winter temperature a range of from -1° to 40.4°. The fall of rain and snow gives a total precipitation ranging from 10.41 to 71.44 in. The greater part of Nova Scotia, New Brunswick, Quebec, Ontario, and the country between Lake Superior and the Pacific Coast is admirably adapted to agriculture. In British Columbia, especially in the S. part, are extensive arable tracts. Grazing is an important industry of Alberta. The soil of the Red River and Saskatchewan valleys is especially fertile. The SW. of Ontario is noted for its apples, pears, peaches, and grapes. In Quebec the cereals, hay, root crops, and fruit grow in abundance. A great part of the Dominion is



still covered with forests (535,000,000 acres). The principal minerals are gold, iron, coal, petroleum, asbestos, copper, and nickel. Nova Scotia, British Columbia, Quebec, Ontario, and part of the W. provinces are the chief mining districts. Nova Scotia is noted for its coal, while the coal-bearing area of the NW. extends over 65,000 sq. m. The gold mined in 1908 had a value of \$9,842,105; total value of mineral produce, 1908, \$86,462,723. Agriculture is the main industry, wheat and oats being the chief staples; ranching is profitable. Immense quantities of dairy products are exported. The cod, salmon, herring, mackerel, lobster, and other fisheries yield large returns. In the year 1905 there were 15,796 manufacturing establishments; capital employed, 1905, \$846,585,023; value of products, \$718,352,603. Leading products include agricultural machinery, furniture, flour, cotton and woolen goods, wood pulp, and paper.

The trade of the Dominion is chiefly with the U. S. and Great Britain. The principal imports from Great Britain are iron and cotton and woolen goods; the chief exports to Great Britain are breadstuffs, timber, cheese, cattle, and apples, and to the U. S., breadstuffs, lumber, cattle, fish, iron, and coal. The imports, 1907-8, were \$370,786,525; exports, \$280,006,606. The registered shipping, 1907, consisted of 7,528 vessels of 698,688 tons. In 1909 there were 31 incorporated banks making returns to the government, with 2,060 branches; total capital paid up, \$97,842,330; average notes in circulation, \$71,960,081. There were 1,128 post-office banks, with deposits of \$43,616,850, and 18 government savings banks. There were, in 1908, railway lines with mileage of 22,966. The Canadian Pacific has 13,122 m. The total mileage of canal, river, and lake navigation exceeds 4,000. The canals are principally to facilitate navigation between the Great Lakes and the St. Lawrence. The chief systems of navigation are the St. Lawrence and Lake, including the Sault Ste. Marie, Ottawa and Rideau, Richelieu and Champlain, River Trent, and St. Peter's. All these belong to the Dominion Govt.

There is no state church, each religious denomination being governed by its own laws. The Roman Catholic Church is the strongest in Quebec, and the Anglican, Presbyterian, Methodist Episcopal, and Baptist churches are the strongest in Ontario. The number of public, high, and superior schools, 1903-4, was 20,980, with 1,113,711 pupils. In Ontario and the Northwest provinces there are separate schools for Roman Catholics. Quebec has separate schools for Protestants. There are some eighteen universities and over a hundred colleges of various kinds.

Executive authority is vested in a Governor General and Privy Council. The Federal Parliament, modeled after that of the United Kingdom, consists of the Senate and the House of Commons. The Governor General, who is appointed by the Crown, has a salary of £10,000 per annum. The senators, of whom there are eighty-seven, are nominated for life by the Governor General; a senator must be thirty years of age, and have real or personal prop-

erty to the value of \$4,000. The 214 members of the House of Commons (one for every 22,688 persons) are chosen by the people for a term of five years; there is no property qualification for the right of suffrage. The provinces have also each a separate legislature and a lieutenant governor. The total actual receipts, 1908-9, were \$85,549,580; expenditures, \$84,064,232; gross debt, \$478,535,427. Esquimaux on the Pacific Coast and Halifax on the Atlantic are strongly fortified and garrisoned by Canadian troops. Steps are being taken to construct war vessels and organize a naval militia. The militia on a peace footing numbers about 46,000 men; on a war footing, 104,600.

The chief historical events are the discovery of the St. Lawrence by Jacques Cartier, 1534; the settlement of the first French colony at Port Royal (Annapolis), 1605; the British conquest, 1759-60; the division of Canada into two provinces, Upper and Lower Canada (afterwards Canada West and Canada East, now Ontario and Quebec), 1791; the union of these two with New Brunswick and Nova Scotia as the Dominion of Canada, 1867; purchase of the territorial rights of the Hudson Bay Company, 1869; the settlement of some long-pending controversies with the U. S. by treaty, 1871; the half-breed and Indian rebellions, 1870-85; the discovery of gold in the Yukon Valley, 1896, causing a boundary-line contention between Canada and the U. S., which was settled by arbitration, 1903.

Canadian River, rises in the NE. of New Mexico; flows through the N. of Texas into Indian Territory; general direction nearly E. After a course of 900 m. it enters the Arkansas River 50 m. W. of Fort Smith. The North Fork of the Canadian, sometimes called Rio Nutria, rises in NE. New Mexico, flows ESE., and enters the Canadian about 50 m. from its mouth; length about 600 m.

Canal, artificial water course for drainage, irrigation, and especially for navigation. The first were built for irrigation, and their enlargement to form navigable channels was an afterthought. The royal canal of Babylon, so enlarged abt. 600 B.C., is among the earliest. Among the projects for connecting rivers and oceans by canals among the Egyptians, Greeks, and early Romans may be mentioned the canal of Marius, 102 B.C., connecting the lower Rhône with the Mediterranean, and the canal of Alexandria, 332 B.C., by which the port of the new city founded by Alexander was put in navigable communication with the Nile, all the mouths of which were obstructed by impassable bars. In 1481 the invention of locks rendered canal navigation much more generally available. This invention, made by two engineers of Viterbo in Italy, at once gave an impetus to canal construction. A canal lock is a chamber with side walls and with gates at each end, and is intended to receive and enable a boat to pass from one level of a canal to another. The process of locking a boat from a lower to a higher level may be briefly described as follows: The water in the lock being at the same height as the water in the lower

level, the boat enters the lock, and the gates at the lower end are closed. The boat being now in a comparatively water-tight chamber, valves are opened in the upper gates, and water from the upper level flows into the chamber until it is at the same height as that of the upper level. The upper gates are then opened and the boat passes out on the upper level. In locking from the upper to the lower level the process is reversed. Machinery is sometimes used to haul the boats into the lock, and is driven by a turbine utilizing the fall between the two levels. In the larger locks of ship canals the water is admitted to the lock chamber by culverts constructed in the lock masonry. These usually pass around back of the hollow quoin, and are provided with gates. Sometimes, however, the culvert passes underneath the lock chamber, and valves in the crown open into the lock bottom.

The locks on the Erie Canal, which are among the best of those used exclusively by canal boats, are 110 ft. long between miter sills, 18 ft. wide at the water surface of the lower level, and have a depth of 7 ft. over the sill. The lifts range between 5 and 15 ft. The locks, lengthened to admit two boats, have nearly the same dimensions, excepting the chamber length, which is 221 ft. The Eastham or tidal locks on the Manchester ship canal have the walls made of concrete, with granite coping and fender courses. Three locks of different sizes are placed side by side to serve the different types of vessels. The chamber of the smallest is 150 by 30 ft.; that of the next in size 350 by 50 ft. The largest, which is also the largest completed lock in the world, has a length of 600 ft. between gates, and is 80 ft. wide. The depth over sill is 26 ft., and the walls are 49 ft. high.

The first canal in the U. S. was built, 1793, around the falls of the Connecticut River at S. Hadley, Mass., Benjamin Prescott being the engineer. The oldest British canal, the Foss Dyke, in Lincoln, is a cut originally made by the Romans. Internal navigation was the subject of legislation, 1423, and there exist locks on the river Lee, built 1570. In 1908 there were about forty noteworthy canals in the U. S., used for commercial purposes, which had an aggregate length of 2,470 m., and had cost upward of \$215,000,000. The greatest were the Erie, from Albany to Buffalo, 387 m., opened 1826. The greatest enlargement of the state system, the barge canal, which accommodates barges of over 1,000 tons capacity, has a least depth of 12 ft. and a least bottom width of 75 ft. Leaving Lake Erie at an elevation of 565.6 ft. above sea level, it enters the Hudson River near Albany at tide level. The Ohio, from Cleveland to Portsmouth, 317 m.; Miami and Erie, from Cincinnati to Toledo, 274 m.; Pennsylvania, connecting Columbia, Northumberland, Wilkes Barre, and Huntingdon, 193 m.; and the Chesapeake and Ohio, from Cumberland, Md., to Washington, D. C., 184 m., are also notable. The Sault Ste. Marie, connecting lakes Superior and Huron at St. Mary's River, Mich., and the Harlem River, connecting the Hudson River and Long Island Sound, at New York City, are termed ship

canals, as is also the Welland, from Port Dalhousie, Lake Ontario, to Port Colborne, Lake Erie. The ship canal is the latest development of artificial waterways, and as now constructed is equally adapted to commercial vessels and warships. At the head of the ship canals, historically, is the Suez, begun 1859, completed 1869, and considered the most important example of this type of canals, though the number of vessels passing through it annually does not equal that passing through the canals connecting Lake Superior with the chain of Great Lakes at the S. Then follow the Cronstadt and St. Petersburg, begun 1877, completed 1890; the Corinth, begun 1884, completed 1893; the Manchester, completed 1894; the Kaiser Wilhelm, completed 1895; and the Elbe and Trave, opened 1900, both connecting the Baltic and North seas. The Illinois and Mississippi Canal is designed to furnish a navigable waterway from the Mississippi, at the mouth of Rock River, in Illinois, to the Illinois River at Hennepin, Ill., and thence by river and canal to Lake Michigan. Probably the most noteworthy canal of another type in the U. S. is the Chicago Drainage Canal, 30 m. long, cost \$30,000,000, built primarily for local drainage, but with a view to future enlargement and change to a ship canal. The Panama Canal (*q.v.*), over which the U. S. is to exercise control, will have a total length of about 54 m. It was begun by a French company in 1881. In 1904 the U. S. purchased the right of way and assumed control of the enterprise. See IRRIGATION.

Canandaigua (kän-än-dä'gwä) Lake, in W. New York; mostly included within Ontario Co.; 15 m. long, and varies in width from $\frac{1}{4}$ of a m. to $1\frac{1}{2}$ m.; is surrounded by high banks which present beautiful and diversified scenery; its water is discharged at the N. extremity by an outlet which communicates with Clyde River, an affluent of the Seneca; surface of lake, 437 ft. higher than that of Lake Ontario, and 668 above the sea.

Canaries (kä-nä'réz), or **Canary Islands**, group in the Atlantic Ocean; belonging to Spain; about 60 m. W. from the coast of Africa; seven largest are Lanzarote, Fuerteventura, Gran Canaria, Tenerife, Gomera, Palma, and Ferro (or Hierro); besides which there are several small islets; total area, 2,808 sq. m. The largest is Tenerife, nearly 60 m. long, and has an area of 877 sq. m.; chief town and port, Santa Cruz de Santiago. Las Palmas, the former capital of the province, and the most populous of its towns, is on Gran Canaria. The Canaries have belonged to Spain since 1493, when the aboriginal race, called Guanches, was conquered. The islands were known to the Romans, and have been described by the elder Pliny, who states that at his time they were uninhabited. They are considered to be the Fortunate Islands of the ancients.

Canary Bird, singing bird of the family *Fringillidae*; native of the Canary Islands; color in wild state gray above, with darker spots; the other parts yellow; in domesticated

form the whole bird is often yellow. In confinement it breeds readily several times a year. Its favorite foods are canary seed, hempseed, sugar, and bland green leaves, such as those of chickweed or lettuce.

Can'by, Edward Richard Sprigg, 1819-73; U. S. army officer; b. Kentucky; graduated at West Point, 1839; served in Mexican War; with Utah and Navajo expeditions; commanded U. S. troops in New York during the draft riots, 1863; succeeded Gen. N. P. Banks in command of the army in Louisiana, 1864; brigadier general U. S. army and major general U. S. volunteers, 1866; commissioner to negotiate removal of Modoc Indians from N. California; was treacherously killed by Chief Jack during conference.

Can'cer, popular name for *carcinoma*, a form of tumorous growth composed essentially of epithelial cells, usually arranged in nests or alveoli. Cancer finds its most frequent seats in the uterus, the skin, the female breast, the rectum, stomach, œsophagus, about the lips, the external genital organs, and less commonly in other localities. There are two important forms—the ordinary or glandular cancer, such as occurs in the female breast, and which may be hard or scirrhus, soft or medullary; and the form called epithelioma, which is of epithelial origin, but not so distinctly after the type of glands—hence not glandular. The cause of cancer has been the subject of scientific investigation for generations, and at no time has it been so thorough and widespread as at present. At the 1904 annual meeting of the General Committee of the Cancer Research Fund, under which experiments were being conducted by experts of the British Royal College of Physicians and the Royal College of Surgeons, the report declared that cancer is not infectious, is not caused by a parasite, is not transmissible from one species to another, is not curable by radium, is not on the increase; that a cancer cell can reacquire powers of self-propagation, and that a serum had been discovered from which good results were hoped. Dr. John Beard, Lecturer in Comparative Embryology in Edinburgh Univ., published in *The Lancet*, 1902, under the title of "Embryological Aspects and Etiology of Carcinoma," with a supplementary statement, 1904, a declaration that all malignant tumors are products of aberrant germ cells, that these cells have always been in the body, that they awake to malignant activity only under exceptional conditions, and that they may be digested (destroyed) by means of trypsin, the pancreatic fluid, this treatment to be followed within a few weeks by injections of amylopin, another extract of the pancreas. The Cancer Fund Committee, conducting investigations in the Harvard Medical School, in its 1905 report declared the parasite theory untenable, sustained the cellular theory, and asserted that cancer is not infectious, that the X-ray treatment is not successful, and that the knife is the only effective remedy. It thus appears that in the essentials of causation these three authorities are in practical accord. See **TUMOR**.

Cancer, the fourth sign of the Zodiac, which the sun enters abt. June 21st. The first point of Cancer is about 90° distant from the first point of Aries, and is called the summer solstice. Cancer is also the name of a constellation of the Zodiac, which does not coincide with the sign.



CANCER.

Cancer, Trop'ic of, one of the lesser circles of the earth; a parallel about 23° 27' N. of the equator. At the summer solstice (June 21st) the sun is vertical over this line. There is a corresponding circle on the astronomical globe, which touches the ecliptic in the first point of the sign Cancer; hence the name.

Candahar'. See **KANDAHAR**.

Candelabrum (*kân-dê-lâ'brûm*), support for lamps. Candelabra usually were of wood, but marble and metals were used for their construction, and sometimes they were of great richness of material and workmanship. The lamp was generally placed upon the flat top of the candelabrum, but other lamps were sometimes hung on the sides by rings or chains.

Can'dia, Pedro de, abt. 1470-1542; Greek soldier; so called from the island of Candia, where he was born; went to America as a soldier in the Spanish army, and, 1527, was with Francisco Pizarro in the second expedition in search of Peru; was Pizarro's companion to Spain, and received the title of Grand Pilot of the S. Seas, 1528. After Pizarro's death he joined the rebellion of the younger Almagro. At the beginning of the battle of Chupas, Candia pointed his guns too high; and Almagro, suspecting treachery, ran him through with his sword.

Candia, fortified seaport and capital of Crete; on the N. coast; contains several mosques, pasha's palace, and an arsenal; its massive fortifications and a cathedral were erected by the Venetians, who owned the island until it was captured by the Turks, 1669. Pop. (1900) 22,331.

Can'dle, a cylinder of wax, fatty matter, or paraffin, through the axis of which runs a wick; used as a source of light, and among the earliest forms of illuminants. A candle in action consists of some fusible, combustible substance through which an infusible, combustible substance—the wick—passes longitudinally. When the wick, which projects at one end, is lighted, the heat developed melts the material of which the candle is made, and the melting taking place to a greater extent near the wick than near the outer edge of the candle, a small cup-shaped cavity is formed around the base of the wick, which serves as a receptacle for the molten material. The liquid moves upward through the wick in consequence of capillary action, and is soon converted into gases, which, burning, give the flame and the light. The earliest form of the candle was the *dip*; made from refuse kitchen fat by melting this and dipping the wick into it. Practically all candles are now made by molding. Until abt. 1820 the wicks were made

of twisted cotton yarn. As the candle burned down the wick projected into the flame and seriously interfered with the combustion. It was necessary from time to time to remove the superfluous matter by means of snuffers. At present the wick is plaited, and this causes it to bend downward as it is released, and the outer end, thus coming in contact with the air, is burned off, so that snuffers are no longer needed. The burning off of the wick is further facilitated by "picking" it—that is to say, by soaking it in a solution of some substance, such as borax, niter, or sal ammoniac, which causes the wick to burn in a clean way without smoke. The materials used for candles are at present palmitic and stearic acids and paraffin. Tallow, spermaceti, ozocerite, and beeswax are also used. Stearin candles contain some paraffin, and paraffin candles some stearin.

Candle, in photometry, is the practical unit of illuminating power. The standard candle of Great Britain and the U. S. burns 120 grains of spermaceti wax in an hour. The standard candle of Germany is otherwise defined. It has a diameter of 20 mm., is composed of paraffin wax, and must produce a flame 50 mm. in height. In France the practical standard of light is the carcel, being the light produced by the lamp of that name. The relation between these standards of light is as follows: 1 carcel = 9.5 standard candles (English); 1 carcel = 7.5 standard candles (German).

Electric candle is an early form of the electric arc lamp, which was devoid of regulating mechanism; best known as the Jablochhoff candle.

Can'dlemas, festival to commemorate the presentation of the infant Jesus in the temple and the purification of the Virgin; observed by Catholics February 2d. On this day all the candles for use on the altar during the year are blessed. The feast was established very early, and there are records of its observance in the early part of the fourth century; observed also by the Anglicans and the Lutherans.

Candolle (kän-döl'). See DE CANDOLLE.

Cand'lish, Robert Smith, 1806-73; Scottish preacher; b. Edinburgh; began to preach in Edinburgh, 1834; was a leader of the popular party, and cooperated with Dr. Chalmers in organizing the Free Church after the disruption in 1843; was chosen, 1847, Chalmers' successor as Prof. of Divinity in New College, Edinburgh, but declined to serve; 1862 Honorary Principal of the college. He was interested in movements looking to the union of the various Presbyterian bodies outside of the Establishment.

Can'dy, town of Ceylon. See KANDY.

Cane, a name given to several species of plants, and to the stems of the smaller palms and the larger grasses. The canes or rattans of commerce, which are used in making cane seats of chairs, etc., are the product of the palmaceous plants *Calamus rotang* and *Cal-*

mus viminalis. The term cane is also applied to the *Arundinaria macrosperma*, an arborescent grass which grows in the S. U. S. on the alluvial banks of rivers, and forms thickets called canebrakes, which are almost impenetrable. This plant often grows to the height of 15 or 20 feet. See RATTAN; SUGAR.

Cane'a, or **Khani'a**, seaport of Crete; on the N. coast; about 70 m. W. of Candia; occupies the site of the ancient Cydonia; is the most commercial town in the island, and has a safe but shallow harbor. Pop. (1900) 21,025.

Canes Venatici (kän'nez vē-nä'ti-si), i. e., the hunting dogs, constellation of the N. hemisphere; represented on the celestial globe by two dogs, Asterion and Chara, which are held in leash by Boötes, and appear as if pursuing Ursa Major.

Caney (kä-nä'), Cuban town; 4 m. NE. of Santiago de Cuba; scene of some of the hardest fighting (July 1, 1898) between the U. S. and Spanish forces in the battle of Santiago. Pop. (1899) 884.

Cang, or **Cangue** (käng), Chinese *kia* or portable pillory.

Canic'ula (literally "little dog"), Sirius, the dog star; a star in the constellation Canis Major.

Canicular Year, ancient year of the Egyptians; so called because its commencement was determined by the heliacal rising of Sirius (or Canicula), which occurred about the same date as the annual inundation of the Nile. The common year of the Egyptians consisted of three hundred and sixty-five days, and every fourth year of three hundred and sixty-six.

Ca'nis Ma'jor ("Greater Dog"), constellation which appears in the celestial globe under the feet of Orion; comprises Sirius, the dog star, which surpasses all the stars of the firmament in splendor and apparent magnitude.

Canis Mi'nor ("Lesser Dog"), constellation adjacent to Canis Major and to Gemini; comprises Procyon, a star of the first magnitude, nearly in a direct line between Sirius and Pollux.

Canisius (kä-në'së-üs), Petrus, real name, PIETER DE HONDT, 1521-97; Dutch Jesuit; b. Nimeguen; entered the Jesuit order, 1543, the first German member of the society; afterwards founded Jesuit schools at Vienna, Prague, Innsbruck, Munich, Ingoldstadt, Freiburg, Dillingen, and Augsburg; contributed much to stop the progress of the Reformation in S. Germany; became Prof. and Rector of the Univ. of Ingoldstadt, 1549; was a prominent member of the Council of Trent, 1547 and 1562; beatified, 1864.

Can'kerworm, larvæ of certain geometrid moths of which many species occur in the U. S. and Europe; also called measuring worms, from their peculiar locomotion. One common American species is *Anisopteryx vernata*. In this the female is wingless, but the male has four thin, silky wings, which have

an extent of about an 1½ in. when expanded. The moths come out principally in the spring, sometimes also in the autumn. The female lays from 60 to 100 eggs, glued in clusters to branches of trees; they hatch in the early part of May. The larvæ then feed on the leaves, especially of apple and elm trees, which they pierce with multitudes of holes.

Cannæ (kân'nê), ancient Roman town in Apulia; on the Aufidus; near its entrance into the Adriatic. Here, August 2d, 216 B.C., Hannibal gained a victory over the Roman army commanded by C. Terentius Varro. According to Livy, the Romans on this day lost about 45,000 infantry and 3,000 cavalry. The site of Cannæ is occupied by a village called Canne, about 10 m. WSW. of Barletta.

Can'nel Coal, a bituminous coal, very dense and compact, and breaks with an uneven or largely conchoidal fracture; sometimes exhibits a waxy luster, and is generally of a brown or black color; burns with a bright flame, and splits and crackles without melting. Production in U. S., 1906, 546,234 short tons. See COAL.

Cannes (kân), seaport of France; department of Alpes-Maritimes; on the Mediterranean; 25 m. SE. of Draguignan; has an old Gothic castle; is the center of a large industry in raising fragrant and ornamental flowers, and, owing to the mildness and salubrity of the climate, is a favorite winter resort. Napoleon landed at Fréjus, near Cannes, after his escape from Elba, March 1, 1815. Pop. (1901) 30,420.

Can'nibalism, practice of eating human flesh. It was in force among aboriginal inhabitants of America, and is still found in New Zealand, Polynesia, Malaysia, interior of Africa, and India. It originated in hunger, and has developed as a habit from the spirit of vengeance and the taste contracted for human flesh. Many tribes eat only enemies who are taken prisoners, and as prisoners of war were eaten, war was waged to gratify the appetite thus excited. Superstition and even religion mingle with the custom. Inhabitants of New Zealand think that by eating an enemy's heart they assimilate his life and courage, rob him of protection of the gods, and gain double favor themselves. Among the Capanagugas of S. America, cannibalism takes the place of burial. The Rhinderwas of India, in order to propitiate the favor of the Goddess Kali, kill and eat those of their relatives who are attacked by an incurable malady, or whom old age has rendered infirm. The Battas of Sumatra make cannibalism a part of the judicial system. Cannibalism as a custom among savage races must be distinguished from occasional acts of the kind committed under peculiar circumstances and pressure of apparent necessity.

Can'ning, Charles John (Earl), 1812-62; British statesman; son of George Canning; became viscount, 1837, and earl, 1859; began public life as a Conservative; appointed Postmaster-General, 1852; Governor General of In-

dia, 1855. During his administration the great Sepoy mutiny (1857-58) occurred, which brought him obloquy for his clemency, but he is now seen to have shown courage and high judgment.

Canning, George, 1770-1827; British statesman; b. London; entered Parliament, 1793, as a supporter of Pitt, and became an Under Secretary of State, 1796. Abt. 1797 Canning, Ellis, and others began to publish the witty and famous political satires called "The Anti-Jacobin." After the resignation of Pitt, 1801, Canning joined the opposition against the ministry of Addington, and in Pitt's last ministry, 1804-6, was Treasurer of the Navy. In 1807 he became Minister of Foreign Affairs in the Tory Cabinet formed by the Duke of Portland. He advocated Catholic emancipation, 1812, was returned to Parliament that year, and became President of the Board of Control, 1816. In the latter part of his life Canning and Lord Brougham were considered the most eloquent and powerful orators in the House of Commons. On the death of Lord Castlereagh, 1822, Canning succeeded him as Secretary of Foreign Affairs in the cabinet of Lord Liverpool. He infused a more liberal spirit into the cabinet, and pursued a foreign policy independent of the Holy Alliance.

Canning, Stratford. See STRATFORD DE REDCLIFFE.

Can'on. See ARTILLERY, ORDNANCE.

Cannon-ball Tree, a large tree of the family *Myrtaceæ*; native of Guiana. It bears racemes of white and rose-colored flowers, and a fruit which has a hard woody shell and is nearly round. This fruit is about the size of a 30-lb. cannon ball.

Cann'statt, town of Würtemberg; in valley of the Neckar; 2½ m. NE. of Stuttgart. In 1796 a battle was fought near the town between Archduke Charles and Gen. Moreau. Pop. (1900) 26,497.

Ca'no, Alonzo, 1601-67; Spanish painter, sculptor, and architect; b. Granada; studied painting under Pacheco and Juan de Castillo; founder of the school of Granada; was put to the torture on a groundless accusation of destroying his wife; appointed court painter by Philip IV, 1638; chief work "Conception of the Virgin." His paintings may be seen in Granada, Seville, and Madrid.

Cano, Juan Sebastian del, abt. 1460-1526; Spanish navigator; b. Guetaria, Guipuzcoa; in 1521 commander of the *Concepcion*, one of the vessels with which Magellan passed the straits bearing his name and navigated the Pacific. After Magellan's death, 1521, *Cara-bello* was put in command, but soon deposed. Del Cano was then elected to command the fleet, and reached the Moluccas safely. Loading his two remaining vessels with spices, he crossed the Indian Ocean, where one more ship was lost; finally, with the *Victoria* he doubled the Cape of Good Hope, and reached Spain, September 6, 1522, being thus the first circumnavigator of the globe. He was gener-

ously rewarded, and granted a coat of arms on which was a globe with the inscription *Primus circumdedisti me*.

Canoe (kā-nó'), originally a rude boat made of the trunk of a tree, hollowed out. Canoes are generally open boats, propelled and steered by paddles. The length and other dimensions vary greatly. Eskimo canoes are made of whalebone frames covered with sealskins, which are drawn across as a deck, with only a hole large enough for one man to sit in. The Fiji canoe is sometimes 100 ft. long and decked, as are others in the S. Pacific islands. Stanley saw canoes carry 100 men on the Kongo. The name is also applied to boats made of birch bark, and to other rude craft, and of late to a light pleasure boat propelled by a paddle or paddles. The modern cruising canoe is fitted with metallic centerboard, rudder, and sails.

Canon, term of various significations in theology, science, and art; means, in general, a law, rule, or standard. In theology applied to a law or rule of doctrine or discipline, or the decree of a general council; also to the genuine books of the Scripture, called the Sacred Canon. The Roman Catholic Church recognizes as parts of the canon of Scripture the apocryphal books, which Protestants reject. In the canon of the New Testament the agreement of the Christian churches may be said to be unanimous.

Canon is also the name of a dignitary of the Roman Catholic and Anglican churches. In each cathedral and collegiate church there are canons, who perform some parts of the services and receive a portion of the revenue of the church. In a collective capacity the canons are called a chapter, and once formed the council of the bishop.

Cañon (kān'yūn), or **Can'yon**, narrow defile along a river course. The typical cañon is a geologically young, water-cut valley, deep and steep walled for a considerable distance along the course of the stream; is formed when an elevated plateau, uplifted in relatively recent geological times, is crossed by a large river; the river cuts down a narrow valley deep below the surface of the plateau. Cañon is also applied to a local narrowing of a valley, where a river cuts through a mountain range or ridge, as the cañon of Weber River through the Wahsatch Mountains above Ogden, Utah; and in Western phrase the river is here said "to cañon." Gorge is often used for shorter defiles of this kind.

Can'oness, member of certain orders of the Roman Catholic Church, who often took no monastic vows, though they lived in common and usually observed the rule of St. Augustine. Many noblemen sought well-endowed canonical livings for their daughters, who were at liberty to marry when they chose. The custom prevailed in Germany even after the Reformation, and there were many houses of Protestant canonesses, especially in Westphalia and Mecklenburg.

Canon'ical Hours, in the Roman Catholic Church, certain fixed times in the day for devotions. In the Church of England, Bishop Cosin published a book of "Hours" for those who liked to use them. These hours are called nocturnes, matins, lauds, tierce, nones, vespers, and complines. The breviary has seven canonical hours, because the Psalter says, "Seven times in the day will I praise thee." In England the hours between 8 A.M. and 12 M. are canonical, and until recently no marriage could take place in the churches of the Establishment except in canonical time. Recent enactments extend the canonical hours to 3 P.M.

Canon'icus, d. 1647; American Indian; chief of the Narragansetts, who, at first hostile to the Pilgrims who landed at Plymouth, 1620, became friendly to the whites, and especially to the colony of Roger Williams.

Canoniza'tion, act of declaring a person a saint; a ceremony in the Roman Catholic and Greek churches by which deceased beatified persons are enrolled in the catalogue or canon of saints. In the Roman Catholic Church it takes place through a solemn and public declaration of the pope that the person in question is to be looked on as enjoying the vision of God, and to be venerated (not worshiped) and invoked. Regularly, canonization cannot take place until fifty years after the decease of the servant of God, and is now always preceded by the act of beatification. The first papal canonization of which history speaks is that of St. Ulrich, Bishop of Augsburg, by John XV, in the Lateran Council of 993. See **BEATIFICATION**.

Canon Law, public and general code of laws of the Roman Catholic Church. The divisions of ecclesiastical law are: (1) The general law of the Church, binding upon all her subjects; (2) laws peculiar either to the Oriental or to the Latin Church; (3) laws observed only by particular or national churches; (4) diocesan regulations. The source of all ecclesiastical law is held by Catholics to be the pope as vicar of Christ. General councils have also the same authority. Patriarchs, provincial councils, and bishops may legislate for their special jurisdiction, their decrees being subject to the revision of the pope. The collection of regulations approved by the Council of Chalcedon (451) contained canons enacted by the councils of Nice, Antioch, Laodicea, Neo-Cæsarea, and Constantinople. The collection of ecclesiastical laws made by Dionysius Exiguus (sixth century), about the time of Justinian, is said to be the foundation of canon law. The canon law of the Eastern Church was compiled toward the end of the ninth century by Photius, Patriarch of Constantinople. A collection of the canons of Dionysius, with many additions, the whole falsely attributed to St. Isidore of Seville, came into use first in the Frankish Empire and then in other Western countries, where its authority prevailed until the end of the fifteenth century. These are now known as the pseudo Isidorean or false decretals.

Canopus, or **Canopus**, brilliant star of the first magnitude in Argo; a constellation of the

S. hemisphere; is never visible in the N. or middle U. S., being only $37\frac{1}{2}^{\circ}$ from the S. Pole.

Canosa (ancient *Canusium*), town of Italy; province of Bari; 14 SW. of Barletta; has an ancient cathedral and ruins of the ancient *Canusium*, an important city of Apulia. In the subterranean tombs of this place were found painted vases and magnificent funereal furniture, with precious stones and jewels. Pop. (1901) 18,000.

Canos'sa, small town of Italy; 24 m. SW. of Modena; contains the ruins of the famous castle belonging to Matilda of Tuscany, before whose gates the German emperor, Henry IV, stood three days bareheaded and barefooted before Pope Gregory VII would admit him to his presence.

Canova, Antonio, 1757-1822; Italian sculptor; b. Possagno, Venetia; aspired to restore the pure and classic style of the antique; acquired celebrity by his "Theseus and the Minotaur"; did not adhere strictly to the severe simplicity of the antique, but modified it by a peculiar grace, apparent in his "Cupid and Psyche" and his "Venus and Adonis." Having been invited by Napoleon, he went to Paris, 1802, and executed an admirable statue of that emperor; other works, a "Venus Victorious," a monument to Clement XIII, a statue of Washington, and a "Perseus with the Head of Medusa"; was the founder of a new school of sculpture, and was reputed the greatest sculptor of his age.

Canovas del Castillo (kã'nõ-vãs dël kãs-tãl'yõ), Antonio, 1828-97; Spanish statesman; b. Malaga; belonged to the Liberal Party, 1852-68; then became leader of the Liberal Conservatives; was a strict monarchist; led the movement which placed Alfonso XII on the throne, 1874; was several times Prime Minister; assassinated by an anarchist.

Canrobert (kõn-rõ-bãr'), François Certain, 1809-95; French general; b. St.-Céré, Lot; general of brigade, 1850, and general of division, 1853; commanded a division in the Crimea, 1854; succeeded Marshal St.-Arnaud as commander in chief of the French army, and began the siege of Sebastopol; resigned command to Gen. Pelissier, May, 1855; a marshal, 1856; commanded a corp at Solferino, 1859. On the outbreak of hostilities, 1870, the Sixth Corps, under Canrobert at Châlons, was, immediately after the disasters of Forbach and Reichshofen, summoned to Metz to reinforce Bazaine. Canrobert took a prominent part in all the battles and events preceding and attending the investiture and capitulation of Metz, where he was made prisoner. At the trial of Bazaine the bearing and evidence of this veteran soldier excited popular admiration.

Can'so, Gut of, strait which separates Nova Scotia from the island of Cape Breton, and connects the Atlantic with the Gulf of St. Lawrence; is 17 m. long, and has an average width of $2\frac{1}{2}$ m.

Cantabile (kãn-tã'bë-lã), in music, a term applied to movements intended to be per-

formed in a graceful, elegant and melodious style.

Cantabri (kãn-tã'brë), rude race of ancient mountaineers who lived in Cantabria, the N. part of Spain, near the Bay of Biscay; chief towns were Juliobrigas, Concana, and Vellica. They made a brave resistance to the Romans in the Catabrian War (25-19 B.C.); said to have been of Iberian origin.

Canta'brian Mountains, a general name of several ranges in the N. part of Spain; connected with the Pyrenees, from which they extend W. to Cape Finisterre; highest summits, estimated at 10,000 ft.; several portions receive the local names of Salvada, Órdunte, Peña, Anafia, Mellara, etc.

Cantacuzenus (kãn-tã-kũ-zë'nũs), Anglicized as CANTACUZENE, JOHN, d. 1383; Byzantine emperor and historian; was Prime Minister under Andronicus III (d. 1341), and proclaimed himself emperor, 1342, fighting for his supremacy five years in a civil war with Anna, the wife of Andronicus III; retired to a monastery, 1355, before Turkish inroads, and died in Gallipoli; wrote a work on Byzantine history from 1320-57.

Can'taloupe. See MUSKMELON.

Cantata (kãn-tã'tã), vocal composition of choruses, arias, and recitatives with instrumental accompaniment. While many cantatas are comparatively short works, some of them, more especially the modern ones, are of the caliber of the opera on the one hand, or the oratorio upon the other. See OPERA; ORATORIO.

Canteen', military term used in several senses: (1) A small vessel for holding water which each soldier carries; (2) a small chest or coffer containing the table equipage and utensils of an officer in active service; (3) a place in garrisons and barracks for the sale of malt liquor and groceries, in order that the soldiers may obtain such articles without going outside of the barracks.

Can'terbury, city of Kent, England; on the river Stour; 56 m. ESE. of London; the metropolitan see of England, being the seat of the Archbishop of Canterbury, who is Primate of all England and has precedence immediately after the royal dukes in court ceremonies. Canterbury contains fourteen old churches, mostly built of flint; remains of St. Augustine's Benedictine abbey, ruins of a Norman castle, several hospitals, museum, and theater, and manufactures of linen damask. St. Augustine became first Archbishop of Canterbury, 597 A.D. Archbishop Cuthbert built here, abt. 740 A.D., a church which subsequently received numerous additions. The choir was destroyed by fire, 1174, and rebuilt by William of Sens. This restored choir is probably one of the oldest parts of the cathedral, which presents a magnificent union of almost every style of Christian architecture. The central tower is 234 ft. high, and the total exterior length of the cathedral is 545 ft. Immense numbers of pilgrims came here to wor-

ship at the shrine of Thomas à Becket, who was killed in the N. transept, 1170. Pop. (1901) 24,899.

Cantharis (kän'thā-ris), genus *Coleoptera* belonging to the *Cantharidæ*, or blister beetles. The species, of which more than 200 are known, have elongated bodies, a rather large head bearing long slender antennæ, and long wing covers, true wings being present. Most important of all the species is the Spanish fly, *Cantharis vesicatoria*. This is common throughout the warmer parts of Europe, where the adults feed upon the ash, elder, honeysuckle, maple, poplar, larch, and other trees. It is golden or bluish green, less than an inch in length, and appears in June, when it does considerable damage to the foliage. Spanish flies are used in various ways, the most common being in a plaster composed of the powdered beetles mixed with lard, etc., as alcoholic tincture, etc. They owe their use in therapeutics to a peculiar substance, cantharidin, which when placed on the skin produces blisters and when taken internally causes severe and even dangerous inflammation of the throat, stomach, kidneys, etc.

Canticle (kän'ti-kl), called in the English Bible, "Solomon's Song"; in the Hebrew, "Song of the Songs"; lyric poem with a dramatic arrangement in the form of a dialogue. The subject is chaste love. The rabbis first began to interpret it allegorically of God and his people, and this interpretation was so established before the time of the Massorettes that they did not hesitate to recognize the book as canonical. The same method of interpretation passed into the Christian Church, only that the allegory was there accepted as referring to Christ and the Church. The book probably belongs to the time of Solomon, though there was no satisfactory data for deciding as to its date and author.

Cantilever (kän'ti-lév-ér), part of a beam which projects out from a wall or beyond a support. A balcony in front of a window of a house is often supported by cantilever beams or brackets, and another example is that of the projecting beams which support a sidewalk placed outside of the trusses of a bridge. A beam supported at its middle point consists of two equal cantilever arms. When a beam is supported at one end and the other projects beyond the second support, the projecting part is a cantilever, and sometimes the whole beam is said to be a cantilever beam. See BRIDGE.

Can'to Fer'mo, in music, the subject song or theme. Every part that is the subject of counterpoint, whether plain or figured, is called *canto fermo* by the Italians. In church music this term means plain song or choral song in unison, and in notes all of equal length.

Can'ton, one of the greatest emporia of China; capital of the province of Kwangtung; on the Canton or Pearl River; 70 m. from its entrance into the China Sea. The city is inclosed by a brick wall about 7 m. in extent; is entered by twelve gates; and is defended by four strong forts, erected on the hills on

its N. side. Several islands in the river below Canton are also fortified. The city is divided into the old and new town, the former occupied by Tartars and the latter by the Chinese. The streets are crooked and narrow. The houses are built of brick, stone, or wood, and are seldom more than two stories high. Many thousands of people called Tankia, having no homes on the island, live on boats and rafts, and subsist by fishing and rearing poultry. Canton contains several many-storied pagodas, a Mohammedan mosque, and about 120 Buddhist temples or monasteries; the most remarkable is on the island of Honam, opposite the city, and covers about seven acres. Since the war between France and Great Britain on the one side, and China on the other (1857-61), the foreign merchants settled in Canton occupy the *Sha-mien* or "sand flats," an artificial island 2,850 ft. long and 950 ft. broad, surrounded with a substantial embankment of granite, and separated from the Chinese city by a canal 100 ft. wide. The chief exports are tea, silk goods, sugar, porcelain, and precious metals. Portuguese vessels visited Canton, 1517; English, 1596; but the port was not formally opened to foreign trade until the close of the seventeenth century, and the European powers have been compelled to use force in order to overcome the prejudices of the natives. Pop. (1904) estimated 900,000.

Canton, capital of Stark Co., Ohio. The city derives its prosperity chiefly from its manufactures, though the surrounding country is a rich agricultural one. A national monument to the memory of Pres. McKinley was erected here, 1907. Pop. (1900) 30,667.

Canton, small piece of territory; each of the states or independent provinces which united form the republic of Switzerland, each retaining its autonomy in internal administration.

Can'tonment, military term applied to temporary resting places of European armies. When troops are detached and quartered in several adjacent towns or villages they are said to be in cantonments.

Cantù (kän-to'), Cesare, 1807-95; Italian historian; b. near Milan; wrote "Universal History" (thirty-five volumes), 1834-42; "The History of the Italians," 1854; "The Last One Hundred Years," 1864; "The Italian Heretics," 1866-68.

Canu'sium. See CANOSA.

Canute (kä-nüt'), or Knut, abt. 995-1035; King of Denmark; conqueror of England; son of Sweyn, King of Denmark; succeeded to the English conquests of his father; fled before Ethelred to Denmark, 1014; returned next year, and overran the realm, except London; after the battle of Assandun, Edmund Ironsides divided the kingdom with him, retaining Wessex; on death of Edmund he became sole monarch, sending Edmund's infant sons out of the kingdom. Inherited the crown of Denmark, 1018, and of Norway, 1030, and became the most powerful European monarch of his day.

Can'vasback, species of N. American duck, highly prized for the table; frequents the bays



CANVASBACK DUCK.

of the sea and the estuaries of rivers; plumage is diversified with black, white, chestnut brown, and slate color; length about 20 in.

Caoutchouc (kô'chôk). See RUBBER.

Cape Ann, E. point of Essex Co., Mass.; 31 m. N.E. of Boston. Here is a rocky headland, on which, at Rockport, valuable quarries of syenite are worked.

Cape Blan'co, or **Or'ford**, on the Pacific; extreme W. point of Oregon.

Cape Boeo (bô-â'ô), extreme W. point of Sicily; was in ancient times a naval station, near which the Romans gained a naval victory in the first Punic War.

Cape Breton (brêt'ôn), island of N. America; a part of the Canadian province of Nova Scotia; in the Atlantic Ocean; separated from the N.E. extremity of Nova Scotia by a narrow strait called the Gut of Canso. Chief exports, fish, coal, iron, and lumber. It is noted for its fisheries of cod and mackerel.

Cape Catoche (kâ-tô'châ), N.E. extremity of Yucatan; on the Gulf of Mexico; was the part of the American continent on which the Spaniards first landed.

Cape Charles, Va., the S. point of the "Eastern Shore," a peninsula which separates Chesapeake Bay from the Atlantic Ocean. A lighthouse stands on Smith's Island near this cape, with a flashing light of the first order.

Cape Coast Castle, British town on the Gold Coast, W. coast of Africa; defended by several forts; chief exports are palm oil, gold dust, and tortoise shell. Pop. 28,948.

Cape Cod, long, narrow, sandy peninsula, which nearly coincides with Barnstable Co., Mass.; about 65 m. long, and from 1 to 20 m. wide. The form of it is similar to a man's arm bent at the elbow. The project of a ship canal across Cape Cod, under discussion for more than 200 years, was taken up by cap-

italists, 1906, who promised to have it completed within three years. As planned it will be 8 m. long, extend in a straight line from Buzzard's Bay on the S. to Sandwich, or Barnstable Bay, on the N., and cost about \$10,000,000. Work on the canal was begun in 1909.

Cape Col'ony, British colony, occupying the S. extremity of Africa; bounded N. by the Orange River, E. and S. by the Indian Ocean, and W. by the Atlantic; area, 276,995 sq. m.; pop. (1904) 2,405,552; comprises Cape Colony proper, Transkei, Griqualand East, Tembuland, Walfish Bay, Pondoland, and Bechuanaland; capital, Cape Town. The interior is a succession of plateaus and mountain ranges, which increase in elevation as they recede from the coast. The seacoast presents several comparatively safe and commodious harbors. Cape Colony has no rivers that are of much value for navigation. The vegetation is rich in flowers, among which are the ixia, gladiolus, tritonia, strelitzia, pelargonium or Cape geranium, and xeranthemum. Among the indigenous animals are the elephant, giraffe, rhinoceros, lion, buffalo, panther, wild boar, hyena, antelope, quagga, springbok, and ostrich. The chief exports are wool, wine, copper, hides, horses, flour, aloes, fish, fruits, and maize. The Dutch, the first Europeans who colonized this region, founded Cape Town, 1652. The colony was captured, 1806, by the British, to whom it was formally ceded, 1815.

Cape Di'amond, in Canada; at the confluence of the St. Charles River with the St. Lawrence; is 333 ft. above the river, to which it presents a precipitous bluff; on this point stands the citadel of Quebec.

Cape Duca'to, sometimes called **THE LOVER'S LEAF**, S. point of the Greek island of Leucadia or Santa Maura; is a perpendicular white cliff over 2,000 ft. high, whence Sappho cast herself for love of Phaon. From it the ancients once a year cast a criminal, first tying a great number of birds to him; if he was carried to the sea alive by the birds, he was taken up in a boat and set at liberty.

Cape Fear Riv'er, stream formed by the Haw and Deep rivers, which unite at Haywood, Chatham Co., N. C.; flows SE.; passes Fayetteville and Wilmington; enters the Atlantic near Cape Fear; length, excluding branches, about 200 m.

Cape Flat'tery, NW. point of the State of Washington; is the extreme W. point of the U. S., exclusive of Alaska.

Cape Français'. See CAPE HAITIEN.

Cape Haitien (hâ'tê-ên), original Indian name GUARICO, seaport of Haiti; on the N. coast of the island of San Domingo; pop. abt. 30,000; in the middle of the eighteenth century, while under French rule, it was a flourishing city, with a university, an academy of music, etc. In 1791 it was burned by Toussaint l'Ouverture; in 1842 it was destroyed by an earthquake.

Cape Hat'teras, E. extremity of N. Carolina; a point of a low sandy island separated from the mainland by Pamlico Sound; navigation dangerous in this vicinity, on account of shoals which extend far out into the sea.

Cape Henlo'pen, Del.; at the entrance of Delaware Bay; 13 m. SSW. of Cape May. It has a stone lighthouse, showing a fixed white dioptric light of the first order, 128 ft. above the sea.

Cape Horn, extreme S. point of America; an island of the archipelago of Terra del Fuego; received its name from the Dutch navigator Horn, or Hoorn, who discovered it nearly a century after Magellan had discovered the strait which bears his name; is a dismal place, with a perpetual antarctic climate. Nevertheless, vessels which pass from the Atlantic to the Pacific, or the reverse, usually double this cape, rather than pass through the Strait of Magellan.

Cape la Hague (-lä häg), headland of France, in Normandy; on the English Channel; 16 m. NNW. of Cherbourg. On the E. side of Cotentin is Cape la Hogue, near which the English and Dutch fleets defeated the French, 1692.

Capella, i.e., the Kid, bright star of the first magnitude in the constellation of Auriga; is a double star.

Cape May, extremity of New Jersey, at the entrance of Delaware Bay; also a city and watering place; 2 m. E. of the lighthouse; on the seacoast; 82 m. S. of Philadelphia; has two large and many small hosteleries and boarding houses capable of accommodating 25,000 guests; public graded schools, many churches; frequented for bathing, fishing, and gunning. Pop. (1900) 2,257.

Cape of Good Hope, promontory near the S. extremity of Africa; 30 m. S. of Cape Town; discovered by Bartholomew Diaz, 1486; first doubled by Vasco da Gama, 1497.

Cape Pal'mas, S. extremity of Liberia; a high point with a lighthouse; also the popular name of that part of the country; is included in the Liberian State of Maryland.

Cape Prince of Wales, extreme W. point of the American continent; on the E. side of Bering Strait; is a lofty headland, with dangerous shoals in the vicinity.

Caper, the pickled flower buds of the *Caparis spinosa* of S. Europe and Barbary. Several other species yield buds which are similarly used. Florida has two native species of the caper tree, which are erect and not trailing. The plant called caper in England is the caper spurge, a *Euphorbia*. Capers have an agreeable pungency of taste, and are used as a condiment and ingredient of sauces. They have medicinal properties, being stimulant and laxative. The buds are gathered every morning, and immediately put into vinegar.

Cape Race, lofty and precipitous headland forming the SE. extremity of Newfoundland; a point dangerous to ships sailing in foggy weather between the U. S. and Europe.

Capercaillie (kä-për-käl'zi), or Capercaill'ie, Wood Grouse, or Cock of the Woods, a large gallinaceous bird (*Tetrao urogallus*); native of Europe; a species of grouse. The male weighs 15 lbs. or more. The plumage of the male is variegated with black, brown, and white, and the chest is dark green. Above the eye is a scarlet patch of naked skin. The legs and feet are feathered to the toes. This bird is found in the pine-covered mountains of several countries of Europe and N. Asia, and feeds on berries, seeds, insects, and young shoots of the fir and pine. It builds on the ground. The flesh is highly esteemed for food.

Capernaum (kä-për'nä-üm), ancient city of Palestine; on the NW. coast of the Sea of Galilee. Some identify it with the modern Tel-Hum.

Cape Ru'bies, fine pyrope garnets found with the diamond in S. Africa.

Cape Sa'ble, the SW. point of Nova Scotia. It has a lighthouse and is on Cape Sable Island, in Barrington township, Shelburne Co. The island had, in 1891, 2,117 inhabitants, mostly fishermen, descended from loyalists who left the U. S. during the Revolution. A ferry connects it with the mainland. The name Cape Sable Island is also given to Sable Island.

Cape Sable, the most S. point of the peninsula of Florida. It is sandy and low, and is the site of Fort Poinsett.

Cape St. Vin'cent, SW. extremity of Portugal. Near this cape the British Admiral Jervis defeated the Spanish fleet, February 14, 1797.

Capet (kä-pä'), Hugh, abt. 940-996 A.D.; King of France; founder of the Capetian dynasty; son of Hugh the Great, Count of Paris. The throne being vacant by the death of Louis V, the last Carolingian king, 987, Hugh assumed the royal power with the consent of many of the barons. He ruled with moderation; selected Paris as the capital of France; and is said to have been the ancestor of thirty-two kings of France.

Cape Town, capital of Cape Colony, S. Africa; on Table Bay. It is intersected by several canals, built on a regular plan, and contains an exchange, college, observatory, public library, and botanic garden; founded by the Dutch, 1652; ceded to Great Britain, 1815. Pop. (1904) 77,668; with suburbs, 169,641.

Cape Trafalgar (träf-äl-gär'), headland of Spain; on the Atlantic Ocean, between Cadiz and Gibraltar. Near this cape, October 21, 1805, the English fleet gained a victory over the French, and Lord Nelson, who commanded the former, was killed.

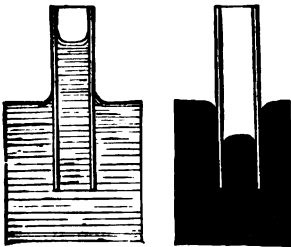
Cape Verde (vérd) Is'lands, group of islands belonging to Portugal; in the Atlantic. 320 m. W. of Cape Verde; area, 1,480 sq. m.; pop. (1901) 147,424. The group consists of fourteen islands, nine of which are inhabited—namely, Sal, Boavista, Mayo, Fogo, Brava, São Nicolão, São Thiago, São Antão, and São Vicente. They are all mountainous and of volcanic formation.

Cape Wrath, the NW. extremity of Scotland; projects from Sutherland into the Atlantic Ocean. It is a pyramid of gneiss about 600 ft. high, and is remarkable for the wildness and grandeur of its scenery. Here is a lighthouse 400 ft. above the sea.

Capias (kă'pî-ās), name of several species of common-law writs, the command of which to the officer is that he take into custody, for a purpose specified, the persons against whom they are directed.

Capillaries, minute blood vessels intermediate between arteries and veins; function, to subdivide and distribute the blood among all the organs and tissues of the body.

Capillary Action, the force of adhesion shown by the movement of a liquid on a solid surface placed partly within the fluid; called capillary because it is most striking on the



CAPILLARITY.

inside of very small (capillary or hairlike) tubes. If such tubes are partly immersed in water or any other liquid which wets them, it will be noticed that on withdrawing them in part the level of the liquid in the tube is above that outside and is higher as the diameter of the tubes is smaller. In the case of mercury or other liquid which does not wet the glass, there is a depression of level in the tubes in place of elevation.

Capital Punishment, the punishment of death. As the penalty for murder it has prevailed from the earliest times in all parts of the world. In most nations treason or rebellion against lawful government has also been thus punished; and in England and elsewhere, down to a very recent period, the same has been true of counterfeiting, forgery, mail robbery, and several other crimes. The manner of execution varies greatly. Military criminals, in modern times, are usually shot. In civil administration the modes most prevalent have been decapitation upon the "block," used for political criminals of rank in Great Britain; the guillotine in France; in Spanish countries the garrote; and hanging. On June 4, 1888, hanging was abolished in the State of New York for all murders committed after January 1, 1889, and death by electric shock substituted therefor. In China there are three degrees of capital punishment: *ling-chi*, or slow death by being cut to pieces, decapitation, and strangling. The last mentioned is preferred for many reasons. In Japan, for some offenses, the criminal was formerly condemned to take his own life by disemboweling in the presence of officials. See HARI-KIRI.

In Christendom the tendency in modern times has been to limit capital punishment to the greatest crimes only, and many intelligent

persons believe that it should be abolished altogether. The grounds upon which the question is argued are chiefly—1, common right; 2, Scripture; 3, expediency. Arguments in favor of capital punishment on grounds of common right are based on the theory of society, that the safety of the community requires it. On Scriptural grounds arguments hold that its enforcement is under Divine authority, in accordance with the words "Whoso sheddeth man's blood, by man shall his blood be shed" (Gen. ix, 6), and not prohibited in any place in the New Testament; also that this injunction was given to Noah when he represented the whole human race and therefore has no discriminative qualification. On the other side, it has been argued that the Noachic law may reasonably be supposed to be subject to modification by the progress of the race. As to expediency, the effect of capital punishment upon the commission of crime has not been decided enough to prove such a step either advisable or unadvisable. See ELECTROCUTION.

Capitol, temple of Jupiter Capitolinus, which, with the citadel or fortress and other buildings, occupied the Capitoline Hill in ancient Rome. These edifices were founded by the Tarquins abt. 600 B.C., and dedicated 507 B.C. The temple was burned in the time of Sulla, 83 B.C., was soon rebuilt, and was burned again, 69 A.D. The steepness of the sides of the Capitoline Hill rendered it a natural fortress. On one side of it was the Tarpeian Rock, from which traitors and state criminals were thrown. The site of the Capitol is now occupied by the Church of St. Maria in Araceli, and the Palazzo del Campidoglio, built by Michaelangelo.

Capitol of U. S., at Washington, D. C., on a hill 90 ft. above the level of the Potomac River; the present structure, dating from 1818, occupies site of original building, erected 1793, and destroyed by the British, 1814. The main building with low dome was completed, 1827; wings and new dome added, 1851-65. Numerous architects have been employed on the building, chief of whom, I. N. Walter, designed the extensions and new dome. The main edifice is of sandstone painted white with two wings of marble; covers 3½ acres, and cost \$16,000,000. In 1903 Congress authorized further extensions, costing \$2,500,000, to be carried out on plans drawn by I. N. Walter, under supervision of Federal architect Woods.

Capitularies (kă-pit'ü-lä-rēs), laws enacted by the Frankish kings from the time of Childebert. The most celebrated capitularies were those of Charlemagne and St. Louis.

Capitulation, surrendering to an enemy upon stipulated terms; a treaty of surrender to an enemy, which is concluded when the garrison or besieged force does not surrender at discretion or unconditionally; also applied to agreements whereby citizens of one state residing in another are released from the jurisdiction of the country of their residence and placed under that of consular courts of their own nation, as is the case in Egypt.

Capodistrias (kā-pō-dīs'trē-ās), **John Anthony** (Count), 1776-1831; Greek statesman; b. Corfu; held high office in the republic of the Seven United Islands till its incorporation with France (1807); then entered Russian diplomatic service; became Secretary of Foreign Affairs; was elected President of the Greek Republic, 1827; assassinated in Nauplia.

Cappadocia (kā-pā-dō'shē-ā), ancient province of Asia Minor; bounded N. by Pontus and Galatia, E. by Armenia, S. by Mt. Taurus (which separated it from Syria and Cilicia), and W. by Lycaonia; was traversed by the Halys River; chief towns were Comana, Ariarathia, and Tyana. It was conquered by Cyrus, and was ruled by independent kings from the time of Alexander until 17 A.D., when Tiberius made it a Roman province. The greater part of it is included in the modern Karamania.

Capri (kā'prē), island of Italy; in the Mediterranean; at the entrance of the Bay of Naples; 20 m. S. of Naples; 4½ m. long and 3 m. wide. On this island is a cavern, the Grotto of the Nymphs, or the Blue Grotto. Tiberius passed the last ten years of his life here, and built twelve villas or palaces, of which the ruins are visible.

Capricorn (kāp'ri-kōrn), tenth sign of the Zodiac, which the sun enters at the winter solstice, abt. December 21st. Also a constellation which may be seen in the S. during autumn.



CAPRICORN.

Capricorn, Trop'ic of, one of the lesser circles of the earth; a parallel nearly 23° 27' S. of the equator. At the winter solstice (December 21st) the sun is vertical over this line.

There is a corresponding circle on the astronomical sphere. This circle touches the ecliptic in the first point of the sign Capricorn, which therefore gives name to this tropic.

Caprivi de Caprera de Monte-Cucculi (kā-prē've dā kā-prā'rā dā mōn-tā-kō'kō-lē), **Georg Leo von**, 1831-99; German soldier and statesman; b. Charlottenburg; son of Julius Edward von Caprivi, who held high legal office in Prussia; entered the army, 1848, served in the campaigns of 1864 and 1866; chief of staff of the Tenth Corps in Franco-Prussian War; succeeded Bismarck as Chancellor of the German Empire and President of the Prussian Council, 1890; retired, 1894.

Cap'sicum, a genus of plants of the family *Solanaceæ*; natives of warm parts of America, Africa, and Asia; mostly annual or biennial plants, with woody stems, and wheel-shaped corolla, with five convergent protruding anthers. The fruits of *Capsicum annuum*, *frutescens*, *fastigiatum*, *baocatum*, *grossum*, and *cerasiforme*, form, when pulverized, Cayenne pepper. It is often employed in medicines as a derivative and stimulant. It is the true Cayenne pepper.

Cap'stan, strong, massive column of timber or iron, shaped like a truncated cone, its upper

part pierced to receive bars or levers for the purpose of winding a rope round it, to raise heavy weights or otherwise exert great power; is chiefly used in vessels for drawing in cables in order to raise anchors, etc.

Cap'tain, a military term which in a general sense signifies a commander, a man skilled in war or the military art. In a technical sense, captain is the title of an officer who commands a troop of cavalry, a company of infantry, or a battery of artillery. He is next in rank below a major. In the U. S. army a captain is responsible for the camp and garrison equipage, the arms, ammunition, and clothing of his company. A captain of the U. S. marines is of a rank corresponding to that of a captain in the army and that of a lieutenant in the navy.

Captain (of the navy) is an officer of higher rank and more responsible position than a captain of the land forces. He has the command of a ship, and is responsible for everything on board—all that relates to the *personnel* or the *matériel* of the vessel. The commanders of all British vessels are captains. A captain in the U. S. navy takes rank with a colonel in the army, and next below a commodore. He rises by regular succession to the rank of rear admiral. The term captain is also applied to the master of a merchant vessel.

Capua (kāp'ū-ā), city of Italy; province of Caserta; on the river Volturno, 27 m. N. of Naples; is a military station; founded on the site of *Casilinum*, 2 or 3 m. E. of the ancient Capua, 856 A.D., which is supposed to have been founded by the Etruscans, who called it *Vulturnum*; probably as ancient as Rome itself, and was the greatest and most opulent city of Italy abt. 350 B.C.; conquered by the Romans 340 B.C., but continued to prosper, and at the second Punic War was scarcely inferior to Rome and Carthage. Capua was noted for its luxury and refinement. The site is now partly occupied by Santa Maria di Capua. Here are visible the remains of a grand amphitheater. Pop. (1901) 12,389.

Capuchins (kāp'ū-shēns'), branch of the order of Franciscan monks, originated with Matteo di Basso, an Observantine Franciscan in the convent of Montefalco, Urbino, Italy, 1525; are the third branch of the Franciscans, the other two being the Observantines and the Conventuals. They are very strict in discipline; are committed to absolute poverty; and have rendered distinguished mission service. They spread with rapidity, and reached (over 31,000) their greatest extent, 1775. They have convents in the U. S. at Green Bay, Leavenworth, Milwaukee, and New York.

Capyba'ra, or **Capiba'ra**, known also as the **WATER CAVY**, the largest known quadruped (*Hydrochærus capybara*) of the order *Rodentia*, and family *Cavidae*. It is an aquatic animal, a native of S. America, and feeds on vegetable food exclusively. Its dentition resembles that of the cavy, except that the grinding teeth are formed of many transverse plates,

the number of plates increasing as the animal advances in age. It is inoffensive and easily



CAPYBARA.

tamed. The flesh is esteemed good food. It is somewhat smaller than the common hog.

Carabobo (kă-ră-bô'bô), locality 30 m. SW. of Valencia, Venezuela, on the Paito River; memorable for victories won by Bolivar, May 28, 1814, and June 25, 1821, which ended Spanish domination in Venezuela, and insured the independence of Colombia and Ecuador. Pop. (1905) 222,196.

Caracalla (kăr-ă-kăl'lă), **Marcus Aurelius Antoninus Bassianus**, 188-217 A.D.; Roman emperor; son of Septimius Severus; b. Lyons; ascended the throne, 211 A.D., and caused his brother, Geta, to be murdered; also massacred several thousand friends of Geta, including Papinian, the great jurist; reign disgraced by cruelty and infamy; assassinated near Edessa. The baths of Caracalla are among the most striking ruins of Rome.

Caracas (kă-ră'käs), capital of Venezuela; 12 m. S. of La Guayra, its seaport. Among the principal edifices are the cathedral, Church of Alta Gracia, university, museum, academy of fine arts, library, and government buildings. Caracas is the seat of a Roman Catholic archbishop; contains a college and several hospitals; has exports of cacao, cotton, indigo, coffee, hides, etc. Pop. abt. 73,000.

Caracci (kă-răt'chë), or **Carracci**, **Agostino**, 1558-1602; Italian painter; brother of Annibal Caracci; b. Bologna; assisted Annibal in his Farnese work; an engraver of high merit; painted the "Communion of St. Jerome," now in Bologna.

Caracci, Annibal, 1560-1609; Italian painter; b. Bologna; pupil of his cousin, Ludovico Caracci, with whom he was associated as a founder of the Bolognese school of painting. The pictures he painted in the Farnese Gallery, Rome, are considered his best works.

Caracci, Ludovico, 1555-1619; Italian painter; b. Bologna; chief works, "Transfiguration," "The Preaching of John the Baptist," and some "Madonnas," all in Bologna; was the founder of the Eclectic school, famous for its adherence to nature and freedom from traditional methods.

Caractacus (kă-răk'tă-küs), or **Caradoc**, d. 54 A.D.; King of the Silures; a tribe of ancient Britons who lived in Wales; resisted the Ro-

man armies for nine years, but at length defeated by Ostorius on the border of S. Wales; fled to Cartismandua, Queen of the Brigantes, who betrayed him; carried a captive to Rome, 51 A.D.

Carafa da Colobrano (kă-ră'fă dă kôl-üm-brä'nô), **Michele**, 1785-1872; Italian composer; b. Naples; chief works the operas "Il Sonnambulo" and "Massaniello."

Caralis (kăr-ă-lis), or **Cal'aris**, capital or chief town of ancient Sardinia; said to have been founded by the Carthaginians before the second Punic War; had a good port, and was for many centuries an important place; site now occupied by Cagliari. Pop. (1901) 48,673.

Car'rat, a unit of weight used by jewelers in weighing gold and precious stones. For diamonds a carat is $3\frac{1}{8}$ troy grains, a carat grain being one fourth of this. In assaying gold the term is equivalent to " $\frac{1}{24}$ part," and designates the proportion of pure gold in an alloy. That which contains $\frac{1}{24}$ of gold is said to be "22 carats fine." Eighteen-carat gold contains 18 parts of pure gold and 6 parts of alloy, while 14-carat gold contains $\frac{1}{4}$ of pure gold and $\frac{3}{4}$ of alloy. There is here no absolute designation of weight.

Carausius (kă-ră'si-üs), d. 294 A.D.; emperor of Britain, 286-94 A.D.; native of what is now the Netherlands; invited by the Britons to become their ruler, he successfully resisted the Romans; maintained himself for seven years as sovereign of Britain and of a maritime confederacy at the mouth of the Rhine, waging wars against the Romans on one side and the Scots and Picts on the other; executed important public works, traces of which still exist; was assassinated at York.

Caravan (kăr-ă-vän), and **Caravansary** (kăr-ă-vän'să-rî), organized company of travelers or pilgrims in Asia and Africa, and an edifice for their lodging. The commercial intercourse of those regions has been for ages carried on chiefly by caravans of camels. In Mohammedan countries large caravans of pilgrims are annually assembled to perform the journey to Mecca, the most important being those which start from Damascus, Cairo, and Babylon.

Car'avel, galley-rigged bark of the fifteenth and sixteenth centuries, employed by the Span-



CARAVEL.

iards and Portuguese for commerce and exploration, its lightness enabling it to run close

to shore and to enter shallow harbors. The Portuguese used it in war for its swiftness and easy management. The vessels employed by Columbus in his voyages were caravels, although one of the three, with which he made his first trip across the Atlantic, the *Santa Maria*, was a "carrack," and larger than the average caravel. Reproductions of the vessels used by Columbus, 1492, were made in Spain, 1892, and were a feature of the Columbian Exposition, 1893.

Caraway, a plant (*Carum carui*) of the order *Umbelliferae*; grows wild in S. Europe and in some parts of Asia. It is cultivated in Europe and America for its aromatic seeds (carpels), which are used in medicine as a carminative and tonic. They are also used as a condiment by confectioners, pastry cooks, and perfumers. Their aromatic principles depend on a volatile oil called oil of caraway, which is obtained by distilling the crushed seeds with water.

Carbine. See SMALL ARMS.

Carbolic Acid, called also phenic acid, carbol, and phenol; derivat of coal tar, obtained by distillation; employed as a disinfectant and germicide, for which purposes it is one of the most efficient agents used. It does not act at all through the atmosphere, and must be brought in direct contact with the body to be disinfected. The solution of it should be not less than one per cent, and the contact must be maintained for many hours; ordinarily the solution of five per cent should be employed.

Carbolic acid acts upon the human system as a powerful and quick poison. In sufficient concentration it may paralyze the respiratory centers and the heart at once. Death has been produced by it in less than three minutes. The symptoms are violent burning pain in the œsophagus and stomach, with vomiting, stupor, distress of breathing, widespread paralysis, and finally complete unconsciousness and collapse. Diluted sulphuric acid and soluble innocuous sulphates, such as the sulphate of sodium, are efficient antidotes, neutralizing the acid in the gastrointestinal tract before absorption, and converting the poison into a harmless sulpho-carbolic acid.

Carbon, an element; is the principal constituent of all plants and animals, in which it occurs in a great variety of combinations. Among the most abundant substances of which it forms a part are cellulose, starch, sugar, the fats, albumin, fibrin, etc.; it is also found in the earth as carbonates, of which limestone, chalk, and marble are common varieties. In the atmosphere it is present principally as carbon dioxide or carbonic acid; and this gas is also found dissolved in all natural waters. Coal consists chiefly of carbon, the proportion of this element being largest in the hard coals. Further, carbon is the principal constituent of petroleum.

Carbon occurs in nature crystallized in two forms, diamond and graphite or plumbago. There are therefore three forms of the element, (1) diamond, (2) graphite, and (3) amorphous carbon, or charcoal. Of these, diamond

is the purest. All three forms differ markedly from one another, have certain properties in common; are all insoluble in all the ordinary solvents, all infusible, and all are converted into carbon dioxide, CO_2 , when heated to a high temperature. Lampblack, coke, and charcoal are impure forms of carbon. Lampblack is deposited from flames of burning oil; coke is formed when coal is heated so that it is protected from the air, as in the manufacture of gas; and charcoal is made by heating wood in kilns by which the action of the air is prevented, except so far as may be necessary to keep up slow burning.

Carbonari (kär-bō-nä'rē), secret political society; founded during the French rule in Naples in the beginning of the nineteenth century by republicans and others dissatisfied with the French rule; were originally refugees in the mountains of the Abruzzi provinces and took their name from the mountain charcoal burners. Capobianco was their leader. After aiding the Austrians in the expulsion of the French, the organization spread all over Italy, but was never able to effect a general union. In 1820 they organized branches in France, and after the revolution of 1830 the society disappeared, although as late as 1841 a society was found in S. France.

Carbonic Acid, common name for carbon dioxide (CO_2); formed by many natural processes, as combustion, respiration, and fermentation. All fuels contain carbon, and when they are burned the carbon combines with the oxygen of the air to form carbon dioxide. It is frequently stated that the bad effects caused by breathing the air of badly ventilated rooms are due to the presence of carbon dioxide. It has, however, been shown that air containing pure carbon dioxide to the extent of five per cent can be breathed with impunity. The gases given off from the lungs contain volatile organic substances which are undergoing decomposition, and these are poisonous. If taken back into the lungs, bad effects follow. All life on the earth is dependent upon the presence of carbon dioxide in the air; for all animals, either directly or indirectly, depend upon plants for food, and all plants in turn depend upon carbon dioxide.

Carbonic Oxide, or **Carbon Monoxide** (CO), compound formed when carbon dioxide comes in contact with highly heated coal, as in the interior of every coal fire; burns with a blue flame seen at the surface of a hard coal fire, as the carbon monoxide formed in the interior burns to carbon dioxide when it reaches the surface of the coal and finds air with which it can combine. This gas does not perform any active part in natural phenomena, but in the reduction of ores, as in the blast furnace, it is of the greatest importance.

Carboniferous Period, division of geologic time between the Devonian and the Jura-Trias. The name originated in Great Britain, where the coal-bearing strata belong to this period. In W. N. America and elsewhere rocks of carboniferous age contain little or no coal, and such as do afford coal belong to later periods.

Carborun'dum. See SILICIDE OF CARBON.

Carbuncle (kär'bünk-l), violent and painful inflammation, larger than a boil, on any part of the skin, most frequently on the back. The part swells and hardens, and, as the disease advances, assumes a livid redness. The cuticle often rises in blisters, and a number of small openings may occur, through which matter escapes. The origin of carbuncle seems to be constitutional, and it is usually attended by great suffering and considerable prostration. See BOIL.

Also a name applied to certain kinds of fine red garnet, usually the *pyrope* and *almandine* varieties, when cut *en cabochon*, i.e., with a rounded convex surface. The carbuncle of the ancients seems to have been any transparent deep-red gem, whether garnet, ruby, or red spinel. Nearly all come from Siam and Pegu, India.

Carcassonne (kär-kä-sün'), city of France, capital of the department of Aude; on the river Aude and the Canal du Midi; 56 m. ESE. of Toulouse. The river is crossed by a bridge of ten arches, and separates the old from the new town. The former is inclosed by walls of great solidity, has an ancient castle, and retains the aspect of a fortress of the Middle Ages. Here are manufactures of fine woolen cloth. Pop. (1900) 30,720.

Car'cel, or Carcel Lamp, lamp burning vegetable oil (colza), the flame from which furnishes the standard of illumination in France. Uniformity of combustion is secured through a small pump driven by clockwork, which feeds the wick with oil. The standard for photometry consumes 42 gms. of oil in an hour, and should furnish a flame 40 mm. in height.

Car'damom, capsule and seed of several plants of the genera *Amomum* and *Elettaria* of the family *Scitamineæ*; capsules, three celled, and contain numerous seeds, aromatic and pungent, with an agreeable taste; used as a condiment in Asia and Germany, and in medicine.

Car'dan, Jerome, 1501-76; Italian scholar; b. Pavia; Prof. of Mathematics at Milan; afterwards resided successively at Pavia, Bologna, and Rome; was an astrologer, and professed to be an adept in magical arts. He published, 1545, in his "Ars Magna" a formula for the solution of cubic equations, called "Cardan's Formula." He wrote on physics, astrology, medicine, astronomy, etc.

Cardenas (kär'dä-näs), city in province of Matanzas, Cuba; 30 m. E. of Matanzas; at the head of a spacious bay, sheltered by the promontory of Cape Hicacos. The chief center of the sugar industry lies in the plains to the SE.; Cardenas is engaged in the export of sugar and molasses. Pop. (1902) 26,448.

Car'diff, seaport of S. Wales; capital of Glamorgan; on the river Taff; 171 m. W. of London; contains a town hall, a fine old castle, a theater, and about thirty churches and chapels. It has a good harbor, improved by the construction of magnificent basins and docks. Coal

and iron are the chief exports, and its coal exports exceed those of any port in the world. Cardiff Castle, built in the eleventh century, is partly in ruins. Robert, Duke of Normandy, was confined in it about twenty-seven years by Henry I. Cromwell obtained possession of it, 1648, by stratagem, after a bombardment of three days. Pop. (1901) 164,333.

Cardigan (kär'di-gän), James Thomas Brudenell (Earl of), 1797-1868; English general; obliged to leave the service when a lieutenant colonel for bullying a brother officer, but was restored to his rank; he was a daring dragoon officer, and rose in India to be a major general. At the battle of Balaklava led the famous charge of the Six Hundred.

Card'inal, title of an ecclesiastic in the Roman Catholic Church; cardinals are the highest dignitaries of the Church, except the pope, of whom they are the electors and the counselors. Their distinctive dress is the scarlet biretta, cape, and cassock. The scarlet hat is only symbolical, imposed once by the pope, and after death hung up in the titular church or cathedral of the cardinal.

Cardinal Flower, perennial herbaceous plant of the *Campanulaceæ*; common in the U. S. in wet places, in the Atlantic region. There is a similar species or a new variety of it in Mexico. The color is intense red.

Cardinal Gros'beak, or Red'bird, one of the finest American song birds of the *Fringillidæ*; native of the U. S.; remarkable for the beauty of its form and plumage. The back of the



CARDINAL GROSBEEK.

male is a dusky red, and the rest of the plumage is a bright, vivid scarlet. It has on the crown long feathers erected into a conical or pointed crest, which it is said to raise and lower at pleasure. It visits the N. states as a summer bird of passage, and spends the winter in the S. states, where some remain all the year.

Cardi'tis. See HEART DISEASE.

Carducci (kär-döc'chi), Giosué, 1836-1907; Italian poet and critic; b. Valdicastello, Tuscany; Prof. of Italian Literature, Univ. of

Bologna, 1861; wrote essays and verse. Among the most important of his works are: "Inno a Satana," "Odi Barbare," "Croce di Savoia," "L'Annessione," and "Studié Leterarié." In 1906 he was awarded the Nobel Prize for literature. His poetry is intensely national and his personal influence for the development of Italian literature was widespread.

Caribbe'an Sea, inlet of the Atlantic Ocean; between N. and S. America, separated from the Pacific by the Isthmus of Darien (or Panama) and Central America. It separates the W. India islands from S. America, and communicates with the Gulf of Mexico by the Channel of Yucatan a passage about 120 m. wide, which divides Cuba from Yucatan. The water accumulated in the Caribbean Sea by an oceanic current flows into the Gulf of Mexico, from which it can only escape by the narrow passage between Florida and the Bahamas, thus forming the Gulf Stream. The depth of this sea is generally more than 500 fathoms.

Caribee Islands. See W. INDIES.

Caribou, American reindeer; inhabits Maine, New Brunswick, and other cold regions of N. America; is remarkable for the great development of the brow antlers or branches, which



CARIBOU.

extend in both sexes forward over the forehead; average weight, 250 or 300 lbs. Its flesh is esteemed as food, and its skin is of value.

Caribs, race of Indians who, in the fifteenth century, occupied portions of the N. coast of S. America from the Amazon to the Orinoco, and beyond and far up the latter river; they had driven the Arawaks from the Caribbean islands, and occupied most of them. The Caribs may be described as Indian freebooters, constantly at war with other tribes, by whom they were much feared, and their incursions in canoes often extended for hundreds of miles. In battle they were fierce and cruel, but treated their prisoners well, and often married the women; hence there was a constant change going on in the race. They were conquered by the English, and the survivors, to the number

about 5,000, were transported to the island of Rutan in the Gulf of Honduras (1796); thence they passed to the mainland, where their descendants now live and are esteemed as excellent workmen.

Car'icature, a grotesque representation in art. Caricature is of two kinds; the first confines itself to giving merely an exaggerated prominence to deformities and physical infirmities; the second, which alone is worthy of serious consideration, while giving prominence to the grotesque aspects, is concerned more especially with man's vices, weaknesses, or passions. The first is a mere grotesque amusement; the second may become cruel personal injury, revengeful satire, or the most redoubtable means of public censure. Caricature, in the latter aspect, has unquestionably played no small part in political and social movements.

Caricature was employed in remote antiquity to score and to ridicule vices. The Assyrians, the Egyptians, and the Greeks cultivated this branch of art successfully. The miniatures in manuscripts of the Middle Ages, even the most religious, are often caricatures of great skill and fineness of execution. Most of the sculptures that ornament the cathedrals with their burlesque and grotesque attitudes were true caricatures in stone. After the Renaissance caricature reappeared in more vigorous form than ever in Italy. Leonardo da Vinci was distinguished for his satirical compositions, as was also Carrache the Florentine and Baccio del Binco. In Germany Holbein became most distinguished. Among his principal works of this character are the "Dance of Death," and illustrations for the "Praise of Folly" of his friend Erasmus. In France in the seventeenth century Callot was the leader in this art. The Revolution of 1789 stirred up caricature anew. The king and queen were especially attacked, and later all the different parties were assailed in their turn. The most notable caricaturist of England was Hogarth. He is one of the most humorous and vigorous of all artists of this class. Gilray, Bunbury, and Cruikshank are also distinguished in this line in England. In no country of Europe has political caricature had such free play as in England. The most eminent Spanish caricaturist is Goya. In recent years Du Maurier in England has won great fame in the field of social caricature. In the U. S. caricature has had wide development and free scope.

Caries (kă'ri-ěz), Latin, "rottenness," a disease of the bones analogous to ulceration of the soft parts, as necrosis of bone is analogous to gangrene. In caries as in ulceration the parts destroyed are cast off in small portions, molecularly; in necrosis large portions are removed at a time. Caries of the teeth is very common. It may be due to general conditions, such as indigestion or other diseases, or to improper care of the teeth. It is now known that a microorganism has a part in its causation. See NECROSIS.

Cari'nus, Marcus Aurelius, d. 285 A.D.; Roman emperor; son of Emperor Carus. On the death of Carus, 284 A.D., Carinus and Diocletian were competitors for the throne. The

former gained an advantage in Mœsia over Diocletian, 285, but was killed by his own soldiers, whom he had offended by his cruelty.

Carleton (kär'l'tön), **Sir Guy** (Lord Dorchester), 1724-1808; British general; b. Strabane, Ireland; became Governor of Quebec, 1772, which he defended against the American Revolutionary army, December, 1775; invaded New York, 1776, and fought against Arnold on Lake Champlain; in 1777 he was relieved of the command, but succeeded Sir Henry Clinton as commander in chief in N. America, 1781.

Carleton, William, 1794-1869; Irish novelist; b. Tyrone Co.; first work, "Traits and Stories of the Irish Peasantry," 1830, received with favor; in 1839 published "Fardorougha the Miser," which was very successful; described Irish life and manners with vigor and accuracy in other works, as "Rody the Rover," 1846, and "Willie Reilly" (three volumes), 1855.

Car'ling Sun'day, English term for the fifth Sunday in Lent, or Passion Sunday; so called because "carles" (a sort of pea) were made into cakes and eaten on that day.

Carlisle (kär-ll'), ancient episcopal city of England; capital of Cumberland; at the confluence of the Eden and Caldew rivers; 301 m. NNW. of London; has a cathedral founded by William Rufus, dedicated, 1101, damaged by fire, 1292, and restored abt. 1854. The choir, 138 ft. long and 72 ft. high, is one of the finest in England. Here is a castle founded, 1092. Carlisle manufactures gingham and cotton checks. It was the residence of the kings of Cumbria, and was destroyed by the Danes, 900. During the wars between the English and Scotch it was an important fortified border town, and was often besieged. Pop. (1901) 45,480.

Car'lists, Spanish political party, followers of Carlos of Bourbon and his descendants.

Carlos (kär'lós), **Don**, 1545-68; (Infante of Spain); son and heir apparent of Philip II; of violent temper and sickly constitution; appears to have been deficient in intellect. He attacked or menaced the Duke of Alva with a poniard in 1567. The king ordered him to be tried by the Inquisition, which pronounced him guilty. He is the subject of Schiller's "Don Carlos."

Carlos of Bour'bon, Don (Count de Molina), 1788-1855; second son of Charles IV of Spain; heir presumptive until the birth of Isabella, 1830. On the death of his brother, Ferdinand VII, 1833, he claimed the throne, under the Salic Law introduced into Spain, 1713, and abrogated by Ferdinand on his marriage to Christina; was supported by a party called Carlists, between whom and the partisans of Isabella a civil war ensued. The priests and absolutists mostly preferred Don Carlos, but his claim was rejected by the Cortes, 1836. The Carlist army, which drew its numerical and strategic strength from the Basque provinces, was defeated, 1839, and Don Carlos fled to France.

He abdicated in favor of his son, Don Carlos, Count de Montemolin, 1845.

Carlos, Don (Count de Montemolin), 1818-61; son of Carlos of Bourbon; was recognized, after the death of his father, as Charles VI by the Carlists, who revolted, 1860, without success.

Carlos, Don, 1848-1909; (Duke of Madrid); nephew of the preceding; son of Don Juan of Bourbon and grandson of Don Carlos, Count of Molina. His father abdicated in his favor, October 3, 1868, and he was recognized by the Carlists as Charles VII. He made, 1870 and 1872, unsuccessful efforts to overthrow the government of King Amadeus, and, 1873, waged war against the republican government; fled to France; put forth claims to the French throne, 1881; obliged to seek refuge in London; afterwards lived in Venice; his heir, Don Jayme (b. 1870), became an officer in the Russian army.

Carlot'ta, 1840- ; former Empress of Mexico; b. Brussels; daughter of Leopold I of Belgium; married Maximilian, Archduke of Austria, 1857; accompanied him to Mexico, 1864; returned to Europe, 1866, to seek aid from Napoleon III and the pope; lost her reason on account of her failure and her husband's disaster.

Carlovingian (kär-lö-vin'ji-än), second dynasty of French or Frankish kings. Their origin is traced to Arnulph, Bishop of Metz, who died, 631. The dynasty derived its name from Charles Martel or his grandson, Charlemagne. Charles Martel became, 714 A.D., king in reality, but permitted Childeric to retain the name and form of royalty. The Merovingian dynasty ended in Childeric, who, after a nominal reign, was deposed, 752, by Pepin le Bref, son of Charles Martel. Pepin was the first Carlovingian who took the title of king. He was succeeded by his son, Charlemagne, 771.

Carlowitz (kär'lö-vits), town of Slavonia, Austria, on the Danube, where peace was concluded, 1699, for twenty-five years between Austria, Poland, Russia, Venice, and Turkey. Pop. abt. 5,500.

Carlow (kär'lö), town of Ireland; capital of county of same name; on the Barrow, at the mouth of the Burren; 57 m. SSW. of Dublin; has ruins of a large Anglo-Norman castle founded, 1180, taken and dismantled by the army of Ireton, 1650. Pop. (1901) 37,700.

Carlsbad (kär'ls'bät), or **Karls'bad**, town in Bohemia famous for its hot springs; on both banks of the river Tepl, 76 m. WNW. of Prague; in a narrow valley between steep mountains, and surrounded by beautiful scenery; contains a theater, reading rooms, and over 1,000 hotels and pensions for guests. There are seventeen springs, the most famous being the Sprudel (discovered, according to tradition, by Charles IV, while hunting), the Schlossbrunn, and the Mühlbrunn. A congress of German powers was held here, 1819. Pop. (1900) 15,000.

Carlsrona (kär'ls-krö'nä), or **Karlskrö'na**, seaport of Sweden; on several small islands, connected by bridges; 258 m. SSW. of Stockholm; the principal station of the Swedish navy. The entrance to the harbor is defended by two strong forts. Here are dry docks blasted out of the granite rock, and a naval arsenal. Pop. (1903) 25,960.

Carlsruhe (kär'ls'rö), or **Karls'ruhe**, capital of the grand duchy of Baden; 46 m. S. of Mannheim; streets converge toward a central point, occupied by the palace of the grand duke. Carlsruhe was founded, 1715, by Charles William, Margrave of Baden. Pop. (1901) 97,185.

Carlstadt (kär'l'stät), **Andreas Rodolphus Bodenstein**, abt. 1483-1541; German reformer; b. Carlstadt, Franconia; prof. at Wittenberg, 1513, where he taught in the usual manner of the schoolmen. After an absence on a visit to Rome, he found the whole theology of the university changed by Luther. He first offered some opposition, but then suddenly adopted the views of the Reformer and carried them to extremes; later was banished from Saxony; settled at Strassburg, 1530; sided with Zwingli in the controversy concerning the Lord's Supper; was pastor at Basel, where he continued his attacks on Luther.

Carlyle', Thomas, 1795-1881; Scottish critic and historian; b. Ecclefechan, Dumfries; son of a stonemason; educated at Edinburgh Univ.; taught mathematics at Annan, Kircaldy, and Edinburgh; removed to London, 1824, and married Jane Welsh. He lived in Edinburgh, 1826-28, and at Craigenputtoch, Dumfries, 1828-34; then removed to Chelsea, London, where he resided until his death. While in London he became a prominent member of a literary circle, which included John Stuart Mill, Leigh Hunt, and others. He began to contribute to Scottish and English magazines abt. 1820, and set himself to the task of acquainting English readers with German literature through his translations of and critical essays on German literature. His "Life of Schiller" and his translation of "Wilhelm Meister" were published in 1824. His first great book "Sartor Resartus" (The Tailor Retailored), a satire on shams and conventions, was published in 1834. His next work of importance was his "French Revolution," 1837. About this time he delivered several series of lectures "On Heroes and Hero Worship," which were published in 1841. "Chartism" and "Past and Present," published about this time, were small works bearing more or less on the affairs of the times. His largest and most laborious work was the "History of Frederick the Great," 1858-65. Other works include: "Signs of the Times," 1829; "Cromwell's Letters and Speeches," 1845; "The Nigger Question," 1849; "Latter-day Pamphlets," 1850; "Life of John Sterling," 1851; "Shooting Niagara," 1867; "Early Kings of Norway," 1875. Toward the end of his life he was offered a government pension and a baronetcy, but declined both. His command over the English language was greater

than almost any other prose writer, and his style was unique.

Carmagnole (kär-mä-nyöl'), political song of the Jacobins in the French Revolution; also applied to a popular dance of that period, and to a jacket worn by the revolutionists as a symbol of patriotism.

Carmathians. See **KARMATHIANS**.

Carmel, Mount, promontory of a range of limestone hills in Palestine; the place where Elijah slew the priests of Baal. He lived there hidden during the reign of Ahab, and the cave in which he found shelter is still shown. From the first passage (1 Kings xviii, 19), in which the mountain is mentioned, it appears that it was a holy place, where altars were erected to Baal; hence Elijah selected it for his sacrifice.

Carmelites (kär'mël-its), or **Order of Our Lady of Mt. Carmel**, monastic order of the Roman Catholic Church; founded on Mt. Carmel, 1156, by the crusader Berthold from Calabria; but Carmelites claim to have been instituted by the prophet Elijah. They were compelled by the Saracens to wear a striped dress; but later their brown habit, with white cloak and scapular, was adopted, and they were called The White Friars. They were at first under the rule given them by Albert, Patriarch of Jerusalem, 1209. Carmelite nuns were instituted, 1452. St. Theresa in the sixteenth century reformed them, and the friars as well, and the strict Carmelites are called Discalced or Barefooted Carmelites. They are entirely independent of the former. Their manner of life is very austere. The Carmelite monks and nuns, Mitigated and Discalceate, are found in almost every country.

Car'men Syl'va, pseudonym of Queen Elizabeth of Roumania, 1843- ; b. Rhenish Prussia; daughter of Prince William Charles von Neuwied; married, 1869, Prince Karl von Hohenzollern, proclaimed King of Roumania, 1881; has made efforts to improve popular education and develop Roumanian industries; author of novels, romances, and poems, including "Sappho," "Roumânische Dichtungen and Stürme," "Jehovah," "Pelesch Märchen," "Meine Ruh," collected lyric poems.

Carmin'atives, medicines such as cardamoms, ginger, and the essential oils of peppermint and juniper, used for remedying flatulence and colic.

Carmine (kär'min), a beautiful red pigment composed chiefly of cochineal, mixed with alumina and a little oxide of tin. It is employed by artists and silk dyers, and is an ingredient in the best red inks. It has been in use since the middle of the seventeenth century. Imitations of carmine are made of red sandalwood, Brazil wood, and other substances, and are often sold as *rouge*.

Carnac', village of France; department of Morbihan; 19 m. SE. of Lorient. On a plain adjacent to Carnac, and near the sea, is a monument, consisting of about 1,100 to 1,200 (formerly over 4,000) rude obelisks of gran-

ite, standing with their smaller ends on the ground, arranged in eleven parallel rows, and from 6 to 21 ft. high. These remains were thought to be Druidical or Celtic, but are now ascribed to a prehistoric race.

Carnarvon (kär-när'vön), or **Caernarvon**, seaport of N. Wales; capital of Carnarvon; near the SW. end of the Menai Strait, which separates it from Anglesey; 60 m. WSW. of Liverpool. Here is a castle founded by Edward I, 1282, now one of the most imposing ruins in the kingdom. It has thirteen embattled towers surmounted by turrets. Carnarvon is about half a mile from the site of *Segontium*, an ancient Roman town or station. Pop. (1901) 125,649.

Carna'tion, ornamental plant of the pink family *Dianthus caryophyllus*; has been cultivated for centuries, and flowers were known in old times nearly 4 in. across. The species is immensely variable, in the color and shape of the flower, and in the character of the plant. See PINK.

Carneades (kär-nē'ä-dēz), abt. 213-120 B.C.; Greek philosopher; b. Cyrene, Africa; opposed the Stoics; founded a school called the New Academy, and maintained that man has no criterion of truth; was distinguished for his subtle dialectic and powerful and specious eloquence; went as ambassador from Athens to Rome, 155, where he gained much applause by his orations.

Carnelian (kär-nel'yän), name given to a variety of chalcedony; red or flesh color, and rarely milky white. Beautiful specimens are found in Hindustan, where they are manufactured into ornaments; found also in Scotland and in the U. S., especially on Lake Superior, in Missouri, and on the Upper Mississippi. The bright, clear red carnelian is most valued.

Carnifex (kär'ni-fēks), Fer'ry, locality in Nicholas Co., W. Va.; abt. 8 m. below Summer-ville; gives its name to a severe action on the N. bank of the Gauley River; September 10, 1861, about 5,000 Confederates under Floyd had entrenched themselves in this position, where they were attacked by Rosecrans on the afternoon of September 10th. Darkness terminated the battle of the day, and during the night Floyd, being outnumbered, escaped with his command across the Gauley, destroying his bridge behind him, which prevented pursuit. All the camp equipage and munitions of war fell into the hands of the Federal forces.

Carnival, festival in most Roman Catholic countries preceding Lent; formerly most brilliantly celebrated at Venice; later, especially in Rome. Like many other usages the carnival probably originated in the heathen springtime festivals, as the Lupercalia and Bacchanalia of the Romans and the Yule feasts of the Germans. During the Middle Ages costly banquets with the rich, and drinking bouts among others, marked the time.

Carnivora, mammalian animals which eat flesh and little or no vegetable food; all quadrupeds properly called beasts of prey, except a few of the marsupials.

Carno'chan (kär'nök-än), **John Murray**, 1817-87; American surgeon; b. Savannah, Ga.; studied chiefly in Europe; began practice in New York, 1847; gained distinction for his bold and successful operations; Prof. of Surgery, New York Medical College, 1851-63; surgeon in chief State Immigrant Hospital; Health Officer of the Port, 1860-71; published "Congenital Dislocations," "Contributions to Operative Surgery," etc.

Carnot (kär-nó'), **Lazare Hippolyte**, 1801-88; French radical; son of L. N. M. Carnot; b. St.-Omer; member of the Chamber of Deputies, 1840-48; Minister of Public Instruction; member of the Legislative Assembly, 1864-68; elected Life Senator, 1875; wrote on Saint-Simonism.

Carnot, Lazare Nicholas Marguerite, 1753-1823; French statesman; b. Nolay, Burgundy; educated as a soldier and military engineer; was honored with the laurel crown, 1783, for his eulogy on Vauban, and was sent to the legislature by the Pas-de-Calais; later, as a member of the Convention, voted for the execution of Louis XVI; prominent revolutionist, and called "the organizer of victory"; Minister of War before the Consulate, and voted against its extension, as well as against the empire; but retired to private life in the early days of the latter.

Carnot, Marie François Sadi, 1837-94; French statesman; b. Limoges; son of Adolphe Carnot, grandson of L. N. M. Carnot, and grand nephew of the first Sadi Carnot; by profession an engineer; Préfet de la Seine-Inférieure, 1871; took part in all works of defense, and distinguished himself as much by his knowledge of the art of war as by his bravery. He was elected to the National Assembly, 1871; Secretary of the Chamber of Deputies, 1876; Secretary of Public Works, 1878; Minister of Public Works, 1881-82; Minister of Finance, 1882 and 1886; on the resignation of M. Grévy was elected President of the French Republic, December 3, 1887; assassinated at Lyons by an anarchist.

Carnot, Nicholas Leonard Sadi, 1796-1832; French physicist; b. Paris; but remembered by his book, "Reflexions sur la puissance motrice du feu," the first of modern works on thermodynamics, the science of heat and work transformations.

Caroli'na Mari'a, 1752-1814; Queen of Naples; daughter of Francis I and Maria Theresa of Austria; married, 1768, to Ferdinand, King of the Two Sicilies, whom she persuaded to join the coalition against Bonaparte, who expelled him from his kingdom, 1806.

Car'oline Ame'lia Eliz'abeth, 1768-1821; Queen of England; daughter of the Duke of Brunswick and niece of George III of England; married, 1795, to the Prince of Wales, afterwards George IV, who regarded her with aversion, and separated from her soon after the birth of their daughter, the Princess Charlotte. On the accession of George IV, 1820, she was prosecuted on a charge of adultery, was defended by Lord Brougham, and acquitted.

Caroline Islands, archipelago of Micronesia; about 500 islands between the Philippines, Marianas, Marshall Islands, and New Guinea; area, 560 sq. m. Most of the inhabitants are Malays. The islands were discovered, 1543, and named after Charles V. The Spaniards claimed them as part of the Philippine Islands. In 1885 they were claimed by Germany, but the sovereignty of Spain was decided by the pope. In 1899 the Caroline, Polen, and all the Ladrones except Guam, which had been ceded to the U. S., were bought by Germany of Spain.

Carolus-Duran (kär'ô-lüs-dü-rän'), Auguste Émile (family name DURAND), 1837- ; French painter of portraits and of figure subjects with studio in Paris; also a sculptor of considerable ability; b. Lille; one of the best of his portraits, the "Lady with Glove," is in the Luxembourg Gallery, and a ceiling representing "The Triumph of Marie de Medici" is in the Salle Beauvais in the Louvre.

Car'om. See BILLIARDS.

Caron', Sir Joseph Philippe René Adolphe, 1843- ; Canadian statesman; b. Quebec; admitted to the bar, 1865; elected to the Dominion Parliament, 1873, and to each succeeding Parliament to and including that of 1891; Minister of Militia, 1880-92; then Postmaster-General; knighted, 1885, in recognition of his services in suppressing the NW. Rebellion.

Carot'id Ar'tery, the large artery which lies at the side of the neck and supplies blood to the head and brain. On the right side the primitive or common carotid artery is one of the branches of the innominate artery which springs from the arch of the aorta. On the left the common carotid springs directly from the arch of the aorta. Opposite the upper part of the larynx the common or primary carotid artery divides into an external and an internal branch, the former supplying the tissues of the neck, face, tongue, and other external parts with blood, the latter entering the cranium through the carotid canal and supplying the membranes and substance of the brain.

Carp, fresh-water fish of the family *Cyprinidae*; distinguished by its toothless jaws, its fleshy lips and small mouth with four barbels



CARP.

on its upper jaw, its stout teeth on the pharyngeal bones, its olive-brown color above shading off into yellow below, its excellence for food, the ease with which it is propagated,

and the variety of conditions under which it will thrive. It will live for days with no other water than that afforded by wet moss, and it is said to attain at times to the age of two hundred years. A carp weighing 10 lbs. was found by Schneider to contain no less than 700,000 eggs. It thrives best in the quiet waters and soft, muddy bottoms of the S. temperate zone, though it is found in all the countries of N. Europe and in America, and is a favorite fish in China. The weight at five years old is from 3 to 6 lbs.

Carpa'thian Moun'tains. See CARPATHIAN MOUNTAINS.

Carpenta'ria, Gulf of, broad and deep indentation of the N. coast of Australia, a portion of the S. Pacific Ocean; extends from Cape Arnhem to Cape York; about 500 m. long from N. to S. and 350 m. wide; named after Peter Carpenter, governor general of the Dutch E. Indies, 1623-27.

Car'penter, William Benjamin, 1813-85; English physiologist; b. Exeter; published "Principles of General and Comparative Physiology," 1839; reputation extended by his "Principles of Human Physiology," 1846; among his works are "Zoölogy and Instincts of Animals," "The Microscope" and "Nature and Man"; Prof. of Medical Jurisprudence in University College, London. He had few living equals in acquaintance with science, capacity for inquiry, and skill as a writer.

Carpenter Bee, the popular name of hymenopterous insects of the bee family, which show great skill in working wood. Inhabits warm countries. Includes the *Xylocopa violacea* of S. Europe, a beautiful insect of a rich blue color, about the size of a large humblebee. It attacks dry wood, especially when partly decayed, cutting a longitudinal canal about a foot deep and more than a third of an inch wide. In this canal it lays eggs, inclosing each egg with a mass of pollen and honey as food for the future larva, in a hermetically sealed compartment. When the perfect insects are developed, they destroy the partitions and escape into the air. The genus is also American.

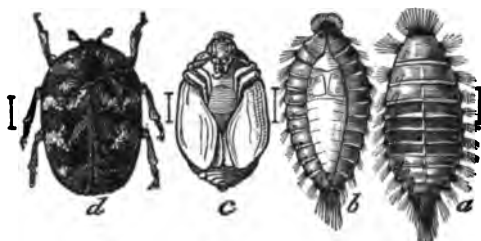
Car'pet, thick fabric used for covering floors; composed wholly or principally of wool; word supposed to be derived from Cairo, probably because Egypt is the country credited with first using floor coverings as articles of luxury in her days of splendor. The original form of the carpet was that of a large rug, spread when occasion required; and is still the custom in the East. The modern weaving of carpet in long, narrow strips, to be sewn together, had its origin in the convenience and cheapness of that form through its adaptation to the ordinary loom.

The principal grades of carpeting (leaving out the Gobelins, Turkish, Persian, and others of ruglike make) are Chenille Axminster, Wilton, Axminster, Moquette, Velvet, Brussels, Tapestry Brussels, Ingrain (two or three ply), and Venetian, taking rank, as to value and desirability, about in the order named. The U. S. is the greatest producer and consumer

of carpets in the world. According to the Census of 1905, the production of carpets and rugs, other than rag, had a value of \$61,656,433, and in the fiscal year ending June 30, 1906, the imports of dutiable carpets and carpeting were valued at \$4,643,520. The manufacture of carpets is confined to Massachusetts, Connecticut, New York, New Jersey, and Pennsylvania. See MAT; RUG.

Carpetbagger (in the U. S.), an adventurer without property interests in the State where he resides. In the West it has been applied to wild-cat bankers. In the South it was used to indicate a man, born and reared in the North or West, who went South with or after the Federal armies, planted himself in one of the states being reconstructed under military rule, and aided in organizing and drilling negroes to vote the Republican ticket.

Carpet Bug (*Anthrenus scrophulariæ*), a destructive beetle of the family *Dermestidæ*; popularly known as "the new carpet bug," since first detected in New York in 1874 and its difference from the larva of the carpet moth observed. It overruns houses and preys upon woolen and other fabrics, but its special



CARPET BUG.

home is beneath the borders of carpets, where, in the larva state shown at *a* in the figures (all enlarged) it eats holes in the carpets. The pupa, *c*, is formed in autumn within the split skin of the larva; and the perfect insect, shown at *d*, of a black color, marked with red along the back, and with red and white spots on the wing covers, emerges in the winter. Kerosene oil and benzine are probably the most efficient agents for destroying it in its earlier stages.

Carpocrates (kär-pök'rá-téz), or Car'pocras, philosopher in Alexandria in the reign of Hadrian; founded a Gnostic sect abt. 130 A.D.; believed in transmigration of souls, and that the world was created by angels.

Car'pus, in anatomy, the series of bones between the forearm and hand. In man there are eight small bones in two rows; the upper row consists of the scaphoides, lunar, cuneiform, and pisiform; the lower, of the trapezium, trapezoides, magnum, and unciform. The upper row is articulated with the radius of the forearm; the lower with the metacarpal bones of the hand. The number and form of the bones of the carpus vary much in different animals, but rudiments of them, at least, appear in all mammals. They are quite distinct in the flipper or paddle of the whale,

as well as in the foreleg of the ox and the horse.

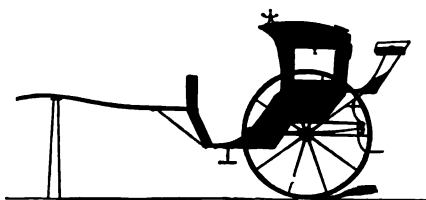
Carr, Sir Robert, d. 1667; British commissioner to New England; appointed by Charles II, 1664; assisted in the capture of New Amsterdam from the Dutch, and changed its name to New York in honor of the Duke of York, afterwards James II.

Carracci (kã-rät'chi). See CARACCI.

Carrara (kã-rã'rã), town of Italy; province of Massa-Carrara; on the Avena; 133 m. NW. of Pisa; has quarries of white statuary marble, which have been worked for two thousand years or more. Many foreign artists come here to work, to save the expense of transporting the marble. The quarries, of which there are more than thirty, are in high hills, formed chiefly of marble. Pop. (1901) 21,104.

Carrageen (kãr'ã-gën), or Irish Moss (from Carrageen in SE. Ireland); any one of several species of seaweed which are not mosses, but algæ. The species which yields the greater part of the carrageen of commerce is the *Chondrus crispus*, one of the red seaweeds (*Florideæ*). It is used as medicine and as an article of food, and is esteemed for its emollient and demulcent properties. It grows on the rocky coasts of several countries of Europe and on the E. shores of N. America. It is from 2 to 12 in. long, branched, cartilaginous, flexible, and reddish brown in color. It is considered easy of digestion. Jelly and blanc-mange are made by boiling the carrageen in water or milk, with an addition of sugar and spices. The Iceland moss (*Cetraria islandica*) is a wholly different plant, though used in a similar way. It is not true moss, but a lichen.

Car'riage, wheeled vehicle for conveying persons or things on land. The class includes coaches, chariots, wagons, carts, cars, etc.; now commonly restricted to vehicles for conveying persons. The first attempts at carriages were made like the bullock carts of India and S. Central Africa, the wheels solid pieces of wood and the axle a solid beam. Carts and



HANSONM CAB.

chariots were used by the Egyptians and Assyrians, but for several centuries they were two wheeled. Near the Christian era chariots became four wheeled, and often had room for six. During the Middle Ages in Europe roads were so rough that carriages were almost abandoned for conveying persons. In 1550 there were only three carriages in Paris. The state coach was introduced into England during Elizabeth's reign, and the nobility soon set up their own carriages; hackney coaches, one-horse vehicles for hire, were kept after 1625.

The first stagecoach line between London and Edinburgh was established, 1754; cabriolets or cabs were introduced into England abt. 1820; hansom cabs, invented there, first used abt. 1835; omnibuses, of French origin, abt. 1831. At the time of the Revolution only wealthy families in the American colonies kept



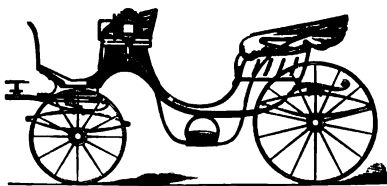
CROWN BROUGHAM.

coaches. In the middle states the great Conestoga wagon, with canvas-covered body, drawn by horses or yokes of oxen, carried goods from the seaports into rural districts. During the emigration to the West these became known as prairie schooners. From 1810 to 1845 stagecoaches were used on the thoroughfares, supplanting the heavy wagons formerly em-



HIGH DOOR CURTAIN ROCKAWAY.

ployed for carrying the mails. For travel in newer regions Concord wagons or coaches, originally made in Concord, N. H., were preferred. Most of the coaches in use in the Pacific states are of this description. Among the two-wheeled vehicles may be mentioned the cart, the gig, the sulky, the hansom cab, the Irish jaunting car, and the Japanese



CABRIOLET.

jinrikisha; among four wheelers, the wagon, the cab, coach, buggy, barouche, dogcart, etc. Of the two-wheeled vehicles, the gig is probably the oldest and most typical. The trotting sulky is a product of the U. S.; the road cart, used in the agricultural regions, is a cheap modification of it. The jinrikisha,

or "manpower carriage" of Japan, China, and India, is said to have been invented by an American missionary. The calèche or calash, used to some extent in Canada, has a seat



PNEUMATIC TIRE SULKY.

for two and a seat on the splashboard for the driver. Among four-wheeled covered vehicles may be mentioned the coach, the landau, the brougham, and the rockaway. The rockaway, a covered carriage, originally made in Jamaica, L. I., has been developed, and is now much used as a family carriage. The dogcart, a light pleasure cart, has back-to-back seats, the rear seat covering a box in which dogs may be carried. The buggy is a peculiarly American carriage; the buckboard is a variety of it.

Carrickfergus (kâr-rî'-fêr'gûs), seaport of Ireland; on Carrickfergus Bay; 10 m. NNE. of Belfast; has a picturesque castle, supposed to be seven hundred years old, on a high rock on the sea, on which three sides of it are situated. It is used as an arsenal, barracks, and a fort. King William III of England landed here June 14, 1690, sixteen days before the battle of the Boyne. In 1760 it was surrendered to a French naval force under Thurot, who evacuated it on the appearance of the British squadron under Com. Eliot soon after, which captured Thurot's squadron. Capt. Paul Jones captured the sloop of war *Drake* in Carrickfergus Bay April 24, 1778, but made no attempt to seize the town. Pop. abt. 4,500.

Carrier (kâ-rê-â'), **Jean Baptiste**, 1756-94; French revolutionist; notorious for his cruelty; b. near Aurillac, Haute-Auvergne; elected to the National Convention, 1792; went to Nantes, 1793, where he found many Vendean prisoners—to assist in repressing the civil war commenced by the priests and royalists; selected a committee to give apparent legal sanction to his cruelties, but took them from the most vicious classes; soon dispensed with all formality, and executed his prisoners in large numbers; murdered multitudes of men, women, and children by various modes. More than 16,000 were killed by him in a single month. Soon after the fall of Robespierre the public called for justice against Carrier, and he was recalled, condemned by the revolutionary tribunal, and guillotined.

Carrier Pigeon, variety of the common pigeon, about 15 in. in length and about 1½ lb. in weight. The instinct which renders this bird valuable as a bearer of messages is its very strong love of home. The ordinary rate

of its flight is not generally held to exceed 30 m. an hour, though instances of 60 m. or even 90 m. are recorded. See PIGEON.

Carriers, Com'mon, those who, for hire, transport from one place to another the goods or persons of such as choose to employ them; distinguished from private carriers by this readiness to accommodate the public generally, and are subjected in law to a different responsibility. They may be either carriers by land or by water. Familiar examples of the former are stagecoach proprietors, railway companies, express companies, wagoners, and teamsters, etc.; of the latter, the owners and masters of steamships, ferryboats, and vessels of all kinds engaged in a general transportation business.

Car'rrington, Edward, 1749-1810; American army officer; b. Virginia; lieutenant colonel of Harrison's Artillery Regiment in the Revolutionary army, November 30, 1776; served under Gates and Greene, and became the quartermaster general of the latter; commanded the artillery with success at Hobkirk's Hill, April 24, 1781, and at Yorktown; was a delegate to Continental Congress from Virginia, 1785-86, and foreman of the jury in Aaron Burr's trial for treason.

Car'roll, Charles (OF CARROLLTON), 1737-1832; an American patriot; b. Annapolis, Md.; delegate to the Continental Congress, 1776, and signed the Declaration of Independence. To distinguish himself from another man of the same name, he signed himself "Charles Carroll of Carrollton"; elected to the Senate of the U. S., 1788; was of the Roman Catholic faith, and a man of great dignity and worth; was especially honored as the last survivor of the signers of the Declaration of Independence.

Carroll, John, 1735-1815; first Roman Catholic Bishop in the U. S., and cousin of Charles; b. Upper Marlborough, Md.; educated by the Jesuits in Belgium; ordained priest, 1759; Prof. of Moral Philosophy in St.-Omer and Liège, 1759-71; became a Jesuit, 1771; Prefect to the Jesuit college at Bruges, Belgium, and when the pope suppressed the society went, 1773, to England, and to America, 1774. In 1784 he was, at the instance of Franklin, appointed superior to the clergy of the U. S.; 1790 he was consecrated Bishop of Baltimore. In 1791 he founded Georgetown College; in 1808 became Archbishop of Baltimore.

Carroll, Lewis. See DODGSON, CHARLES LUTWIDGE.

Carronade'. See ARTILLERY.

Car'rot, a plant of the genus *Daucus* and order *Umbelliferae*. The common carrot (*D. carota*) is a biennial plant, a native of the East, but naturalized both in Europe and America. In many parts of the E. U. S. it has become a pernicious weed. Its leaves are pinnately compound; the flowers creamy white. The root of the cultivated plant is much thicker and more agreeable to the taste than the wild. For man and beast it is a wholesome and moderately nutritious article of food. The root is also used for poultices.

Car'son, Christopher, commonly called **KIR CARSON**, 1809-68; American trapper and scout; b. Kentucky; was guide to Frémont in his Rocky Mountain explorations and an officer in the army in the Mexican and Civil wars, brigadier general, U. S. volunteers, in the latter.

Carson Cit'y, capital of Nevada and of Ormsby Co.; at the base of the Sierra Nevadas, 3 m. W. of Carson River, 12 m. NE. of Lake Tahoe, 15 m. SW. of Virginia City; is in a noted gold- and silver-mining region. Pop. (1900) 2,100.

Cartagena (kär-tä-jě'nä), fortified seaport of Spain; province of Murcia; on a bay of the Mediterranean; 27 m. SSE. of Murcia; formerly the chief naval arsenal of Spain; has a Moorish cathedral, numerous churches and convents, theater, observatory, and manufactories of sail cloth and glass. Red marble is abundant, and used for building. Under the name of *Carthago Nova* it was founded by Hasdrubal abt. 230 B.C., and became one of the richest cities in the world. Pop. (1900) 99,871.

Cartagena, seaport of Colombia; capital of department of Bolivar; founded by Pedro de Heredia, 1533; during the colonial period an important port and stronghold of Spanish America; several times sacked by buccaneers and English corsairs, and in the effort to make it impregnable the Spanish Govt. spent nearly \$60,000,000 on its defenses. It has a fine cathedral, hospital, theater, many convents, and other old buildings of historical interest. Pop. (1900) 20,000.

Cartago (kär-tä'gö), city of Costa Rica, on the Cartago River, 13 m. ENE. of San José, and near the foot of the Irazu volcano; 4,900 ft. above sea level; founded by Coronado, 1565, on the site of an Indian town; was for several years the capital of Costa Rica; almost destroyed by earthquake, 1841, but soon rebuilt; has wide paved streets, substantial buildings, large barracks, hospital, college, several public fountains, and, nearby, popular mineral springs. Pop., 8,000 to 10,000.

Car'tel, Anglicized French word which in France signifies a challenge. As a military term it is used to denote an agreement between two belligerents for the exchange of prisoners. A vessel used in exchanging prisoners or carrying proposals to an enemy is called a cartel ship.

Car'ter, James Coolidge, 1827-1905; American lawyer; b. Lancaster, Mass.; admitted to the bar, New York City, 1853; counsel for the city against W. M. Tweed for the recovery of the moneys fraudulently taken under "the \$6,000,000 credit"; advocate for the U. S. Govt. in the Bering Sea arbitration at Paris; member of the commission to devise a form of municipal government for the cities of the State of New York; author of "The Proposed Codification of our Common Law," "The Provinces of the Written and the Unwritten Law," and "The Ideal and Actual Law."

Carteret (kär-tér-ét'), John. See GRANVILLE, EARL.

Carteret, Philip, English navigator, who made an expedition to the South Seas, 1766-69, and discovered Queen Charlotte Islands and others, naming two Gower and Carteret.

Cartesian (kär-të'zhän) Philos'ophy, system of philosophy brought forward by René Descartes (1596-1650), one of the most original thinkers of France or of any country. He proposed as a basis, and as a ground for all knowledge, the act of conscious thought, as necessarily involving the idea of existence. His celebrated dictum, "*Cogito, ergo sum,*" i.e., "I think, therefore I exist" is the starting point of his philosophy. Descartes attributed all phenomena to the actual presence of an all-pervading Deity.

Cartesians, disciples of Descartes, or those who adopted his philosophy. In the seventeenth century nearly all the philosophers of France were ranged under two parties, as Cartesians and Gassendists.

Carthage (kär'thij), ancient city of Africa, capital of the republic of Carthage; a Phœnician colony founded by immigrants from Tyre abt. 850 B.C.; situated near the site of modern Tunis. The Carthaginians gradually acquired a dominion over the other Phœnician colonies of N. Africa, and also over the Libyans and Numidians or nomadic tribes. It became one of the greatest emporiums and maritime powers of the world. Its population amounted to 700,000 in 150 B.C. Competition with Rome for the possession of Sicily involved Carthage in the first Punic War, 264 B.C.; in which Carthage was defeated. Hamilcar Barca, leader of the democratic party in the state, conquered most of Spain, 237-229 B.C. His son, the famous Hannibal, began the second Punic War, 218 B.C., and conquered Italy, but was defeated by Scipio, 201 B.C., and Carthage lost all her dominions outside of Africa. The third Punic War, begun by the Romans, 150 B.C., resulted in the capture and ruin of the city. Here, 122 B.C., Caius Gracchus founded Junonia, which eventually stood next to Rome in population and wealth. Genseric captured it, 439 A.D., and made it the capital of the Vandal Kingdom in Africa. It was destroyed by the Arabs, 647 A.D.

Cartha'go No'va. See CARTAGENA.

Carthusians (kär-thü'zhäns), monastic order founded by St. Bruno, 1084, in Chartreuse, France, 14 m. N. of Grenoble. It was propagated in Germany, Spain, England, and Italy. The original structures were superseded by the present one of vast extent, known as La Grande Chartreuse, long famous as the manufactory of the Chartreuse liqueur. The prior of this monastery is the head of the order; there is also a proctor general who resides at Rome. The monasteries in England were called Charterhouses, a corruption of *Chartreuse*. Carthusians are divided into monks, *patres*, and lay brothers, *conversi*. The former live by themselves in separate cells. There

are few houses of either monks or nuns now existing.

Cartier (kär-tyä'), Sir George Etienne, 1814-73; Canadian statesman; b. St. Antoine, P. Q.; admitted to the bar, 1835; aided the rebels, 1837; entered Parliament, 1848; Provincial Secretary, 1856; Attorney-General for Lower Canada, 1856, and, with Sir John A. Macdonald, formed the Macdonald-Cartier government, 1857; was an active promoter of confederation, and, 1867, became Minister of Militia in the first Dominion cabinet; made a baronet, 1868.

Cartier, Jacques, 1494-abt. 1554: French navigator; b. St.-Malo; discovered the St. Lawrence River, 1534, and ascended it as far as the site of Montreal; joined Roberval's expedition and sailed again, 1541, exploring the rapids above Montreal, but the next year abandoned Roberval and returned; ennobled by the King of France.

Cartilage (kär'ti-lāj), connective tissue, more or less elastic and translucent, whitish or yellowish; commonly known as gristle. Temporary cartilage is the basis of ossification, and in an infant or youth the bones consist mainly of cartilage. As age advances the true bone increases, and by the twentieth or twenty-fifth year the process is usually complete. There are left, then, only the cartilages which form the articular ends of bones. Even these may become partially ossified in advanced life.

Cartog'raphy. See MAP.

Cartoon', a design drawn on strong paper or other material, and used as a model to be executed in fresco, oil color, tapestry, or glass. The cartoon is drawn the same size as the picture to be executed, enabling the artist to readily alter the drawing or composition. The drawing is made either in chalk or distemper, and is sometimes primed or washed with ground color. The cartoon is transferred to canvas or plaster, either by tracing the lines with a hard point or by pricking them with pins. In the first instance, the back of the cartoon is first covered with coloring matter; in the second, a bag of pulverized charcoal or colored powder is passed over the perforations, pouncing the designs onto the surface to be worked on. The sketches in comic papers are also called cartoons.

Car'tridge, a case containing powder or ammunition to charge a firearm. Cartridges for muskets were usually paper tubes containing a small amount of powder and a leaden ball. Cartridges for cannon or large guns are chiefly made of serge or flannel sewed up in the form of a bag, which, filled with a given weight of powder, is tied around the neck and strengthened by iron hoops. Cartridges for pistols and other modern firearms are usually copper cylinders, having at the base fulminating powder, which inflames the gunpowder upon being struck by the hammer. A cartridge which contains a ball is called a ball cartridge, one which contains only powder, a blank cartridge.

Cart'wright, Edmund, 1743-1823; English clergyman; inventor of the power loom; b. at

Marnham; rector of Goadby Marwood, Leicestershire; in 1785 exhibited his first power loom, the introduction of which was violently opposed by the operatives, who burned a mill containing 500 of his looms.

Cartwright, Peter, 1785-1872; American Methodist preacher; b. Amherst Co., Va.; began to preach as a "local," 1801; labored with success for over sixty years; said to have preached 18,000 sermons; defeated for Congress; 1846, by Abraham Lincoln. His labors were chiefly in the Mississippi Valley.

Cartwright, Sir Richard John, 1835- ; Canadian statesman; b. Kingston, Ontario; member of Canadian Assembly, 1863-67; of Dominion Parliament, 1867- ; began as a Conservative, but through a disagreement with Sir John A. Macdonald became a Liberal; Minister of Finance, 1873-78; chief financial critic and a leader of the opposition, 1879-96; acting Premier and leader House of Commons, 1897; represented Canada on the Anglo-American Joint High Commission, 1898-99; Minister of Trade and Commerce since 1896; knighted, 1879.

Ca'rus, Marcus Aurelius, abt. 222-283 A.D.; Roman emperor; praetorian prefect under Probus, on whose assassination, 282, he was proclaimed emperor by the army; conquered the Sarmatians; died suddenly, as he was setting out against Persia.

Ca'ry, Alice, 1820-71; American author; b. Hamilton Co., Ohio; removed to New York with her sister Phœbe, 1852, with whom she published, 1850, a volume of poems; other works include: "Clovernook"; "Hagar, a Story of To-day"; "Married, not Mated"; "Pictures of Country Life"; "The Lover's Diary."

Cary, Phœbe, 1824-71; American poet; b. Hamilton Co., Ohio; sister of Alice Cary; chief works, "Poems and Parodies" and "Poems of Faith, Hope, and Love."

Cary, Samuel Fenton, 1814-1900; American legislator; b. Cincinnati, Ohio; studied law; engaged in agriculture; Republican member of Congress, 1867-69; only Republican in the House who voted against impeachment of President Johnson; Greenback candidate for Vice President on ticket headed by Peter Cooper, 1876.

Caryatides (kär-I-ät'I-déz), a term applied in Greek architecture to female figures which were used instead of columns to support a roof or entablature. They were usually dressed in long robes. The corresponding male figures are called Atlantes and Telamones.

Casablanca (kä-sä-blänk-ä'), or **Dar-al-Ba'ida**, an important seaport of Morocco; midway between Rabat and Mazagan; pop. abt. 20,000, chiefly Arabs. In March-July, 1907, five Frenchmen, two Spaniards, and an Italian were murdered in the city, and as the authorities made no at-

tempt to punish the assassins or to offer reparation, France and Spain came to an understanding under the terms of the Algeciras Convention, and August 4th the city was bombarded by French cruisers; occupied after severe fighting, and fully obtained by surrender a few days later. Several attempts by Moorish tribesmen to recapture the city were repulsed with great slaughter.

Casas (kä'säs), **Bartolomé de las**, 1474-1566; Spanish ecclesiastic; b. Seville; went to Hispaniola, 1502; became a curate in Cuba; twice visited Spain to obtain the abolishment of Indian slavery, but failed; was appointed protector of the Indians against the cruelty of the Spaniards; lived as a Dominican monk in San Domingo, 1522-30; later visited Mexico, Guatemala, and Nicaragua in the interest of the Indians; thrice went to Germany to interview Charles V; published works on the cruelty of the Spaniards; Bishop of Chiapa, Mexico, 1544-47; thereafter resided at Valladolid, Spain; chief works, "Destruction of the Indies by the Spaniards" and "History of the Indies."

Casati (kä-sä'té), **Gaetano**, 1838-1902; Italian explorer; sent to Africa, 1879, by a commercial company; was shut in with Emin Pasha in the Niam-Niam country by the Mahdi; lived as resident in the territory of the King Kabba Rega, of Unyoro, and acted as Emin's postmaster; was condemned to death, but escaped to Albert Nyanza Lake and was rescued by Emin Pasha, 1888.

Casaubon (kä-sä'bön), **Isaac**, 1559-1614; French Protestant theologian and scholar; b. Geneva, Switzerland, of Gascon parents; Prof. of Greek at the Academy of Geneva, 1582-96, of Languages at Montpellier, 1596-1600; librarian to the king in Paris, 1600-10; prebendary of Canterbury and Westminster, England, 1610-14; published an annotated edition of Theophrastus's "Characters" and his own "Ephemerides," and wrote "Exercitationes contra Baronium."

Cas'ca, Publius Servilius, Roman conspirator; tribune at the time he assisted in the assassination of Cæsar, 44 B.C. According to Plutarch, he struck the first blow. He fought at Philippi, 42 B.C., and died soon after.

Cascade (käs-käd') **Range**, chain of mountains which stretches from S. Oregon through Washington into British N. America; a continuation of the Sierra Nevada. Its distance from the seacoast in Oregon is about 120 m. The Columbia River breaks through this range, forming the cascades from which the name is derived; is constituted chiefly of volcanic rocks. Among the great summits are Mt. Logan, 19,500 ft.; Mt. St. Elias, 18,001 ft.; Mt. Hood, 11,225 ft.; Mt. Adams, 13,258 ft.; and Mt. Rainier (Tacoma), 14,444 ft.

Cascari'l'a, the bark of *Croton eluteria*, which grows in the W. Indies. It is a shrub of 3 to 5 ft. in height, and the stem is frequently as thick as 4 to 8 in. It is used in medicine as an aromatic tonic, and was formerly used in



CARYATID.

the place of cinchona bark in the treatment of malarial fevers. It is useful in the treatment of dyspepsia, indigestion, or flatulent colic.

Cas'co Bay, in Maine; washes the shore of Cumberland Co.; is abt. 20 m. long. The city of Portland is at its W. extremity; incloses about 300 islands.

Case, in law, an action, cause, or controversy, either in law or equity, submitted for decision to a court of justice. In particular (1) a form of action called "an action on the case," or, more fully, "special action of trespass on the case." This action is founded on the peculiar circumstances of the case, and supplies a remedy for such wrongs against one's person or property as cannot be included under the term "trespass," and which are indirect and consequential. The action is called "trespass on the case," or simply "case." Out of this action grew the modern action of "assumpsit," instituted to recover damages for breach of contract. (2) In U. S. constitutional law the term case is applied to a civil or criminal action, as distinguished from a *controversy*, which term is applied to a civil action only. (3) A written or printed statement of facts for the opinion of counsel or for the decision of a court or judge. A question of law. See ACTION; SUIT.

Casein (kă'sē-in), nitrogenous organic substance allied to albumen, found in milk, and most abundantly in that of flesh-eating animals. Casein is curdled by acids or by rennet, and is the chief constituent of cheese. It also forms insoluble precipitates with corrosive sublimate, nitrate of silver, and acetate of lead. Hence copious draughts of milk are an antidote in cases of poisoning with either of the above salts. Casein is also used in calico printing.

Case'mate, originally, a ditch defense; later, a chamber with a strong roof, usually of arched masonry, covered with earth to render it bombproof; usually built in the rampart of a fortification and sometimes partly below ground. They are used for quarters, hospitals, storerooms, magazines, etc., and also for gun chambers, the guns being fired through embrasures.

Cash, name in use among foreigners for the coin of the Chinese, by them called *Tsien* (pronounced *chen*); is a disk of an inferior alloy of copper, is slightly larger than a U. S. 25-cent piece, but thinner and lighter, and has a square hole in the middle for convenience in stringing. A string of cash usually contains 500 or 1,000, with 50 or 100 in each division, according to the custom of the locality. Each coin has a value of $\frac{1}{10}$ to $\frac{1}{4}$ of a U. S. cent, i. e., 1,000 to 1,400 equal one dollar.

Cashgar'. See KASHGAR.

Cash'mere. See KASHMIR.

Casimir (kăs'i-mēr), the name of several kings of Poland, the most important of whom were CASIMIR I, 1015-58, surnamed The

Peaceful; CASIMIR III, 1309-70; annexed Red Russia to Poland and founded the Univ. of Cracow; CASIMIR IV, 1427-92, fought the Teutonic knights for fourteen years and forced them to cede W. Prussia to Poland in the treaty of Thorn, 1466.

Casimir-Périer (-pă-rē-ă'), Jean Paul Pierre, 1847-1907; President of the French Republic; b. Paris; grandson of Casimir-Périer, Prime Minister of Louis Philippe; son of Auguste Casimir-Perier, Minister of the Interior under Thiers; served with honor in the Franco-German War; after peace entered politics; in the Ministry of the Interior, of which his father was head; in 1878 was elected to the Chamber of Deputies, to which he was re-elected; voted steadily with the moderate republicans; elected vice president of the Chamber, 1890, having in the meantime held important posts in the Ministry of Public Instruction and the Minister for War; in 1893, president of the Chamber, but resigned to become president of the Council. On June 27, 1894, he was chosen President, but resigned, suddenly, January 15, 1895.

Casino (kă-sē'nō), a name generally given to a kind of clubhouse or place of amusement, containing rooms for dancing, playing at billiards, etc.

Cask. See BARREL; COOPERAGE.

Cas'pian Sea, large inland sea forming part of the boundary between Europe and Asia; now within Russian territory, except at the S. end, where it is margined by Persia; is 690 m. long from N. to S.; average width, 200 m.; area, 169,381 sq. m.; depth toward the S. nearly 3,000 ft., but toward the N. it is shallower. The deepest sounding of the N. basin is about 2,500 ft. The Caspian receives several large rivers—the Volga, the Ural, and the Kura. It has no outlet.

Cass, Lewis, 1782-1866; American statesman; b. Exeter, N. H.; practiced law at Zanesville, Ohio; entered the army as a colonel, 1812; served in Canada under Gen. Hull; brigadier general, 1813; Governor of Michigan Territory, 1814-30; negotiated many treaties with the Indians; Secretary of War, 1831; minister to France, 1836, where he succeeded in keeping France from joining the "quintuple alliance" intended to enforce British claims to right of search on the high seas; U. S. Senator, 1844; having opposed the Wilmot Proviso, was nominated as Democratic candidate for the Presidency, 1848, but was defeated by Gen. Taylor. In 1849, reflected to the Senate; supported Douglas's Kansas-Nebraska bill, 1854; Secretary of State, March, 1857; resigned December, 1860, because the President would not reinforce the garrison of Fort Sumter.

Cassagnac (kă-săn-yăk'). See GRANIER DE CASSAGNAC.

Cassandra (kăs-săn'dēr), d. 297 B. C.; Macedonian prince; son of Antipater, regent of Macedonia; on his father's death, 318 B. C.,

fought with Polysperchon for the regency and was victorious; married Thessalonica, sister of Alexander the Great; put to death Alexander's son Ægus and usurped the throne; with Seleucus and Ptolemy defeated Antigonus at Ipsus, 301.

Cassan'dra, Trojan princess; daughter of Priam; celebrated for her prophetic inspiration. According to the poetical legend Apollo was enamored of her, and taught her the secrets of fate, but he ordained that her prophecies should not be credited. During the siege of Troy she predicted the ruin of that city, but she was regarded as a lunatic by the Trojans. She was carried away as a captive by Agamemnon, and slain by his wife Clytemnestra.

Cassandra, Gulf of, part of the Ægean Sea; in Macedonia, European Turkey; extends between two peninsulas, the extremities of which are called Cape Drepano and Cape Pailluri; is nearly 25 m. long. The peninsula to the W. of the gulf and a cape on its W. side have the same name.

Cassel (käs'säl), or **Kas'sel**, city of Hesse-Nassau, Prussia; once capital of the electorate of Hesse-Cassel; on the river Fulda, 132 m. W. of Leipzig. It has several public squares, in the largest, Friedrichsplatz, stands the palace of the Electors of Hesse. Near this palace is a museum with a library of 165,000 volumes. Cassel contains an observatory, a picture gallery, hospitals, normal school, academies of painting and sculpture, and manufactures of cotton, silk, and woolen fabrics, lace, gloves, carpets, hardware, etc. In the environs of Cassel is the royal palace of Wilhelmshöhe. Pop. (1900) 106,034.

Cassia (käh'sä), a fragrant bark mentioned in the Bible, and supposed to be the cassia bark of the shops; a coarse variety of cinnamon from China, Annam, and other Eastern countries. It is sold as cinnamon, though cheaper and inferior. It yields the oil of cinnamon. "Cassia buds" are the dried flower buds.

Cassia is also the name of a genus of herbs, shrubs, and trees, natives of both continents. Several species are valuable for their leaves, which when dried constitute the drug *senna* or have the cathartic properties of *senna* in a milder degree. "Cassia pulp" or "purging cassia" comes from the pods of *Cassia fistula*, now naturalized in most tropical countries. It contains a large percentage of sugar, and is used in making laxative conserves for medicinal use.

Cassini (käs-së'në), **Giovanni Domenico**, 1625-1712; Italian astronomer; b. near Nice; discovered, 1665, that Jupiter performs a rotation in nine hours and fifty-six minutes, and published, 1668, his ephemerides of the satellites of Jupiter; removed to Paris, 1669, and became director of the observatory of that city; discovered four satellites of Saturn, also explained the causes of lunar libration, and took part in measuring an arc of the meridian,

1684. His descendants for several generations were able astronomers.

Cassino (käs-së'nö), town of Italy; province of Caserta; 49 m. NW. of Caserta. Large ruins of Roman theaters and palaces are in the neighborhood. Just above the city, on a mountain, is the monastery Monte Cassino, founded 529 A.D. by St. Benedict. Pop. (1901) 6,234.

Cassino, game at cards; played by two, three, or four persons. Four cards are dealt each player, and four (the *lay out*) are turned face up on the board; the hands are played one card each turn; four more cards are then dealt each player; so on until the pack is exhausted. A card is played (1) by adding it to the layout; (2) by taking with it from the layout cards of the same denomination; (3) by building, i.e., combining it with cards in the layout so that the number of spots equals that of another card in the player's hand; or (4) by duplicating, i.e., combining it with one or more cards or builds, so as to form two or more cards or combinations each equivalent to another card in the hand. Cards left in the layout after the last hand belong to the last player who took a trick. On being taken, big cassino (ten of diamonds) counts 2; little cassino (two of spades), 1; each ace, 1; the greatest number of cards, 3; the greatest number of spades, 1. Each sweep (leaving no cards in the layout) counts 1. Game is usually 21 points.

Cassiodo'rus, **Magnus Aurelius**, abt. 468-568 A.D.; Italian statesman; b. Scylacium; entered service of Theodoric, King of the Ostrogoths, abt. 497; became his chief minister; had a high reputation for ability and learning, and was long in power; at age of seventy retired to the monastery of Viviers, in Calabria, which he had founded and endowed. There he instituted the practice of adding the copying of MSS. to the list of monastic duties. He wrote, besides works on grammar and rhetoric, a "History of the Goths," now extant only in the abridgment of Jornandes; a valuable collection of state papers entitled "Variarum Epistolarum Libri XII," which was first printed, 1533, and the chief source of our knowledge of Italy in the sixth century.

Cassiopeia (käs-si-ö-pë'yä), in classic mythology, the wife of Cepheus and the mother of Andromeda; said to have been transformed into a constellation.

Cassiopeia, or **La'dy in the Chair**, constellation in the N. hemisphere; has several stars of the second magnitude; represented on the celestial globe as a lady sitting in a chair. Five of its most conspicuous stars are arranged like a W. In 1572 a new and brilliant star suddenly appeared in Cassiopeia. It was observed by Tycho Brahe in November, and is said to have surpassed all the fixed stars in splendor. It disappeared in March, 1574, after a gradual diminution of luster.

Cassiquiare (kä-së-kë-ä'rä), or **Cassiquiare** (kä-së-kë-ä'rä), a river in Venezuela; a deep

and rapid stream, forming the S. branch of the Orinoco. It issues from the Orinoco and flowing SW. about 130 m., enters the Rio Negro near San Carlos. This river opens a navigable communication between the Orinoco and the Rio Negro, but above the middle rapids of both rivers. It is 600 yds. wide at its entrance into the latter.

Cassiterides (kās-i-tēr'ī-dēz), ancient name of certain islands, supposed to be the Scilly Isles, and by others some little islands of Vigo Bay on the Spanish coast, from which the Phœnicians procured tin.

Cassius Longinus (kāsh'ē-ūs lōn-jī'nūs), **Caïus**, d. 42 B.C.; Roman general and politician; one of the conspirators who killed Cæsar, 44 B.C., soon after which event he commanded with success in Syria. His army was subsequently united with that of Brutus. Brutus and Cassius, who were the principal leaders of the republican party, were defeated by Antony and Octavius at Philippi, 42 B.C., and then killed themselves.

Cassius Parmensis (-pār-mēn'sis), or **Ca'ius Cas'sius Seve'rus**, d. abt. 30 B.C.; Latin poet who wrote epigrams and elegies; was one of the conspirators who killed Cæsar. Having entered the service of Mark Antony, he fought against Augustus, by whose order he was put to death. Only small fragments of his works are extant.

Cassivelaunus (kās-i-vē-lā'nūs), or **Cassibelaunus**, sometimes Anglicized as **CASSIBELAN**, chief of the ancient Britons who ruled the country N. of the Thames; fought bravely when Cæsar invaded Britain, 54 B.C.; but Cæsar took his capital and compelled him to pay tribute.

Cas'sock, tightly fitting garment as regards the body, but loose and flowing below, worn by ecclesiastics. It varies in color. In the Church of England the clergy of all orders wear black; bishops on state occasions frequently wear purple. In the Roman Catholic Church, priests, deacons, and subdeacons, with persons in the minor orders, wear black cassocks; bishops wear purple. Scarlet cassocks were worn by doctors of divinity and civil law and are still part of the dress of cardinals. The Bishop of Rome alone wears a white cassock.

Cas'sowary, the common name of several large flightless birds of the genus *Casuaris*; related to the ostriches, but generally placed with the emus. In appearance is not unlike the ostrich, but has a much shorter neck, and next to it is the largest bird known. The plumage is loose and coarse, the wings small. The inner toe bears a long, straight claw, a formidable weapon; the kick of one of these birds is sufficiently powerful to knock a man down. Parts of the head and neck are naked and colored bright red and blue or blue and yellow; are confined to New Guinea and the adjacent islands; in N.E. Australia. They frequent thickets, are wary and fleet of foot; they eat fruit, berries, worms, and insects. The

nest is a mere depression amid fallen leaves; the eggs are green and usually five in number.



CASSOWARY.

The best-known species is the helmeted cassowary (*C. galcatus*) from Ceram.

Castalia, fountain at Mt. Parnassus, near Delphi; sacred to Apollo and the muses. The ancient poets imagined that it filled those who drank of it with poetic inspiration.

Castanets, musical instrument, a pair of concave shells of ivory or wood, originally chestnut, loosely fastened together by a band passed over the thumb, and used in beating time to music and dacing, and much employed by the Moors and Spaniards as an accompaniment to the guitar.

Castañes (kās-tā'n'yōs), **Francisco Xavier de** (Duke of Baylen), 1756-1852; Spanish general; b. Madrid; obtained the command of a corps, 1808, and defeated the French general Dupont at Baylen, July, 1808; was defeated the same year at Tudela by Lannes; distinguished at Albuera, 1811; Salamanca, 1812, and Vittoria, 1813; was appointed captain general, 1823, and opposed the Carlists.

Caste, a term, often used loosely to indicate a class distinction of any sort, but originally employed to denote social divisions in India. Our earliest information in regard to caste comes from the Hindus, who in the Vedas and in their law books have first expressed the consciousness of the distinctions involved, and then elaborately systematized society according to formal divisions of occupation.

To the first class belonged the Brahman, or priest; his duty was to make sacrifices, to teach members of the three upper castes, and to study. His privilege was to take gifts in return for making sacrifice, and receive daily alms of members of the pure castes. His person was regarded as sacred, and he might not change his mode of life unless in danger of starvation, in which case he might temporarily assume the life of a workingman. To the second class belonged the warrior; his

one duty was to fight, and he was liable at any time to be called into the field. His rights were to study the Vedas, a very highly esteemed privilege, and command the two lower castes. Like the priest, in case of necessity, the warrior might assume the manner of life of the lower castes, but in no case exercise the duties of a priest. The third caste, the husbandman, shared with the two upper castes the privilege of studying the sacred writings and attendance on sacrificial rites; otherwise his position was practically much lower than that of the priest and warrior. He was in person superior only to the slave caste. The *Cudra* (*Sudra*), the slave caste, was the slave of every caste, but was regarded as more particularly the servant of the priest. He had no rights whatever. His slightest offense against the upper classes was severely punished, often with death. He could possess no property save what was given him by his master, and that was liable to be taken away without redress by any member of the pure castes. He was not permitted to study or even hear the Vedas recited. He was regarded as outside the pale of society, and was permitted to come into contact with it only to serve its necessities.

Castelar (*käs-tä-lär'*), **Emilio**, 1832-99; Spanish statesman; b. Cadiz; Prof. of Philosophy and Literature at Madrid, 1857; and, 1864, founded a radical journal, *La Democracia*, wherein he developed his political principles. After the abdication of Amadeus, 1873, he took charge of Foreign Affairs, and from September 9, 1873, to January 2, 1874, was President of the Spanish Republic with dictatorial power. During this time he put down with energy an uprising of the communists at Cartagena, and effected a reorganization of the army.

Castellamare di Stabia (*käs-täl-lä-mä'rä dä stä'bi-ä*), fortified city and seaport of Italy; province of Naples; on the Gulf of Naples; 17 m. SE. of Naples. The castle was built in the thirteenth century by the emperor, Frederick II. It is near the site of the ancient *Stabiaz*, where Pliny was killed by an eruption of Vesuvius, 79 A.D. Pop. (1901) 33,102.

Castelnau (*käs-täl-nö'*), **Michel de**, 1520-92; French diplomatist and general; b. Touraine; fought against the Protestants at Rouen, Dreux, etc., 1562-63; executed many important diplomatic missions for Henry II and Charles IX; minister to England, 1574-84. His "Memoirs," written in England, are a valuable record of the period, 1559-70.

Casti (*käs'të*), **Giovanni Battista**, or **Giam-battista**, 1721-1803; Italian poet; b. Prato; took orders, but after being presented to Joseph II of Austria abt. 1769, devoted himself to court life; poet laureate of Austria, 1782-90; author of forty-eight spirited "Novelle Galanti," in verse, 1793; the political satire "Gli Animali Parlanti," 1802, and various comic operas.

Castiglione (*käs-täl-yö'nä*), **Baldassare**, 1478-1529; Italian statesman; b. Casatico; a fa-

vorite at the court of the Duke of Urbino, by whom he was sent as envoy to Henry VII of England, 1505, and whose interests he represented with popes Leo X and Clement VII; employed by Clement on an embassy to Charles V of Spain, 1525.

Castile (*käs-täl'*), former kingdom of Spain; occupied the central table-land of the peninsula, and was the nucleus and central seat of the Spanish monarchy; first became independent, 762, and remained so until 1028, when it was conquered by Sancho III, King of Navarre. The kingdom was founded, abt. 1035, by Ferdinand I, who conquered Leon and annexed it to Castile. By the marriage of Ferdinand the Catholic with Isabella of Castile, 1469, Castile and Aragon were united into one kingdom.

Castile, New, old province of Spain; the S. portion of Castile; area of 20,178 sq. m.; former capital, Madrid; divided into provinces of Madrid, Toledo, Cuenca, and Guadalajara. Pop. (1900) 1,601,730.

Castile, Old, old province of Spain; bounded N. by the Cantabrian Mountains; E. by Aragon, S. by New Castile, and W. by Leon; area, 25,408 sq. m.; is divided into provinces of Burgos, Valladolid, Palencia, Avila, Logroño, Segovia, Santander, and Soria. Pop. (1900) 1,785,403.

Castilla (*käs-täl'yä*), **Ramon**, 1796-1867; Peruvian statesman; b. Tarapaca; served in the war of independence; was second in command of the army which invaded Bolivia, 1841; overthrew the dictator, Vivanco, 1844; President of Peru, 1845-51; soon after close of his term began a revolution at Arequipa, overcame his successor, and entered Lima as supreme ruler, 1855; abolished slavery; reflected President, 1858; proclaimed a new constitution with universal suffrage, 1860; President of the Senate, 1865; and at the time of his death was preparing to attack Gen. Prado, who had seized the presidency.

Castilla del O'ro, or **Castilia del Oro**, name first officially given to the part of Central America between the Gulf of Urabá (Darién) and Cape Nombre de Dios; granted to Nicuesa, 1508; was later transferred to that portion of the S. American coast between the Gulf of Urabá and Santa Martha, the interior extent being undefined.

Cast'ing. See MOLDING AND CASTING.

Cast Iron. See IRON.

Castle (*käs'li*), fortified residence; a class of structures erected by the feudal lords and princes of the Middle Ages, and palaces and manor houses of the early Renaissance in which the plan or forms of the feudal castles were retained. The earlier type consisted of a massive tower or "donjon," sometimes circular, sometimes square, or even of irregular plan, standing in the middle or at one side of a court or bailey, surrounded by a high wall with an exterior moat, crossed at the one

fortified entrance gate by a drawbridge. The gate, defended by towers, was closed by a portcullis, raised and lowered by chains and weights, in addition to its iron-bound doors or valves. With the dawn of the Renaissance the castle became a palace, but retained many of the arrangements of the feudal structures, such as the moat and drawbridge. The castles of Coucy, Pierrefonds, and Chambord, in France, and Rochester, Warwick, and the earlier manor houses in England, illustrate this development, while in Germany one may trace them all in the beautiful castle of Heidelberg on the Rhine.

Castle Gar'den, building at the S. extremity of New York City; built, 1807, by the U. S. Govt. as a fort 300 yds. from shore, but this space is now occupied by made land. Castle Clinton, as it was then called, was ceded to New York City, 1822, and later was leased to private parties, who transformed it into an indoor garden and theater, and renamed it Castle Garden. Here Jenny Lind made her first appearance in America under the management of P. T. Barnum; in 1855-90 it was used as a landing place for immigrants. Now a public aquarium.

Castlereagh (käs'l-rä), **Robert Stewart** (Viscount), 1769-1822; British statesman; b. Down Co., Ireland; eldest son of the first Marquis of Londonderry; entered the House of Commons, 1794, and efficiently promoted the union of Ireland with England, 1800; appointed President, 1802, of the Board of Control by Mr. Pitt; Secretary of State for the Department of War and the Colonies, 1805; fought a duel with George Canning, 1809. He entered the ministry of Lord Liverpool as Secretary for Foreign Affairs in February, 1812, and was a powerful director of the coalition against Napoleon; represented Great Britain at the Congress of Vienna, 1814, and the Congress of Paris, 1815.

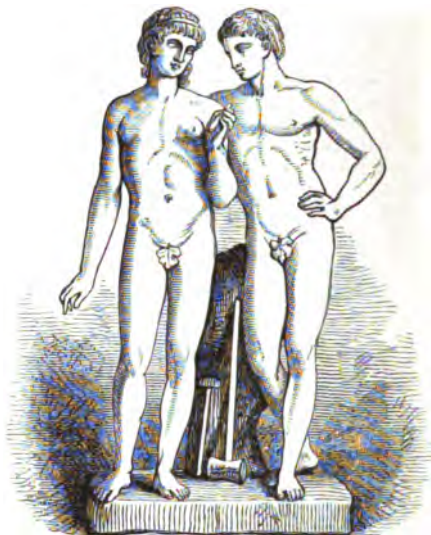
Castleton (käs'l-tön), village of Rutland Co., Vt.; on Castleton River; 11 m. W. of Rutland; the seat of a state normal school. Fort Castleton commanded the valley, 1775, and here Ethan Allen mustered his forces to capture Fort Ticonderoga. Pop. (1900) 2,089.

Cas'tletown, ancient capital of the Isle of Man. Castle Rushen, now used as a prison, stands on the site of an old Danish fortress destroyed by Robert Bruce, 1313.

Cast'or, remarkable binary or double star of the second magnitude in the constellation of Gemini; called also Geminorum. The two stars rotate around their common center of gravity.

Castor and Pol'lux, called also **DIOSCURI**, heroes of classic mythology, twin brothers, offspring of Leda by Jupiter, who visited Leda in the guise of a swan. According to one version of the myth, Leda brought forth two eggs, from one of which the two immortal babes, Pollux and Helen, were born, and from the other the mortal, Castor and Clytemnestra. The principal exploits of the twin brothers

were their expedition to Attica to rescue their sister Helen from Theseus, their participation in the hunting of the Calydonian boar and in the Argonautic expedition, and their combat with the sons of Aphareus. Castor was killed in the combat, and when Pollux found him dead he implored Jupiter that he too might die, in order to be with his brother. Jupiter



CASTOR AND POLLUX.

took mercy on the great love of Pollux, and restored life to Castor on the condition that both of them should on alternate days descend to Hades, or, according to another version, placed them both among the stars. Generally, the Dioscuri are represented in art as mounted on fiery steeds, with spears and egg-shaped helmets ornamented with stars. They presided over the public games; Castor was the god of equestrian exercise, Pollux of boxing; they were also the patrons of hospitality.

Castor and Pollux, an electrical meteor which sometimes appears at sea, attached to the extremities of the masts of ships, under the form of two balls of fire. Sailors consider this phenomenon a sign of fair weather, but a single ball, which is called Helena, is supposed to portend a storm.

Castor Oil, fixed oil derived by expression from the seeds of *Ricinus communis* or castor-oil plant, which frequently grows, in the E. Indies and in Africa, to the height of 30 or 40 ft.; forming a tree, but in the U. S. and similar climates it practically never reaches over 15 ft. The nativity of the plant is doubtful, but it is held to have been native to tropical Africa. It was early cultivated by the Egyptians under the name of *kiki*, and the seeds have been found in their tombs. The seeds, which are oval and very smooth and shining, marbled, and of an ashy color, possess a rather agreeable nutty taste. They are, however, distinctly poisonous, as they contain

a substance known as ricinoleic acid or ricin, capable of producing severe inflammation of



CASTOR-OIL PLANT.

the stomach and bowels. Castor oil is recognized as being a gentle purgative in cases where the bowels are inflamed or irritated.

Castres (kăst'r), ancient town of France; department of Tarn; on the Agout; 34 m. N.E. of Castelnaudary; is the seat of a Protestant consistory, having been one of the strongholds of the early Huguenots. Louis XIII razed the fortifications, 1629, and Henry IV resided here during the religious wars. Pop. (1900) 27,308.

Castro, Cipriano, 1858– ; Venezuelan statesman; b. near Capacho; son of a peasant; became a rancher and coffee grower; took part in Crespo's rebellion, 1892; elected Senator from Tachira; spoiled by tax collectors, excited a revolt, 1899; was proclaimed President of Tachira; aided by government army officers, seized Caracas, and was formally elected President of the Republic, 1900; organized, 1901, a commission to consider foreign claims, with a view to settlement; defeated, 1901, a revolutionary force under Gen. Matos; during civil dissensions, property of subjects of Great Britain and Germany was destroyed and their concessions violated; blockade of Venezuelan ports by those powers, aided by Italy, followed, 1902-3; claims at issue adjudicated by The Hague Tribunal; Castro was embroiled with the U. S., 1905, over claims which he refused to submit to arbitration. In 1908 he had much trouble with the Dutch over trade relations. He left Venezuela at the end of 1908, ostensibly to consult with European physicians about his health. The government was seized by his enemies and he was restrained from landing when he returned in 1909.

Castro, Inez de. See INEZ DE CASTRO.

Castro Giovanni (-jō-văn'nē), town of Sicily; province of Caltanissetta; on plateau 4,000 ft. above sea level; 14 m. N.E. of Caltanissetta; has a feudal fortress of Saracenic origin. The

ancient *Enna* was the site of the most famous temple of Ceres, and was a favorite resort of that goddess. Pop. (1901) 25,826.

Castro, Guillem de, 1569-1631; Spanish poet; b. Valencia; friend and imitator of Lope de Vega; left nearly forty plays, of which two are responsible for most of the poet's fame, both being devoted to the "Youthful Adventures of the Cid." From these plays Corneille got the hint and much matter for "Le Cid."

Casuistry (kăzh'ū-is-trī), means the application of juridical methods of reasoning to moral questions. The word has undeservedly come to have the meaning of hairsplitting with regard to moral questions and consequently of sophistry. Whenever a state of culture grows complex, however, laws become difficult of application to particular cases and casuistry develops spontaneously as a necessary result. It thus developed among the Jews. As the Greeks never learned the absolute distinction between the morals and aesthetics, so the Jews never knew the absolute distinction between morality and legality. Their moral code and their civil law were one and the same thing. Casuistry may develop as the result of moral decadence, and its latent purpose is then to help people to circumvent the authority of conscience. This was the case in the Græco-Roman civilization of the first two centuries of our era, when treatises on the right to commit suicide, on the possible collision between the duties of citizenship and friendship, etc., engaged attention.

Cat, any member of the family *Felidæ*, including the lion, tiger, lynx, etc., but the name is sometimes limited to the smaller species. The original abode of the domestic cat (*Felis domestica*) is not certainly known, but probably it is descended from the domestic cat of ancient Egypt, which was an object of veneration, and the records of which run back to a very early period. The cat is scarcely mentioned in the authors of ancient Greece, Rome, and Judæa, and in the earlier mediæval period of Europe cats were comparatively rare and costly. They seem to have been long known in China, which affords a fine variety with a soft and beautiful fur and pendulous ears. Among the varieties are the Manx or Cornish cat, with a rudimentary tail; the Angora, with long hair; the Maltese and Chartreuse, of a bluish-slate color, etc.

Catacaustics, caustic curves formed by the reflection of rays of light, so called to distinguish them from the diacaustic, formed by refracted rays.

Cat'acombs, subterranean sepulchral galleries; especially the series in Rome supposed to have been excavated by the early Christians from Nero's time to the fall of Rome, and used by them for burial and as chapels for worship and refuges from persecution. Their aggregate length amounts to hundreds of miles, and they are said to contain the bones of 6,000,000 persons, mostly placed in niches or *loculi*, cut in the sides of the galleries. It is in the catacombs that we observe the beginnings of Chris-

tian art in the mystic symbols, figures of the Good Shepherd, etc., which adorn the sarcophagi and chambers or chapels. The catacombs have been made the object of careful researches, and abound in archaeological interest. Catacombs also exist in Egypt, Naples, Sicily, and elsewhere, and the name is also applied to certain ancient subterranean quarries in Paris, which have been used since 1786 as ossuaries or charnel houses.

Catalaunian (kăt-ă-lă'n-ăn) Plain, ancient name of the wide plain surrounding Châlons-sur-Marne, in France, where the Roman general Aëtius and his ally, Theodoric the Visigoth, gained a great victory over Attila, 451 A.D.

Catalepsy (kăt-ă-lép-sí), condition which occurs in various diseases, characterized by muscular rigidity, so that the patient retains any position in which he is placed. Formerly this was regarded as a special disease, but is now known to be a symptom of several. Most frequently the cause is hysteria; or it may be grave mental disease, as melancholia atonita, or katonita; in children, and more rarely in adults, it may occur in various general diseases; and lastly catalepsy is one of the phenomena obtainable in hypnotism.

Catalo'nia, old province of Spain; bounded N. by France, E. by the Mediterranean, S. by Valencia, and W. by Aragon; area, 12,427 sq. m.; pop. (1900) 1,966,382; capital, Barcelona. Catalonia is now divided into Barcelona, Tarragona, Lerida, and Gerona. The Catalans speak a peculiar language, different from Castilian, and related to Provençal. This region was a Roman province, *Hispania Tarraconensis*. The Goths and Moors successively ruled. In 1137 it was united with Aragon by a marriage of the sovereigns, and, 1460, they both were united with Castile by the marriage of Ferdinand and Isabella.

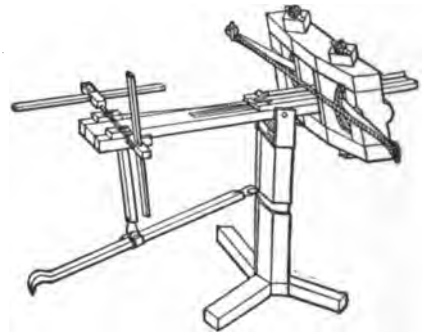
Catal'pa, genus of trees of the family *Bignoniaceæ*. The *C. bignonioides* and *C. speciosa* (W. catalpa) are indigenous in the S. and central U. S., and are planted for ornamental and other purposes in the N. states and in Europe. They have large cordate and pointed leaves, and showy flowers in open compound panicles. The fruit is a pod often a foot long, and usually remains on the tree all winter.

Catamaran', raft used by the Hindus of the Coromandel coast; formed of three planks lashed together, the middle piece, longer than the others. The catamaran, propelled by a paddle, is used by the people of Madras to maintain communication between the shore and ships where the surf is so violent that ordinary boats are unsafe. A catamaran carrying a sail is also used on the coast of Brazil. The name was also given to the fire boats prepared by the British, 1804, to destroy the French vessels which Napoleon gathered for the invasion of England; used again to denote any craft with two hulls having their inner sides parallel, however it may be propelled.

Cat'amount. See PUMA.

Catania (kă-tă'ně-ă), ancient *Catana*, city of Sicily; capital of province of Catania; on the E. coast at the foot of Mt. Etna; 31 m. NNW. of Syracuse. It presents a noble appearance from the sea, and is internally handsome, well built, with wide and straight streets, paved with lava. Some of the public buildings also are of lava. It has been several times damaged by eruptions of Mt. Etna, but it has risen again with greater beauty and splendor, and is now perhaps the finest city of Sicily. The ancient *Catana* was founded by the Phœnicians or Greeks, and was nearly as old as Rome. It was taken by the Athenian general Nicias abt. 413 B.C., and was an important city under the Romans, who adorned it with magnificent edifices. The remains of an aqueduct, a temple of Ceres, and an amphitheater are still visible. Pop. (1901) 149,295.

Cat'apult, ancient military apparatus for throwing stones, darts, and other missiles, invented in Syracuse in the reign of Dionysius



CATAPULT.

the Elder. It acted on the principle of the bow, and consisted of wood framework a part of which was elastic, and furnished with tense cords of hair or gut.

Cat'aract, opaque state of the crystalline lens of the eye, of its capsule, or both; called cataract because the ancients believed that a kind of opaque veil fell down within the eye, obscuring vision. Cataracts are thus lenticular, capsular, or lenticulo-capsular. Various other kinds are enumerated, such as hard cataract, in which the nucleus of the lens is large; soft cataract, in which the nucleus of the lens is small or wanting; and liquid cataract, in which there is a liquefaction of the cortical matter of the lens. Cataracts are also designated by their color as black, white, amber, etc. A cataract is either partial and stationary, or progressive and becomes complete, and is classified as senile, congenital or juvenile, secondary or complicated, and traumatic. The most common variety of cataract is the ordinary senile cataract, which is rare before the forty-fifth year. Medical treatment for cataract is useless, it must be surgically removed; then, if a spectacle known as a cataract glass be worn, sight is to a great degree restored.

Cataracts, or **Wa'terfalls**, places of more or less sudden descent in the course of a stream

or river, where the water leaps or rushes in its course; they indicate the occurrence of some disturbance in the regular course of river development by which a fall is introduced. The simplest type are those made in the course of normal valley cutting, as the Shoshone Falls (190 ft.) in the Shoshone or Snake River of Idaho, where a narrow gorge is cut down through a heavy series of horizontal lava beds, and the river falls from one bed to another. The falls of the Yosemite Valley (Yosemite Fall, 1,600 ft., and many of less height) plunge over cliffs in whose formation they have had no share; the Staubbach (900 ft.) of Switzerland, the Rjukanfos (900 ft.) and other lofty falls of Norway are similar to these. Falls of another class are formed where rivers deepen their channels and discover the uneven foundation on which the strata of the region lie; the cataracts or rapids of the Nile occur where the river has locally trenched through the weak desert sandstones and found hard crystalline rocks beneath. The uneven distribution of glacial and river drift has frequently diverted rivers from their former courses, and turned them over buried spurs or ledges, where falls are subsequently developed; the falls of the Rhine at Schaffhausen (60 ft.), the rapids of the St. Lawrence, and all the water powers of the Merrimac and other New England rivers have been produced.

Catarrh, condition characterized by congestion of the blood vessels of any mucous surface, with increased secretion. Thus there may be catarrh of the nose, throat, air passages, bowels, vagina, bladder, or urethra; but popularly catarrh designates a cold in general, a cold in the head, or a chronic catarrh of the nostrils and throat. Catarrhs in general arise from exposure to cold and wet, and to sudden atmospheric changes.

Cat'bird, song bird common in the U. S.; of the *Turdida*; related to the mocking bird, which it resembles in its vocal powers. It



CATBIRD.

derives its common name from a note or cry which it utters. It occurs in the Middle States as a summer bird of passage, and breeds in gardens or in the vicinity of dwelling houses.

Catawba (kā-tā'ba), or Great Catawba, river which rises in McDowell Co., N. C.; flows nearly E. to Iredell Co.; afterward S. into S. Carolina, and forms the E. boundary of York

and Chester counties. Below Rocky Mount it is called the Wateree, which unites with the Congaree to form the Santee, their outlet to the Atlantic Ocean. The Little or S. Catawba enters the Catawba on the W., a few miles above Charlotte, N. C. Its length from its source to Rocky Mount is 250 m.

Cateau-Cambresis (kā-tō'-kōn-brā-zē'), or **Le Cateau**, town of France; department of Nord; on the Selle; 14 m. ESE. of Cambrai; is well built, and was formerly fortified. A treaty was concluded here between Henry II of France and Philip II of Spain, 1559.

Catechet'ical Schools, name given to the ancient Christian schools of theology, of which the principal were those of Alexandria (160-400 A.D.) and Antioch (290 A.D. through the fifth century). The most noted teachers in the great school of Alexandria were Clement and Origen.

Cat'echism, arrangement of questions and answers, generally designed to teach religious doctrine to the young. Catechetical instruction has long prevailed among the Jews, and in the early Christian Church the *catechumens* (persons receiving instruction preparatory to baptism) constituted, according to several of the Fathers, a separate order in the membership of the Church. It has been said that the catechisms of Luther (1518-29) were the first which received this name. The Roman Catholic Church had long used catechisms, though called by other names. Kero of St. Gall in the eighth century prepared one of the earliest in German. The principal catechisms of later times have been those of Luther (the Exposition of 1518, the Catechism of 1520, the Smaller and Larger Catechism of 1529); Calvin's catechisms, the Smaller and Larger (1536-41); the Heidelberg Catechism (1563) (Reformed) that of Ecclampadius (1545); of Erasmus (1547); of Leo Judæ (1553); the Tridentine Catechism (1566), a standard in the Roman Catholic Church; the Anglican catechisms—the Larger (Latin, 1570), the Shorter or Middle Catechism, and the Smaller, which, with a few changes, is published in the Book of Common Prayer; the British Presbyterian catechisms—the Shorter (1647) and Larger (1648), which, with the Westminster Confession (1646), are standard books with most Presbyterian churches in the U. S. and Great Britain. The Greek Church has the "Orthodox Confession of the Eastern Church," 1643, and the Russian Church, a "Primer for Children," 1720, and a Shorter and Longer Catechism (1839). Besides these are the three Wesleyan catechisms prepared by Richard Watson, and the three Methodist Episcopal Church catechisms (New York, 1852).

Catechu (kāt'ē-kū), an extract which is obtained from the wood of *Acacia catechu*, or from the leaves and young shoots of *Uncaria gambir*, now substituted for true catechu. True catechu, such as is most commonly employed in the U. S., is derived chiefly from the E. Indies, and comes in masses of various shapes. Its color is light or dark, rusty brown. It is without odor, but has an astringent, bitter taste, which is also slightly sweet. It

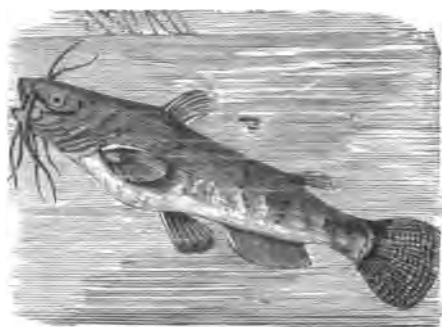
contains an extractive which is called catechin. The source of true catechu is a tree, varying from 3 to 40 ft. in height, which bears pale-yellow flowers arranged in dense cylinderlike spikes, about 3 in. in length. The wood of this tree is very heavy and durable, and contains a dark heart wood which is reddish brown or blackish brown in color. This heart wood, having been cut into chips, is boiled in water until the decoction thereby obtained is sufficiently strong, when it is strained and evaporated until the watery extract is of such a consistency that when poured into a mold it hardens. Catechu is used in medicine for the purpose of producing an astringent effect in cases where there is relaxation of the mucous membranes, particularly of the stomach and intestines.

Cate'na, in biblical literature, a commentary made up of selections from various writers. The number of catenæ is considerable, and some are of great antiquity. Perhaps the most celebrated is the *Catena Aurea* (i.e., golden chain) of Thomas Aquinas.

Cat'enary, curve formed by a cord or flexible chain of uniform density and size when suspended or allowed to hang freely from two fixed points. This curve was first noticed by Galileo, but he imagined it to be the same as the parabola. It has several remarkable properties, one of which is that its center of gravity is lower than that of any curve of equal perimeter and with the same fixed points for its extremities. It is interesting for the light it throws on the theory of arches, and by its application to the construction of suspension bridges.

Caterina da Siena (kă-trē'nă dă sē-ā'nă), **Santa** (St. Catherine of Sienna), 1347-80; Italian saint and writer; b. Siena; joined the Dominican nuns, and practiced asceticism; appeared at Avignon before the consistory (1376) to demand reform and the return of the pope to Rome. The next year she went to Florence as Gregory XI's ambassador to reconcile the Florentines. In 1378, at Pope Urban's request, she went to Rome to live. In 1461 she was canonized; April 30th was made her day.

Cat'fish, any one of several species of *Siluridae*, so called in allusion to the presence of



CATFISH.

long fleshy barbels about the mouth, suggesting the whiskers of a cat. All the catfishes

are scaleless, and have stiff spines in the dorsal and pectoral fins. They are among the most conspicuous inhabitants of sluggish streams and ponds in the regions they inhabit.

Cat'gut, a material employed for the strings of violins and other musical instruments, for the cords used by clock makers, for bow strings, fishing lines, and for belt stitching in mills, etc. It is generally prepared from the intestines of sheep, and sometimes from those of the horse and ass. It is prepared by an elaborate process, and preserved from putrefaction by treating it with a dilute solution of alkali. The best violin strings are manufactured in Italy, and are called Roman strings. Catgut is much used in surgery for sewing up wounds.

Cath'ari, name applied at different times to various sects of Christians, such as the Novatians of the third century, and to the Paulicians, who in Thrace were known as Bogomili, to the Albigenses, Patarenes, Waldenses, and others in the twelfth century. The name is analogous to Puritans, and was apparently in some cases assumed, and in others ironically conferred in consequence of their professed aim at greater purity of life than was ordinarily attained.

Cath'arine (Russian EKATERINA) I, 1684-1727; Empress of Russia; b. near Dorpat, Livonia; first husband was a Swedish dragon; was taken a captive by the Russians, 1702; became the mistress of Prince Menschikoff; then of the Emperor Peter the Great, who married her, 1707, and avowed it, 1711; was crowned, 1712, and on the death of Peter, 1725, was acknowledged empress.

Catharine II, 1729-96; Empress of Russia; b. Stettin; daughter of the Prince of Anhalt-Zerbst; was married, 1745, to Peter, a nephew and heir of Elizabeth, Empress of Russia. They soon quarreled and became estranged. On the death of Elizabeth he ascended the throne as Peter III. In July, 1762, he was assassinated by conspirators, of whom Catharine was probably an accomplice, and she assumed sovereign power, for which she was qualified by superior talents, although of very dissolute character. She administered the government with energy and success, and increased the extent and power of the empire. She cooperated with Austria and Prussia in the partition of Poland, 1772, and in the second partition of 1793. The Russians were victorious in a war against the Turks, which was ended by the treaty of Kainardji, 1774. She was a liberal patron of scientific men.

Catharine of Ar'agon, 1485-1536; Queen of England; daughter of Ferdinand and Isabella of Castile; was married to Arthur, eldest son of Henry VII of England, 1501, who died, 1502; then married, 1509, under a papal dispensation, Arthur's brother, Henry VIII, who was six years her junior; gave birth, 1516, to a daughter, Mary, who alone survived of five of her children, and became queen. The king, who had conceived a passion for Anne Boleyn, abt. 1527 expressed doubts of the legality of

his marriage with Catharine, and applied to the pope for a divorce. The disagreement between the pope and Henry VIII on this subject was one of the causes of the prevalence of Protestantism in England. Cranmer declared the marriage void, 1533; Catharine went to live at Amphill, Bedford, and then at Kimbolton Castle, Huntingdon, where she died.

Catharine of Braganza, 1638-1705; queen of Charles II of England; daughter of John IV of Portugal; brought in dower Tangiers and Bombay; had been religiously bred, and found the licentious customs of the English court strange. After the death of Charles (1685) she returned to Portugal, 1693, and was made regent by her brother Pedro, 1704.

Catharine de Médici (-mä'dë-chë), 1519-80; Queen of France; b. Florence; daughter of the Duke of Urbino, who was a nephew of Pope Leo X; married, 1533, to a son of Francis I of France, who ascended the throne as Henry II, 1547. On the death of her son Francis II, 1560, she became regent of France during the minority of her son Charles IX. She was ambitious, crafty, perfidious, and her intrigues promoted the civil or religious war by which France was long afflicted. She also appears to have been one of the instigators of the massacre of St. Bartholomew, 1572.

Catharine Parr, 1512-48; sixth wife of Henry VIII of England; married Edward Borough, then Lord Latimer; after his death became, 1543, queen of Henry VIII; was a woman of considerable learning and tact; after the death of the king she married Sir Thomas Seymour.

Catharine, Saint, of Alexandria, d. abt. 312 A.D.; virgin and martyr; festival November 25th; daughter of Cestus, pagan governor of Alexandria; converted many pagan philosophers by her arguments and the example of her life; the special patron of philosophical schools; martyred by Maximin Daja, a Roman officer, whose love she repudiated.

Catharine of Valois (vål-wål'), 1401-37; queen of Henry V of England; daughter of Charles VI of France; her hand, with the right of succession to the French throne, was given to Henry by the treaty of Troyes. After the death of the king, Catharine became the wife of Owen Tudor, a Welsh gentleman, and from them the Tudor dynasty was derived.

Catharine Archipel'ago. See ALEUTIAN ISLANDS.

Cathar'tic, a drug which possesses the power of producing active movements of the bowels. Some persons employ the term cathartic as equivalent to purgative, but a cathartic is a drug which has more powerful effects than the average purgative has. Jalap is a typical cathartic, while castor oil, Epsom salts, and sulphate of magnesia represent what might be called purgatives. Nearly all cathartics act upon the bowels; first, by stimulating or irritating its mucous membrane, and, second, by causing a reflex irritation of the nerves and nervous centers governing peristaltic action. See APERIENT; PURGATIVE.

Cathay (käth-a'), name by which China was known to Europeans during the Middle Ages, but more properly applied to the N. provinces of China, which were subdued by a Tartar race called Khitan in the early part of the tenth century. The capital of Cathay was Cambeluc or Yehking, now Peking.

Cath'cart, William Shaw (Earl of), 1755-1843; English general and diplomatist; b. Petersham; served in the American Revolution as an officer of dragoons, and as an aide to Sir Henry Clinton; commanded Tarleton's British Legion; wounded at Brandywine and Monmouth; returned from the siege of Charleston, 1780, to England; joined the Walcheren expedition, 1793, as brigadier general; major general, 1794; was sent on a mission to Russia, 1805; commanded the land forces which, with the aid of the fleet, captured Copenhagen, 1807; ambassador to St. Petersburg, 1813; created earl, 1814.

Cathe'dral, the principal church of a diocese, containing the bishop's throne or *cathedra*; usually the most imposing religious edifice in the diocese. Gothic architecture received its chief impetus and development in the designing of cathedrals and abbeys, and in the course of the Middle Ages evolved from the early Christian basilica the typical cathedral, with its nave, transepts, and choir, three aisled or five aisled; with or without exterior chapels; with its towers and spires, its lofty clearstory, and its ribbed vaulting of stone. The English cathedrals are noted for their extreme length, square easterly termination, rich vaulting, and, in some cases, their secondary transepts. Among them may be mentioned Durham, Peterborough, Lincoln, and Ely; Canterbury, Salisbury, and York, and Winchester. French cathedrals differ from the English in being shorter, much loftier, and broader (having often four side aisles besides chapels), and in their apsidal easterly terminations encircled by chapels and called *chevets*, the most important are Notre Dame at Paris, Chartres, Rheims, Rouen, Bourges, Sens, Troyes, Beauvais, and Amiens. In Germany the most magnificent is that at Cologne, completed in 1883, nearly 640 years after its commencement. In Italy the Duomo at Florence is, with one exception, the largest Gothic cathedral, covering 84,000 sq. ft., the cathedral of Milan alone exceeding it with its area of 107,000 sq. ft.

The Renaissance produced the cathedral, or more properly the basilica, of St. Peter at Rome, the greatest of all churches, 602 ft. long internally, and covering 240,000 sq. ft., and the Cathedral of St. Paul at London, Wren's masterpiece. St. Peter's is not, strictly speaking, the cathedral of Rome, this distinction belonging to the ancient basilica of St. John Lateran. In the U. S. the most important cathedrals are St. Patrick's (Roman Catholic) and the Protestant Episcopal Cathedral of St. John the Divine, both in New York City.

Cath'erine. See CATHARINE.

Catherine, Saint (of SWEDEN). See BRIDGET. SAINT.

Catherine of Alexan'dria, Saint. See CATHARINE.

Catherine of Siena, Saint. See CATERINA DA SIENA.

Cath'eter, surgical instrument used for insertion into mucous canals, particularly the urethra. Catheters made of metal have been found among relics of primitive peoples, and have been in use among civilized nations for many centuries. Those in ordinary use are made of silver or rubber.

Cath'ode. See KATHODE.

Cath'olic Apostolic Church (popularly known as the **IRVINGITES**), a body of Christians, followers of the Rev. Edward Irving, who died in 1834. They are distinguished by their claim to the exercise of the spiritual gifts enumerated in 1 Cor. xii, such as prophecy, unknown tongues, and the healing of disease. They receive the Apostles', the Nicene, and the Athanasian creeds. They are further distinguished by their claim to possess the fourfold ministry of apostles, prophets, evangelists, and pastors, mentioned in Eph. iv, and have in addition deacons, under deacons, and deaconesses. Each church is under the rule of a bishop (or angel, as he is termed). Their ritual is very full and impressive, combining many features of those of other branches of the Christian Church. The movement originated in London in 1830, and churches have been established throughout Christendom.

Catholic Church, phrase equivalent to "universal church," and not properly limited to any particular sect or body; once employed to distinguish the Christian Church from the Jewish, the latter being restricted to a single nation, while the former was intended for the world. Afterwards it marked the difference between the so-called Orthodox Church and the sects which sprang from it, as the Arians, Gnostics, etc. The name has been especially claimed by the Church of Rome. Protestant divines deny its applicability, yet the term Catholic is popularly used as synonymous with Roman Catholic.

Catholic Emancipa'tion, in British history, measure enacted April 13, 1829, by which the political disabilities previously resting upon Roman Catholics were chiefly removed. These disabilities weighed most heavily upon the Roman Catholics of Ireland, where they were enforced from the subjugation of Ireland by William III, 1691. Priests had been banished; the people disarmed; after 1704, a son turning Protestant could take his father's estate; no office could be held by a Roman Catholic; no Roman Catholic could practice law or teach school, could vote, nor marry a Protestant wife, etc. The only disabilities left upon Catholics were their exclusion from the regency, the chancellorship of England or Ireland, the viceroyship of Ireland, and from the offices and patronage of the Anglican Church, the universities and the church schools; the prohibition of episcopal titles, the public use of clerical insignia, the extension of monasti-

cism, and the increase of the number of Jesuits. These latter prohibitions are, however, practically overlooked.

Catholic Epis'tles, certain epistles of the New Testament addressed to the Church universal or to a large and indefinite circle of readers, namely, the I, II, and III of John, the I and II Peter, and those of James and Jude.

Catholicos (kă-thöl'i-kös), patriarchs or chief ecclesiastics in the hierarchy of the Armenian Church; also the prelates of the Christians of Georgia and Mingrelia.

Catholic Univer'sity of America, institution of learning in Washington, D. C.; confined to post-graduate work; organized under authority of the Plenary Council in Baltimore, 1884; incorporated, 1885; approved and granted power of conferring degrees by Pope Leo XIII, 1887; opened (faculty of theology) 1889.

Cat'iline, Lucius Sergius Catilina, 108-62 B.C.; Roman demagogue, chiefly known as the author and leader of the conspiracy against the republic, 62 B.C., which was exposed and thwarted by Cicero, then consul with C. Antonius, on the night of November 6th. Catiline left Rome the next day and went to the camp of Manlius, who was his accomplice and at the head of an army in Etruria. The army of the senate encountered that of Catiline near Pistoria (now Pistoia) in 62 B.C.; a desperate battle ensued, in which Catiline was defeated and killed, with about 3,000 of his partisans.

Cation (kät'i-ön). See KATION.

Cat Mon'key. See FLYING LEMUR.

Cat'nip, or **Cat'mint** (*Nepeta cataria*), an herbaceous plant of the family *Labiatae*, a native of Europe; a common weed in the U. S., but not indigenous there. It has cordate and crenate leaves, which are whitish, downy underneath, and emit a peculiar odor. Cats are extremely fond of this plant, which they eat with avidity and signs of excitement.

Ca'to, Dionysius, Latin moralist of the third century, of whom nothing is known; the reputed author of a small volume of moral precepts, entitled "Disticha de Moribus ad Filium," which was a popular book in the Middle Ages. Each precept is expressed in two hexameter verses.

Cato, Marcus Porcius, surnamed **THE ELDER**, to distinguish him from his great grandson, Cato Uticensis, 234-149 B.C.; Roman statesman; b. Tusculum; served in the second Punic War; later removed to Rome; gained distinction as an advocate; elected prætor, 198 B.C.; consul, 195, and commanded an army in Spain; elected censor, 184; acted as a military tribune in the war against Antiochus, 191, and contributed his part to deliver Greece from the encroachments of the East and bring her into closer and more intimate relations with the West. He was an implacable enemy of Carthage, and often repeated in the senate the phrase "Delenda est Carthago" ("Carthage must be destroyed").

Cato, Marcus Porcius, surnamed **THE YOUNGER** and **UTICENSIS**; 95-46 B.C.; Roman statesman; great grandson of the preceding; studied and adopted the doctrines and discipline of the Stoics; served against Spartacus; elected quaestor (treasurer); became tribune of the people, 63 B.C., and cooperated with Cicero to defeat the treason of Catiline and his accomplices. He opposed the triumvirs, Cæsar, Pompey, and Crassus, after they had formed a coalition; was chosen prætor, 54, and used his power to prevent bribery in elections. In the civil war he adhered to the senate and Pompey; was left in charge of Pompey's camp at Dyrrhachium during the battle of Pharsalia; and after that event escaped into Africa, where he was elected commander by the partisans of Pompey, but resigned the command to Metellus Scipio. The republican cause was ruined by the defeat of Scipio's army at Thapsus, April, 46, and Utica, which Cato had been defending, in the same year fell into the hands of the enemy. He refused to save his own life by flight, but to avoid capture by the enemy killed himself with his sword.

Cats, Jacob, 1577-1660; Dutch poet; b. Brouwershaven; has had extraordinary popularity among the Dutch middle class, being known as "Father Cats." He was educated at Leyden and at Orleans, France. In 1636 became grand pensionary of Holland, which office he held till 1652. He was twice sent as ambassador to England. Both as a man and as a poet Cats reflected to a remarkable degree the ideals of the Dutch *bourgeoisie*, and represents the best side of the prosaic Flemish genius of the period. His most noted and characteristic works are "Het Houwelich" (marriage), "Sinneen Minnebeelden," and "Trouringh."

Cat's-eye, beautiful variety of chalcedonic quartz of various shades of greenish gray or brownish red; displays, when polished, a pearly opalescence or floating internal light, much resembling the reflections exhibited by the eye of a cat.

Catskill Group, uppermost division of the Devonian system in N. America; named from the Catskill Mountains, supposed to be formed of these rocks, but are now known to be mainly composed of strata of the Chemung group. The Catskill rocks are best seen in the N. counties of Pennsylvania—Tioga, Bradford, Potter, etc. They are mainly red sandstones and shales, and contain as characteristic fossils the scales and bones of large ganoid fishes.

Catskill Moun'tains, group of the Appalachian system; included mostly in Greene Co., N. Y.; highest summit, Slide Mountain, 4,205 ft. The summits of the mountains command extensive and beautiful prospects, the scenery being diversified by cascades, rocky precipices, small lakes, and deep ravines.

Cat'tail, or **Cat's-tail** (*Typha latifolia*), an aquatic herbaceous plant of the family *Typhaceæ*; indigenous in the U. S. and Europe. It bears flowers in a long and very dense cylindrical spike terminating the stem. Its leaves

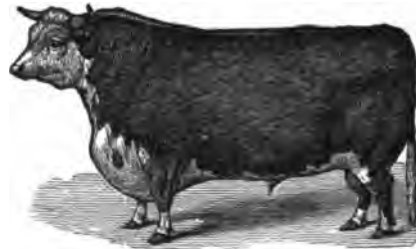
have been employed with success in France as a material for paper making.

Cattaro (kät'tä-rö), seaport of Austria, in Dalmatia, on the Gulf of Cattaro, 37 m. SE. of Ragusa; is strongly fortified; formerly the capital of a small republic of the same name. Pop. (1900) 5,693.

Cattaro, Bocca di (bök'kä dë), tortuous inlet of the Adriatic; at the S. extremity of the coast of Dalmatia; 30 m. long; protected from winds by high mountains on several sides; the best harbor in the Adriatic. The entrance from the sea is about 1½ m. wide.

Cat'tegat, or **Kat'tegat**, part of the ocean which separates Denmark from Sweden and washes the E. side of Jutland; communicates with the Baltic by three channels—Great Belt, Little Belt, and the Sound. On the other side the Skager-Rak connects it with the German Ocean. It is 160 m. long and 85 m. wide. Dangerous sand banks occur in it.

Cat'tle, in Old English, property, goods, chattels; whence (because a man's cattle were his principal goods) comes the modern use of the word as a collective term which in its widest sense includes all domestic animals, and in the usage of some writers includes also deer and other wild grazing animals. Among agriculturists, however, it is generally limited to beasts of the species *Bos taurus*, the domestic ox, the neat cattle or black cattle of British writers. There are many varieties or breeds of cattle. The principal breeds in the U. S. are of British origin, but the Texas cattle

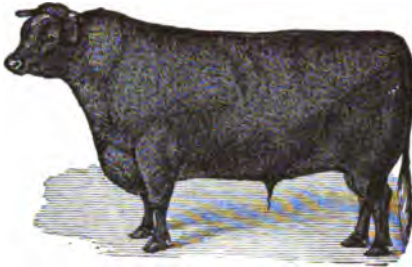


HEREFORD.

are descended chiefly from Spanish stock. The old native stock is of extremely mixed descent, but lately much attention has been paid to the rearing of pure-blooded and grade stock. The best are the short horn or Durham breed, which produces excellent beef cattle, and is extensively reared in the U. S., chiefly for fattening purposes; the Herefords, for beef; the Devons, for working oxen; the Ayrshires, for milking qualities; the Jerseys or Alderneys, for milk. The best breeds of the Great Britain, and to some extent of other parts of Europe, are largely introduced and mingled with the native stock.

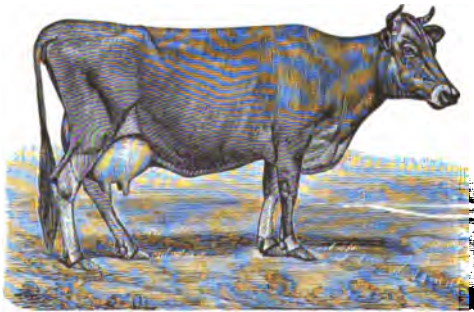
The British cattle are the best in the world. *The Long Horns*, an ancient and once famous breed of Lancashire and Westmoreland, England, are not bred in the U. S. A few are still bred in some English districts. *The Devons* claim the first place among the *Middle*

Horns. They are of medium size and symmetrical; their distinctive color is red. The head is small; the horns are clear, smooth, and symmetrically curved. They are not excelled for activity, docility, intelligence, and hardiness. The cow is gentle, feeds well on scanty pastures, and gives a moderate yield of rich milk. The flesh of this breed is excellent. Probably the first cattle imported into the U. S. were Devons. *The Sussex cattle* resemble the Devons, but are larger and coarser. *The Hereford* are of a medium or dark red



SHORT HORN.

color, with white faces and sometimes white on throat, back, and bellies. They make beef of the best quality. *The Welsh cattle* are smaller than the preceding. *The West Highland*, or *Kyloe*, originally found in the Hebrides and the county of Argyle, have remained unchanged, or improved only by selection. They are a beef rather than a dairy breed. They are of varied colors, but never particolored. *Ayrshire cattle* have for many years been considered as a leading dairy breed. They are of medium size, with wedge-shaped body,



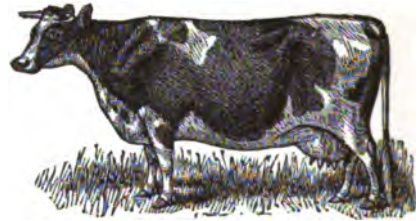
JERSEY.

slim neck, a small head, and graceful horns. In color they vary considerably, red and white spotted or mottled being the most common. Ayrshire milk is better adapted to cheese making than to butter. *The Kerry cow* of Ireland—sometimes called “the poor man’s cow,” from her moderate size, hardiness, good milking qualities, and docility—has a neatly formed head, upturned horns, lively and expressive eyes, and a body but little more than 3 ft. high. Black is the common color.

The Short Horn breed has been prominent in the counties of Durham and York, Eng-

land, since the latter part of the seventeenth century. See **SHORT HORNS**.

The Channel Island cattle from the islands of Jersey and Guernsey, in the British Channel, have long been noted for their value in the production of milk rich in butter properties. Many of them have been exported from Jersey, and in the U. S. they are generally known by that name, though formerly they were often called Alderney. The Jersey has a small deerlike head; muzzle fine and dark and encircled by a light color; horns small, crumpled, and of an amber color; chest inclined to be narrow; tail fine; udder full in form, well up behind, and running well forward; milk veins prominent; escutcheon or milk mirror high and broad, and full on thighs. They give a moderate amount of milk rich in butter fat of a deep yellow color. Fawn is a common and favorite color. The Guernseys are larger and



HOLSTEIN.

hardier than the Jerseys, but have the same general characteristics.

Holstein-Friesian cattle are found in greatest perfection in the provinces of N. Holland and W. Friesland in the kingdom of the Netherlands. They are large, heavy animals with form indicating milking quality, muzzle black, colors black and white spotted or mottled in greater or less inequalities of proportion on the body. They are a hardy breed and large feeders. Holsteins are remarkable rather for the quantity of their milk product than for its richness, and have been thought better adapted to the manufacture of cheese than to that of butter.

Polled or Hornless Cattle.—The most prominent are the Galloway and the Aberdeen or Angus, both Scotch breeds, and the Norfolk or Suffolk, an English breed. The Aberdeens and the Galloways are black, the Norfolk red. The first have been housed and fed better than the second, and have become smoother, finer animals of excellent feeding quality. See **BOVIDÆ**; **BULL**.

Cattle Plague. See **RINDERPEST**.

Cattleya (kät'tlë-yä), genus of showy orchids; natives of tropical America, especially of Colombia, and numbering about twenty species, which have under cultivation given rise to numberless varieties. The plants are epiphytic, and form thickened bulblike enlargements upon their leaf stalks (pseudobulbs), which serve as reservoirs of food material.

Cat'y, a Chinese weight known also as kin, or pound. The weight equivalent fixed at the Chinese customhouse is 1.3316 lb. avoirdupois, or 0.60453 of a kilogram.

Catullus, Gaius Valerius, abt. 87-47 B.C.; Roman poet; b. Verona; in early life a resident of Rome, and enjoyed the society of Cicero and Cæsar; the first Roman who excelled in lyric poetry; wrote, besides numerous odes and epigrams, a heroic or narrative poem entitled "The Nuptials of Peleus and Thetis," his longest work, and a poem called "Atys."

Cat'ulus, Quintus Lutatius, d. 87 B.C.; Roman general; consul and colleague of Caius Marius, 102 B.C.; with Marius commanded two armies, which united and defeated the Cimbri near Vercelli, 101 B.C.; joined Sulla in the civil war, and condemned to death by the Marian party, killed himself.

Caucasian (kâ-kâ'shân), loosely applied to the principal white races of mankind. The Circassians and Georgians dwelling at the foot of Mt. Caucasus have been taken as the type of the Caucasian race, and suggested the name. According to Blumenbach, the Caucasian race is the principal of the five divisions of the human family, and the original stock. It comprises the most enlightened and powerful nations of the earth, including, besides the Aryan races, the Hebrews, Phœnicians, and Arabs. But the inhabitants of the Caucasus are now classed by some with the Mongols.

Caucasus (kâ-kâ-sûs), or **Cauca'sia**, Russian territory between the Black and Caspian seas, on each side of the Caucasus Mountains; consists of thirteen provinces, of which three (Kuban, Stavropol, and Terek) are in Europe and form Cis-Caucasia, or N. Caucasia, while the others (Kutais, Tiflis, Batum, Black Sea, Zakataly, Elizabethpol, Baku, Eriwan, Daghestan, and Kars) form Trans-Caucasia, or Caucasia in Asia; area of Cis-Caucasia, 80,201 sq. m.; pop. (1906) 4,343,900; Trans-Caucasia, area, 95,402 sq. m.; pop. (1906) 6,114,600.

Also the name of a lofty mountain range between the Black Sea and the Caspian, and along the boundary between Europe and Asia. It is 690 m. long, and extends from the peninsula of Taman on the Black Sea, in an ESE. direction, to the peninsula of Apsheron on the Caspian. Connected with this central chain are several branches or transverse ridges on both sides. The culminating point is Mt. Elburz, about 18,570 ft., near the middle of the central chain. Its base is 7,660 ft. above sea level. The inhabitants of the Caucasus comprise a variety of tribes, who speak different languages and are subject to Russia. Among them are the Circassians, Georgians, and Leaghians. They are noted for their love of freedom; and to maintain their independence they waged a long war against the Russian invaders, which was terminated by the capture of their leader, Schamyl, 1859.

Caucus, in American politics, a meeting of citizens for the selection of candidates to be supported at a pending election, or of legislators or others to confer and decide upon party measures or policy. The word originated in Boston during the popular discontent and agitation which culminated in the Revolutionary struggle. Boston being then a straggling

maritime village, mainly supported by commerce and the seaboard fisheries, which gave importance to the arts subsidiary to navigation. The calkers of vessels were thus relatively numerous; they were robust, active citizens in the prime of life, and they were enlisted, heart and soul, in the patriot cause. Their work was done at the N. End, where but few houses had yet been built, and their dwellings were mainly in that neighborhood. If they had a place of meeting as a craft, it would naturally be chosen for their political gatherings as well; and the Tories, or loyalists, seeing these convened at the calkers' headquarters, would call them calkers' meetings, implying that none but low-bred mechanics and their like were hostile to the royal cause. **Caucus**—at first a corruption of calkers—thus became the received designation of a political meeting, especially if held with closed doors. The word first appears in the diary of John Adams, under date of February, 1763, as follows: "This day found that the Caucus Club meets at certain times in the garret of Tom Dawes, the adjutant of the Boston (militia) regiment."

Cau'dine Forks, two narrow passes through the mountains of ancient Samnium, considered identical with the valley now called the Val d'Arpaja, by which passed the road from Capuato Beneventum. In 321 B.C., during the Samnite War, the Roman army, caught between the passes, were obliged to surrender and compelled to pass under the yoke.

Caul, thin membrane which sometimes covers the head of the child at birth. In ancient times it was considered propitious to be born with a caul, and the person purchasing a caul thereby secured for himself various happy prospects. The caul was of particular value to advocates, who by its possession thought to obtain eloquence, and to seamen, to secure them against drowning, and in consequence large sums were at times offered for the charm.

Cauliflower, a plant of the mustard family and of the same species as the cabbage. The edible portion is a head composed of the transformed flowers and flower stems. The head is cooked in various ways after the manner of preparing cabbage. The crop is cultivated in essentially the same manner as early cabbages. The cauliflower demands a rather moist soil and humid atmosphere. The seacoast regions of New England, Long Island, and Puget Sound are thought to be particularly adapted to the plant. The head is usually bleached, or protected from sun-scorching, by breaking the leaves over it when it is nearly grown. Cauliflower seed is mostly grown in Europe. Broccoli is a large and late type of cauliflower.

Caulonia (kâ-lô'nî-â), ancient Greek city and seaport of Italy; in Bruttium, between Locri and the Gulf of Scyllacium; an important city abt. 500 B.C. According to Porphyry, Pythagoras sought refuge here after his expulsion from Crotona. The people of Caulonia formed a league with those of Crotona and Sybaris. In 389 B.C. Dionysius the Elder invaded Magna

Græcia with a large army, took Caulonia, and removed the inhabitants to Syracuse. Pop. (1901) 6,344.

Caus (kō), Salomon de, 1576-1626; French engineer; b. Dieppe; lived much in Germany and England; considered by Arago to be the inventor of the steam engine; published, 1615, a work on motive powers entitled "Les Raisons des Forces Mouvants," etc., which gives a theorem on the expansion and condensation of steam.

Cause, in law, an action, suit, or controversy in a court of justice; a case; a question tried before a judge. The term cause refers particularly to the subject matter in dispute, while "action" and "suit" refer to the legal procedure.

Cause, in ontology, is any principle which in any way whatever embraces the ground or reason why anything diverse from itself exists. The principle correspondent with this principle is called effect, and the relation which exists between cause and effect is causality. The ontological principles are: There is no effect without a cause; out of nothing, nothing comes; nothing can be the efficient cause of itself; two things cannot be the reciprocal cause of each other; the effect and the cause are always proportioned to each other; whatever is in the effect must in some sense be in the cause; the cause of the cause is also the cause of the effect; the same causes always produce the same effects; the cause must be present, either immediately or mediately, with that which it effects. See ONTOLOGY.

Causes célèbres, celebrated causes or trials, particularly certain French state trials of the seventeenth and eighteenth centuries, the reports of the decisions of which are contained in two collections, one by Gayot de Pitival and another by Des Essarts. In general, any trial which is especially interesting or remarkable in its incidents is called a *cause célèbre*, as the Dreyfus trial.

Caustic (kās'tik), a substance which exerts a disintegrating or destructive effect upon animal tissues. Caustics usually produce a sensation as of burning. "Lunar caustic" is the silver nitrate, so called because *luna* (the moon) is the old alchemical name for silver. Caustic lime, potash, soda, and magnesia are in effect like substances when pure, so called to distinguish them from their less active carbonates. Many other chemical reagents are used in surgery as caustics, notably the nitric, chromic, and arsenious acids and bromine.

Caustic, in optics, is a term applied to curved lines formed by a series of points where (from the intersection of reflected or refracted rays) the heat and light are most intense. Reflected rays produce catacaustics—refracted rays, diacaustics. The study of caustic surfaces and curves is of the greatest importance in the construction of lenses and mirrors.

Cautery (kā'tē-rī), in surgery, the application of a red-hot iron; also the instrument which is heated and applied in this operation.

The cautery is useful in destroying morbid and gangrenous tissues, in staying hemorrhages, and in relieving severe local pain. It is a method of treatment in certain spinal affections.

Cavaignac (kā-vān-yāk'), Louis Eugene, 1802-57; French general and statesman; b. Paris; son of Jean Baptiste Cavaignac, a notable revolutionist and member of the Council of Five Hundred; served with distinction in Algeria, 1832-48; governor general in latter year; suddenly called to Paris to defend the government against the mob the same year; Minister of War; displayed energy, skill, and presence of mind in his operations against the socialists and communists, who began an insurrection in Paris, June 23, 1848, and were defeated in a battle which lasted three days. Abt. June 28th he was chosen *chef du pouvoir exécutif*, or President of the Republic, by the National Assembly, and used his power with clemency. In the autumn of 1848 he was a candidate for the presidency, but was defeated by Louis Napoleon. He retired from power December 20th, and took his seat in the National Assembly.

Cavalcanti (kā-vāl-kān'tē), Guido, abt. 1240-1300; Italian poet; b. Florence; succeeded his father-in-law Überti as chief of the Ghibeline Party, and was exiled; noted for his friendship with Dante, which led to an exchange of delightful sonnets; best-known poem, canzone on the "Nature of Love."

Cavalier (kā-v-ā-lēr'), horseman, knight, armed horseman, gentleman attendant on a lady, soldier who fights on horseback; a member of the party which fought on the king's side in the contest between Charles I of England and the Parliament, their opponents being called Roundheads. It was at first a nickname and term of reproach, whence cavalier as an adjective came to be synonymous with rude or contemptuous, a meaning still perpetuated; afterwards it implied respect and was used as a title of honor.

Cavalry, mounted troops; first employed, apparently, by the Carthaginians; were first organized in Greece and Macedonia. The battle of the Granicus and the battles of Issus and Arbela were won by Alexander's horse. The Roman cavalry was trained to fight on foot as well as mounted. Under the feudal system the great body of cavalry was made up of mail-clad knights with their men at arms; cavalry in the Middle Ages was used in heavy masses, crashing through the opposing ranks with spear and sword. With the introduction of gunpowder and the abandonment of armor, disciplined troops became a necessity, and standing armies were the result. From the time of Frederick the Great, Prussian cavalry was regarded as the finest in the world. A regiment of cavalry consists of twelve companies or troops of sixty-three men each; two troops form a squadron. In war, batteries of horse artillery are usually attached to the cavalry, the cannoneers being mounted. The arms of cavalry are usually straight swords or sabers, pistols, and carbines. In 1909 the U. S. had fifteen regiments of cavalry.

The crashing cavalry charge of the Napoleonic wars, then an important means of demoralizing the enemy after they had been shaken by artillery fire, has now lost its strategic importance. Rapid-fire guns and long-range projectiles require that troops shall cross the zone of fire in open order, and a massed cavalry charge, under modern conditions, presents too favorable a target for an enemy, even if the effect of the charge is not entirely destroyed by pits, barbed wires, or other obstacles. Cavalry is now used principally for reconnoitering, for quick raids, and intercepting conveyed goods, and is especially valuable when by vigorously pushing a retreating enemy it can turn a defeat into a rout.

Cavatina (kă-vă-tě'nă), in music, a short operatic melody, simpler than the aria, without second and *da-capo* parts, a distinction, however, not uniformly observed by composers. A specimen is to be found in Meyerbeer's "Roberto il Diavolo."

Cave, or **Cavern**, underground hollow space, more or less in communication with the surface. The largest caverns are formed by the solvent action of subterranean waters on limestone rocks. The Mammoth Cave of Kentucky, Luray and other caverns of Virginia are the most noted in the U. S. Tubular caverns are found in lava flows, where the congealed surface of the flow stands as a roof while the liquid lava within has escaped. These are common on the Hawaiian Islands. Caves of moderate depth are cut where strong sea waves beat on a bold rocky coast, eating away the weaker parts of the rock at water level more rapidly than the cliff above retreats by weathering on its face. Fingal's Cave, Scotland, is the most noted of this kind. Plants do not grow in caverns, but a few species of fish, crayfish and crickets, nearly colorless and with undeveloped eyes, inhabit these dark regions.

Caveat (kă-vě-ăt), in law, a formal caution or notice given to a court, judge, or ministerial officer to stay the performance of certain acts. It is used to prevent the enrollment of a decree in chancery; the issuing of a commission of lunacy; the admission of a will to probate; the grant of letters testamentary to an executor; the issuing of letters patent. A caveat in patent law is a written notice to the Patent Office of a person's claim to an alleged invention, to prevent the granting of letters patent to another person while the caveat is in force, without notice to the caveator.

Cave Dwellers, a population inhabiting certain portions of W. Europe in the palæolithic period of the Stone Age, and by extension to similar populations elsewhere. The cave dwellers appear to have selected caverns for the seats of their densest population and most active industries. Characteristic caves of this period have been discovered in many parts of Europe, especially in Belgium, France, England, Wales, and Spain; also along the S. slope of the Sierra Nevadas in N. America. Bones of extinct animals found in European

caves include those of the cave bear, hairy mammoth, tiger, rhinoceros, musk ox, and horse, the last named, apparently used as food; relics of man include weapons and utensils of bone, stone, horn flint, needles, and ivory ornaments; the cave dwellers were evidently not cannibals; skeletons of men and women found in S. France, nearly 6 ft. high and of powerful build; those in Belgium, much smaller. See **CLIFF DWELLINGS**.

Cavendish, Henry, 1731-1810, English chemist and physicist; b. Nice, Italy; he was the possessor of a large fortune, and devoted himself to the natural sciences, particularly chemistry and physics; by his discovery of hydrogen, 1766, contributed to overthrow the phlogiston theory, and laid the foundation of pneumatic chemistry; discovered that water is a compound of oxygen and hydrogen in certain proportions. The "Cavendish experiment" was a device of his for determining the earth's density. He was distinguished for the precision and accuracy of his processes. Lived in extraordinary seclusion.

Cavendish, Sir Thomas, abt. 1555-92; English navigator; b. Trimley, St. Martin, Suffolk; fitted out a ship and went to Virginia, 1585, with the expedition under Sir Richard Grenville; during a voyage around S. America and up the California coast, 1586, destroyed nineteen Spanish ships; returned via the Cape of Good Hope, becoming the third circumnavigator; for this was knighted; afterwards discovered the harbor of Port Desire, Patagonia.

Cavern. See **CAVE**.

Caviar (kăv'ĭ-ăr), or **Caviare** (kă-věr'), prepared and salted roe of the sturgeon; made chiefly in Russia, the Caspian fishery alone sometimes yielding several hundred tons annually. Caviar is verbally disagreeable to the uneducated palate, though highly esteemed by the initiated. It is now prepared extensively in the U. S.

Cavite (kă-vě-tă'), fortified seaport of Luzon, P. I.; on the Bay of Manila; 3 m. SW. of Manila; formerly the chief naval depot of the Spanish possessions in the East; was captured by Dewey, May 3, 1898; now a U. S. naval station. Pop. abt. 5,000.

Cavour (kă-vôr'), **Camillo Benso di** (Count), 1810-61; Italian statesman; b. Turin; became an engineer officer, but resigned, 1831; turned his attention to agriculture and to reform agitations; started the liberal journal, *Il Risorgimento*, 1848; on the granting of a constitutional government to Sardinia, 1848, was elected to the Chamber; Minister of Commerce, 1850; of Finance, 1851; Premier, 1852; conducted the policy of Italy, bringing about its political consolidation; promoted free trade and religious toleration; formed an alliance with Great Britain and France, by which Italy participated in the Crimean War; made a secret treaty with Napoleon III, 1858, involving a plan to drive Austria from Italy, which brought about the Franco-Sardinian War, and the cession of Lombardy to Italy; resigned, 1859, disapproving of the Treaty of Villa-

franca, which allowed Austria to retain Venetia, but resumed office, 1860; was Prime Minister of the new kingdom of Italy when he died.

Cawnpur (kân-pôr'), town of Hindustan; on the Ganges; about 96 m. SW. of Lucknow; is an important British military station, having cantonments for 7,000 men. During the mutiny, 1857, Nana Sahib massacred here a number of British captives. A monument has been erected over the well into which their bodies were thrown. Pop. (1901) 197,170.

Carxton, William, abt. 1422-92; English merchant and printer; b. Kent; negotiated a treaty of commerce between Edward IV of England and the Duke of Burgundy, 1464; translated from the French a "History of Troy," which he printed in Bruges, 1474, is said to the first book printed in English, as his "Dictes and Sayings of the Philosophers" is the first book published in England, 1774; after a residence at the court of the Duchess of Burgundy, returned to England and established a printing office in Westminster, 1476, where he printed other books. Most of his books were of his own translation, in folio, and may be called "black-letter" books.

Cayenne (kâ-yên'), fortified seaport, capital of French Guiana; on the Atlantic Ocean and an island of same name; at mouth of the Cayenne River; coffee, sugar, gold, indigo, cotton, and cacao are exported; has a college, museum, and library; island is a penal colony. Pop. (1906) 12,612.

Caymans (kî-mânz'), The, three small islands in the Caribbean Sea; 130 m. NW. of Jamaica; belong to Great Britain, and are politically attached to Jamaica; chief products, coconuts and turtles; area, 225 sq. m.; pop. of largest island, Grand Cayman, 5,290.

Cayuga (kâ-yô'gâ) Lake, in New York State; between Cayuga and Seneca counties; about 38 m. long; width, 1 to 3 m.; greatest depth more than 500 ft.; the surface, 387 ft. above sea level. The outlet is Seneca River, a tributary of Lake Ontario.

Cayugas, tribe of N. American Indians, belonging to the Iroquois family, known as the Six Nations; inhabited several villages on Cayuga Lake, and numbered when first known to the French, about 300 warriors. During the American Revolution they joined the English. After the war they ceded all their land to the State of New York except a small reservation, which they abandoned, 1800; now dwindled to about 150.

Cebú (thâ-bô'), province of the Visayas, P. I.; comprises the large island of same name and twenty-nine dependent islands; between Negros and Bohal; NW. of Mindanao; surrounded by the Visayan Sea; area of main island and dependencies, 1,782 sq. m.; pop. (1903) 653,727; capital, Cebú, on main island. The province has a number of bays and harbors; mountain chain running NE. to SW.; several long rivers, but none of present importance; a highway along almost the entire

E. coast, which unites twenty-one towns with the capital, another on the W. coast, and a new one connecting the E. and W. coasts; deposits of coal, gold, silver, lead, iron, oil, and gas.

Cebú, capital of province of same name in Philippine Islands; on the E. coast of the island of Cebú; is the center of a large coast trade with Manila, all the Visayan islands, Mindanao, and Palawan; has an excellent harbor, large stone fort within the city limits and earth fort 5 m. distant; has a government house, episcopal palace, with rich interior decorations, and the "Rizal," small building on the plaza, which holds the cross said to have been planted by Magellan on taking possession of the island; has large exports of hemp, sugar, and copra. Pop. (1903) 31,079.

Cecil (sês'il), **Robert** (Lord). See SALISBURY, MARQUISES OF.

Cecil, William (Lord Burleigh), 1520-98; English statesman; b. Bourn, Lincoln; Secretary of State, 1548; resigned on the accession of Queen Mary, 1553; reappointed by Queen Elizabeth, 1558; was virtually Prime Minister for forty years from that date; created Baron Burleigh, 1571; Lord Treasurer, 1572.

Cecilia (sê-sil'i-â), Saint, Roman virgin who suffered martyrdom under Marcus Aurelius. In 821 Pope Paschal placed her bones in the new Church of St. Cecilia in Rome. She is regarded as the patroness of musicians and the inventor of the organ. Her festival is November 22d, and in Rome is celebrated with fine music. She must not be confounded with St. Cecilia of Africa, who suffered martyrdom by starvation under Diocletian, and whose calendar day is February 11th.

Ce'crops, a semifabulous hero of the Pelasgian race; called the first king and legislator of Attica; instituted marriage and instructed the Athenians in agriculture, navigation, religion, etc. The people of Attica were sometimes called Cecropidae.

Ce'dar, common name of several species of evergreen trees of the family *Coniferae*, which afford durable and valuable timber. The name red cedar is given to the *Juniperus virginiana*, a native of the U. S. In the Western states it attains the height of 70 ft. or more, but in the Eastern states it is a small tree. The American white cedar (*Chamaecyparis sphaeroidea*), an evergreen tree, abounds in the swamps of the E. U. S., and grows from 30 to 90 ft. high. The timber of this tree is an excellent material for posts of fences and for shingles. The name white cedar is given in the U. S. to the wood of *C. sphaeroidea* and *Thuja occidentalis*, or "arbor vitæ," the latter throughout the Northern states. The cedar of Lebanon is the true and original cedar. It is not, like the American cedars, related to the cypress, but to the pine and larch. Of the celebrated cedars on Mt. Lebanon eleven groves still remain. Perhaps a dozen of these are very old; the largest, 63 ft. in girth, is thought by some to have attained the age of two thousand years. Spanish cedar, of which cigar

boxes are made, and which is used for wardrobes and sometimes for lead pencils (as a substitute for red cedar), is the wood of *Cedrela odorata*, a W. Indian tree of the mahogany family.

Cedar Bird, or Cherry Bird (*Ampelis cedrorum*), a species of waxwing (*Ampelidæ*);



CEDAR BIRD.

abundant in the U. S.; a graceful little bird, of a soft-brown color, not musical, feeding upon insects and fruits.

Cedar Creek, stream that rises in Shenandoah Co., Va., and flows into the N. Fork of the Shenandoah River, 4 m. below Strasburg; gives its name to a brilliant action in the Civil War, the last important battle in the Shenandoah Valley, October 19, 1864, between a Union force under command, first of Wright, and later, of Sheridan, and a Confederate army under Early. The first part of the action was advantageous to the Confederates, but the sudden arrival of Sheridan, after a 20-m. ride (celebrated in Thomas B. Read's familiar poem), reversed the issue and led to the rout and retreat of the Confederates, and the recovery of all Wright had lost.

Cedar Moun'tain, elevation in Culpeper Co., Va.; 2 m. W. of Mitchell's Station; scene of a battle, August 9, 1862, between a Union force under Banks and a much larger Confederate one under Jackson, in which Banks was defeated.

Cedar Rap'ids, city in Linn Co., Iowa; on Cedar River; 219 m. W. of Chicago; a railroad and manufacturing center; has valuable water power. Pop. (1900) 25,656.

Cedar River, stream of Iowa; rises in the S. part of Minnesota; flows nearly SE. through Mitchell, Floyd, Bremer, Black Hawk, Benton, Linn, and Cedar counties; then turning to the S.W., enters the Iowa River; length estimated 350 m.

Ceiling, covering or upper surface of a room. Ancient ceilings, whether of wood or stone, usually consisted of horizontal beams or lintels, supporting flat slabs richly painted. Two sets of intersecting beams, forming panels or *lacunæ*, often were used; and this style of

ceiling was extensively imitated and elaborated in the Renaissance. The Romans were the first to make general use of arched or vaulted ceilings, especially in their temples and *thermæ*; these were usually of brick or concrete, heavily stuccoed, and the stucco wrought into rich panels or painted; they were of three kinds—barrel vaults, groined vaults, and domes. While the East elaborated the domical ceiling, the West, throughout the Middle Ages, was perfecting the groined vault with ribs. Modern ceilings are usually flat, finished in wood or in plaster. Those divided into deep panels are called *coffered*; those in which a curved surface intervenes between the flat portion and the wall are called *coved* ceilings.

Celandine, the *Chelidonium majus* of the Poppy family (*Papaveraceæ*); a biennial or perennial herb, more or less cultivated everywhere. It is the sole representative of the genus, which is related to the California poppy (*Eschscholtzia*). It attains a height of 2 or 3 ft., and is a smooth, branching, leafy plant, with small, yellow flowers, which blossom all summer. It is used in medicine, constituting the drug "chelidonium"; an acrid purgative, diuretic, and expectorant.

Celebes (sêl'ê-bêz), native, NEGRI-ORANG-BUGIS, large island of Malaysia; 75 m. E. of Borneo, from which it is separated by Macassar Strait; area, 71,470 sq. m.; pop. (1901) estimated 884,141; chief town, Macassar; has a very irregular form, being divided by deep bays into four peninsulas, one of which, Menado, is 400 m. long and very narrow. These peninsulas are formed by chains of mountains radiating from the central part of the island, and in the N. there are lofty volcanoes, recently active, and still giving rise to earthquakes. The two S. peninsulas are separated by the Bay of Boni. The fauna comprises some animals peculiar to the island, as the tailless baboon, the babiroussa, the cuscus, the saputan or wild cow, several species of starlings, and magpies. The town of Menado is the seat of a Dutch residence. Celebes is partly occupied by a race called Bugis, who are strong and well built, revengeful, and fond of the chase. The Wadjus are an intelligent race who pursue commerce; the Arafuras inhabit the central regions, and are the aborigines. This island was visited by the Portuguese, 1512. The Dutch expelled the Portuguese, 1660, and planted colonies, which they still possess. Their two-hundred-year-old war with the natives was supposed to have ended, 1906, when the fortress of Barupu, where the rebels made their last stand, was captured after a long siege.

Cel'ery, a plant of the parsley family (*Umbellifera*), cultivated in temperate climates for its leaf stalks, which are bleached by various means, and eaten raw with salt and in salads or cooked in various ways. Its leaves, roots, or ground seeds are used for flavoring. In medicine it is valuable for the apiol it contains, which has action similar to that of many volatile oils, but in addition dilates the

blood vessels. One form, the *celeriac* or *turnip-rooted celery*, is grown for the swollen subterranean part. Its technical name, *Apium graveolens*, records the heavy scent of the foliage. The acrid principles of the plant are greatly mollified by cultivation and bleaching, and the tissues also become more tender and brittle.

The cultivation of celery in the U. S. has increased rapidly in recent years. Formerly it was grown in drills from 6 in. to a foot deep, a method thought necessary to insure the proper bleaching of the leaf stalks. It is now grown in level culture, the bleaching being performed by heaping earth against the plants or by the use of boards, paper, or other material; or the plants may be set so thickly as to bleach themselves. The lower and moister lands are ordinarily devoted to celery culture, although the plant grows well upon rich upland. Celery is nearly always started in hotbeds or cold frames, or the late crop may be started in seed beds in the open. The plants are set in the field when about 6 in. high, in rows from 3 to 4 ft. apart and a foot or less apart in the row.

Celestial Em'pire, popular name of the Chinese Empire; derived from the Chinese *Tien Chao*, meaning Heavenly Dynasty; hence the name Celestials, applied to natives of China.

Celestine (sēl'is-tin), name of five popes, the most important of whom were CELESTINE III (GIACINTO ORSINI); elected pope in 1191; promoted the first crusade; excommunicated Leopold, Duke of Austria, for detaining Richard Cœur de Lion in prison; d. in Rome, 1198. CELESTINE V, St. (PIETRO DA MURBONE or MORONE), 1215-96; b. Isernia, Italy; elected pope, 1204. Before that event he had founded an order of hermits called Celestines. He abdicated the office, 1294, after a disastrous reign, and returned to the monastic life; was succeeded by Boniface VIII, who confined him in the Castle Fumone, near Anagnin, where he died. He was canonized in 1313.

Celestines, order of hermits or monks founded, 1254, by Pietro Angelier (Pope Celestine V); spread rapidly in France, Italy, and Germany, 1264 to 1400, but now nearly extinct. First called Hermits of St. Damian or of Morone, and after 1294 Celestines. Their costume is white, with black hood and scapulary. They followed the rule of St. Benedict, and preferred a contemplative life.

Celibacy (sē-lib'ā-sī), condition of a person never married; applied often to the voluntary life of abstinence from marriage assumed by religious devotees and the clergy of some churches, such as the Roman Catholic. Practiced in ancient Rome in the case of the vestal virgins, in Judæa by the Essenes, and in the East by the priests of Buddhism, it possibly took its origin among them in the belief that the material body is the source of evil and the prison of the soul. Among Christians it was the natural outcome of the ascetic teachings and spirit of the Gospel, as well as of the example of Christ himself.

Cell, the structural and physiological unit of plants and animals. Most plants and animals of the lowest divisions, the protophytes and protozoa, consist of a single cell, while the bodies of higher animals and plants are made up of masses of cells and their products. The life of an organism is the sum of the activities of all its cells. In the single-celled animals all the physiological activities are carried on by a single cell, while in the multicellular animals different groups of cells, the tissues, are specialized to perform some one of these processes, and by this physiological division of labor a better organization is effected. At present a typical cell is considered to be a portion of living matter usually of from $\frac{1}{100}$ to $\frac{1}{1000}$ of an inch in diameter, the actual sizes extending through a much greater range, surrounded by a wall of its own formation, the cell wall, the contents consisting of a central part, the nucleus, imbedded in a surrounding mass, the protoplasm. The protoplasm consists of at least two substances, a network of somewhat firm material which will stain with certain reagents called by some authors spongioplasm, containing in its meshes a more liquid material, the hyaloplasm. Imbedded in this latter there may be particles of various other substances, such as oil globules, food granules, or pigment grains. The protoplasm may show spontaneous movement called amœboid movements, and always makes use of oxygen with the production of carbonic acid. In the single-celled organisms the protoplasm possesses general physiological properties, such as secretion, respiration, digestion, motion, and sensitiveness to stimuli.

Cellini (chēl'lē-nē), **Benvenuto**, 1500-71; Italian artist; b. Florence; was a skillful engraver, gold worker, and sculptor; was in Rome, 1527, when it was attacked by the army of Constable Bourbon and boasted that he killed that commander; worked in Rome, Paris, and Florence; works include "Perseus with the Head of Medusa," now in the Loggia dei Lanza, Florence; wrote an autobiography which is famous.

Cello (chēl'lō): See VIOLONCELLO.

Cellular (sēl'ū-lēr) **Tis'sue**, **Are'olar**, **Tis'sue**, in animals the soft, elastic, filamentous substance which underlies the skin and the serous and mucous membranes, and which fills the spaces between muscles and between their fibers, and indeed surrounds almost all important organs, such as nerves, glands, blood vessels, etc., throughout the body. It normally contains a small quantity of serous fluid, which in certain diseased conditions becomes increased, constituting anasarca or widespread dropsy. Cellular tissue in botany is nonvascular substance (parenchyma) composed entirely of untransformed cells.

Celluloid (sēl'ū-loid), trade name for a plastic composition of gun cotton and camphor; made by treating tissue paper with nitric and sulphuric acids. The product is mixed with camphor and pigments to produce the desired color, and the materials are incorporated by heated rolls. It is then submitted to pressure

and molded by heated dies. Celluloid is applicable to the greatest variety of purposes, as it is very hard and elastic, and takes a high polish. It is also highly inflammable.

Cellulose (sĕl'ŭ-lōs), the mass of the cell membranes of plants; next to water the most abundant substance in the vegetable kingdom. During the early stages of the development of the plant the cell walls consist entirely of cellulose, but as the plant grows the walls become intergrown with resins, coloring matters, etc. Some tissues consist almost entirely of cellulose, as the pith of the Chinese rice-paper plant and vegetable ivory. Cotton, linen, hemp, and unsized paper consist of almost pure cellulose. Cellulose is said to exist in the animal kingdom in the mantle of *Mollusca* and the integuments of insects and *Crustacea*. It is more probable, however, that these tissues consist of chitin. Virchow found cellulose in degenerated human spleen and in the brain. De Luca found it in the skin of the silkworm and of the serpent. It is insoluble in water, alcohol, ether, and oils—both volatile and fixed. A property that has greatly extended its use is that of swelling when wet; hence cellulose from cocoanut fiber or corn pith is used in war ships, being packed in a cofferdam at the water line, extending round the ship, where it serves to close any aperture before much water enters.

Celma (sĕl'mā), Thessalian lady, who, with her husband, Celmus, was changed into adamant for denying the immortality of Jupiter.

Celsius (sĕl'sĕ-ŭs), Anders, 1701-44; Swedish astronomer; b. Upsala; Prof. of Astronomy at Upsala, 1730-32; sent with Maupertuis to Lapland by the French Govt. to measure a degree of latitude, 1736; founded the observatory at Upsala, 1740; introduced the Celsius, or centigrade, thermometer, abt. 1742.

Cel'sus, oldest literary opponent of Christianity; of uncertain date and origin; the author of "The True Discourse" (abt. 178 A.D.), to which Origen replied, giving copious extracts, and thus preserving our only knowledge of the treatise.

Celtic (sĕl'tic) **Lan'guages**. These languages are steadily declining, two only of their branches having living representatives to-day—(1) the Irish or Gaelic (Goidelic), divided into the Irish in Ireland, the Gaelic in Scotland and the W. islands, and the Manx of the Isle of Man; (2) the Brittonic, divided into the Welsh (Cymric) in Wales and the Bretonic (Armoric) in the French Basse-Bretagne, which was settled in the fifth and sixth centuries A.D. by immigrants from England. To this branch belonged also the Cornish of Cornwall, which became extinct in the eighteenth century, and was closely allied with the Bretonic. It is also proposed to call this second group Brythonic, from a native name for Welsh. The Celtic-speaking population of the world, i.e., the number of those able to speak Celtic, was estimated in 1880 at abt. 3,500,000. The most of these, however, spoke a second language, the English or the French.

Since that time the Celtic has certainly declined still further. The only one of its languages that now possesses actual vitality is the Welsh.

Celtiberi (sĕl-tĭ-bĕ'rĭ), or Celtibe'rians, ancient and powerful people who inhabited the N. or NE. part of Spain; supposed to have been a mixture of indigenous Iberians with Celts from Gaul. Their country was called *Celtiberia*. They were warlike, and were subdued by Hannibal with difficulty. In the second Punic War they fought for the Carthaginians. They made a brave and long resistance to the Romans, who conquered them abt. 143-133 B.C., and renewed the war under Sertorius. Celtiberia proper comprised the SW. part of Aragon, Cuenca, Soria, and the greater part of Burgos, but the name was sometimes applied by the Romans to a larger region.

Celts (sĕlts), or Kelts, one of the divisions of the Indo-European family of mankind, itself divided on the basis of language into three groups: the Gaelic, Brittonic, and Gallic. The Gaelic division comprises the Irish, the Scotch-Gaelic and the Manx. The Irish and the Scotch Gaelic have been differentiated only since the eight or ninth century. The Brittonic comprises the Cymric, or Welsh, the Cornish (extinct since early in the nineteenth century), and the Bretonic (Armoric) of Brittany. The Gallic, or the language of ancient Gaul, is known only from a few inscriptions and coins, and Celtic names quoted by Latin and Greek writers. The Celtic blood is more widely diffused than those relics of their language would indicate. Almost all France (Gallia) was inhabited by Celts. The Belgæ are thought to have been partially Cymric, as the ancient Britons undoubtedly were. The name Celtiberi indicates that in Spain the Celtic was probably long ago mixed with the Basque or Iberian blood. N. Italy was long so entirely Celtic as to be called Cisalpine Gaul. The Celts under Brennus invaded Greece. In Asia Minor they settled and gave name to Galatia. In Germany the Boii gave name to Bohemia and Bavaria. In Great Britain the Cymri long had sway in Cornwall, Cumberland, and Strathclyde. It is probable that the present Cymric element of NW. France, though generally traced to immigration from England, is partly of direct Gaulish descent. Many of the Latin and Germanic races have a strong infusion of Celtic blood.

Cement', any plastic substance capable of uniting solid bodies together when interposed between the surfaces, and afterwards solidifying. There are various kinds of cement; animal, vegetable, or mineral, used separately or in combination with each other, but only the cements used in building, as common lime, hydraulic lime, and hydraulic cement will be considered here.

Lime, common lime, quicklime, or caustic lime is produced when limestone or any other nearly pure calcium carbonate is calcined with sufficient heat to expel the carbon dioxide. It has a specific gravity of 2.3, is highly caustic, and will absorb nearly a quarter of its weight of water. It is accompanied by

great elevation of temperature, the evolution of hot and slightly caustic vapor, the bursting of the lime into pieces, and finally its reduction to a powder, of a volume two and a half to three and a half times that of the original lime. In this condition the lime is said to be slaked, and is ready for use in making mortar. For construction purposes lime is mixed with sand to form a mortar which will slowly harden in air, and lime mortar can only be used in masonry exposed to the air. Hydraulic lime is a limestone containing clay (aluminum silicate), which when calcined and reduced to powder can be made into a paste with water that will harden under water or in damp places excluded from contact with the atmospheric air. Hydraulic lime is usually made by breaking quarried stone into pieces which are then burned in a kiln at a heat just sufficient to expel the carbon dioxide, and then, while still warm, the lime is sprinkled with from fifteen to twenty per cent of its own weight of water, and left in large heaps for six or eight days, in order that it may slake by the steam evolved. There are two kinds of hydraulic cement: natural, formed by burning a natural product, as a limestone mixed with clay; and artificial, formed by burning a mixture of chalk or fat lime with clay and grinding the resulting clinker. Such cements have the property of quick setting, and are most valuable for protecting joints made with slowly setting Portland cements, from the action of waves and running water. Portland cement, the best of the artificial cements, was invented by John Aspdin in Leeds, England, in 1826, and has the valuable properties of setting very slowly, and acquiring with time great strength and hardness. Portland cement consists of limestone or chalk in England, or argillaceous limestone in the U. S., mixed with clay or river mud, burned and reduced to powder.

Cem'etery, place for the burial of the dead. The ancient Germans interred their dead in consecrated groves; the Egyptians interred them in vast catacombs or pyramids; the Hebrews usually selected for this purpose ornamental gardens, fertile valleys, or grottoes, and they still designate them, with a sad emphasis, as the "house of the living"; the Greeks discouraged interments within their cities, consigned their dead to shaded groves, and called them "places of repose." The Romans erected monuments to the dead on the sides of their spacious roads, in the midst of trees and ornamental walks, placing therein the ashes of their great citizens. The Appian Way was crowded with columns and obelisks in memory of their heroes, and at every turn the short and touching inscription met the eye—*Siste, viator* (Pause, traveler). It is probable that the modern idea of a cemetery was derived from the Turks, for Constantinople is almost environed with cypress groves filled with sepulchral stones. The word was applied by the early Christians to their usual places of interment, which were extramural, but after some centuries the desire to lie under the religious sanction of the Church led to the transfer of burial places to consecrated grounds and crypts of sacred edifices. "God's acre"

was usually the churchyard, and these places rapidly became populous with the dead. One of the earliest of modern cemeteries is that of *Père la Chaise*, in Paris, laid out, 1804, at that time beyond the walls. The earliest in the U. S. is Mt. Auburn, near Boston, where a park of 625 acres was opened for burial uses, 1831. Soon after, Laurel Hill was established on the Schuylkill River above Philadelphia. Greenwood, in Brooklyn, N. Y., followed, 1838.

Cenci (chĕn'chĕ), *Beatrice*, 1577-99; Roman lady of noble birth, famous for her beauty and tragic fate; the subject of an alleged contemporary painting by Guido Reni in the Barberina Palace, Rome, a tragedy by Shelley (1819), and a novel by Guerrazzi (1854). Her father, Francesco, the son of a cardinal who left him vast wealth, was depraved and extravagant, and treated his children with cruelty. Finally, Francesco was found dead under suspicious circumstances; Beatrice, her brother, and her stepmother were accused of his murder, and for that crime were executed at Rome. The long-current story, with its well-nigh incredible details of ferocity and depravity, is derived from the "Annales" of Muratori, and has been familiarized as stated, but is now given slight credence.

Cenis (sĕ-nĕ'), *Mont.* See **MONT CENIS**.

Cenozoic (sĕ-nō-zō'ĭk), or **Cainozoic** *E'ra*, latest of the greater divisions of geologic time, including the Tertiary and Quaternary of earlier classifications, and coordinate with Mesozoic, Palaeozoic, and Proterozoic. In this era are included the Eocene, Neocene, and Pleistocene periods. See **GEOLOGY**.

Cen'ser, vase or other vessel for burning incense in churches; used by the ancient Hebrews and Greeks; and now employed in the Roman Catholic Church; also in some services of ritualistic Protestant Episcopal churches. The censor now in use is suspended by chains which are held in the hand, and is tossed or swung in the air. It is frequently called the thurible.

Cen'sor, title of two magistrates in ancient Rome, who were appointed to take the census, also to inspect and regulate manners and moral conduct. In the early ages these duties were performed by the consuls, and no special magistrates were elected for the purpose until 443 B.C. In 339 B.C. a law was enacted that one of the censors must be a plebeian, and, 131 B.C., both the censors elected were plebeian. The censorship was regarded as the highest dignity in the republic except the office of dictator.

Cen'sorship of Books, interference by a government with the freedom of the press, exercised formerly over books alone, but now extended to periodicals. The censorship of books did not come into operation until the invention of printing (except that heretical books were prohibited by the Church). It soon became common to all European countries, Great Britain included. In the republics of N. and S. America a censorship of books has never been known. The Roman Catholic Church has long claimed the right of censorship over books.

The authoritative lists of that Church have a continuous history from the time of the Council of Trent, and are known as the two collections, "Index Librorum Prohibitorum," which forbids the reading of the book named at all, and the "Index Expurgatorius," which requires the elimination of certain parts before the book named can be read. See BOOK.

Cen'sus, official enumeration of persons and property, with facts to show moral, social, physical, and industrial conditions. There is record of a census in China, 2042 B.C., and in Japan in the first century B.C.; censuses were taken by the Greeks and Romans. The censuses referred to in the New Testament did not originate with the people of Judæa, but were conducted under Roman authority. By the Solonian laws, determination of the wealth of all citizens, and their classification according to four grades in this respect, was a part of the constitution of Athens. This classification had both a fiscal and a political purpose, the higher classes not only paying taxes at a greater rate upon their property, but possessing larger political privileges. The first census of the U. S. was taken, 1790; Great Britain, 1801; Ireland, 1811; Germany, 1871. In the U. S., Great Britain, Belgium, Denmark, Italy, Netherlands, Portugal, Sweden, and Switzerland the census is decennial; in France and Austria it is taken every five years; in Russia, Spain, Greece, and some S. American and other countries it is taken at irregular periods; in many Eastern countries an occasional general estimate takes the place of a census; in China, it is said, there has been no systematic enumeration since 1812, though one was attempted, 1842, the latest figures being those issued by the government, estimated for the purpose of the apportionment of the indemnity to the powers. See POPULATION.

Cent, coin of the U. S. of the legal value of the one hundredth part of a dollar; now coined of an alloy of copper, tin, and zinc, and is legal tender for the payment of sums not exceeding twenty-five cents. The Dutch cent is the one hundredth of a guilder, and its value is about one third of that of the American cent. The French cent (*centime*) is one hundredth of a franc.

Centaur (*sên'târ*), fabulous animals which the Greek poets imagined to be half men and half horses, the head and anterior part being human; supposed to be the offspring of Ixion and a cloud, and to have lived in Thessaly. The battle of the centaurs with the Lapithæ was celebrated in Greek mythology, and was a favorite subject of ancient art.

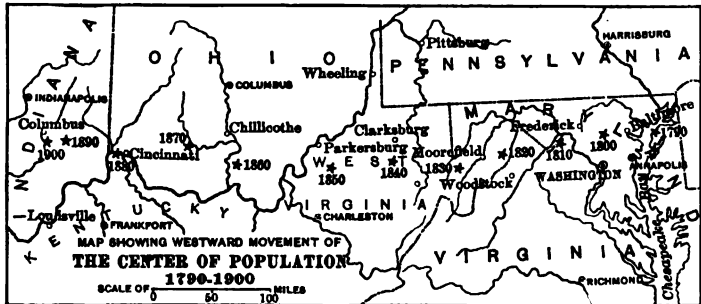
Cen'ter, originally a point; hence the point of a compass which remains fixed while the other is moved to describe a circle. The cen-

ter of a circle is a point within it equally distant from every part of the circumference. The center of a sphere is a point equally distant from every point of the surface. In war, center is the main body of an army located between the two wings. In French politics, Center designates a party of moderate royalists or conservatives who support a policy intermediate between that of the *Droit*, "right," and that of the *Gauche*, "left"; in German politics it is applied to the Roman Catholic representatives.

Center of Grav'ity, point in a body which is always in the line of the resultant of the weights of all the particles composing that body, no matter in what position the body be placed. Each particle of a body held above the surface of the earth is acted upon by gravitation, and we may look upon the gravitation of each particle as being one of a system of parallel forces, and the gravitation of the whole as a resultant of those forces. Every mass which is supported above the earth must have its center of gravity so placed that a line drawn from it perpendicularly downward will fall within the base; otherwise the body will fall. See GRAVITY.

Center of Mag'nitude, point of a geometric figure which would be its center of gravity were it a mass of uniform density throughout. It is, therefore, not always coincident with the center of gravity.

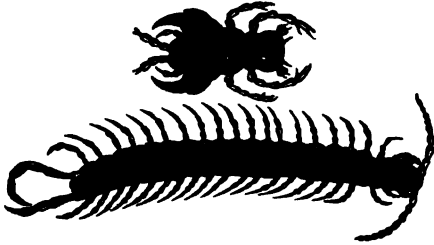
Center of Popula'tion, center of gravity of the population of the country, each individual being assumed to have the same weight. In



the U. S., after the census of 1900, it was at a point in S. Indiana, about 6 m. SE. of Columbus, the capital of Bartholomew Co. In the ten years preceding, this center moved W. about 14 m. and S. about 2½ m. The closeness with which the center has clung to the parallel of 39° latitude cannot fail to be noticed on the official diagram of its movement since the census of 1790.

Centipede (*sên'ti-pêd*), "the hundred-footed," a popular name for various insects of the order *Myriapoda*, but properly given to those of the suborder *Chilopoda*, and especially to the family *Scolopendridæ*. They have long slender bodies, and twenty-one to twenty-three pairs of feet. Some tropical species are nearly

a foot long. The bite of many species is poisonous, and even dangerous. *Scolopendra*



SCOLOPENDRA MORBITANS.

castaniceps is the largest U. S. species, and is found in the S. states.

Central America, territory connecting N. and S. America; extends from about latitude 7° to 18° N.; is 800 to 900 m. long and 30 to 300 m. wide; comprises the republics of Costa Rica, Guatemala, Honduras, Nicaragua, and San Salvador, and Belize or British Honduras; area, 176,927 sq. m. Total pop. abt. 4,454,000. Some geographers include the Mexican states of Chiapas, Tabasco, and Yucatan, and a part of the republic of Panama. The region is traversed lengthwise by a chain of mountains with peaks 3,000 to 14,000 ft. high. Central America was subject to Spain till abt. 1823; the five colonies constituted a federal republic, 1823-39; other unions have since been formed and dissolved; and wars between the republics have been frequent. (See articles on the separate republics.) In 1907 Pres. Roosevelt tendered the friendly offices of the U. S. Govt. to supplement the efforts of Pres. Diaz of Mexico toward establishing permanent peace between the five republics.

Central Falls, city of Providence Co., R. I.; on Blackstone River; 6 m. N. of Providence. Pop. (1900), 18,169.

Centripetal and Centrifugal Forces, in mechanics, two opposite laws of motion. If we suppose a body to move in a circle with a uniform velocity, it is shown by the laws of motion that it must be acted upon continually by a uniform force directed toward the center; which force expends itself each instant in deflecting the moving body from the straight line in which it would normally move, this line being a tangent of the circle in which motion takes place. The force with which the body is impelled toward the center is called centripetal; the equal and opposite reaction of the body against this impulsion is the centrifugal force. Both together are the *central* forces. Each is equal to the mass of the body multiplied by the square of the velocity, and divided by the radius of the circle round which the body moves.

Centum'alus, **Cnæus Fulvius**, Roman consul, 229 B.C.; gained the first victory over the Illyrians, 228 B.C., and imprisoned their queen, Teuta.

Centumalus, **Cnæus Fulvius**, d. 210 B.C.; Roman consul; son of preceding; consul, 211

B.C., with P. Sulpicius Galba. His command was prolonged beyond the term of his consulship; defeated and killed by Hannibal in Apulia.

Centumalus, **Maximus**, Roman consul; member of a plebeian family of the gens Fulvia; legate to the dictator, M. Valvius Corvus, in the Etruscan War, 301 B.C., and consul with L. Cornelius Scipio, 298 B.C., when he gained a victory over the Samnites.

Centumviri (sën-tüm'vî-rî), among the Romans, judges appointed, three out of each tribe, to decide common causes.

Centuries of Mag'deburg, the first Protestant Church history, the preparation of which occupied many eminent scholars for a long period. The plan of an extended work, which should reveal the deviations of the Roman Church from the practices of the early Christians, was first conceived by Matthew Flacius of Magdeburg, 1552. The work appeared in Basel in thirteen folio volumes, each volume covering a century (1559-74), but the headquarters of the enterprise was Magdeburg, whence the name. The work stirred up a vigorous Roman Catholic opposition, the result of which was great gain to the study of Church history. It was in refutation of the "centuries" that Baronius wrote the "Annales Ecclesiastici" (twelve volumes), 1588-1607.

Centurion, in the ancient Roman army, the commander of a century, or body of 100 men, but afterwards an indefinite number, the sixtieth part of a legion. The rank of a centurion corresponds somewhat to that of a captain in modern armies.

Century, company of 100 men in the Roman army; also a civil division of the Romans for the purpose of voting. According to this division, which was founded on property, the people voted in the *comitia centuriata*. Servius Tullius divided the citizens of Rome into 193 centuries. In modern times the term is used mostly to denote a period of one hundred years.

Century Plant. See AGAVE.

Cephalonia (chêf-â-lô'ni-â), largest of the Ionian islands; a nomarchy of Greece; in the Mediterranean, near the W. coast of Greece; greatest length, 32 m.; area, 302 sq. m.; surface; mountainous; highest summit rises about 5,000 ft.; chief exports, currants and olive oil; principal towns, Argostoli and Lixuri. This island was called *Samos* by Homer. Pop. (1907) 71,235.

Cephalop'oda, the highest class of the *Mollusca*, including cuttlefishes, squids, octopods, sepias, *Nautilus*, and *Argonauta* (paper nautilus). The class is characterized by having a distinct head and arms which surround the mouth, and are provided with suckers.

The body is covered with a mantle, from the open mouth of which project the head and arms. The water can pass freely into the



CEREA

- | | | |
|-------------------------|-------------------------|----|
| 1. Corn | 3. Oats, panicle opened | 5. |
| 2. Oats, panicle closed | 4. Bearded Wheat | 6. |

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(Proserpine), who was abducted by Pluto to the lower world. On discovering her daughter's abode, Ceres left Olympus in anger to dwell among men, diffusing blessings of civilization and plenty, especially the gift of breadstuffs. Zeus eventually released the daughter (though she was obliged to spend a third part of each year in Hades), and she and her mother re-



CERES.

turned to Olympus. The Greeks revered Demeter; her chief temple was at Eleusis; her great festivals were the Eleusinia and the Theomophoria. Her great Latin festival was the Cerealia; her temple at Rome was made the archive of the state. CERES is also the name of the asteroid discovered by Piazzi at Palermo, January, 1801; its apparent size is nearly equal to a star of the seventh magnitude.

Cerigo (chër'ë-gō), ancient *Cythera*, one of the Ionian Islands, now constituting, with the neighboring small islands, an eparchy of the nomarchy of Argolis and Corinth, in Greece; in the Mediterranean, separated by a narrow strait from the Morea; area, 110 sq. m.; pop. abt. 15,000; capital, Capsali. The ancient *Cythera* was sacred to Venus, and her favorite residence.

Cerinthus (së-rin'thüs), founder of an heretical sect; according to Irenæus, a contemporary of the Apostle John; flourished under Trajan, 98-117; a converted Jew, born in Egypt, but removed to Asia Minor; taught that the world was made by a certain power separate and distinct from God, though an emanation from Him; also that Jesus was the natural offspring of Joseph and Mary; that after his baptism the Christ came down into him in the form of a dove, and that toward the end the Christ again flew away from Jesus.

Cerium, rare metal obtained from cerite; symbol Ce; atomic weight 92; it forms two

oxides; not employed in arts and manufactures, but its oxalate is used as an antiemetic.

Cernuschi (chër-nüs'kë), Enrico, 1821-96; Italian economist; b. Milan; fought as a revolutionist, 1848-49; in 1850 engaged in banking at Paris; an advocate of bimetalism; author of "Mécanique de l'Exchange," "Illusions des Sociétés Co-opératives," "Discours," "Silver Vindicated," "Le Bimétallisme à Quinze et Demi," "Anatomie de la Monnaie," and other works.

Cer'ro Gor'do, celebrated battlefield and mountain pass in Mexico, through which the National Road from Vera Cruz to the City of Mexico passes. Here Gen. Scott defeated a superior force of Mexicans under Santa Anna, April 18, 1847, taking 3,000 prisoners.

Certiorari (sër-shi-ò-rä'rë), writ issued from a supreme court to an inferior court or a special body having judicial powers; to bring the entire record of the inferior tribunal before the superior court to enable the latter to determine whether the former had jurisdiction, or had failed to proceed according to the essential requirements of the law. It is applicable to either civil or criminal cases.

Cer'uline Pink. See SAFFRANINE.

Ceru'men, the ear wax. It is a yellowish, oily secretion of certain small glands lying in the skin of the external meatus of the ear. These glands are analogous to the sebaceous glands of the skin, and their secretion is similar to the sebum. It serves to attach and cause the removal of foreign bodies which enter the auditory meatus, and also to make the skin pliable and soft.

Cerussite (sër'rüs-it), or **Ce'ruscite**, native carbonate of lead; occurs in fibrous, compact, and earthy masses, and in numerous crystalline forms which may be referred to a right rhombic prism. When pure, it consists of 16.42 per cent of carbonic acid and 83.58 of oxide of lead, or 77 per cent of metallic lead. When perfectly pure, it is colorless and transparent, with an adamantine luster, which is resinous on fractured surfaces. Next to galena, cerussite is the most common ore of lead.

Cervantes Saavedra (sër-vän'tëz sä-vëd'rä), Miguel de, 1547-1616; the most celebrated Spanish author; b. Alcalá de Henares. Very little is known of his youth; took part in the naval battle of Lepanto, 1571. In 1575 he was captured by Algerine pirates. Ransomed in 1580 he returned to Spain, and here served in the campaign against Portugal and the Azores. In 1583 he retired from the service in Portugal. In 1584 he published the pastoral romance "Galatea." In the years 1585-92 he wrote for the stage. Of the twenty or more plays which he is reported as having produced only "Numancia, El Trato del Argel," published in 1615, has come down to us. During his imprisonment from some unknown cause, from 1599 to 1601, Cervantes composed the principal work of his life, the social romance "Don Quixote," 1605, 1616. He wrote under the title of "Novelas Ejemplares," published 1613, a series of

novels of adventure, in imitation of the Italian novel of this kind. The best of these tales are "La Gitanita," "La Ilustre Fregona," and "El Casamiento Engañoso."

Cervera y Topete (thär-vä'rä & tö-pä'tä), Pascual, 1839-1909; Spanish naval officer; b. Medina-Sidonia; graduated at the Naval Academy of San Fernando; served on Morocco coast, 1859-60; in campaigns against insurgent Filipinos, 1869-76; Minister of Marine, 1892; commander of fleet destroyed by American fleet under Rear-Admiral Sampson, off Santiago, Cuba, July 3, 1898; chief of naval staff, 1902-3; commandant at Ferrol station, 1906.

Cervin, Mont (möñ sér-vän'), in German, MATTERHORN, peak of the Pennine Alps, between Valais, in Switzerland, and Piedmont, in Italy; 12 m. WNW. of Monte Rosa; rises 14,705 ft. above sea level; is exceedingly steep; within 3,000 ft. of the top, resembling an obelisk of rock. The summit was first reached by the artist Whymper and his companions, 1865, when several of the party were killed.

Cesalpino (chä-säl-pä'nö), **Andrea**, 1519-1603; Italian botanist; b. Arezzo, Tuscany; Prof. of Medicine and Botany at Pisa, and physician to Pope Clement VIII; wrote "Ars Medica" and a work "On Plants," in which he propounded an improved system of botany; was the first who proposed a natural system of classification on philosophical principles.

Cesnola (chës-nö'lä), **Luigi Palma di**, 1832-1904; Italian-American archæologist; b. near Turin; served in Italian war for independence, in Crimea, removed to the U. S., 1860, in the Civil War, becoming a colonel of cavalry and brigadier general; was U. S. consul at Cyprus, 1865-77, where he made excavations resulting in remarkable discoveries of objects of art, purchased for the Metropolitan Museum of Art in New York, and constituting the Cesnola collection; director of the museum from 1878 till his death; awarded Congressional Medal of Honor for conspicuous military service.

Céspedes (thäs'pä-dës), **Carlos Manuel de**, 1819-74; Cuban revolutionist; b. Bayamo; studied law at Havana and at Barcelona, and, 1843, was banished from Spain for taking part in the conspiracy of Gen. Prim; returning to Cuba, 1844, practiced law in his native town, and was a leader of those who secretly endeavored to secure Cuban independence; in 1868 headed an insurrection near Yara. A congress of fifteen representatives met at Guaimaro, April, 1869, promulgated a republican constitution, and proclaimed Céspedes president. He had issued a proclamation freeing the slaves. The first successes were followed by reverses. Céspedes was driven to the mountains, where he was shot while resisting an attempt to capture him.

Cestius (sës'ti-üs), **Pyramid of**, antique Roman monument near the Porta San Paolo of Rome; 125 ft. high; built of brick and tufa, faced with Carrara marble; the internal walls

are decorated
been erected

Ces'toid

Ces'tus,
round the
of Venus
gauntlet
their hands

Ce'tin

Ce'tus,
called southerly
able star

Cetacea

of mammals
strictly aquatic
horizontal
warm blooded
young are
mother's
orders—the
the toothed
comprises
ily, and the
latter, the
Ziphiidae,
the *Intidae*
dolphins.

Cetewayo

or king; not
recognized
after a disastrous
trary, tyrant
prove an
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ions, 1882,
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Cettinje

(Cetinje),
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Ceuta (s)

coast of Africa
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Cevennes

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Rhône and t
ity of Carca
Canal du Cé
or Mezen, 5

stronghold of the Protestants called Camisards, and were the scene of several religious wars.

Ceylon (sē-lōn'), native SINGHALA; island belonging to the British; in the Indian Ocean, about 55 m. S. of Hindustan, from which it is separated by Palk Strait; length, 266 m.; greatest width, 140½ m.; area, 25,333 sq. m.; pop. (1901) 3,578,333. The surface is diversified by mountains, valleys, and plains. The highest summit is Pedrotallagalla, 8,280 ft.; Adam's Peak is 7,280 ft. high. Among the minerals are iron, tin, coal, plumbago, and salt. Many sapphires, rubies, amethysts, and other precious stones are found. The climate is humid and hot, but more moderate than the mainland of India. Ceylon is remarkable for the luxuriance and variety of its flora. Among its indigenous trees are the cocoa palm, palmyra, the coral tree, breadfruit, cinnamon, satinwood, and ebony. The betree or peepul, deemed sacred by the natives, attains a great age. The chief exports are coffee, tea, cinnamon, coconuts, coconut oil, coir, hides, pearls, and plumbago. Among the wild animals are the buffalo, bear, deer, leopard, and elephant. Harbors are Point de Galle, on the S. coast; Trincomalee, on the N.E. coast, and Colombo, on the SW. coast. Ceylon is divided into the W., central, S., N., and E. provinces; capital, Colombo. Kandy, Trincomalee, Point de Galle, Jaffnapatam, and Singapadaya are important cities. Buddhism is the prevailing religion. The principal religious creeds included, 1901, Buddhists, 2,141,599; Hindus, 828,622; Mohammedans, 248,140; Christians, mostly Singhalese and Tamils, 362,000. A Royal College, Technical College, Government Training College for Teachers, industrial schools, high and common schools, enrollment over 239,000 students. Original inhabitants, Yakkhos, who were conquered by Singhalese, 543 B.C.; Malabars conquered Ceylon abt. 1200 A.D., but the Singhalese recovered it, 1235. Portuguese came, 1505; were driven out by the Dutch, 1658, who in turn were driven out by the English, 1795. Ceylon was annexed to British crown, 1802, and the whole island conquered, 1815. It is the most prosperous of British colonies.

Chabrias (kā'brī-ās), d. 357 B.C.; Athenian general; commanded in a war against the Spartans, 378 B.C.; gained a naval victory at Naxos, 376; was killed at the siege of Chios, where he commanded a fleet; invented a famous maneuver, which consisted in receiving a charge in a kneeling posture, with shields resting on the ground and the spears pointed against the enemy.

Chacabuco (chā-kā-bō'kō), W. spur or branch of the Andes in Chile, about latitude 33° S., forming the N. boundary of the great central plain. During the revolution in Spanish S. America, the patriot army of San Martin crossed the Andes, and approached Santiago by a pass, also called Chacabuco, in these mountains. The pass was defended by about 4,000 Spaniards under Maroto. It was carried by a brilliant charge, led by the Chilean,

O'Higgins. As a result of this battle the patriots occupied Santiago, and ultimately secured the independence of Chile.

Chaco (chā'kō), El Gran. See GRAN CHACO, EL.

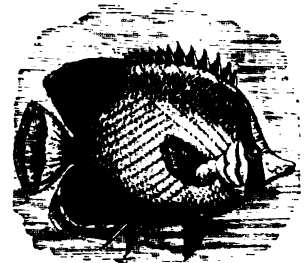
Chad. See TCHAD.

Chæremon (kē-rē'mōn), Greek tragic poet, lived at Athens abt. 380 B.C.; his pieces were better suited for reading than for acting. Besides tragedies, Chæremon composed a dramatic medley of meters called "Centaurus."

Chæremon of Alexan'dria, Stoic philosopher and historian of the first century; went from Alexandria to Rome to take charge of the education of Nero; wrote a work on hieroglyphics and one on the history and religion of Egypt.

Chæroneæ (kēr-ō-nē'ā), ancient town of Bœotia; 5 m. N. of Lebadea. Here Philip of Macedon gained a victory over the Athenians and Thebans, 338 B.C., and Sulla defeated the army of Mithridates, 86 B.C. The site is occupied by the village of Kapurna.

Chætodontidæ (kē-tō-dōn'ti-dē), family of the spiny-rayed marine fishes, with very slender toothbrush-like teeth and the fins closely covered with scales. Most of the species are brilliantly colored; the chief genus is *Chætodon*; abundant in the W. Indies.



CHÆTODON.

Chætopoda (kē-tōp'ō-dā), an order of Annelids (jointed worms) most of which are characterized by the possession of regularly arranged bristles upon every segment of the body. In some, as the earthworms, these bristles are unsupported, but in others they are surrounded by a fleshy outgrowth (parapodium) on either side of each segment. In the *Archiannelida* (a group of small forms by some regarded as very primitive, by others as degenerate) the bristles are absent. The *Chætopoda* are divided into (1) *Archiannelida*; (2) *Polychætæ* (containing forms with many bristles in each segment, and in turn divided into *Errantia*, or forms which live free lives, and *Tubicola*, or those which build tubes); (3) *Oligochætæ*; (4) *Echiurida*.

Chaffee, Adna Romanza, 1842- ; American military officer; b. Orwell, Ohio; enlisted in the army, 1861; served through Civil War, becoming lieutenant; took part in most of the important Indian wars; instructor in Fort Leavenworth School for Officers, 1894-96; commandant, cavalry school of instruction, Fort Riley, Kan.; in Spanish-American War commissioned brigadier general of volunteers; later colonel Eighth Cavalry; for bravery at El Caney breveted major general volunteers; commanded American forces in China, 1900;

major general U. S. army, 1901; military governor, Philippines, June 1901 to November, 1902; commander Department of the East, New York, 1902; chief of staff, 1903; lieutenant general, 1904; retired, 1906.

Chaf'ra. See KHAFRA.

Chagos (chä'gös) Archipel'ago, scattered group in the Indian Ocean; S. extension of the Maldives; dependency of the British colony of Mauritius; pop. abt. 1,000; consists of eight or ten separate clusters of islands, among which the Oil Islands are most important. The largest of the latter, and of the archipelago, is Diego Garcia, an important coaling station; exports cocoanut oil; possesses a spacious harbor, and is on the route of the Australian and Red Sea steamers.

Chagres (chä'gräs), small seaport town of republic of Panama; on the Caribbean Sea; at the mouth of the Chagres River; about 9 m. WSW. of Colon, which has recently superseded it in commercial importance. Pop. abt. 1,000.

Chagres is also the name of a river of the republic of Panama, flowing into the Caribbean Sea; length, 102 m., of which about 60 are navigable; has been known to rise 40 ft. in the rainy season. The line of the Panama Canal is partly in the valley of the Chagres, crossing the river about a dozen times.

Chaillé-Long (shä-yä-lön'), Charles, 1842-; American military officer and diplomat; b. Princess Anne Co., Md.; entered the Union volunteer army, 1862; promoted to captain Eleventh Maryland Volunteers; served in the Egyptian army, 1869-77, as lieutenant colonel; later, colonel and bey; chief of three sections on general staff, same army, 1869-73; chief of staff to Gen. Gordon, 1874-77, and undertook a mission to King Mtesa, which resulted in the annexation of Uganda to Great Britain; U. S. Secretary of Legation and Consul General to Korea, 1887-89; author of "Central Africa," "Sources of the Nile," "Egypt and her Lost Provinces," etc.

Chaillu (shä-yü'), Paul du. See DU CHAILLU.

Chain Mail, fabric of small metal rings or links, interlinked so that four or more links pass through each separate link and form a flexible material of which garments can be made. Such armor was rare in antiquity, but common in the Middle Ages.

Chain Shot, missiles formerly used in naval warfare, consisting of two balls, or half balls, which were connected by a chain about 8 in. long, and discharged from a cannon.

Chains and Chain'making. A chain consists of a series of links, usually elliptical, occasionally oval or circular, and in a few instances of rectangular or other forms, each interlocked with its adjacent neighbors in such manner as to form a continuous strong and flexible metal line. The chain is of unknown antiquity. It is especially familiar in literature of early date as a form of cable (*q.v.*) by which the anchors of ships were most safely held. It is commonly made of iron; but

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Chalcedony named becaus Chalcedon; identical wit chemical comj rocks in man translucent, exhibits vario white, blue, in jewelry for antique gems specimens of carnelian, ony

Chalcis (käl'sis), a Greek town, anciently the chief town of Eubœa, separated by the narrow strait of Euripus from the Bœotian coast and the mainland of Greece, with which it was connected by a bridge. Chalcis, which is mentioned by Homer, early became one of the greatest of the Ionic cities, carrying on an extensive commerce, and planting numerous colonies in Syria, Macedonia, Italy, Sicily, and the islands of the Ægean Sea. It was subsequently a place of importance under the Romans. There is still a town on the site, consisting of an inner walled town and an outer suburb, and said to be one of the prettiest and most attractive of Greek provincial towns. A bridge, so constructed as to let vessels pass through, connects it with the mainland. Pop. 12,250.

Chalco (chäl'kō), town of Mexico, state of Mexico; an ancient Aztec city, subject to Montezuma II, but the chiefs joined Cortez, and aided in the siege of Mexico. It is situated on Lake Chalco, one of the group of lakes surrounding Mexico city; about 12 m. SE. of it, and separated from Lake Xochimilco only by a narrow causeway; area of the lake is about 40 sq. m.; it has two islands, one of them an extinct volcanic cone with a nearly perfect crater. The water is fresh; masses of grass and reeds float on the surface, somewhat resembling the Aztec *chiampas*, or floating gardens. Pop. abt. 4,000.

Chaldea (käl-dē'ä). See **BABYLONIA**.

Chaldean Christians, also called Syro-Chaldeans or Syro-Orientals, branch of the Church of Rome, consisting of those Christians in Assyria, Mesopotamia, and a part of Persia, who acknowledge the pope. They are of the Eastern rite, and are under the Patriarch of Babylonia, who resides in Mosul, and thirteen bishops, of whom five have archdioceses, and three reside in Persia; number abt. 90,000, and are most numerous in the dioceses of Mosul and Bagdad. The Syro-Chaldaic is their liturgical language.

Chaleurs (shä-lör's') Bay, inlet of the Gulf of St. Lawrence, Canada; separates Quebec from New Brunswick; extends E. and W. about 90 m.; about 22 m. wide at the broadest part; affords good anchorage, and can be navigated without danger; has important mackerel fisheries.

Chalice (chäl'is), cup used in the celebration of the Holy Communion. One division of the foot or base usually bears a representation of the Passion, which should always be turned toward the celebrant.

Chalk (chäk), a calcareous earth; a soft variety of limestone or carbonate of lime. Its color is generally white. It is easily pulverized, and is very meager to the touch. In geology it is a sedimentary rock of great extent and importance, and a member of the cretaceous system. Chalk is abundant in England and France, and has recently been found extensively in Texas and Arkansas. Chalk is of animal origin, and is mostly composed of the shells of microscopic marine animals. Ac-

ording to Ehrenberg, a cubic inch of chalk often contains more than a million of microscopic organisms. Chalk is extensively used in the preparation of lime, in the composition of Portland cement, and is commonly employed by carpenters to mark boards. The material sold under the name of whiting or Spanish white, and used to make putty, is chalk in a purified state. Purified chalk, also known as Vienna white, is employed by artists in pastel work and crayon as a basis of pigments, and is administered in medicine as an antacid. Black chalk (a clayey formation), French chalk (a soapstone), and red chalk (ocher) are not chalks at all.

Challenger Expedition, scientific exploration of the Atlantic, Southern, and Pacific oceans, instituted by the British Govt., 1872-76. The corvette *Challenger*, was placed at the disposal of a body of naval surveyors and scientists; investigations were made at 362 stations, and in its circuitous circumnavigation of the globe the vessel cruised over 68,900 nautical m.

Chalmers, Thomas, 1780-1847; Scottish theologian; b. Anstruther, Fife; Prof. of Moral Philosophy, Univ. of St. Andrews, 1823-28; of Theology, Univ. of Edinburgh, 1823-43; seceded from the Church of Scotland with 470 other clergymen, 1843, and organized the Free Church; works include "Political Economy," "Adaptation of External Nature to the Moral and Intellectual Constitution of Man," "Institutes of Theology."

Châlons-sur-Marne (shä-lön-sür-märn'), city of France; capital of the department of Marne; on the Marne River; 107 m. E. of Paris. In the Catalaunian Plain adjacent to Chalons, Aetius and Theodoric the Visigoth, gained a great victory over Attila, 451 A.D. In the early Dark Ages, Chalons was an important commercial city of Europe, and had 60,000 inhabitants. Pop. (1901) 21,487.

Chalon-sur-Saone (-sön'), town of France; department of Saône-et-Loire; on the Saone; 77 m. N. of Lyons. It is identified with the ancient *Cabillonum*, which became the capital of Burgundy under King Gontran. Pop. (1901) 26,426.

Chalybeate (kä-lyb'ë-ät), that which contains iron in solution; applied to waters impregnated with iron. There are two kinds of chalybeate water—the carbonated, which contains carbonate of iron, and may be recognized by forming an ochreous deposit of red oxide of iron on the stones near the mouth of the spring; and the sulphated, which contain sulphate of iron (copperas) in solution.

Chamberlain, Joseph, 1836- ; English statesman; b. London; early became noted for his advanced radical opinions and his ability as a speaker; mayor of Birmingham, 1874-76; elected to Parliament, 1876; favored disestablishment and compulsory education; re-elected, 1880; President of the Board of Trade in Gladstone's Cabinet, 1880; prepared and passed the Bankruptcy Act; President of the Local Government Board in Gladstone's Cab-

net, 1886; resigned by reason of not agreeing with the Irish Home Rule measures; elected to Parliament as a Unionist and withdrew from the Liberal Party, 1886; commissioner to the conference at Washington for the settlement of the dispute between the U. S. and Canada on the fisheries question, 1887; Secretary of State for the Colonies, 1895; carried the Australian Federation measures through Parliament, 1900; advocated a revision of fiscal policy and the adoption of preferential tariffs, 1903; believing that policy to be unacceptable to the majority in the constituencies, he resigned, 1903, and devoted himself to the explanation and popularization of his proposals; initiated the Tariff Commission, 1903; reelected for Birmingham, West, 1906; married, 1888, a daughter of William C. Endicott, Secretary of War in Cleveland's first Cabinet.

Chambers, Robert, 1802-71; Scottish author and publisher; b. Peebles; formed a partnership with his brother William, 1832; founded "Chambers's Encyclopædia," still published; published many cheap and popular works; wrote "Vestiges of Creation," anticipating many of the speculations of Darwin, and other books.

Chamber of Com'merce, voluntary association of merchants and others for the protection and promotion of the commercial interests of the city, district, or country. They are, as a rule, incorporated. A chamber of commerce may exist as a distinct body, may form a department of a board of trade, as is sometimes the case in the U. S., or may correspond so closely with a board of trade as to be called indifferently by either name. France, which established courts for the decision of disputes in trade as early as 1549 (at Toulouse), has the credit of establishing the first chamber of commerce. This was at Marseilles, about the end of the fourteenth century or the beginning of the fifteenth, but was not fully organized until 1650. In 1791 the French chambers were suppressed by the National Assembly, but, 1802, were reestablished, and have met with no further reverses except that their organization has been thrice modified and their independence somewhat limited. A close connection exists between them and the national government.

The chamber of commerce at Glasgow, instituted and incorporated, 1783, is the oldest in Great Britain. The London Chamber of Commerce, the most important in the United Kingdom, was established 1882. An association of chambers of commerce of the United Kingdom, established 1860, has done much to promote commercial interests.

The New York Chamber of Commerce, the oldest in the U. S., was formed, 1768, by twenty merchants, and received a royal charter, 1770. In 1784 it was reorganized and received a new charter from the Legislature. It has an arbitrator, nominated by the governor and appointed with the consent of the State Senate. The Boston Chamber of Commerce was established not many years after that of New York. Similar organizations ex-

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pear to assimilate its color to the object upon which it is placed. But its colors are somewhat changeable: (1) by nervous energy, as in blushing, which affects the amount of blood in the skin, (2) by the varied amount of air in its lungs, (3) by the action of light, (4) by its having two layers of different colored pigment cells in its skin which move upon each other and produce varying effects of colors. It is said that the lack of nervous coordination in it is such that one side of the reptile may be awake while the other is asleep.

Chaminade (shā-mē-nād'), Cecile, 1861-; French musician and composer; b. Paris. Her works are chiefly for the piano, but she has also written many songs and some small cantatas.

Chamisso (shā-mis'o), Adelbert von, 1781-1838; German poet and naturalist; b. in Champagne, France; removed with his parents to Berlin, 1790; wrote several works on natural history, but his reputation rests chiefly on his lyrical poems and ballads, and on the highly original tale of "Peter Schlemihl."

Chamois (shām'ni), goatlike antelope (*Rupicapra tragus*) of the mountains of central and S. Europe and W. Asia; found especially in



CHAMOIS

the Alps; is about the size of a large goat, and is remarkable for its speed, its ability to leap chasms, and its delicate power of scent. Its skin furnishes true chamois leather, but the article generally sold as such is sheepskin.

Chamouni (shā-mō-nē'), Val'ley of, in the French department of Haute-Savoie; 15 m. long and $\frac{1}{2}$ of a m. broad; traversed by the Arve; 3,400 ft. above the sea; is inclosed by Mont Blanc, the Aiguilles Rouges and Mont Breven. The glaciers Mer de Glace and Argentière are the most remarkable in Switzerland. Formerly known as *Les Montagnes Maudites*—a name still retained for the roughest part between the Dome of Mont Blanc and the Mer de Glace.

Champagne (shōn-pāff'), former province in the N.E. of France; bounded E. by Lorraine, S. by Burgundy; is now mostly comprised in the departments of Marne, Aube, Ardennes, Haute-Marne, and Yonne. The surface is diversified with plains and hills, on which latter is grown the famous champagne wine. In the twelfth century Champagne was independent or governed by native princes; annexed to France abt. 1235.

Champagne (shām-pān') Wine, wines of various kinds, white or red, still or sparkling, produced in Champagne. Of these the sparkling and foaming varieties (*vin mousseux* and *demi-mousseux*) are best known. Even in France, but still more in other countries, a very large part of the so-called champagne wine is factitious, being made of cider, light Rhenish and other cheap wines, and other substances. True champagne is characterized by the low alcohol content and high acidity.

Champ de Mars (shān dē mār'), large oblong park or public square in Paris, between the Seine and the Military School; is devoted to military exercises and public gatherings. Its name has a double reference to the Campus Martius of ancient Rome and other Italian cities, and to the old Frankish field meetings, for legislative and other purposes, held in March or May, and historically known as Champs de Mars or de Mai. During the first revolution it was the scene of several important events, among them the celebration of the capture of the Bastille, the festival of the Supreme Being, etc. The buildings of the great international expositions of 1867, 1878, 1889, and 1900 were located here.

Cham'pak, or Chum'pac, E. Indian tree of the magnolia family, remarkable for the beauty of its flowers and foliage. The flowers are pale yellow, and have a sweet, oppressive perfume, celebrated in Oriental poetry of Shelley. This tree is venerated by the Brahmans and Buddhists.

Champfleury (shān-flē-rē'), pseudonym of JULES FRANÇOIS FÉLIX HUSSON FLEURY, 1821-89; French author; b. Laon; became a journalist in Paris; after 1872 had charge of the collections of the porcelain factory at Sèvres, and wrote on the history of pottery; other works include stories, romances, etc., such as "Chien-Callou," "Contes d'Été," "Les Bourgeois de Molinchart"; one of the founders of realism.

Cham'pion, person in the Middle Ages, and even in more recent times, who appeared and took part in judicial combats as the hired representative of women, children, feeble persons, and other noncombatants, or acted as an official at a tournament or ceremony. In the more romantic periods of chivalry, knights and gentlemen might contend, especially with those of their own rank, in behalf of injured ladies and children, and were called champions. The crown of England since the time of William the Conqueror has had a champion at coronations—a mounted official fully armed, who, by throwing down his glove, challenges all who refuse to recognize the king as

the true sovereign. The championship has been hereditary in the family of Dymoke since the time of Henry IV. This function was carried out for the last time at the coronation of George IV.

Champion Hills, locality in Hinds Co., Miss.; midway between Jackson and Vicksburg; the scene of a desperate struggle, May 16, 1863, between forces under Grant and Confederates under Pemberton; the Confederates were forced to retire to the Big Black River; also known as the battle of Baker's Creek.

Champlain (shām-plān'), **Samuel de**, abt. 1570-1635; French navigator and explorer; b. Brouage, Saintonge; made several expeditions to Canada, the third, 1608-10, noteworthy on account of the foundation of Quebec, the defeat of the Iroquois, and the discovery of Lake Champlain; was lieutenant governor, 1612-35, but for a time, 1628-32, after the capture of Quebec, was a prisoner in England; founded Three Rivers and a college for Indians in Quebec; published, 1632, "Voyages à la Nouvelle France."

Champlain Ep'och, in geology, a term applied to the events which in NE. N. America closed the Pleistocene period. During this epoch the ice finally retreated from the N. U. S. and Canada, and there was great elevation and subsidence of the land. During the melting of the ice a series of lakes was contained between the ice front and the upland constituting the S. boundary of the Laurentian basin. As the ice withdrew from the St. Lawrence Valley it was replaced by the sea, which extended westward at least to Ogdensburg and southward over the basin of Lake Champlain. The land then rose to a position somewhat higher than the present, and was afterwards depressed.

Champlain, Lake, between New York and Vermont; extends from Whitehall, N. Y., northward to Canada; about 125 m. long. The S. half averages less than 2 m. wide, and in many places is less than a mile. In the N. part, where large islands occur in it, the width is 10 m. or more. The greatest depth is about 280 ft. The water is discharged by the Sorel, or Richelieu River, which issues from its N. extremity. The chief towns on its shores are Burlington and Plattsburg. Occupying a basin between the Adirondack and Green Mountains, this lake is connected with the Hudson River by the Champlain Canal, and is remarkable for its beautiful and picturesque scenery. A naval battle was fought on Lake Champlain between Gen. Arnold and the British October 13, 1776, in which the latter had the advantage. September 11, 1814, Com. McDonough gained an important victory over the British fleet near Plattsburg.

Champollion (shōn-pōl-yōn'), **Jean François**, 1790-1832; French linguist and Egyptologist; b. Figeac, Lot; Prof. of History in the Academy of Grenoble; from the inscriptions on the Rosetta Stone obtained a key to the hieroglyphs of ancient Egypt; published "Summary of the Hieroglyphic System of the Ancient Egyptians," 1824, in which he proves that the

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with which they chiefly have business relations. If the vessel crosses from W. to E. the day is reckoned twice, *i.e.*, if it is April 6th when the line is crossed, the following day is also counted as April 6th. If the vessel crosses from E. to W. a day is dropped out; *e.g.*, if the crossing occurs on April 1st the following day is April 3d.

Changsha (chǎng-shǎ'), city of China; capital of province of Hunan; on the Siang-Kiang; 360 m. N. of Canton; is well built and surrounded with a wall; is a center of the silk manufacture and also of the silk trade; is the seat of the College of Yo-lo. Pop. 230,000.

Chan'nel Islands, group off the NW. coast of France; belong to Great Britain; governed by their own laws; the only parts of the dukedom of Normandy now belonging to the British crown. King John, 1204, lost all the rest. The chief islands are Jersey, Guernsey, Alderney, and Sark; area of the whole, 75 sq. m. Pop. (1901) 95,618; chief industries, agriculture and cattle breeding.

Chan'ning, William Ellery, 1780-1842; American clergyman and writer; b. Newport, R. I.; pastor of the Federal Street Society, Boston, 1803; leader of the Unitarian movement that divided the Congregational churches in New England, but as he grew older became more humanitarian than Arian; prominent in temperance and antislavery agitation; a noted preacher.

Channing, William Henry, 1810-84; American Unitarian minister; b. Boston; preached in New York, Boston, Cincinnati, and Liverpool, England; interested in the Brook Farm experiment, and in socialism as the religious expression of the brotherhood of man.

Chant, originally plain vocal music, especially as used in Christian congregations; now musical compositions sung to words which are not metrical, or if metrical words are used the verbal cadences are not observed in the music. St. Ambrose and Gregory the Great greatly improved the chant, which was, and still is, chiefly used in liturgical worship. The reading of the service in a half-chanting style is called intonation, and a similar method of reading the Scripture in Jewish synagogues is called cantillation.

Chantilly (shǎn-tǎ-yě'), town of France; department of Oise; 25 m. NNE. of Paris; has a fine hospital, and manufactures of blond lace and porcelain. Annual races are held here. A castle, once the residence of the great Prince of Condé, one of the finest in France, was destroyed during the Revolution, 1793, but the estate was bought, 1872, by the Duc d'Aumale, who rebuilt the chateau, filled it with art works at a cost of nearly \$10,000,000, and, 1886, presented it to the French Institute for public uses. Pop. (1901) 4,689.

Chantilly (shǎn-tǎ'lē), village of Fairfax Co., Va.; 20 m. W. of Washington; the scene of a severe engagement in the Civil War, September 1, 1862, between a Union force under

Gen. John Pope and a Confederate army under "Stonewall" Jackson; former attacked by latter; fight lasted till dark; Gen. Isaac I. Stevens, Union, killed in action, and Gen. "Phil" Kearny, Union, in reconnaissance after dark; Union loss, 1,300; Confederate, 800.

Chantrey (chǎn'trē), Sir Francis, 1781-1841; English sculptor; b. Jordanthorpe, Derby; learned the trade of carver in Sheffield; bought his freedom with the proceeds of his portrait painting; removed, abt. 1804, to London; devoted himself to sculpture. Among his best works are a statue of Sir Joseph Banks, one of William Pitt in London, one of Canning at Liverpool, one of Washington, in the state house at Boston, Mass.; knighted, 1837; left a large sum to the Royal Academy for the extension of its art collection.

Chap'books, humble variety of literature formerly vended by chapmen or peddlers; small volumes printed on coarse paper, dealing with popular theology or history, the lives of godly or famous personages, fortune telling and the reading of dreams, and giant, witch, and goblin tales in verse or in prose.

Chap'el, a minor or supplementary place of worship. The term is applied to small edifices for special or occasional services, to structures erected to accommodate parishioners living at a distance from the parish church, and to domestic oratories and places of worship erected by private individuals or attached to public institutions. It also designates a distinct portion or subdivision of a church containing the altar or dedicated to the worship of a particular saint.

Chapleau (shǎ-pō'), Joseph Adolphe, 1840-98; Canadian statesman; b. St. Thérèse de Blainville, Terrebonne, province of Quebec; Prof. of Criminal Jurisprudence, and afterwards of International Law, Laval Univ.; represented Terrebonne in the Quebec Assembly, 1867-82; elected to Dominion Parliament, 1882, 1887, 1891; successively Solicitor General, Provincial Secretary, and Premier in the government of Quebec; Secretary of State of Canada, 1882-92; Minister of Customs for a short time in 1892; Lieutenant Governor of Quebec, 1892-98; knighted in 1896; a distinguished orator.

Chap'let, garland or wreath worn on the head; the circle of a crown; a string of beads used by Catholics (rosary); in architecture a molding carved into round beads, pearls, olives, etc.

Chap'man, George, 1557-1634; English poet and translator; b. Hertford; became a resident of London and a friend of Shakespeare and Spenser; produced many comedies and tragedies; first translator of Homer into English verse.

Chappe (shǎp), Claude, 1760-1805; French engineer; b. Rouen; produced, 1792, a system of signals and a machine which he called a telegraph, by which a dispatch was transmitted from Paris to Lille, 48 leagues, in

thirteen minutes and forty seconds. Numerous lines of his telegraph were soon extended through other parts of France.

Chapra (chāp-rā'), town of British India capital of Sarun District, Patna Division, Bengal; near the Ganges; 34 m. NW. of Patna city; noted for its wealth, its pottery, and brass goods; has much trade in saltpeter. Pop. abt. 45,000.

Chap'ter, body of the clergy of a cathedral united under the bishop, or, where the bishop is not in residence, under a dean. The dean however, was a late addition, dating back no further than the tenth century.

Chapultepec (chā-pōl-tā-pēk'), strong Mexican fortress; stormed by the American forces under Gen. Scott, September 13, 1847, during the war with Mexico; about 2 m. SW. of the City of Mexico; is an isolated eminence, 150 ft. high, fortified to protect the causeway to the city by a citadel, which crowns the hill. Its approaches were also strongly guarded by outworks at its base and on its acclivities. The castle contained, besides a strong garrison, the military school of the republic. At present Chapultepec is the summer palace of the President of Mexico, as it was of the Emperor Maximilian. The military school occupies a portion of it, and the castle is surrounded by a beautiful park.

Char'acter, mark or figure which is engraven on an object; letter or type used in writing or printing; the qualities impressed on a person by nature or habit; qualities of heart, mind, and manners. Often used to denote a person or actor in an epic poem or drama. In painting and sculpture, after the representation of form or color, the expression of character is the most important part of the work. In natural history, character is an enumeration or brief description in scientific terms of the essential and distinctive marks of a species, genus, order, etc.

Charade (shā-rād'), social amusement, consisting sometimes of the division of a word into its constituent syllables or letters, and then making some statement as to each syllable and the whole word, the company being required to guess the word. In "acting charades" each syllable is introduced prominently, but not too conspicuously, into the successive scenes of a dialogue, the whole word being brought into the last scene.

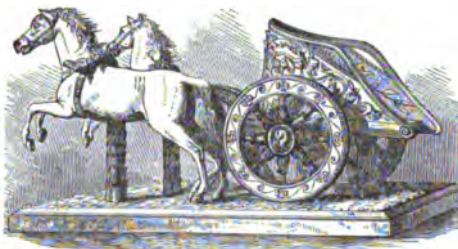
Char'coal, a common name of a variety of carbon; a carbonaceous substance obtained by heating wood and other vegetable matters in close vessels, or by partially burning them; also, the solid residuum which results from the destructive distillation of animal matter and peat. It burns without flame or smoke, and produces a greater heat than an equal weight of wood. It is used as an ingredient in the composition of gunpowder, as an agent in clarifying liquors and for the smelting of ores. It has an extraordinary capacity for absorbing gases.

The charcoal used as an ingredient of gunpowder is made from wood which is free from

legally bound to follow. (4) In equity practice the words "charge and discharge" are found in connection with the taking of accounts in that court of moneys paid and received. The *charge* means the statement of debts due by the party against whom the account is rendered, and *discharge* means the items of credit presented by the latter. This practice has been generally abandoned. (5) In equity pleadings there is a statement made by the plaintiff, known as the charging part of the bill (or complaint), in which he sets forth certain facts, anticipatory of a defense which he supposes that the defendant will make. The word *charge* here means a distinct and formal affirmation, and the pleader sets forth the defendant's claim as a mere pretense on his part, and alleges on his own part the facts in opposition to it.

Chargé d'Affaires (shär-zhä' däf-fär'), a diplomatic agent of the fourth or lowest rank, the others being (1) ambassador; (2) envoy or minister; and (3) resident minister. The first two are accredited to a sovereign. The *chargé d'affaires* is accredited to the Foreign Minister or Secretary of State of the country to which he is sent.

Chariot (chär'i-öt), vehicle used by the ancients in war and in journeys. It had two wheels and was drawn by two horses, sometimes with one or two more. It was closed in front and open behind. War chariots were used by the ancient Greeks, Romans, Assyri-



ROMAN CHARIOT.

ans, Britons, etc. The four-horse chariot in which Roman generals rode when they entered Rome in triumph was called a *quadriga*.

Charites (kär'i-téz), graces of classic mythology; were said to be the daughters of Jupiter. They were patrons of poetry and art, and presided over festivals and social enjoyments. There were three: Aglaia, Euphrosyne, and Thalia.

Charity Organiza'tion, a recent development born of the multiplication of relief agencies in large cities, and of the waste and mischief wrought by their independent action. It aims at building up voluntary unity of every sort of benevolent endeavor. It is to charity what confederations of workmen, exchanges, and clearing houses are to industry and commerce, a necessity in the interest of economy and effectiveness. The name is derived from the London Society for Organizing Charitable Relief and Repressing Mendicity, a title so cumbersome that it was popularly abbreviated into

Charity Organization Society. As this society began, 1869, that date may be taken for the birth of the movement. Its principles were the outcome of the experience and experiments of Europe for the previous fifty years. Its methods were first copied in the U. S. in Philadelphia, 1873.

Since that time kindred societies have been formed in all of the principal cities and towns of the U. S., and the principal relief societies have adopted Charity Organization principles. These municipalities include about one sixth of the population of the U. S. The societies have taken the diverse names of associated charities, bureau of charities, societies for organizing charity, etc., but are alike in principles and practice. They are allied through representatives sent to the National Conference of Charities and Correction, which meets annually, and are affiliated with each other, and by correspondence and interchange of services, with similar organizations all over the world.

Charity, Sisters of, religious congregation founded by St. Vincent de Paul at Chatillon, France, 1629, for the care of the poor and the education of children. The American branch was established at Emmitsburg, Md., 1809, by Mrs. Eliza Seton. Several congregations of Augustinian nuns and of other Roman Catholic orders are called Sisters of Charity and Sisters of Mercy, and have branches in the U. S.

Charlemagne (shär-lë-män'). See CHARLES I OF GERMANY.

Charleroi (shär-lë-rwö'), strongly fortified town of Hainaut, Belgium; on the river Sambre; 33 m. S. of Brussels; fortified by Vauban, and held alternately by the French and Spaniards; has manufactures of cutlery, glass, nails, etc. In this vicinity are coal mines, and smelting furnaces which produce cast iron. Pop. (1905) 26,528.

Charles, name of a number of European sovereigns, the most important of whom are here treated under the alphabetical order of the countries over which they ruled.

CHARLES I of England (Charles Stuart), 1600-49; b. Dunfermline, Scotland; son of James I and Anne, daughter of Frederick II of Denmark; ascended the throne in 1625; plunged into war with France and tried to carry on this and a war with Spain by forced loans and other illegal expedients. Attempted to impose a liturgy on the Scottish people; summoned a Parliament, but dissolved it within a month, 1640; by arbitrary acts forced the nation into civil war. Scottish insurgents invaded England, defeated the royal army at Newburn-on-Tyne, and held Northumberland and Durham. Charles then called a new Parliament, the Long Parliament, which met, November, 1640. They impeached the Earl of Strafford (executed, 1641), and imprisoned Archbishop Laud, the king's minister. Charles made an abortive attempt to arrest Pym, Hampden, and three other members of the House of Commons, 1642. Provoked by this, the Parliament appealed to arms. The royal-

of Ferdinand of Aragon and Isabella of Castile; heir presumptive to the Hapsburg possessions in Germany and the Netherlands, 1506. He succeeded Ferdinand as King of Spain, 1516; was elected Emperor of Germany, 1519; assembled a diet at Worms to check the spread of Lutheran doctrines, 1521. He joined Henry VIII of England in war against Francis I of France, for advantages in Italy, 1522; defeated Francis and took him prisoner at Pavia, 1525. He suspended the campaign after Treaty of Madrid, 1526, but the war was renewed by Francis, 1527. Charles assaulted Rome and took Pope Clement VII prisoner; signed peace at Cambrai, 1529. In 1531 the German Protestant princes formed the League of Schmalkald, and extorted concessions from Charles, who, being then engaged in a war against the Turks, temporized. In 1535 he defeated Barbarossa at Tunis; invaded the S. of France, 1536, but was soon forced to retreat. The truce of ten years concluded between Charles and Francis I, 1538, was broken, 1542. The French gained a victory at Ceresole, Italy, 1544, soon after which the war was ended. Resolving to extirpate heresy, Charles published, 1546, the ban of the empire against the Elector of Saxony and the Landgrave of Hesse, chiefs of the Protestant party. They took arms, but were defeated at Mühlburg, 1547. Their cause found an able defender in Maurice of Saxony, who, as the head of a league, allied himself with Henry II of France and took arms against Charles, 1552. The French king invaded Lorraine, and Maurice of Saxony invaded S. Germany, surprising the emperor at Innsbrück. Charles was compelled to flee into Carinthia; an attempt by him to recover Metz was ended by the Treaty of Passau, August 22, 1552, which secured religious liberty to the German Protestants. He resigned to his son Philip the sovereignty of the Low Countries, Spain, and his other hereditary dominions; abdicated the imperial crown and was succeeded by his brother Ferdinand, 1555.

CHARLES I OF SPAIN. See **CHARLES V OF GERMANY.**

CHARLES IV of Spain, 1748-1819; succeeded his father, 1788; defeated in many battles by the French, 1793-95. As ally of France declared war against England, 1796; his fleet ruined by Nelson at Trafalgar; abdicated in favor of his son Ferdinand, 1808, whom Napoleon deposed in the same year, placing his own brother, Joseph, on the throne.

CHARLES XII of Sweden, 1682-1718; b. Stockholm; son of Charles XI; succeeded, 1697; in alliance with England and Holland, invaded Denmark, 1700, and forced cession of Schleswig-Holstein to Sweden; defeated an overwhelming Russian army at Narva the same year; defeated the Saxons and Poles, 1701-6; invaded Russia, 1707; defeated by Peter the Great at Poltava, July 8, 1709; escaped into Turkey; returned to Sweden, 1714; fought war waged by Russia, Denmark, and Prussia; killed at siege of Frederikshall; succeeded by his sister, Ulrica Eleonora, and her husband, Frederick of Hesse.

CHARLES XIV OF SWEDEN. See **BERNADOTTE.**

Charles Ed'ward Lou'is Phil'ip Cas'imir Stu'art, "the Young Pretender," 1720-88; b. Rome; son of James Stuart, the first Pretender, and the Polish princess, Clementina Sobieski; went to Scotland to incite insurrection for recovery of British crown for his father, 1745; raised an army of Highlanders; entered Edinburgh; defeated army sent against him at Prestonpans; captured Carlisle; marched upon London; checked at Derby; utterly overthrown at Culloden, April 16, 1746; escaped by the aid of the famous Flora MacDonald; lived in Italy as Count of Albany.

Charles the Bold, Duke of Burgundy, 1433-77; b. Dijon, France; son of Philip the Good; conquered Lorraine, 1475; defeated by the Swiss at Granson, March 3; at Morat, June 22, 1476; and at Nancy, January 5, 1477, where he was killed; succeeded by his daughter Mary, wife of Emperor Maximilian I. He aimed to restore the kingdom of Burgundy, and with him ended the resistance of the great feudatories to the crown of France.

Charles, Elizabeth Rundle, 1826-96; English author; married Andrew P. Charles, of London; chief work, "Chronicles of the Schönberg-Cotta Family," 1863.

Charles Fried'rich Au'gust Wil'helm, 1804-73; Duke of Brunswick; son of Friedrich Wilhelm, killed at battle of Quatre Bras; had for his guardian George IV of England; assumed government, 1823; ruled so capriciously and arbitrarily that he was deposed by the German Diet; lived afterwards in Paris and London; bequeathed his immense fortune to the city of Geneva.

Charles (shärl), Jacques Alexander César, 1746-1823; French savant; b. Beaugency; a popular lecturer on physical science in Paris, and gained distinction by his experiments in electricity; also improved the art of ballooning by substituting hydrogen for heated air. He and M. Robert were the first persons who ever ascended in a balloon; reached the height of 7,000 ft., 1783.

Charles Riv'er, stream that rises in Worcester Co., Mass.; pursues a tortuous course through Norfolk and Middlesex counties; meets tidewater at Boston, forming part of Boston harbor, and separating the old part of the city from the Cambridge district; length about 75 m.

Charles'ton, capital of Charleston Co., S. C.; chief city of the state; on a peninsula formed by the Ashley and Cooper rivers, which unite in a beautiful harbor. The harbor is defended by Fort Moultrie on Sullivan's Island and the rebuilt Fort Sumter on a shoal covering the channel. The harbor has a depth of 40 ft., and is one of the safest and most commodious on the Atlantic coast. The College of Charleston, S. Carolina Medical College, and S. Carolina Military Academy are the leading educational institutions. The city has a large wholesale trade with the interior, and is the port through which the inland cities of neighboring states draw their supplies. The principal exports are cotton, rice, turpentine casks,

CHARLESTON

resin, phosphates, fertilizers, lumber, cotton goods, fruits, and vegetables; value of exports, 1905, \$3,358,725; imports, \$2,478,156.

Charleston was founded, 1670, by an English colony. At the time of the Revolution it was the most important commercial port in America. It was taken by the British, 1780, and evacuated by them, 1782; was the State capital until 1790, when the seat of government was removed to Columbia. It was the seat of the Democratic Convention, 1860, and of the convention that passed the Ordinance of Secession. The reduction of Fort Sumter, its principal harbor defense, was the first conflict of the Civil War. In December, 1861, nearly half of the city was destroyed by fire. During the last two years of the war it sustained a protracted siege and bombardment, and was evacuated by the Confederates, February 19, 1865. An earthquake destroyed a large part of the city and many lives, August 31, 1886, but within a few years the damage was completely repaired. The Interstate and W. Indian Exposition was held here, 1901-2. Pop. (1906) est. 62,000.

Charleston, capital of W. Virginia and of Kanawha Co.; at junction of Kanawha and Elk rivers; 150 m. SW. of Wheeling. The seat of the State government was removed to Charleston, 1869; to Wheeling, 1875, and permanently to Charleston, 1885. Pop. (1900) 11,099.

Charlestown. See BOSTON.

Charlestown, capital of Jefferson Co., W. Va. Here John Brown was tried and executed, December 2, 1859. On October 18, 1863, a Confederate force under Gen. Imboden surrounded the place at daylight, and attacked the Union troops stationed there. Being surprised, the latter were panic-stricken, and nearly all captured. The place was recaptured within an hour by U. S. troops under Col. George D. Wells, and the Confederates driven from the town.

Charlevoix (shär-lé-vvä'), Pierre François Xavier de, 1682-1761; French Jesuit traveler and historian; b. St. Quentin; went as a missionary to Canada, 1720; descended the Mississippi to its mouth; wrote, besides other works, a "History and General Description of New France."

Charlotte (shär'löt), capital of Mecklenburg Co., N. C.; gold mines have been opened in the vicinity; the Mecklenburg Declaration of Independence is said to have been framed here, 1775; the city was occupied by the British, 1780. Pop. (1900) 18,090.

Charlotte Amalie (ä-mä'lé-ä), town of the Danish W. Indies; capital of St. Thomas; has a good harbor and extensive trade, being a free port. Pop. abt. 12,000.

Charlottenburg (shär-löt'tän-börg), town of Prussia; province of Brandenburg; on the river Spree; 3 m. W. of Berlin, at the end of the Thiergarten park. Pop. (1900) 189,305.

Charlottetown, capital of Prince Edward Island and of Queen's Co.; on the East River,

near the large ex-

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Charter O. history, one legend runs

went to Hartford, 1687, by command of King James II, to demand the surrender of the charter of the colony, it was concealed by Capt.



CHARTER OAK.

James Wadsworth in a hollow of this oak. This tree was blown down by a gale, August 21, 1856.

Charterhouse, hospital and school in London; founded, 1611, by Sir Thomas Sutton, who endowed it with the revenues of more than twenty manors, lordships, and other estates; originally a Carthusian monastery founded 1371; is an asylum for poor brethren, the number of whom is limited to eighty, who must be bachelors, members of the Church of England, and fifty years old. The school is for the benefit of "the sons of poor gentlemen to whom the charge of education is too onerous." The number of scholars is limited to forty-four, but this number is greatly exceeded. Among the eminent men educated here were Addison, John Wesley, George Grote, Bishop Thirlwall, and Thackeray. The reputation of the school is high. In 1872 it was removed to Godalming, where it occupies a large quadrangle, with a gatehouse tower 130 ft. high and a chapel rich in stained glass.

Chartier (shär-tè-a'), **Alain**, abt. 1392-1440; French writer; b. Bayeux; poet and prose writer of great repute in the fifteenth century; called the father of French eloquence; employed by Charles VI and Charles VII; became archdeacon in Paris cathedral. His influence on his contemporaries was great, and even foreigners, like the English Lydgate, studied him with ardor.

Chartism, political creed in England, named from a proposed people's charter, drawn up 1838, the points of which were universal suffrage, vote by ballot, paid representatives, abolition of property qualification for representatives, annual parliaments, and equal electoral districts. Although the people's charter ceased to be a platform of agitation abt. 1850, the Chartist disturbances led to a larger recognition of labor interests in legislation and British politics.

Chartran (shär-trän'), **Theobald**, 1849-1907; French portrait and figure painter; b. Besançon; studio in Paris; works include "Jeanne d'Arc," decorations in the new Sorbonne, and portrait of Pope Leo XIII.

Chartres (shärt'r), ancient *Autricum*, city of France; capital of department of Eure-et-Loir; on the Eure River; 49 m. SW. of Paris; has a Gothic cathedral of the eleventh century, said to be the most perfect in France; surmounted by two towers, one 382 ft. high, with rich ornamentation, and the other exceedingly massive. During the Middle Ages Chartres was the capital of the district of Chartrain, made a duchy by Francis I, and given as an appanage to the dukes of Orleans. Hence the title Duke of Chartres was given to the eldest son of the Duke of Orleans. More recently the same title was given to Prince Robert of Orleans, grandson of King Louis Philippe, and second son of Duke Ferdinand of Orleans. Pop. (1900) 23,431.

Chartreuse (shär-tröz'), **La Grande**. See BRUNO, ST.; CARTHUSIANS.

Charybdis (kä-ríb'dis), now called GALOPABO, incessant undulation, rather than a whirlpool, on the Sicilian side of the Strait of Messina, opposite the rock Scylla; caused by the meeting of currents; is seldom dangerous; anciently much dreaded by mariners. In Greek mythology, Charybdis was a daughter of Poseidon, killed by Zeus with a thunderbolt and hurled into the sea, where she drew ships into the deep.

Chase, **Salmon Portland**, 1808-73; American jurist; b. Cornish, N. H.; admitted to the bar, 1829; began practice in Cincinnati; identified with the Liberal Party, 1841; delegate to its national conventions, 1843 and 1847; to the National Free Soil Convention at Buffalo, which nominated Martin Van Buren, 1848; U. S. Senator, 1849-55; Governor of Ohio as a Free Soil Democrat, 1855; reelected as a Republican, 1857; U. S. Senator one day, 1861, resigning to become Secretary of the Treasury; resigned, 1864, and appointed Chief Justice, U. S. Supreme Court; presided at the impeachment trial of Pres. Johnson, 1866; delegate to the National Peace Convention, 1868.

Chase, **Samuel**, 1741-1811; American jurist; b. Somerset Co., Md.; a delegate in Congress, 1774-78; signed the Declaration of Independence; an Associate Justice of U. S. Supreme Court, 1796; impeached, 1804, for misdemeanor in the conduct of several political trials, but acquitted by the Senate.

Chasidim (kä-sè'dim), among the ancient Jews, a sect of pietists who originally aimed at strict ceremonial purity under the Mosaic law, espousing the cause of the Maccabees, and opposing Hellenizing tendencies. In recent times the name is applied to a sect of Jews who sprang up in Poland in the eighteenth century, who aim to restore the ancient piety of their nation. Their mystical and cabalistic doctrines and customs are repudiated by orthodox Jews.

CHASING

Chas'ing, the art of ornamenting r means of small steel tools, general with a hammer. By these means the marked with lines, patterns, etc., i upon its surface. The art differs i graving in that the lines, etc., are i and not incised; none of the metal is c It is common to ornament silver and c sels by means of raised patterns produ the reverse side by the snarling iron (is now more generally called, the process). When the projections and ings have been made, roughly, the filled with pitch, which is allowed to and the chaser works upon the out thin metal being supported by the pit chasing tools then push back the r parts, sharpen the edges, define and the pattern, and complete the design.

Chassé (shäs-sä'), **David Hendrik**, 1849; Dutch soldier; b. Thiel, G fought in the uprising of 1787; ente French service, becoming a general of c 1813; commanded the Dutch forces in tl of the Allies at Waterloo, and, 1832, heroic three weeks' defense of the cit Antwerp against the French and Belgi

Chassepot (shäs-pō'), breech-loadin musket; named from its inventor, Antc phonse Chassepot, a French officer and tor of arms, whose first model was n 1863. Later it was improved. It at much attention through its use by the in the war with Germany, 1870-71. Di in the French army by the Lebel rifle chassepot belongs to the same class w German needle gun, having in its carti mass of fulminating material, exploded needle thrust into it along the axis of th

Chasseur (shäs-sér'), French hunt sportsman; light troops in the French distinguished as marksmen. There are seurs both among the infantry and ca In the Austrian army are similar troops *Jägers*. The light troops which fought Garibaldi, 1859 and 1860, were called (*tori dei Alpi* (hunters of the Alps).

Chastelard (shä-të-lär'), **Pierre de Bo** de, abt. 1540-63; French poet; b. Dau as page to Marshal Danville, accom Queen Mary to Scotland, 1561; fell i with her and was encouraged in his pa but on repeating the offense of concealing self in her bedchamber was executed at I island.

Chastellain (shät-län'), **Georges**, abt. 175; French chronicler and poet; b. near Flanders; historiographer to Philip the G wrote "Chronicles of the Dukes of Burgun "Epitaphs on Hector," etc. His "Chro du bon Chevalier Messire Jacques de Lala is a fine portrait of the perfect gentlema then conceived.

Chasuble (chäz'ü-b'l), vestment in the man Catholic Church, the last to be pu by the priest before mass; a long sleev garment, put on through an apertur the top large enough to allow it to fall n

struction. In 1667 the Dutch admiral De Ruyter sailed up the Medway and burned some shipping at Chatham. Pop. (1901) 37,057.

Chatham Islands, British group in the S. Pacific Ocean; 400 m. E. of the Middle Island of New Zealand. The largest is nearly 90 m. in circumference; area, 375 sq. m. Pop. (1901) 419.

Châtillon-sur-Seine (shâ-tâ-yôn'-sür-sân'), town of France; department of Côte-d'Or; on the Upper Seine; 40 m. SW. of Troyes; consisted originally of two distinct portions—Chaumont and Bourg—each with its own fortifications. It was in olden times often the residence of the dukes of Burgundy, but owes its name in history chiefly to the unsuccessful congress held, 1814, to bring about a peace between Napoleon and the Allies. Pop. (1901) 4,833.

Chatoyant (shâ-toi'ânt), in mineralogy, the changeable or floating internal light reflected by certain minerals, as adularia and cat's-eye, and resembles the light reflected from the eye of a cat.

Chatrian (shâ-tre-ân'). See ERCKMANN-CHATRIAN.

Chattahoochee (chât-tâ-hô'chê), river of Georgia; rises in the Blue Ridge in the NE. part of the state; length about 550 m. Small steamboats can ascend it to Columbus, 325 m. from the Gulf of Mexico.

Chattanooga, capital of Hamilton Co., Tenn.; important railroad center in the South; on the Tennessee River, which is navigable from Chattanooga to the Ohio; near the junction of Alabama, Tennessee, and Georgia. It had, 1905, a capital of \$10,942,791 invested in factories, producing merchandise valued at \$15,193,909. Pop. (1900) 30,154.

The city lies at the base of Lookout Mountain; was the scene of three of the bloodiest battles of the Civil War, viz., Chickamauga, Missionary Ridge, and Lookout Mountain. The U. S. Govt. has established here Chickamauga and Chattanooga National Military Park, which, in extent, ranks next to Gettysburg.

The siege and battle of Chattanooga occurred, November 23-25, 1863, between the Federals under Grant and the Confederates under Bragg; after the battle of Chickamauga, September 19th, 20th, Rosecrans withdrew his army behind the fortifications of Chattanooga; Bragg moved up and occupied Missionary Ridge and Lookout Mountain; extended his flanks, inclosing the city on the S. side, and cut the roads by which the Federal army was supplied. In October Grant superseded Rosecrans, having under him the Army of the Cumberland, under Thomas, and the Army of the Tennessee, under Sherman, to which were added the Eleventh and Twelfth Corps, under Hooker, from the Army of the Potomac. Forces under Hooker and W. F. Smith reopened the route by which supplies were obtained, October 26th, 27th; Thomas drove back the Confederate line directly in front of Chattanooga; Sherman's army crossed the Tennessee River

and S. Chickamauga Creek, November 23d, 24th. Hooker attacked and carried Lookout Mountain, November 24th, fighting the Battle Among the Clouds; Sherman opened the battle, November 25th; Thomas attacked the Confederate left, captured the intrenchments on Missionary Ridge, and routed their defenders, pursuing them until dark. The troops in front of Sherman also retreated. Grant's total strength was about 60,000 men, his losses 5,616. Bragg's forces, weakened by the withdrawal of 20,000 to attack Burnside at Knoxville, was about 30,000, his losses 8,684, of whom 6,142 were taken prisoners, besides 40 guns and 7,000 small arms.

Chat'tels. See GOODS AND CHATTELS.

Chat'terer, any one of a small group of singing birds of the *Ampelidæ*. The best-known species is the cedar bird (*A. cedrorum*), found throughout the greater part of N. America, and the Bohemian waxwing (*A. garrulus*), a larger, more richly colored bird, occurring in the N. portions of Europe and N. America. It is remarkable for its erratic wanderings. The term chatterer is a misnomer, as these birds are very quiet.

Chat'terton, Thomas, 1752-70; English poet; b. Bristol; an attorney's apprentice, 1767-70; removed to London, 1770, and adopted the profession of author; while living in Bristol, exhibited manuscript copies of poems which he said were composed by Rowley (a monk of the fifteenth century), and found by him in the archives of a church; even learned men were deceived; produced songs, satiric poems, letters in the style of Junius, and other works, which brought him little remuneration; died by taking poison.

Chaucer (châ'sér), Geoffrey, abt. 1340-1400; English poet; b. London; son of a vintner; was engaged in Edward III's invasion of France; became a valet of the king's chamber, 1367, and received a pension of 20 mk.; employed on royal missions in Italy, Flanders, and France, 1370-78. While in Italy it is believed he learned from Petrarch the story of the Patient Griselda, the tale told by the Clerk, in the "Canterbury Tales." He held offices in the customs, 1374-86; elected to Parliament from Kent, 1386, but was dismissed the same year. His chief work, "The Canterbury Tales," was written at different periods between 1373 and 1400, it consists of twenty stories supposed to have been narrated by pilgrims to the shrine of St. Thomas at Canterbury in 1386. The person and characters of the pilgrims in the "Canterbury Tales" are sketched with marvelous spirit in a prologue, and here and in the tales there is a dramatic power of the comic sort scarcely inferior to that of Shakespeare. Other works include, "Troilus and Cressida," "The Parliament of Fowles," "The Legend of Good Women." Among his minor poems the "Complaint to Pity" and "Complaint to his Purse" are the most important.

Chaudière (shô-dê-âr'), river of Canada; rises in the S. of province of Quebec, flows N., and enters the St. Lawrence 7 m. above Que-

bec; length, 120 m. Two and a half m. from its mouth is a remarkable cataract, about 100 ft. high, called the Falls of the Chaudière.

Chauncey (chän'si), Isaac, 1772-1840; U. S. naval officer; b. Black Rock, Conn.; entered the merchant service abt. 1785; in command of a ship, 1791; on the organization of the navy, 1798, appointed lieutenant; commandant, 1802; captain, 1806; served with distinction in the war with Tripoli; in command of the Lakes in War of 1812; won highest honors for gallantry and skill; captured an English fleet of seven vessels on Lake Ontario, 1813; commanded the Mediterranean squadron, 1816-18.

Chautauqua (shä-tä'kwä), summer educational center on Chautauqua Lake, Chautauqua Co., N. Y.; about 9 m. NW. of Jamestown. The grounds, formerly known as Fair Point, were purchased, 1874, by the Chautauqua Assembly, originated jointly by Lewis Miller, of Akron, Ohio, and Bishop John H. Vincent, of New York. The town, containing more than 500 cottages, a large hotel, and many public buildings, lecture halls, recitation rooms, museum, etc., is built upon heavily wooded terraces, sloping gradually to the lake shore. The average summer population is 10,000.

The plan of applying scientific principles to Bible study and the training of Sunday-school teachers begun at Chautauqua, 1874, expanded to include classes in literature, language, science, art, etc. The combined agencies now employed are known as The Chautauqua System of Education; are divided into (1) Summer Work, offering courses in college studies under instructors from leading institutions, and sessions are held in July and August. (2) Home Reading and Study, consisting of correspondence instruction in all college subjects. Local circles are formed by three or more members for mutual aid. Certificates are granted to all who complete the course.

Chautauqua Lake, Chautauqua Co., N. Y.; about 20 m. long, and 1 to 2 m. wide; is 726 ft. higher than Lake Erie. The surplus water flows into Conewango Creek. Steamboats ply between Mayville, at the NW. end of the lake, and Jamestown at the SE. extremity.

Chauveau (shö-vö'), Pierre Joseph Olivier, 1820-90; Canadian author; b. Quebec; admitted to the bar, 1841; entered Parliament, 1844, and held portfolios of Solicitor-General, 1851; Provincial Secretary, 1853; Premier of Quebec, 1867; Speaker of the Senate, 1873; in 1878 Prof. of Roman Law in Laval Univ., and was President of the Royal Society of Canada. In addition to poems, published "Charles Guérin, Roman de Mœurs Canadiennes," "Voyage de le Prince de Galles," "Souvenirs et Légendes," "François Xavier Garneau, sa Vie et ses Œuvres."

Chauvinism (shö'vin-ism), derived from Chauvin, a character in a comedy performed at the time of the restoration of the Bourbons, 1815. Chauvin was a bragging veteran of Napoleon's army, who talked much of Austerlitz and Jena, and vowed to avenge Waterloo.

A **Chauvinist** is one who has exaggerated and ridiculous sentiments of patriotism, and is excessively warlike or quarrelsome.

Chaux-de-Fonds (shö-dé-fón'), town of Switzerland; canton of Neuchâtel; in a narrow gorge of the Jura Mountains 9 m. NW. of Neuchâtel; is 3,070 ft. above sea level; has manufactories of clocks and watches. Pop. (1904) 38,784.

Chazars (chä'zärz), Tartar people, originally inhabiting the land between the Caucasus and the Caspian Sea. Beginning with the seventh century they spread N. between the Dnieper and the Volga, with their capital at Astrakan. In 1016 they were subdued by the Russians and Greeks.

Chazy (shä-zé') Lime-stone, geological formation occurring on both sides of the Champlain basin and in Canada; belongs to the Trenton epoch of the Silurian period.

Cheat Riv'er, stream of W. Virginia; formed by several branches which rise in the Alleghanies in Randolph Co., and unite in Tucker Co.; flows nearly N., and enters the Monongahela, in Fayette Co., Pa.; length without the branches about 75 m.; takes its name from the extremely variable volume of its waters; for while sometimes a large stream, it often becomes in a few hours quite insignificant.

Check, or **Cheque**, an order addressed to a banker to pay a person named, or his order, or the bearer, a certain sum of money. Indorsements are necessary when the instrument is payable to order. It is quite common to make a check payable to order, as the indorsement of the payee operates as a receipt. In communities where there is a well-organized system of banking, the custom of giving checks for all payments, except of small amounts, economizes time and trouble. Their use makes the transfer of funds a mere matter of cross entries and transferring balances among the bankers (see CLEARING HOUSE). An important practice of *certifying* checks has been established by the banks. An officer of a bank, e.g., a teller, or cashier, has by custom acquired an authority to mark as good such checks as are presented to him. This act is treated in law as an acceptance, and the bank becomes liable for the amount of the check.

Check'ers, or **Draughts**, game for two persons played on a square board divided into sixty-four equal squares of alternate colors, each player having twelve like pieces, or men, distinguished by their color from those of his opponent. Only the thirty-two squares of one color are employed in the game (in the U. S. usually the darker ones), and the board is so placed between the players that each has one of them at the corner to his left. The men of each player are placed before him on the first three rows of these squares; the play then alternates between the two players until the end. A play is made by moving or jumping. A player moves by advancing one of his men from the square it occupies diagonally to an adjacent unoccupied square. A man can move or jump only forward until it reaches

the last row on the opposite side of the board, when it must be crowned by placing upon it another piece; it then becomes a king, and can thereafter move or jump either forward or backward. The game is won by a player capturing all his opponent's pieces, or so hemming them in that his opponent cannot move or jump when it is his turn to play. The game is drawn when neither player can win; if a player claims to have any advantage, his opponent may require him to win the game or show a decided advantage within forty of his plays, and if he fails, may declare the game drawn. The losing game is played by the same rules, save that a player wins by losing all his pieces, or by having them so hemmed in by those of his opponent that he cannot move or jump when it is his turn to play. The game is supposed to have originated before 2000 B.C., and to have preceded chess. It was introduced into Europe from Egypt centuries ago.

Cheduba (chĕ-dŏ'bā), E. Indian island in the Bay of Bengal; about 10 m. from Aracan, to which province it belongs; area about 250 sq. m.; staple productions, cotton, sugar, rice, indigo, and petroleum. This island was ceded to Great Britain, 1826. Pop. abt. 25,000.

Cheese, a food prepared from milk. It is wholesome, nourishing, promotive of digestion, and gives at least one and a half times as much nutrition per pound as ordinary beef. Cheese is usually made from the milk of cows, and varies chiefly according to the process of manufacture.

Milk contains fat, casein, and sugar, with some other constituents, called the "ash." The fat is in the form of minute globules in a condition of permanent emulsion. The *casein* is the portion of the milk which is coagulated by the action of the rennet in the process of cheese making. Milk sugar is essentially of the same composition as cane sugar. When acted on by certain microorganisms it yields lactic acid, which gives milk its souring quality. The ash of milk is made up of calcium, potassium, sodium, and iron. Calcium is particularly important, for its presence in the milk is necessary for the proper action of the rennet.

The quantity of milk required to make 1 lb. of cheese varies. For Cheddar, a hard cheese, it ranges from 9 to 11 lbs. per pound of cured cheese. Perfect regulation of temperature is necessary in order to produce a cheese of the finest quality, and aeration of the milk, directly after milking produces desirable effects.

In the process of manufacture of a typical kind of hard cheese the coagulating action of the natural acids is hastened by heating the milk to a temperature of from 72°-90° F. before introducing the rennet. This process causes the casein to coagulate more quickly than it does in new milk. Rennet, which is commonly used to coagulate the curd, is prepared from the fourth stomach of the young calf. When the milk has coagulated, the curd is cut into small pieces, and while gently stirred at an increasing rate of speed is subjected to a temperature of 90°-100° F., which scalds and cooks it and develops the lactic acid.

The whey is then carefully drained off and the curd gently stirred until dry enough to bear pressure without immediately adhering. It is now allowed to pack, or mat, cut in pieces of convenient size to handle, turned from time to time to get rid of the remaining whey, again packed, and held at a temperature of 90°-94° F., until sufficiently ripened to develop the proper amount of lactic acid, this being determined by its oily quality and fibrous texture when torn. It is then ready for grinding and cutting in hopper-hill devices. Salt, added in proportion of 1½ to 3 lbs. to 100 lbs. of milk, acts as a preservative, and tends to expel moisture. The cheese is next placed in a hooping and banding machine, the inside of which is lined with cheesecloth, which adheres to the cheese when taken from the press.

It requires weeks and sometimes months for the process of fermentation to ripen cheese and give it the proper character. Success or failure in cheese making hinges on the amount of moisture retained in the curd, which in turn depends upon the size of the particles into which the curd is cut, the cooking temperature, the amount of handling, and the accuracy of the acid tests. Cheeses differ according to (1) source of the milk from which made; (2) kind of milk, whether cream, whole, etc.; (3) agent used to effect coagulation; (4) method of manipulating curd and temperature to which it is raised; (5) shape and size of the cheese; (6) manner of curing; (7) results due to inoculation by certain ferments or forms of microorganisms. See BUTTER; MILK.

Chee'tah, or **Hunt'ing Leopard**, the *Guoparda jubata*, or *Cynaelurus jubatus*, a carnivorous mammal of the cat family, distinguished by its slender build, long legs, and nonretractile claws. The general color is pale yellow, marked with numerous small black spots. The hair on the neck and shoulders is long, the fur coarser and crisper than that of most cats. It is found throughout Africa, and in Asia nearly as far N. as Siberia. Its intelligence, docility, and fidelity are so great that in India and Persia it is trained for the chase of antelopes and deer. The cheetah is kept leashed and hooded until the game is found near, when it is let loose and, drawing stealthily near its victim, it rushes suddenly upon it, and can with difficulty be made to let go its hold. This animal is readily domesticated.

Chefoo (chĕ-fŏ'), seaport of China, called by the natives *Yen-ai* (Smoke Terrace); province of Shantung; on the N. shore of the promontory of Shantung, in the SE. angle of a small bay; opened to foreign residence and trade, 1858. Pop. est. (1900) 60,000.

Chehalis (chĕ-hā'lis), river of State of Washington; rises in Lewis Co.; flows into Gray Harbor, and is about ¼ of a m. wide at its mouth; length, about 125. m.

Cheirromancy (kī'rŏ-mān-sī). See CHIRO-MANCY.

Cheiron (kī'rŏn). See CHIRON.

Chelsea (chĕl'sē), suburb of London; in Middlesex; on the left bank of the Thames. Among

the principal edifices are the great Chelsea Hospital for pensioners from the British army and the Royal Military Asylum, founded by Frederick, Duke of York. A fine embankment skirts the river front. In Cheyne Walk, Carlyle lived for many years. During the eighteenth century many famous men resided here, among them Arbuthnot, Atterbury, Gay, Swift, Smollett, Steele, and Count Zinzendorf. Pop. (1901) 73,842.

Chelsea, city of Suffolk Co., Mass.; 3 or 4 m. NE. of Boston Common; separated from Charlestown by the Mystic River; bounded on the S. and SE. by Chelsea Creek, which separates it from E. Boston; a disastrous fire occurred in the tenement and retail districts, April 12, 1908, destroying property to the value of several millions of dollars. Thirteen lives were lost and fifty persons injured. Pop. (1905) 37,289.

Chel'tenham, borough and watering place of Gloucester, England; on the Chelt; 96 m. NW. of London; derives its prosperity from its mineral springs; first spring discovered, 1716; George III made it fashionable, 1788. Pop. (1901) 49,439.

Chemistry (kēm'is-trī). The science that deals with those changes in material substances that profoundly alter their properties, and with the ultimate composition of such substances; also the art (1) of determining by means of the data and methods of this science what elements make up a given body (qualitative analysis) and in what proportion (quantitative analysis); and (2) of combining elements in the proper proportions to form such substances as may be desired (synthesis).

Chemical change is distinguished from physical change, although the line between them is often hard to draw. For instance, the solution of sugar in water is generally considered a physical change, whereas that of zinc in sulphuric acid is regarded as chemical. In the latter case a new substance (zinc sulphide) is formed, and may be obtained by evaporation; while in the former case evaporation only recovers the original sugar. In general a change, to be regarded as chemical, must involve the formation of new substances by combination, disintegration or exchange between elements. Substances that have been found by experiment incapable of splitting up into others are known as elementary substances or elements. Some substances once supposed to be elements have been proved to be compound by attacking them with new and more powerful processes and agents, and it is possible that others may be similarly decomposed. It has long been suspected that all elements are forms of a single material substance (sometimes named "protyle") and the latest theories of matter include this as an assumption; but this theory has not been formally adopted as a part of chemical science, and would not invalidate it if established. Generally accepted theories regard matter as made up of molecules, which are the units of physical change, and which are in turn groups of atoms, the units of chemical change. Pos-

sible further subdivision (as into electrons) is not considered in ordinary chemistry. In physical change molecules remain practically intact; in chemical change the atoms of which they are composed separate and form new groups. This "atomic theory," first proposed by Dalton, was suggested by the laws of definite and multiple proportions, according to which (as experimentally established) any given chemical compound always contains the same elements in exactly the same proportions by weight and if two elements combine in different proportions to form various compounds, the different weights of one that combine with a fixed weight of the other are in simple ratios. Thus, sulphur and iron filings may be mechanically mixed in any proportion; but if they are caused to combine chemically by heating them the proportions of sulphur and iron in the resulting iron sulphide will always be the same. On the atomic theory the iron and sulphur molecules have split up and exchanged some of their atoms. Again, oxygen unites with hydrogen to form two different compounds, water and hydrogen peroxide. For a given weight of hydrogen the peroxide contains always just twice the weight of oxygen that the water does. Speaking atomically, there are twice as many oxygen atoms in the peroxide molecule as in the water molecule.

The accepted formulas of chemistry are based on the atomic theory together with the so-called law of Avogadro (according to which all gases, under the same pressure, contain equal numbers of molecules) and the fundamental idea of the conservation of mass, that is, the fact that weight is not altered by chemical change. An oxygen atom weighs the same, in other words, whether in combination with another oxygen atom or with a hydrogen atom.

To each element is assigned a symbol, as indicated in the table below, which stands also quantitatively for one atom of the element and for the weight of that atom ("atomic weight"), the hydrogen atom being taken as the unit. More atoms than one are indicated by small inferior figures. Thus, water is represented by H_2O , which stands also for the weight of one molecule (molecular weight), and hydrogen peroxide by H_2O_2 . In organic chemistry some substances have more complex formulae, as sugar ($C_{12}H_{22}O_{11}$) and the like. Chemical reactions are represented by equations. Thus, $HCl + AgNO_3 = AgCl + HNO_3$, signifies that hydrochloric acid and nitrate of silver react to form silver chloride and nitric acid. The molecular weights of the two sides of the equations are always the same.

In chemical nomenclature, an attempt is made to indicate composition. When two elements combine, one is always electrically negative to the other, as indicated by their action when decomposed by passage of a current (electrolysis). The name of such a compound is formed by adding to that of the positive element that of the negative with the suffix -ide (or -id), as potassium iodid (formerly always iodide of potassium) formed of potassium and iodine (formula KI). This is a binary compound. Important classes of binary

compounds are *acids*, in which hydrogen unites with a negative element and oxygen, and *alkalies*, in which hydrogen unites with a *positive* element and oxygen. The hydrogen in either is replaceable by a metal, forming a *salt*. Certain binary compounds in which hydrogen is similarly replaceable, are also termed acids, as HCl (hydrochloric acid).

LIST OF THE ELEMENTS, THEIR SYMBOLS AND ATOMIC WEIGHTS

Aluminium.....	Al.....	27.1
Antimony.....	Sb.....	120.2
Argon.....	39.9
Arsenic.....	As.....	75.
Barium.....	Ba.....	137.37
Bismuth.....	Bi.....	208
Boron.....	B.....	11
Bromine.....	Br.....	79.92
Cadmium.....	Cd.....	112.4
Cæsium.....	Cs.....	132.8
Calcium.....	Ca.....	40.09
Carbon.....	C.....	11.12
Cerium.....	Ce.....	140.25
Chlorine.....	Cl.....	35.46
Chromium.....	Cr.....	52.1
Cobalt.....	Co.....	58.97
Columbium.....	Cb.....	93.5
Copper.....	Cu.....	63.57
Dysprosium.....	Dy.....	162.5
Erbium.....	E.....	167.4
Europium.....	Eu.....	152
Fluorine.....	F.....	19
Gadolinium.....	Gd.....	157.3
Gallium.....	Ga.....	69.9
Germanium.....	Ge.....	72.5
Glucinum.....	Gl.....	9.1
Gold.....	Au.....	196.2
Helium.....	He.....	4
Hydrogen.....	H.....	1.008
Indium.....	In.....	114.8
Iodine.....	I.....	126.92
Iridium.....	Ir.....	193.1
Iron.....	Fe.....	55.85
Krypton.....	Kr.....	81.8
Lanthanum.....	La.....	139.5
Lead.....	Pb.....	207.10
Lithium.....	Li.....	7
Lutecium.....	Lu.....	174
Magnesium.....	Mg.....	24.32
Manganese.....	Mn.....	54.93
Mercury.....	Hg.....	200
Molybdenum.....	Mo.....	96
Neodymium.....	Nd.....	14.43
Neon.....	Ne.....	20
Nickel.....	Ni.....	58.68
Nitrogen.....	N.....	14.01
Osmium.....	Os.....	190.9
Oxygen.....	O.....	16
Palladium.....	Pd.....	106.7
Phosphorus.....	P.....	31
Platinum.....	Pt.....	195
Potassium.....	K.....	39.1
Præscodymium.....	Pr.....	140.6
Radium.....	Ra.....	226.4
Rhodium.....	Rh.....	102.9
Rubidium.....	Rb.....	85.45
Ruthenium.....	Ru.....	101.7
Samarium.....	Sa.....	150.4
Scandium.....	Sc.....	44.1
Selenium.....	Se.....	79.2
Silicon.....	Si.....	28.3
Silver.....	Ag.....	107.88
Sodium.....	Na.....	23
Strontium.....	Sr.....	87.621
Sulphur.....	S.....	32.07
Tantalum.....	Ta.....	181
Tellurium.....	Te.....	127.5
Terbium.....	Tb.....	159.2
Thallium.....	Tl.....	204
Thorium.....	Th.....	232.42
Thulium.....	Tu.....	168.5
Tin.....	Sn.....	119
Titanium.....	Ti.....	48.1
Tungsten.....	W.....	184
Uranium.....	U.....	238.5
Vanadium.....	V.....	51.2
Ytterbium.....	Yb.....	172
Yttrium.....	Y.....	89
Zinc.....	Zn.....	63.37
Zirconium.....	Zr.....	90.6
Xenon.....	Xe.....	128

The atomic weights given in the foregoing table are those issued on January 1, 1909, by the International Committee on Atomic Weight. In addition there are several which have been announced, but not definitely accepted, as actinium, announced by Debierne; emanium, announced by Giesel; ionium, announced by Boltwood, and polonium, announced by Madame Curie; holmium, announced by Cleve, and nipponium, announced, 1908, by Masataka Ogawa, a Japanese chemist. See ANALYSIS; STEREO CHEMISTRY.

Chemnitz (kēm'nitz), town of Saxony, Germany; on the Chemnitz River; 44 m. WSW. of Dresden; the most important manufacturing town in the kingdom; is engaged in making cotton goods, silks and woolens, and in calico printing; was an imperial city from the thirteenth to the seventeenth century. Pop. (1900) 214,030.

Chemosh (kē'mōsh), national deity of the Moabites; essentially the same as Moloch of the Ammonites or the Canaanitic Baal. His worship was introduced into Jerusalem by Solomon.

Chemulpo (chē-mūl'pō), open or treaty port on the W. coast of Korea; 27 m. from Seoul. The trade is mostly in the hands of Japanese. The chief exports are hides and beans, imports mostly cotton and woolen goods.

While the Japanese fleet was engaging the Russian fleet and batteries at Port Arthur, in the first days of the war, 1904, a Japanese cruiser squadron drove two Russian cruisers out of the harbor of Chemulpo and destroyed them.

Chénier (shā-nē-ā'), André Marie de, 1762-94; French poet; b. Constantinople; his father being consul general of France; Secretary to the French Embassy in London, 1787-90; on his return to Paris joined the Moderate Party; made himself obnoxious to the Terrorists; was arrested, imprisoned, and guillotined. The idyls "L'Avengle," "La Liberté," "Le Mendicant," "Le Jeune Malade," the ode to Charlotte Corday, and that to "La Jeune Captive," are famous.

Chénier, Marie Joseph Blaise de, 1764-1811; French poet and dramatist; b. Constantinople; abt. 1783 settled in Paris; member of the National Convention, 1792; President, 1795; afterwards a member of the Council of Five Hundred; Inspector of Public Instruction, 1803-6; at the same time a member of the tribunate; works include "Charles IX.," "Henry VIII.," "Caius Gracchus," "Timoleon.," "Fenelon," some of which were proscribed for their republican sentiments; also patriotic songs and odes; among them "Chant du Départ," almost as popular among the soldiers as the "Marsellaise."

Chenopodium (kē-nō-pō'di-ūm), a genus of herbaceous plants of the family *Chenopodiaceæ*; natives of America, Europe, and Asia. They are weeds, growing in gardens and waste places, and often covered with a white mealliness. Several species are naturalized in the U. S., and are known as goose foot, pigweed, and lamb's quarter. The *C. anthelminticum*

(wormseed) is a native of the U. S. An oil which is obtained from the seeds of this plant is administered as a remedy for worms. Among the more important plants of this genus is *Quinoa*.

Cheops (kē'ōps), name given by Herodotus to the despotic builder of the great pyramid in Egypt, now identified with Suphis I (or Shufu) of the monuments; the second king of the fourth dynasty, established at Memphis abt. 2500 B.C.

Cherbourg (shēr'bōrg), fortified seaport and important naval station of France; department of Manche; on the English Channel, 82 m. W. by N. of Havre; the chief industry is in the arsenal and dockyards. The naval port consists of a harbor 776 ft. long by 663 ft. wide, which communicates with two large wet docks. The commercial harbor at the mouth of the Divette, half a mile distant, is connected with the sea by a canal. The breakwater here is the most gigantic work of its kind in ancient or modern times. William the Conqueror founded a hospital and a church here. Cherbourg was besieged by the English, 1378, 1418, 1450, and 1758. Pop. (1901) 42,938.

Cherbuliez (shēr-bū-lē-ā'), Victor, 1829-99; F. novelist and critic; b. Geneva, Switzerland; resided in Paris; works include "A propos d'un Cheval," a reverie on ancient art, and the romances "Le Comte Kostia," "Paul Méré," "Ladislav Boeski," "Samuel Brohl et Cie," "La Vocation du Comte Ghislain."

Cherokees (chēr-ō-kē'), a tribe of N. American Indians, springing from the Iroquoian family; formerly occupied much of the present State of Tennessee, with portions of North and South Carolina, Virginia, Georgia, Alabama, and Missouri. Afterward constituted a family called the Cherokee nation, one of the Five Civilized Tribes; occupied a tract of 7,861 sq. m. in Indian Territory with a population officially reported, 1902, at 28,016. A branch of the tribe occupies reservations in North Carolina and numbers about 2,000. The Cherokees sided with the English in the Revolutionary War till their own country was invaded, when they made peace; acknowledged the sovereignty of the United States, 1785, and were confirmed in possession of their hunting grounds; aided Jackson in the war of 1812-5; removed to Indian Territory, excepting two small bands, 1838-39; organized a national government, with capitol at Tahlequah; sided at first with the Confederates in the Civil War, but majority came within Union lines; had their country ravaged by both armies; terminated their tribal relations and became citizens of the United States, 1906.

Cher'ty, various species of the genus *Prunus* (*Rosaceæ*), which are characterized by small, smooth fruits with a smooth stone, which is globular or approximately so. There are numerous species of cherries in various parts of the world, falling into two groups designated by the inflorescence. In one group, to which garden cherries belong, the flowers are borne in umbel-like, nearly sessile clusters; and in the other, to which belong the choke

cherry and wild black cherry, they are disposed in true racemes. The natural history of the common cherries is not well understood, but most botanists agree in referring them to two species—*P. cerasus*, comprising the Morello type, and *P. avium*, comprising all the sweet cherries and the class known as dukes. In Japan, cherries are popular as ornamental plants, the common species there being *P. pseudocerasus*.

Cherry Val'ley, village of Otsego Co., N. Y.; 68 m. W. of Albany. It was the scene of a massacre by the Tories and Indians in the British service October 11, 1778. Thirty-two inhabitants, nearly all women and children, were murdered, besides sixteen soldiers of the Continental army. The rest of the citizens were made prisoners and taken away, and all the buildings were burned. The village is 6 m. from Sharon Springs, and is a summer resort. Pop. (1900) 772.

Chersiphron (kēr'sī-frōn), eminent Cretan architect who flourished about 600 B.C.; designed the Temple of Diana at Ephesus, one of the seven wonders of the world.

Chersonesus (kēr-sōn-ēs'ūs), ancient name of several peninsulas of Europe and Asia, as Chersonesus Aurea (Malacca), Chersonesus Cimbrica (Jutland), Chersonesus Thracia (Gallipoli), and Chersonesus Taurica (Crimea).

Cher'ub (plural Cherubim or Cherubs), a kind of winged being mentioned in the Scriptures. Cherubim guarded Paradise (Gen. iii, 24) and prevented the return of fallen man; were placed over the mercy seat in the Holy of Holies (Ex. xxxvii, 8); were wrought into the hangings of the temple (Ex. xxvi, 1, 31; xxxvi, 8, 35); so in Solomon's temple (1 Kings vi, 23 sqq.) they overshadowed the ark, and carved upon the doors and elsewhere were used as ornaments (1 Kings vii, 29, 36). They symbolized the nearness and at the same time the inaccessibility of God. They appear as four-winged beings of a generally human form in Christian art. Many critics believe that they are symbols rather than real existences. According to the simple, primitive angelology, cherubim carried God when He appeared in His glory on the earth (Ps. xvii, 10); cf. Ezekiel's visions (Ezek. i, 19; x, 16; xi, 22). So also they are called "the wings of the wind," bearing God to the world (Ps. civ. 3; Is. xix, 1).

Cherubini (kā-rō-bē'nē), Maria Luigi Carlo Zenobio Salvador, 1760-1842; Italian musician; b. Florence; spent most of his life in France; died in Paris; composed much church music: anthems, masses, and overtures, mostly for full orchestra. "Requiem in C. minor," is his greatest work; numerous operas include "Lodoiska;" "Madée;" "Les Deux Journées," the last named occasionally given in Germany under the title of "Der Wassernäger."

Cherusci (kē-rō'sē), ancient German tribe mentioned by Cæsar; lived on the N. side of the Silva Bacenis (Hartz Forest). The famous Hermann (Arminius) was a chief of the Cherusci. Having formed a league with other German tribes, he defeated the Roman general,

Varus, near the Lippe, 9 A.D. According to Tacitus, the Cherusci were conquered by the Catti, or Chatti, after the death of Arminius.

Chesapeake (chês'a-pék) Bay, large inlet of the Atlantic coast of the U. S., extends from capes Charles and Henry N. along Virginia and two parts of Maryland to the mouth of the Susquehanna River; about 200 m. long, and varies in width from 4 to 40 m.; distance from Cape Charles to Cape Henry, nearly 12 m; coasts deeply indented by inlets and estuaries, which are navigable. The Chesapeake is so deep that the largest ships can ascend from the ocean nearly to the N. extremity. It contains numerous islands. The largest rivers which flow into it are the Susquehanna, the Potomac, and the James.

Chess, a well-known game of great antiquity and of E. origin. The game is played by two persons on a board of sixty-four squares in eight rows of eight squares each, alternately black and white. Each player has sixteen men; eight, known as pawns, are of the lowest grade; the other eight are of various grades. They are king and queen, two bishops, two knights, and two rooks, or castles. The board must be placed so that each player shall have a white square to his right hand. The men are then set upon the two rows of squares next the players; the pawns on the second row, leaving between each side four unoccupied rows. The king and queen occupy the central squares facing the corresponding pieces on the opposite side. The queen always occupies a square of her own color. The bishops are next the king and queen, the knights next the bishops, the rooks on the corner squares. The men standing on the king's or queen's side of the board are named respectively king's and queen's men. The pawns are named from the pieces in front of which they stand; king's pawn, king's knights' pawn, etc.

In chess the men capture by occupying the position of the captured man, which is removed. The ordinary move of the pawn is one square straight forward; a pawn never moves backward. The *first* time a pawn is moved it may be played forward one square or two; but in capturing a piece the pawn moves diagonally one square. Pawns have another mode of capture peculiar to themselves, and only available against pawns. If Black's pawn, instead of occupying king 4, stood on king 5, and White played pawn to queen 4, Black could not capture it by placing his pawn on the square it occupies, which would be a false move; but he is at liberty to make the capture by placing his own pawn on the square passed by White's (queen 6). This is called taking *en passant*. When a pawn reaches the eighth square it must be exchanged. The player may choose any piece except the king, but the queen is generally the piece chosen. This is called "queening a pawn," and a player may have several queens. The rook moves in any direction and for any distance that is open along either its row or its file. The bishops are unlimited in range, and move diagonally either backward or forward. The queen is the most powerful piece

on the board, and can move to, or capture at, any distance or direction in a straight line. The king is at once the weakest and the most valuable on the board. In point of direction he is as free as the queen, but for distance he is limited to the adjacent squares. Standing on any central square, he commands the eight squares around him and no more. The king has one special move. Once in the game, if the squares between king and rook are clear, if neither king nor rook has moved, if king is not attacked, and if no hostile man commands the square over which king has to pass, king may move two squares toward



CHESS BOARD.

either king's rook or queen's rook, and rook in the same move must occupy the square over which king has passed. This is called "castling." The knight never moves in a straight line. His move is limited to two squares at a time, one forward or backward, and one diagonally, and he can leap over any man occupying an intermediate square. All captures in chess are optional.

The definite aim in chess is the "checkmating" of the opposing king. The king cannot be taken, he can only be in such a position that if it were any other piece he would be taken. It is a fundamental rule of the game that the king cannot be moved into check. When the king can no longer be defended on being checked by the adversary, either by moving him out of danger, or by interposing, or by capture, the game is lost, and the adversary announces this by saying "checkmate." When a king is placed so that he cannot move without going into check, and no other man can be moved without exposing him, the game is considered drawn.

Chest, or **Thorax**, the part of the body between the neck and the abdomen. It is a conical case formed of bones and cartilages joined together by muscles and soft tissues. It contains the heart and the great blood vessels, the lungs, œsophagus, various nerves, and other structures. The windpipe and the venous trunks of the head, neck, and arms enter the upper portion; in the expanded part are the

lungs, and in the space between the lungs is the heart and the great vessels leading to and leaving it. The lower opening of the thorax is closed by the diaphragm, a musculo-membranous structure attached to the end of the sternum in front, the ribs at the sides, and the spine behind. The diaphragm arches upward into the thorax, but moves up and down with the respirations.

Deformities of the thorax are common, and usually result from disease affecting the bones in early childhood, such as rickets. A marked form of rickety deformity is "chicken breast," in which the chest is compressed laterally, and the sternum and anterior margins of the ribs protrude. In individuals of phthisical tendency the chest is prone to be flattened and elongated. Asthma leads to a barrel-like deformation of the chest. Chest deformities may also contribute to the occurrence of disease by interfering with proper breathing and circulation.

Chester, episcopal city of England; capital of Cheshire; on the Dee; 16 m. SSE. of Liverpool; has a large railway station at which several lines converge. The town is entirely inclosed within ancient and massive walls, nearly 2m. in length. In the four principal streets, the space in front of the second stories of the houses, which are used for shops, forms a covered way for foot passengers called the "rows." It has an old cathedral, a castle, and St. John's Church. Chester occupies the site of an important Roman station called *Deva*, or *Devana*, *Castra*. Pop. (1901) 38,309.

Chester, city in Delaware Co., Pa.; on the Delaware River; 15 m. WSW. of Philadelphia; settled by Swedes, 1643, and is the oldest town in the state; has large shipyards. Pop. (1900) 33,988.

Chesterfield, Philip Dormer Stanhope (fourth Earl of), 1694-1773; English author and courtier distinguished for his wit and politeness; b. London; elected to Parliament, 1715; entered the House of Lords, 1726; became an eloquent debater, and gained distinction by his graceful manners and fine taste; Lord Lieutenant of Ireland, 1744-46; one of the principal secretaries of state, 1745-48; reputation as a writer founded chiefly on his "Letters to his Son." "Take out the immorality," said Dr. Johnson, "and it should be placed in the hands of every gentleman."

Chesterfield, town of Derby, England; 24 m. NNE. of Derby; has a church, with a remarkable twisted spire, built in the thirteenth century. Mines of coal, lead, and iron are worked in the vicinity. Pop. (1901) 27, 185.

Chestnut, tree valuable for its timber and fruit, growing wild in the U. S. and Europe; among the most beautiful of forest trees; some of the oldest and largest trees in the world are of this species; one of the most famous was that on Mt. Etna, the interior of which served as a retreat for shepherds and their flocks. The nuts are eaten raw, boiled, roasted, or ground into meal, and made into pudding, cake, and bread. An important foodstuff in S. Europe.

Chevalier (shè-và-lyà'), Michel, 1806-79; French political economist; b. Limoges; sent to the U. S., 1832, to examine the railroads, and published, 1836, "Letters on North America." He became an advocate of free trade; Prof. of Political Economy in the College of France, and Chief Engineer of Mines. He was deprived of these places by the republicans, 1848; reinstated by Napoleon III, 1852; wrote on the organization of labor against socialism; admitted to the Institute, 1851; author of "History and Description of the Ways of Communication in the United States" (two volumes), 1840-42; "Mexico, Ancient and Modern," 1863, and other works.

Chevaux-de-Frise (shè-vô-dè-frèz'), French military term used also in English; applied to large and strong pieces of timber, from which wooden or iron spikes project in various directions. They are employed to impede the advance of cavalry or of a storming party in a fortified place. Sometimes the *cheval-de-frise* consists of an iron tube, 6 ft. long, in which there are twelve holes. The same number of spears are kept in the tube, and when required for use are inserted in the holes.

Cheverus (shè-v'è-rûs), Jean Louis Anne Madeleine Lefebvre, 1768-1836; French cardinal and philanthropist; b. Mayenne. Imprisoned by the revolutionists, fled to England on his release, 1792; surrendered his fortune to his relatives and migrated to Boston, Mass., 1796, as a missionary. Here he endeared himself to the people by his kindly relations to Protestants, who aided him in building churches, by his humane work among the poor and those stricken by pestilence, and by his support of educational institutions. Was a founder of the Boston Athenæum; Bishop of Boston in 1808; returned to France, 1823; Bishop of Montauban; Archbishop of Bordeaux, 1826, and a cardinal, 1835.

Cheviot Hills, mountain range along the border between England and Scotland; is about 35 m. long. The highest point is Cheviot Peak, 2,676 ft. These hills are grazed by sheep, called cheviots, famed for their wool. Their name is connected with the ballad of Chevy Chase and many incidents of border warfare.

Chevron (shè-v'rûn), an ornament and badge of rank of gold or silver lace, or of braid, worn on the sleeve, deriving its name from its resemblance in form to a pair of rafters. It is of French origin, and has been used to denote periods of service in the ranks or the rank of noncommissioned officers.

CHEVRON, in heraldry, an ordinary representing the rafters of a house, and generally denoting the foundation of his own family by the bearer. The chevron is formed of two lines, joined at the top, and descending to the extremity of the field in the form of a pair of rafters.

CHEVBON, or ZIGZAG MOLDING, in architecture, a molding in the form of a succession of chevrons. In general it is characteristic of Norman architecture.

Chevy Chase, famous British ballad, recounting an affray between Douglas and Percy

on the Scottish border. A much earlier version exists under the title "The Hunting of the Cheviot."

Cheyenne (shĭ-ĕn'), capital of Wyoming and of Laramie Co.; 106 m. N. of Denver; elevation, 6,075 ft.; is a great beef-growing center, and a supply depot for the Rocky Mountain region; contains the U. S. military post of Fort Russell. Pop. (1900) 14,087.

Cheyennes, tribe of N. American Indians, of the Algonquin family; first mentioned in history, 1680, under the name of Chaa, then living at the head of the Mississippi River; believed to have preceded the Sioux in the occupation of the Upper Mississippi region; had fixed villages, practiced agriculture, and made pottery; exceed in stature all the tribes of the plains except the Osages; are proud, contentious, brave to desperation; almost constantly warring with other tribes, frontier settlers, or the U. S. Govt. till 1867. They are now classed as N. Cheyennes, about 1,400, on reservation in Montana, and S. Cheyennes, about 1,900, in Oklahoma, the latter American citizens since 1902.

Chiaroscuro (kyā-rō-skō'rō), combination of light and dark in a painting, drawing, print from wood cut or metal, and the like. The term is especially used for the design in light and dark of a painting, as distinguished from its color design and from its merit as a piece of accurate drawing. Thus a picture may be poor and cold in color, but valuable as chiaroscuro.

Chicago (shĕ-kā'gō), capital of Cook Co., Ill.; largest city on the Great Lakes; second city in the U. S. in population; on Lake Michigan and both sides of the Chicago River; area (1900) 190½ sq. m.; pop. (1907) 2,367,000. Its original site was a narrow sand ridge along the lake, and a low flat prairie adjoining it on the W., only 3 ft. higher than the river. The prairie has since been raised to 14 ft. above the lake. The city stretches along the lake for 26 m.; varies in width from E. to W. from 6 to 14 m.; is divided by the river and its branches into the N., W., and S. sides.

The business center occupies an area less than a mile square, bounded on the E. by the lake and N. and W. by Chicago River. The shipping business is transacted along the river and the canal, the former having a frontage, including docks, of 41 m. The live stock and meat industry is carried on at the Union stock yards, from Thirty-ninth Street to Forty-seventh Street, in the geographical center of the city.

Under an act of the Legislature, 1869, 80 parks have been laid out, with a total area ft. wide, which, with the Lake Shore Drive, circled with a chain of boulevards, 100 to 200 ft. wide, which, with the lake shore drive, circles the entire city with one of the most beautiful driveways in the world, over 65 m. in length. Chicago has two harbors, one at the mouth of the Chicago River, of about 455 acres, protected by breakwaters; the other at the mouth of the Calumet River, in S. Chicago. A great canal, 42 m. long, designed pri-

marily to carry off the sewage, but with an ultimate purpose of being converted into a ship canal, was constructed, 1892-1900, at a cost of about \$45,000,000.

The city is supplied with water from Lake Michigan, obtained at cribs located from 2 to 4 m. from the shore, and is conveyed thence to the city through tunnels under the lake. The Chicago River is spanned by more than fifty swinging bridges of from 200 to 250 ft. in length. Among the notable buildings, other than religious and educational, is the Auditorium, containing the largest theater in the world, a great hotel, and many stores and offices. Educational institutions include the Univ. of Chicago, several professional schools of Northwestern Univ., and Armour Institute.

According to the U. S. Census of 1900, the city had 8,159 industrial plants, with a capital of \$637,743,474, products valued at \$955,038,277. The principal industries were slaughtering and meat packing, smelting and refining, foundry and machine-shop work, iron and steel agricultural implements, bridges, furniture, and malt. Chicago is a port of entry, and in the fiscal year, 1905-6, had imports valued at \$22,210,010; exports, \$2,580,794. There were 12 national banks, with \$24,350,000 capital, and over \$367,678,000 in resources; and exchanges at the clearing house aggregated \$9,821,718,500 in the year. The equalized assessed valuation, 1906, was \$413,995,818; total bonded debt, \$22,618,000; value of property owned by the city, \$95,878,284.

The French missionaries, Marquette and Joliet, visited the site of Chicago, 1673; a fort was erected, 1685; a Jesuit mission post was established soon after. The place was claimed successively by France, Great Britain, Virginia and New York, and the U.S.; was included in several early territories and several counties of Illinois; ceded to the U. S., 1795. Fort Dearborn was erected, 1804, destroyed by Indians, 1812, and rebuilt, 1816. The town was surveyed, 1830, organized, 1833, and chartered as a city, 1837. The greater part of city destroyed by fire, October 8-10, 1871, which burned over 2,100 acres, involving 17,450 buildings, and causing a total loss of \$190,000,000; another fire, 1874, destroyed 18 blocks in heart of city. An anarchist riot at the Haymarket, May, 1886, caused death of six police officers and wounding of others; four anarchists were executed for the crime. The World's Columbian Exposition held here May 1 to October 30, 1893. The burning of Iroquois Theater, December 30, 1903, caused loss of 582 lives, with over 300 others missing.

Chicago, University of, coeducational, non-sectarian institution in Chicago, Ill.; incorporated, 1890, opened, 1892, as successor to Chicago Univ., in operation, 1858-86; endowed by John D. Rockefeller, whose gifts in all amount to \$10,000,000. Two thirds of the board of trustees and the president of the university must belong to the Baptist denomination. William Rainey Harper was the first president, 1891-1906. The site lies between Washington and Jackson parks, and fronts on the Midway Plaisance. The central features

of the group of buildings are a university hall, scientific laboratories, museum, library, chapel, science hall, and gymnasium. Dormitories intended to accommodate over 2,000 students are arranged in quadrangles on the four corners of the site. The Yerkes Astronomical Observatory, at Lake Geneva, Wis., Ogden Scientific School, and the Divinity School, formerly the Baptist Union Theological Seminary, are important departments. Rush Medical College is affiliated with the university. The secondary schools are the Morgan Park Academy, the South Side Academy, and the Chicago Manual Training School. The library has more than 300,000 volumes and 1,500 pamphlets. The work is divided into the university proper and the department of university extension. The university proper includes (1) academies, either directly under the control of the university or affiliated with it; (2) colleges either in Chicago or at other points, the latter being also affiliated with the university on certain definite terms; (3) graduate schools, either nonprofessional or professional.

Chichester (chĭch'ĕs-tĕr), episcopal city of England; capital of Sussex; 17 m. ENE. of Portsmouth; on a plain between an arm of the sea and the South Downs; formerly capital of the kingdom of Sussex; has a cathedral built, 1199. Pop. (1901) 12,244.

Chick'adee (a name derived from its note), the popular name of the black cap titmouse (*Parus atricapillus*) and other American birds of the same genus and of nearly related genera. The common chickadee is frequent all the year round throughout a great part of E. N. America, and is one of the bravest and most cheerful of winter birds. It shares with several others the name snowbird. It nests in a hollow tree, and feeds on insects in their season and on seeds in winter.

Chickahominy (chĭk-ă-hŏm'ĭ-nĭ), river of Virginia; rises about 20 m. NW. of Richmond; flows SE. and after a course of about 75 m. enters the James River; forms the boundary between Henrico and Charles City counties on the right, and Hanover, New Kent, and James City on the left. The margins of the Chickahominy were the theater of the operations of McClellan against Richmond, 1862. In close proximity to this river occurred the battles of Seven Pines and Fair Oaks, May 31-June 1, 1862; Mechanicsville, June 26; Gaines's Mill, June 27; Savage's Station, June 29; White Oak Swamp, June 30, 1862, and Cold Harbor, June 3, 1864.

Chickamauga (chĭk-ă-mă'gă) and **Chattanooga National Park**, park embracing the battlefields of Chickamauga and of the actions about Chattanooga, including Missionary Ridge and Lookout Mountain. Tablets mark scenes of action and position of organizations, etc., for both armies; established by act of Congress, approved, 1890; dedicated, 1895.

Chickamauga, Bat'tle of, near Chickamauga Creek, Tenn., Sept. 19-29, 1863; between 50,000 Confederates under Bragg, and 55,000-60,000

Federals under Rosecrans; in first day's battle, Gen. Polk attacked the Federal right under Gen. Thomas; in second day's fight, Gen. Longstreet separated Rosecrans, McCook and Thomas from the rest of the army, compelling Thomas to bear the brunt of the fighting; result, defeat and retreat of the Federals to Chattanooga, with loss of 18,851; Confederate loss, 17,804. See also CHATTANOOGA, SIEGE AND BATTLE OF.

Chick'asaw Bluffs, Bat'tle of, before Vicksburg, Miss., Dec. 29, 1862; assault on a strongly fortified position here by Federal forces under W. T. Sherman, resulted in heavy loss; Confederate loss slight.

Chickasaws, tribe of N. American Indians, belonging to the Muskogean family, related to the Choctaws in language and customs; constitute one of the Five Civilized Tribes, occupying a large reservation in Indian Territory; capital, Tishomingo. Pop. (1904) 4,828. They were formed, according to De Soto narratives, under the name of Chicazas, in N. Mississippi, abt. 1540. From remote times they were constantly fighting neighboring tribes; were relentless enemies of the French, whom they defeated in several attempts at conquest; made treaty with the U. S., 1786; and were given a separate, independent reservation in Indian Territory, 1855. In recent years the Chickasaws have made much progress in education, agriculture, and material prosperity.

Chick'en Pox, a contagious febrile disease, chiefly of children; bearing some resemblance to a very mild form of smallpox. Chicken pox is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight incrustation, which falls off in a few days, without any such permanent mark or pit as in smallpox. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long. It usually occurs but once in any one patient.

Chick'weed (*Stellaria media*), a common weed found native in most parts of Europe, Asia, and America. It has a procumbent, more or less hairy stem, with ovate, pointed leaves, and many small white flowers. It is much used for feeding cage birds, who eat both the leaves and seed. It is a good substitute for spinach or greens.

Chic'opee, city of Hampden Co., Mass.; on Connecticut River, 4 m. N. of Springfield. At Chicopee Centre are cotton mills, and the largest factory of swords in the U. S. The village of Chicopee Falls is on the Chicopee River, 1½ m. E. of Chicopee Centre; produces cotton flannel, dress goods and blankets. Pop. (1900) 19,167.

Chic'ory, or **Suc'cory**, an herb of the family *Compositæ*. The common chicory or succory (*Cichorium intybus*) is a perennial plant found wild in Europe and naturalized in the U. S., growing in waysides, borders of fields, etc. It has a long carrotlike root of a brownish-

yellow color, and white within. The stem rises 2 to 5 ft., the leaves resembling those of the dandelion; the flowers rather large, beautiful, and generally blue. Chicory is extensively cultivated in Europe for its roots and for feeding cattle with its leaves. The blanched leaves are used as a salad. To this genus belongs also the endive. The dried and powdered roots of chicory are much used as a substitute for coffee; also in the adulteration of that article.



CHICORY.

Chignecto (shġ-nĕk'tō) Bay, inlet in British N. America; the N. part of the Bay of Fundy; between New Brunswick and Nova Scotia; about 30 m. long; has an isthmus of about 14 m. in width between it and Northumberland Strait, in the Gulf of St. Lawrence. Proposals have several times been made to construct a ship railway across the neck of land connecting Nova Scotia with the Canadian mainland.

Chi- (or **Shi-**) **Hwang-Ti** (shġ-hwāng'tē), i.e., "First August Ruler," d. 210 B.C.; despotic ruler of China, who at the age of thirteen succeeded his father, Prince Chwang Siang, 246 B.C., and proclaimed himself First Universal Emperor (221 B.C.); divided his empire into thirty-six provinces, and displayed ability in consolidating it, constructing roads and canals and public buildings; drove out the Hiung Nū, or Huns, and other barbarians, and built the Great Wall to prevent their return.

Chigoe (chġ'ō), or **Jig'ger**, a small species of flea (*Sarcopsylla penetrans*) occurring in tropical and semitropical America. It is but $\frac{1}{8}$ of an inch long and lives especially in the sand. The fertilized female bores into the skin of man and animals. At first there is but a slight irritation and itching, but soon the eggs begin to grow and these distend the abdomen of the mother to the size of a pea. As a result, inflammation and ulceration follows, which should be attended to at once, for if the young jiggers be set free from the parent they can continue the trouble, and death has resulted from neglect. They are usually extracted with the knife, but care must be taken to remove all the eggs. In the S. states the term jigger and chigoe are often given to certain of the ticks which attack man and other animals, but which belong to another zoölogical group.

Chihli (chġ'lġ), extreme NE. province of China, from 35° to 43° N. lat., and 114° 30' to 122° E. lon.; contains Peking, capital of the empire; area, abt. 100,000 sq. m. Pop. abt.

20,000,000. The principal rivers are the Peiho and Lanho, emptying into the Gulf of Pechili. The Great Wall passes through this province, and the Grand Canal enters it from the S. The province is divided into eleven foo, or departments. The department of Shun-Tien, in which Peking is situated, does not fall within the jurisdiction of the viceroy of Chihli. Principal cities, besides Peking, are Tientsin, Paoting (the capital), Chingting, Yungping, Tūngchow.

Chihuahua (chġ-wā'wā), a state of Mexico, bordering on Texas; area, 87,802 sq. m.; pop. (1900) 327,784; bounded NE. by the Rio Grande del Norte, and drained by the Conchos. The W. part is occupied by a long mountain chain called Sierra Madre. The state is rich in minerals, including gold, silver, copper, lead, tin, and cinnabar; chief wealth of the inhabitants consists in herds of cattle, horses, and mules. Capital is Chihuahua; 310 m. NNW. of Durango. Pop. (1900) 30,000.

Chil'blain, a secondary effect of cold and moisture, principally affecting the feet, hands, nose, ears, etc. Mild cases are marked by swelling and redness of the affected part, accompanied by intolerable itching; severer forms assume an ulcerated, and even a gangrenous, character.

Child, Lydia Maria (Francis), 1802-80; American author; b. Medford, Mass.; founder and editor of *The Juvenile Miscellany*, the first periodical of its kind in the U. S.; with her husband edited in New York the *National Antislavery Standard*, 1841-44; numerous works include novels "Hobomok," "The Rebels," a tale of the Revolution; "Appeal in Behalf of that Class of Americans called Africans," "The American Frugal Housewife," "The Girl's Own Book," "Flowers for Children."

Chil'dermas, or **Ho'ly In'nocents' Day**, day (December 28th, or in the East the 29th) observed by the Roman, Anglican, Greek, and various E. churches as a festival in commemoration of the children killed by Herod.

Child La'bor, labor performed by children for money, contributing to the family support, or appreciably assisting in mechanical or agricultural industry. A *Bulletin* of the U. S. Census Bureau, 1907, showed that in the census year, 1900, there were in continental U. S. 1,750,178 breadwinners, ten to fifteen years old, of whom 1,061,971 were in agriculture, 82,004 were textile-mill operatives, 35,070 were other textile workers, and 571,133 in other occupations; 1,264,411 were boys and 488,767 girls; 837,402 were whites of both parents native, 293,210 were whites of one or both parents foreign, and 97,944 were whites of foreign birth; the number, fourteen to fifteen years old, was 45.2 per cent of the whole. The chief objections to child labor—justly charged to the greed of parents as well as employers—are the cruelty and injustice often experienced, and the dwarfing of mind and body, due to long hours, unhealthful work, and association with older employees who are de-

graded or immoral. For many years attempts had been made in various states to restrict the employment of children as breadwinners either by prohibiting child labor, or limiting it by age and hours, and requiring a specified amount of school attendance; but it was not till the recent phenomenal industrial activity had aroused public indignation over the extent and conditions of child labor that unusual efforts were made to bring about reform. The year 1907 opened with new legislation in operation in Massachusetts, Rhode Island, New York, Pennsylvania, Delaware, Illinois, Iowa, Missouri, Wisconsin, and Georgia, and restrictive amendments to labor laws of other states, a Congressional committee working out a child-labor law for the District of Columbia, that it was hoped would be a model for all the states, and with Senator Beveridge pressing his bill to restrict child labor by prohibiting common carriers engaged in interstate commerce from transporting the products of any factory or mine employing children under fourteen years of age. See FACTORY.

Child'ren's Court. See JUVENILE COURT.

Children's Crusade', religious movement organized, 1212, by two peasant boys, Stephen, in France, and Nicholas, in Germany, to rescue the Holy Land from the infidels. Some ninety thousand children left their homes and had ships placed at their disposal. The French children sailed from Marseilles; part were lost by shipwreck on the island of San Pietro; the survivors were sold into Mohammedan slavery. The Germans reached Genoa, and were dispersed by various disasters before spring, both contingents having sailed in midsummer. See CRUSADES.

Childs, George William, 1829-94; American publisher and journalist; b. Baltimore, Md.; removed to Philadelphia in his youth; became a partner in a publishing house, 1849; and, 1864, editor and proprietor of the *Public Ledger*; erected a Shakespeare memorial fountain at Stratford-on-Avon, a memorial window in Westminster Abbey to Cowper and Herbert, and aided in founding a home for printers at Colorado Springs; author of "Recollections of General Grant."

Child Study', scientific study of children. One object of the child-study movement is to arouse and intensify interest in the natural history of childhood among mothers, teachers, and others who lack scientific training. In the case of infants, careful and extended studies have been made of the first three years after birth, covering almost every phase of physical and mental development. The study of school children bears on the child's capacities, attainments, interests, aptitudes, and the development of these under existing conditions. Many collections of children's vocabularies have been made, including one study of the color vocabulary of school children. Tests have been made to determine the contents of children's minds on entering school. It is urged that primary instruction should be based on knowledge gained by such studies. Investi-

gations indicate that in the acquisition of a certain skill, for example, in the learning of a language, there are occasional brief periods of rapid improvement preceded and followed by long periods of slight improvement. The important bearing of special aptitudes on the development of the mind and even on one's philosophy has been shown. Most children are not exclusively or extremely of any one type, but there are many extreme individual cases, and these should be known as such by the teacher. Children's drawings, their preferences among stories, their choice of future occupations, their collections, their plans for spending money, their imaginative creations, their plays, their lies, their secret languages, their rudimentary society, and the like have been studied both statistically on large numbers and by personal acquaintance, all of which help to sound the character and range of mental and moral tendencies, and the trend of change in these as they grow older. See ATYPICAL CHILDREN; PEDAGOGICS.

Chile (chō'lā), S. American republic, from lat. 56° S. to lat. 16° 3' S., and from the Pacific Ocean to the summits of the Andes; breadth, 50 to 200 m.; area, 307,620 sq. m.; pop. (1905) 3,399,928. The language and conventionalities are Spanish. Santiago is the capital. There are twenty-three provinces. The Andes form the E. boundary, while N. of Chiloé is a lower coast range, in parts divided into two, and broken at intervals to allow the passage of rivers. The space between the Andes and the coast range, S. of lat. 33°, consists of plains and rolling lands, with isolated hills. From lat. 33° to 37° the land was originally open prairie; farther S. it is more or less varied with woods, and there are numerous lakes. All this region is well watered and fertile, adapted for grazing and the cultivation of grains, and with a delightful climate. S. of lat. 42° the whole country is mountainous, and covered with heavy forests. N. of lat. 33° the space between the mountains is much broken by spurs and cross chains, and the intermediate plains are high, rainless, and barren. There are several active and quiescent volcanoes, and the whole country is subject to earthquakes. The Bio-Bio, about 250 m., is the longest river. The most important mineral product is nitrate of soda. There are mines of bituminous coal, copper, and silver; gold, quicksilver, lead, iron, antimony, and bismuth are found. The staple agricultural products are wheat and wine; also barley, maize, hemp, potatoes, beans, apples, pears, peaches, and oranges. Industries include the making of food stuffs, beverages, textiles, clothing, leather, woodwork, and pottery. Imports, 1908, \$97,551,000; exports, \$116,489,000. In 1907, 3,288 m. of railway were in operation. The official religion is Roman Catholic. Education is at the cost of the state, but is not compulsory; lyceums and colleges are numerous. The constitution was framed on that of the U. S. The executive power is vested in a president, elected for five years by electors chosen by popular vote. N. Chile to lat. 37° was a part of the dominions of the Incas of Peru. The Spanish conquest, 1541-

50, was complete to lat. 37°. In 1810 Chile revolted against Spain, and independence was proclaimed, 1818. Chile and Peru were engaged in a war with Spain, 1865-69, when the dispute was ended through the mediation of the U. S. After a war with Peru and Bolivia, 1879-83, the N. frontier of Chile was advanced from 24° to 16° 30'. The clash between modern ideas and the old conservative party led to revolutionary outbreaks, which ended, 1874, in the triumph of liberalism. A civil war, 1886-91, between Balmaceda, the president, and the representatives of congress, known as the "Junta," ended in the defeat of the former. During this struggle the partisans of the Junta were hostile to the U. S., believing that Minister Egan had been unfriendly to their cause. An attack on some U. S. sailors by Chilean sailors was regarded as a national insult at Washington, and a demand for satisfaction was complied with only after warships had been dispatched to Chile.

Chili. See CHILILI.

Chiliad (kī'lī-ād), assemblage of things grouped or ranged by thousands. The word is chiefly used by early computers, who expressed the extent of logarithmic tables by saying they contained the logarithms of so many chiliads of absolute numbers.

Chiliasm (kī'lī-āz'm). See MILLENNIUM.

Chillon (shē-yōn'), castle and fortress of Switzerland; in Vaud; 6 m. SE. of Vevey; at the E. end of Lake Geneva, on an isolated rock, standing out from the edge of the lake. Bonnard was confined here, 1530-36, for his efforts to liberate the Genevese; commemorated in Byron's "The Prisoner of Chillon."

Chilo (kī'lō), or **Chil'lon**, a Spartan; one of the seven wise men of Greece; became one of the ephori of Sparta, 556 B.C. Among the maxims ascribed to him is "Know thyself." He is said to have died of joy when his son won a victory at the Olympic games.

Chiloé (chē-lō-ā'), island off the coast of Chile. The W. coast is precipitous; one of the peaks at the S. end is more than 3,000 ft. high. Some portions are very fertile. Chiloé, with about 120 neighboring islets, forms a province, sometimes called Ancud; capital, San Carlos de Ancud. Pop. (1900) 91,122.

Chil'tern Hun'dreds, Stew'ardship of, in England, a nominal office which a member of Parliament, desiring to withdraw from the House of Commons, receives and immediately resigns. A member cannot surrender his representative seat unless disqualified, and an appointment by the crown works such disqualification. In old times the steward's duties were to protect from the robbers who lurked in the forests of the Chiltern Hills.

Chimara (kē-mā'rā). See ACROCERAUNIA.

Chimæra (kī-mē'rā), monster of classic mythology, having the fore part of a lion, the middle of a goat, and the hind part that of a

dragon; it exhaled flames of fire. In Hesiod's account Chimæra was a daughter of Typhaon



BELLEROPHON ON PEGASUS ATTACKING THE CHIMERA.

and Echidna, and wasted Lycia until Bellerophon slew her. In modern languages chimera is applied to any wild or incongruous fancy.

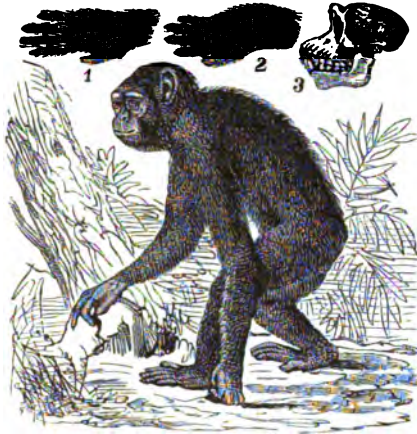
Chimalpopo'ca, third war chief or so-called Emperor of the Aztecs of Mexico; ruled, 1417-23, or, according to others, 1410-22; elected by the chiefs to succeed his brother, Huitzilihuitl, Maxtla having usurped the chieftainship of the Tepanecs. Chimalpopoca tried to aid the legitimate ruler; Maxtla seized and imprisoned him, and he hung himself in the cage in which he was confined. Lineal descendants of Chimalpopoca are still living in Mexico.

Chimborazo (chīm-bō-rā'zō), highest mountain of Ecuador, and one of the highest in America; in the W. Cordillera; 100 m. S. of Quito; altitude, 20,496 ft.; a magnificent dome, its snowy summit visible from the ocean, 150 m. distant. Several glaciers extend far down the sides; is of volcanic formation, but no crater has been discovered, and there is no record of an eruption; first ascended by Whymper, 1879.

Chime, consonant or harmonic sounds of several instruments; correspondence of sound; music performed on a set of bells; sometimes used to denote a set of bells which chime or ring in harmony. The carillon differs from the chime in that its bells are more in number and are stationary.

Chim'ney Swallow, in the U. S., common name for the chimney swift (*Chaetura pelagica*); abundant during summer in the E. U. S., and seems perpetually on the wing, gathering, while in full flight, the little twigs of which its nest is made. In Europe the name is given to a true swallow (*Hirundo rustica*) resembling the American barn swallow. Both chimney swift and chimney swallow are so called from their habit of nesting in chimneys.

Chimpan'zee (*Troglodytes niger*), anthropoid or tailless ape inhabiting the dense forests of the Kongo region, from near the coast E. to the great lakes. When fully grown it is 4 ft. or a little more in height, blackish, with pale hands and feet. It more nearly resembles man



CHIMPANZEE. 1. Hand. 2. Foot. 3. Skull.

in appearance than does any other of the great apes, and assumes an upright attitude with greater ease than its relatives. The gorilla is, however, anatomically, more closely related to man. See APE; BABOON; MONKEY.

Chi'mu, or **Grand Chimu**, name given by archaeologists to an ancient city of NW. Peru; on the seashore; 4 m. N. of the city of Truxillo; chief town and probably the capital of the Chimu or Yuncas, whose civilization was entirely distinct from the Incas until the fifteenth century. The ruins are the most extensive in America, covering a space 12 to 15 m. long and 5 to 6 m. broad. They comprise vast buildings, palaces, and temples.

Chi'na. See CHINESE EMPIRE.

China. See KERAMICS and POTTERY AND PORCELAIN.

China Grass. See RAMIE.

China, Great Wall of, fortification constructed by order of the Emperor Chi-Hwang-Ti, the first Emperor of China to protect the N. and NW. frontier of his empire from the barbarians. To accomplish his object, he united the several defenses which had been erected by the feudal princes. Several millions of men, it is said, were occupied for ten years, during which time half a million of those employed on the work perished. It was completed 211 B.C. The entire length is 1,255 m., the height being from 20 to 25 ft., with towers about 100 yds. apart and 40 ft. high. The wall is thick enough at the summit to admit of six horsemen riding abreast. Each face of the wall was built of hewn stone or brick, with earth filled in between. The Chinese name for the wall is Wan li Ch'ang Ching (Ten-thousand-mile Rampart).

China Sea, that portion of the Pacific Ocean which extends from Japan, Korea, and the S. of the Yellow Sea to Borneo, with the Philippines on the E., and China, Tonkin, Siam, and Malay Peninsula on the W.; includes the East Sea (*Tung-hai*), from Korea to Formosa, and the South Sea (*Nan-hai*), from Formosa to Borneo. These are connected by Formosa Strait, while the South Sea makes the great gulfs of Tonkin and Siam. Navigation is hazardous on account of typhoons. Some geographers restrict the name, China Sea, to the second of these divisions.

China's Sor'row, name applied to the Hoang-ho, or Yellow, River, because it frequently changes its course, causing great loss in property and damage by inundations.

Chinch Bug, small hemipterous insect which commits great depredations in the wheat and corn fields of the U. S., especially in the South and West. The eggs are laid in the ground, and the young appear on the wheat about the middle of June, and may be seen on grains and



CHINCH BUG.

grasses all summer. There are several germ diseases infesting the chinch bug which are now well known; one of them is a fungus belonging to the genus *Sporotrichum*. As this fungus can be artificially cultivated, it has been found practicable to use it as a means of destroying this pest.

Chinchil'la, small S. American rodent, the best-known member of the family *Chinchillidae*; is about 10 in. long, exclusive of the bushy tail; clothed with soft, dense fur, gray above and dusky white beneath; dwells in colonies along the E. slopes of the Andes, from N. Peru to S. Chile, at elevations of from 8,000 to 12,000 ft. Its fur was much valued by the ancient Peruvians, and is still sought for cloak linings, trimmings, etc.

Chinese (ch'i-nèz') **Em'pire**, territory of E. and central Asia; bounded N. by Russian Asia; W. by Russian Turkestan; S. by Hindustan, Burma, Tonkin, and the China Sea; E. by the Pacific Ocean; estimated area, 4,277,100 sq. m., nearly one third of Asia; pop. abt. 433,553,000. It comprises the Middle Kingdom, or China proper; the three E. provinces, N. of Korea, commonly called Manchuria; Mongolia (between China proper and Siberia) and Kukunor (between Tibet and the province of Kansu); Ili, or Kulja (the new frontier province), which includes Sungaria and E. Turkestan and Tibet, which is nearly independent. Burma, Annam, Loochoo, and

Korea were formerly dependent states, the last named, up to 1895. The island Hainan belongs to China proper; the island of Formosa was ceded to Japan, 1895. China proper is bounded N. by Mongolia, from which it is separated by the Great Wall, W. by E. Turkestan and Tibet, S. by Burma, Annam, and the China Sea, and E. by the Yellow Sea, the Pacific Ocean, and the China Sea. With a coast line of about 2,500 m., it has an area of 1,552,420 sq. m.; pop. estimated at 407,253,000. It is divided into eighteen provinces. The capital of China proper and of the whole empire is Peking (pop. abt. 1,600,000). China is divided into three valleys, each with its great river, and separated by two mountain chains, the Tsing-Ling, or Blue, extending from W. to E.; and the Yan-Ling chain extending NE. from the Himalayas to the Pacific. The Yangtze, 3,000 m. long, is the largest river of China. The Hoang-Ho is about 2,600 m. in length, but too rapid for Chinese navigation. Both these streams are navigated by American and European steamers built for the purpose. The two rivers are connected with each other and with Peking by the Grand Canal, 650 m. long. The largest lake is Tung-ting, in Hunan, 200 m. in circumference. The climate in general resembles that of the U. S. in its range of temperature. China furnishes the principal supply of tea to the world; also produces much silk, cotton, camphor, varnish, indigo, rhubarb, rice, maize, barley, wheat, tobacco, and fruits of many kinds. The production of food is not sufficient for the home supply, great quantities of rice being imported. The botany of the empire is rich, and the flora resembles that of America. The zoölogy has not been thoroughly explored. The elephant, rhinoceros, antelope, and deer of several species are known. Among the native insects is the silkworm. Fish form one of the principal articles of food. Domestic fowls are kept in great numbers. Silver, mercury, zinc, iron, kaolin, and fctile clays are abundant. The total coal area is estimated at 419,000 sq. m. Salt yields a large revenue. The Chinese are excellent mechanics, and their fabrics of silk, porcelain, glass, paper (lacquered ware), and curiosities in gold, silver, ivory, etc., are marvels of ingenuity and delicate execution. Raw silk is the leading industry. Foreign commerce is principally with Great Britain and the U. S. The total value of imports, 1907, was \$332,288,000; exports, \$210,976,000; imports from the U. S., \$29,449,000; exports, \$21,225,000; total debt, 1907, \$609,752,200. There are thirty-four treaty ports, some in the interior. The principal exports are tea, raw silk, raw cotton, and hides; the principal imports are cotton goods, kerosene, sugar, and rice. Formerly China consumed nine tenths of the opium produced in India, but an edict abolishing the use was issued, 1906. In 1905 there were, including Manchuria, about 3,000 m. of railroads.

The Chinese belong to the Mongolian race; they are gregarious, living in cities and villages, most of them defended by walls and fortified gates. The better class of buildings are of slate-colored brick with tiled or thatched roof; the less wealthy use sun-dried bricks

covered by a thin coating of plaster or cement; the poorest, adobe, or a wooden framework filled up with wattled bamboos. Marriage is universal, and is contracted in childhood. Polygamy exists among the upper classes. The state religion is Confucianism. Buddhism, modified by Confucianism, is the popular religion. Taoism also has numerous adherents. Christianity was introduced, 505, but suppressed by persecution in the fourteenth century. By the treaty of 1860, the exercise of Christianity was sanctioned. Roman Catholic missionaries entered China, 1292. The number of Roman Catholics is now abt. 1,000,000; of Protestant adherents, abt. 150,000; of Mohammedans, abt. 30,000,000. Education is held in high esteem in China. Many provincial capitals have colleges, and there are various medical, agricultural, mechanical, and military schools and colleges. Many Chinese youths study in Japan. The scholars, or *literati*, form the highest of the four grades, farmers coming next, then artisans, and lastly, merchants.

The government is a patriarchal despotism. The emperor, theoretically absolute, is limited in his power by a code of laws, which he can modify by edicts. His advisory bodies are the Grand Council, of five members; the Government Council, which includes the members of the Grand Council and the more prominent of the Grand Secretariate, and a college of censors or inspectors. The administration is carried on by boards of foreign affairs, commerce, civil service, revenue, ceremonies, war, punishment, police affairs, and education. Each province is ruled by a governor or governor general, responsible to the emperor. The Chinese army, according to a plan promulgated, 1902, is to be national, and will consist of the active army, and the first and second reserves of the imperial land forces. The navy consists of four cruisers, a few miscellaneous vessels, and some old torpedo boats. New armored cruisers, torpedo boats, etc., were ordered, 1907.

The people of China are believed to have entered the country from some place in central Asia, absorbing the aborigines. The "Book of History," edited by Confucius, begins with King Yao, 2357 B.C., and a well-developed government. From the abolition of the feudal system and the consolidation of the empire down to the present time, twenty-one dynasties have ruled. The present rulers are Manchus, who established their reign, 1649. The Dutch and Spanish early opened trade with China by way of their E. colonies. In 1700 Canton was opened to British trade. Unlawful importation of opium by British ships led to war with Great Britain, 1839, resulting in the defeat of China, the cession of Hongkong to Great Britain, and the opening of five ports to European commerce. A rebellion, the Tai-ping, against the Manchu dynasty occurred, 1851-64; a war with Great Britain and France, 1844-85; with Japan, 1894-95. In 1898 Port Arthur and Talien-wan were leased to Russia; a coaling station at Lei-Chai-Fu was ceded to France, and territories opposite Hongkong were ceded to Great

Britain. In 1900 occurred the rebellion of the Boxers, necessitating the intervention of the powers and the payment by China of an indemnity of \$735,000,000. The Russo-Japanese War, 1905, resulted in the restoration to China of Manchuria (Liao-tung peninsula excepted).

Chinese Lan'guage. Spoken by from 300,000,000 to 400,000,000, the Chinese is divided into marked dialects, which are not generally understood (except the Kwan-hwa) beyond the limits of a single province. The Kwan-hwa, called by Europeans the mandarin or court dialect, has the widest currency, and is the language of official communication throughout the empire.

The invention of the present characters is ascribed to Tsang-kié, 2600 B.C. The first signs were purely ideographic, being rude representations of the objects named. A circle with a point in the center stood for the sun, a crescent for the moon, a three-pointed peak for a mountain. The changes of form which they have undergone, arising in part from the different materials used in writing, have left in the present characters little resemblance to the objects pictured. A few words denoting position and number were represented by points and strokes; thus a point above or below a horizontal line signified "above" or "below"; a stroke through the center of a circle, "middle." The combining of two or more signs to express a single idea, either by direct or symbolical representation, was another easy step; thus "water" and "eye" make up the sign for "tear"; "sun" and "moon" for "bright." The more complete dictionaries contain from 40,000 to 60,000 words, of which obsolete and duplicate forms and proper names make up perhaps one half. The number of really different characters which have the sanction of good usage is not far from 25,000, but a knowledge of from 5,000 to 10,000 is sufficient for almost all the needs of the scholar. The labor involved in learning and holding in the memory so many arbitrary characters absorbs no small portion of the intellectual energy of the people. Successful attempts have been made to romanize some of the popular idioms, the tones being marked by diacritic signs, but to the concise classical style, however, this method is quite inapplicable.

Chinese words are not only altogether destitute of inflection, but they are hardly parts of speech in the sense which we attach to the term, being to a great extent still in the root state. The same word may, according to its position in the sentence, be noun, adjective, adverb, or verb; e.g., "sin" must be variously translated "fidelity," "faithful," "faithfully," "believe." This indefiniteness, however, attaches to the words only when taken separately, and disappears in the sentence. The same phonetic combination pronounced in different tones constitutes so many different words, and a wrong tone will sooner occasion misunderstanding than will the substitution of a wrong consonant. In the modern dialects the number of tones varies from four to eight. Two synonyms are often joined: e.g., "shu-muh" (tree). *Shu* and *muh* have each various significations besides that of

"tree," but there is no other in which they agree, so the combination becomes definite. Other phrases are taken collectively: e.g., "hiung-ti" (older brother, younger brother), for brother or brothers.

Chinese White, a name sometimes given to the white oxide of zinc. It is much used as a pigment instead of white lead in painting woodwork, since it is not much changed by atmospheric action. It was experimentally made as early as 1780, but has been manufactured commercially only since 1844.

Chingtu', capital of province of Szechuen, China; on a branch of the Min (a tributary of the Yangtze), in the midst of a fertile plain, 1,700 ft. above sea level. It is a walled city with a circuit of 12 m.; has extensive suburbs, especially on the N. side; well paved and clean. The houses are well built, the shops and stores well stocked, and the people civil and prosperous. There is a greater demand here for foreign goods, articles of luxury, as carpets, rugs, clocks, watches, etc., than in any inland city of China. Pop. abt. 800,000.

Chinking (chin-ké-ang'), fortified city and river port of China; province of Kiangsu; on the Yangtze, near its junction with the Grand Canal; 43½ m. E. of Nanking; has walls about 4 m. in circuit, and ¼ m. from the river; captured by the British, 1842, and opened to foreign trade by treaty, 1858. Pop. (1900) 160,000.

Chinon (shē-nōn'), town of France; department of Indre-et-Loire; on the river Vienne; 25 m. SW. of Tours; has remains of a large castle, the residence of several kings of England. Here Henry II of England died, and Rabelais was born. Charles VII of France resided here when Joan of Arc disclosed her mission to him.

Chinook', warm, dry westerly wind of winter; occurring on the E. slopes of the mountains from Colorado to Oregon and N. to the Peace River; brings a vernal mildness of temperature, and is so dry that the snow and ice disappear without the visible production of water; occurs several times each winter, and usually lasts two or three days; is due to the drawing of the wind over the mountains, and is paralleled by the *Föhn* in Switzerland and similar winds in Greenland, New Zealand, and elsewhere.

Chio (kí'ō), or **Chi'os**. See **SCIO**.

Chioggia (kē-ōd'jā), seaport of Italy; province of Udine; on an island of the Adriatic; 15 m. S. of Venice; is built on piles. Pop. (1901) 20,000.

Chip'munk, a popular name in the U. S. for various small ground squirrels of the genus *Tamias*, and particularly *Tamias striatus*. This little striped squirrel is about 10 in. in length, reddish brown above, white below, marked with two white and five black longitudinal stripes. It is abundant throughout the E. U. S., N. of the lowlands of the S.

states. It feeds on nuts, seeds, and grain, laying up a store for winter's use; as much



CHIPMUNK.

as two pecks of provision have been taken from a single burrow.

Chippewa (chĭp'ě-wā), village and port of entry of Ontario, Canada; on the Niagara River; 3 m. above the falls; is memorable as the scene of a victory of a portion of the U. S. army under Gen. Joseph Brown over a superior British force under Gen. Rial, July 5, 1814; number engaged on the U. S. side, 1,900; British force, 2,100; U. S. loss in killed and wounded, 328; British loss, 505. Pop. (1901) 460.

Also the name of a river of Wisconsin, which rises in Ashland Co., flows nearly SW., and enters the Mississippi at the foot of Lake Pepin; length, 220 m.

Chippewas. See OJIBWAYS.

Chip'ing, Bar'net. See BARNET.

Chiquinquirá (chē-kēn-kē-rā'), city of Boyacá, Colombia; 70 m. N. of Bogotá; principally known for an image of the Virgin, reputed to be miraculous. The chapel devoted to this image is probably the finest church in Colombia, and it is said that over 60,000 pilgrims visit it in a year. Pop. 18,000.

Chiriqui (chē-rē-kē'), a volcano, bay, and river; in the extreme N. of the republic of Panama; the lagoon is an almost completely inclosed bay opening into the Caribbean Sea. The river empties into the sea a short distance to the E. of the lagoon. The volcano is 40 m. SW. of the lagoon, in the main cordillera, and is 11,260 ft. high. The district, of the same name, is fertile, devoted to agriculture and cattle raising, and contains considerable coal; pop. abt. 40,000; capital, David, 10 m. from the sea. The isthmus is here very narrow, with a good harbor on each side.

Chiromancy (kĭ'rō-mān-sĭ), divination by inspection of the lines in the palm of the hand; also called palmistry. The art comes from India, and is of great antiquity. The basis of the art is the three principal lines which are at once recognized in the palm of the hand. The first, nearest the fingers, is the line of the heart; the second, in the middle of the hand, the line of the head; and the third, at the base of the thumb, the line of

life. These represent the trinity of human existence: the heart, sensation; the head, intelligence; life, action. Moreover, the palm is divided into different quarters, and the slight elevations beneath the base of each finger are called mountains, each having its name. The line of the heart when well defined signifies strong and happy affection; if the line is broken, it denotes inconstancy. The line of the head in the same way denotes strong or weak mental faculties. The line of life, the most important of all, determines by its distinctness and clearness the length of life and liability to diseases, etc. Each one of the mountains is named after the various planets, from which they receive, according to their greater or less development, favorable or unfavorable influences.

Chiron (kĭ'rōn), one of the centaurs, the noblest specimen of a combination of the human and animal forms created by Greek imagination. Generally, the centaur expresses the sensual and savage features of a man com-



THE CENTAUR CHIRON AND CUPID.

bined with the strength and swiftness of a horse; but to these qualities Chiron added justness, wisdom, and kindness. Having been instructed by Artemis and Apollo in hunting, gymnastics, music, and medicine, he became the instructor of many heroes—Achilles, Hercules, and others—in these arts.

Chislehurst, parish in Kent, England; 11 m. SE. of London, where Napoleon III fixed his residence after his release by Emperor William, 1871, and where he died, 1873.

Chiton (kĭ'tōn), in ancient Greece, the undermost garment, worn by both sexes. In early times it was a long tunic worn by men. Subsequently two forms arose: the Ionian, made of linen, reaching to the feet, with sleeves, appropriated exclusively by women from the time of Pericles; and the Dorian, a square garment of wool, with short sleeves or mere armholes, peculiarly the garment of men, though common to Spartan women.

Chittagong (chĭt-tā-gōng'), or **Islamabad'**, capital of a district and division of same

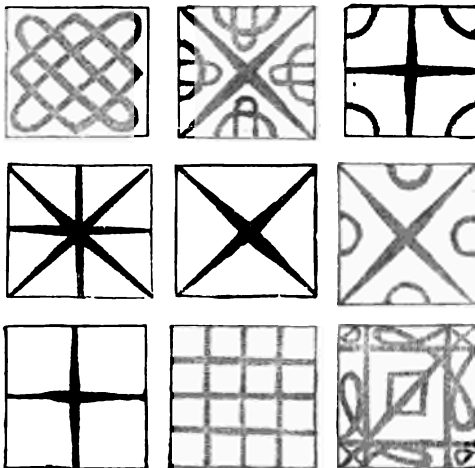
name in Bengal presidency, British India; on the Karuaphuli River; 212 m. E. of Calcutta; one of the chief ports of India under the Portuguese; captured by Moguls, who gave it its Mohammedan name, 1665; still has considerable trade. Pop. (1901) 24,100.

Chit'ty, Joseph, 1776-1841; English lawyer; best known as a special pleader and legal writer; chief works "Treatise on the Parties to Actions and to Pleadings," "Treatise on the Law of Nations," and "Practical Treatise on the Criminal Law."

Chiusi, (kē-o'sē), town of Italy; province of Siena; has a large cathedral; was the *Clusium* of the ancients, one of the twelve cities of the Etruscan confederation, and the headquarters of Porsena. Its museum contains a collection of Etruscan bronzes, mirrors, vases, funeral urns, etc., found in the vicinity. Pop. abt. 2,000.

Chivalry (shīv'āl-rī), institution forming the special characteristic of European civilization in the Middle Ages. Its origin is traced to Teutonic customs and sentiments, especially remarkable for the respect evinced for the female sex, and for their development of the feudal system. It was essentially aristocratic, and included military accomplishments, the relation of vassal to his lord, the defense of women and devotion to their honor and persons. The moral and social standards of the institution were high, and the manners inculcated heroic and elevated. The ceremonial relation assumed by the Church to knighthood enhanced these ideals, and tended to make them the common rule of life for persons of gentle birth, although in conduct individuals frequently fell far below them. See KNIGHT.

Chladni's (klād'nēs) Fig'ures, sand figures by means of which the vibrations of plates may be studied. When a metal plate of any regu-



CHLADNI'S FIGURES.

lar geometrical form is clamped at the center and thrown into vibration by the application of a bow upon one of its edges, it gives out

a more or less complex musical note. If dry sand be strewn upon the surface of the plate it will arrange itself along certain well-defined lines (nodal lines), producing a symmetrical pattern, by means of which the number and shape of the vibrating segments into which the plate is broken up are indicated. This phenomenon was discovered by Ernst Florens Chladni (1756-1827), a German, the founder of the science of acoustics.

Chlamys (klā'mīs), woolen outer garment of the Greeks, differing from the *amictus* in being finer, gayer in color, and oblong instead of square. It was fastened round the neck by a brooch (fibula), and hung down the back to the calf, or over the left shoulder, covering the left arm.

Chloral (klō'rāl), liquid obtained by the action of chlorine on absolute alcohol. Its formula is $CCl_2 \cdot CHO$. Chemically considered, chloral is acetic aldehyde in which the H_2 is replaced by Cl_2 . When kept for a time it becomes solid, but is not changed in composition, and may be liquefied by heat. With water it forms a solid hydrate known as chloral hydrate, now much used as a hypnotic.

Chlor'ate, salt formed by the replacement of the hydrogen of chloric acid by a metal. The best known is potassium chlorate ($KClO_3$), which, mixed with combustibles, such as sulphur and charcoal, forms explosive compounds, which ignite by a blow or friction. It is also a useful medicine.

Chlorine (klō'rīn), an element; occurs in nature in large quantities, but always in combination; its most abundant compound is common salt, or sodium chloride. It was early found that when salt is treated with yitriol an acid is formed, called hydrochloric, formerly muriatic, acid. In 1774 Scheele, while investigating black oxide of manganese, or pyrolusite, treated it with muriatic acid and obtained chlorine. Chlorine is a greenish-yellow gas of disagreeable odor. It acts with energy upon most substances, disintegrating them and forming new compounds, among which are chlorides. Its chief use is for bleaching.

Chlo'ris, daughter of Niobe, spared by Apollo and Diana when the rest of the family was destroyed; the wife of Zephyrus, and the Grecian goddess of flowers.

Chloroform (CHCl₃), heavy, colorless, and very volatile liquid, not inflammable, and possesses a sweet taste and a neutral reaction. It is soluble in about 200 parts of water and in all proportions in alcohol and ether. Because of its power as a solvent it is used for other than medicinal purposes. Applied to the skin, chloroform produces irritation and even blisters if evaporation is prevented. When inhaled it speedily produces anaesthesia during which any major surgical operation may be performed without pain. It was first introduced as a general anaesthetic by Simpson, of Edinburgh. Chloroform was discovered by Guthrie, of Sackett's Harbor, N. Y., and also almost simultaneously by Soubeiran, of France. Guthrie failed to recognize it as chloroform,

and called it chloric ether. It is not so safe an anæsthetic as ether, through its depression on the heart and lungs, but in some cases is to be preferred. Among its advantages are rapidity of action, the small quantity required to produce unconsciousness, and the fact that its inhalation is not, generally, unpleasant.

Chlorophyll (klō'rō-fīl), green coloring matter of plants; is a product of protoplasm, and is usually secreted by definite portions (plastids) known as chloroplasts or chloroplastids. In some of the lower plants, the whole cell mass is colored, but in the majority of cases the chloroplasts constitute but a small part of the protoplasm of the cell.

Chlorosis (klō-rō'sis) or **Green Sick'ness**, disease almost peculiar to young women, usually associated with other troubles peculiar to that time of life; named from a greenish-yellow tint of the skin which some patients exhibit. There is heart disturbance, breathlessness, and capricious and perverted appetite. The blood is greatly impoverished. Treated by, first, rest; then an out-of-door life with good hygiene. Iron (given in the form of Blaud's pill) is almost a specific remedy.

Choate (chōt), **Joseph Hodges**, 1832- ; American diplomatist; b. Salem, Mass.; admitted to the bar, 1855; settled in New York, 1856; acquired a national reputation as an orator and pleader at the bar; was one of the Committee of Seventy which broke up the Tweed ring, and was associated with Charles O'Connor in the trial and conviction of Tweed; counsel for Gen. Fitz-John Porter, restored to his military rank after years of litigation; conducted the successful defense of Gen. di Cesnola in the libel suit arising out of the question as to the authenticity of the Cypriote antiquities presented by him to the Metropolitan Museum of Art; conducted the litigation in which the U. S. income tax was declared unconstitutional; ambassador to Great Britain, 1899-1905.

Choate, Rufus, 1799-1859; American lawyer; b. Essex, Mass.; settled in Salem to practice; elected to State House, 1825; to State Senate, 1827; to Congress, 1832; to the U. S. Senate, 1841; removed to Boston, 1835; Attorney-General of the State, 1853; retired to private life, 1858. Succeeded Daniel Webster in the U. S. Senate and in the leadership of the Massachusetts bar; in political life acted with the conservative wing of the Whigs; possessed oratorical powers of the highest order.

Chocolate (chōk'ō-lāt), a dried paste made from the kernel of cacao or chocolate nuts, which, after being roasted, are deprived of their shell and ground. To this paste are frequently added rice flour or other starch powders, and lard or butter, to improve its taste and nutritive properties. In other instances certain flavoring substances are employed, such as cinnamon or vanilla. Chocolate is generally used in the form of a drink made by the addition of hot water or hot milk to the powdered nut, which has been flavored and sweetened, or it is eaten in the form of confections. It possesses a high nutritive value, both on ac-

count of the starch it contains and the oily material which is present in it. Chocolate is derived from cacao or cocoa, which has been technically called theobroma, and not from coca, from which is derived the anæsthetic alkaloid cocaine.

Choctaws (chōk'tāz), tribe of N. American Indians, belonging to the Muskogean stock, formerly occupying middle and S. Mississippi; earliest mention in De Soto narratives, 1540; became allies of the French; a part later sided with the English; tribe constantly at war with the Creeks and Chickasaws; began to settle in Indian Territory, 1832, having ceded most of their lands to the U. S.; later constituted the Choctaw Nation; became pre-eminently the agriculturists of the S. Indians; numbered (1904) 17,805, exclusive of 4,722 Choctaw freedmen.

Choir, a company of singers or choristers in a church; the part of a church occupied by the singers. The term generally signifies, architecturally, that portion of the church between the transepts and the apse, and which in parish churches, having no side aisles or chapels around it, is called the chancel. The choir in many large churches is furnished with stalls or *sedilia* for the choristers and clergy, and is separated from the nave by an elaborate screen, either of stone or of metal openwork, called the *rood screen*.

Choiseul (shwā-zō'), **Étienne François de** (Duc de Choiseul et d'Amboise), 1719-85; French statesman; gained the rank of lieutenant general; sent as ambassador to Vienna, 1756, to secure coalition against Frederick the Great; author of the "Bourbon Family Compact," and of the policy of securing the liberties of the Gallican Church, the E. Indian trade, and the commercial development of France; Prime Minister and favorite of Louis XV; an able and popular diplomat, but removed from power by the influence of Madame du Barry, 1770.

Cholera (kōl'ēr-ā), acute infectious disease in which purging and vomiting are prominent symptoms. The home of genuine Asiatic cholera is in India, whence all its great epidemics have taken origin. The first outbreak of which we have accurate record occurred, 1817, and it first appeared in Europe in notable degree, 1830-32; since then many epidemics have occurred, the one, 1866, being noteworthy, that of 1892, in Russia, France, Italy, and Hamburg, also being severe. Has been often epidemic in the U. S., the outbreaks of 1832, 1849, 1854, and 1866 being notable. The actual demonstration of the specific germ remained for the genius of Prof. Robert Koch, who discovered the bacillus of cholera in Egypt, 1883. It is a short, rod-shaped organism generally presenting a slight curve, whence often known as the comma bacillus; but it is also seen as long spiral threads, and is, strictly speaking, a *spirillum*. This organism occurs only in the intestinal canal and contents, never in the blood or distant organs. Pure contagiousness, that is, infection by association with a patient by emanations, or the

like, probably never occurs. The dejecta being cast out are preserved in the soil, the germs enter water which is afterward drunk, and the disease so produced. This is doubtless the most common method.

The worst forms are ushered in with slight diarrhea, attended with malaise and general depression. Later the dejections grow more and more frequent and copious, at last consisting of large quantities of watery fluid containing loosened epithelium from the bowel wall ("rice-water discharges"). Vomiting begins and grows in intensity, until the patient lies collapsed, with cold exterior, pinched features, whispering or absent voice, and finally death. It is at times difficult to distinguish violent cases of cholera morbus from true Asiatic cholera. The treatment of the disease consists largely in palliation of the symptoms, with supporting measures. In the early stage of diarrhea it is necessary to check this, to which end some advise opium, others bismuth. During the stage of collapse it is necessary to supply the fluids wasted by the enormous discharges, by injecting large quantities of weak salt solution under the skin or into the rectum, and to supply external heat, stimulants, and supporting measures.

Cholera Infantum, severe and dangerous form of infantile diarrhea, seen principally during the first two years of life, and more commonly among the poor, but not confined to them. It is most frequently observed in hot climates, and during the hot season in more temperate zones, in the U. S. and in Europe, occurring just as frequently during the first as the second summer. It has no direct relation to dentition, which is illogically accused of being the cause of many infantile diseases; it also is but rarely due to exposure, or to mental emotions of infant, mother, or wet nurse. Usually the cause is improper feeding, especially during hot weather; the former does direct injury, and the latter, by debilitating the nervous system and the digestive organs, diminishes the general strength and power of endurance. Thus nurslings are but seldom affected, and many infants will recover from an attack by being returned to the mother's breast.

Choliambus (kō-lī-ām'būs), iambic verse in which a spondee or trochee is substituted for the final iambus, and the rhythm reversed. This "halting" measure is used in satirical, mocking, querulous poems, notably in the fables of Babrius and the mimes of Herondas.

Cholula (chō-lō'lā), town of Mexico, state of Puebla, 7 m. W. of Puebla city; in a plain 6,906 ft. above the sea; was an Indian settlement of great antiquity and unknown origin. At the time of the conquest it was occupied by a tribe of the Nahuatl race, and formed, with the neighboring villages, a semi-independent state, with only a nominal allegiance to Montezuma. Cortes estimated that the town contained 20,000 houses and the outskirts as many more. Near the town there was an immense, irregular brick pyramid, or mound, covering over 20 acres and 170 ft. high. This pyramid, which still exists, is

much more ancient than the Nahuatl occupation, and is connected with the legends of the hero god, Quetzalcohuatl. There are remains of several smaller mounds. These and the pyramid were occupied by Indian temples.

Chonós (chō'nōs) **Archipel'ago**, group of high island and islets along the W. coast of Patagonia, between Chiloé and the peninsula of Taytas; number over 1,000, including rocks; separated from the mainland and from each other by intricate channels; larger ones are covered with forest, and all are very picturesque; belong to Chile; formerly the homes of the Chonós Indians, now extinct; at present uninhabited, or nearly so.

Chopin (shō-pān'), **Frederic François**, 1809-49; Russian pianist and composer; b. Warsaw; removed to Paris because of political troubles in Poland, 1831; there became famous as a composer; produced concertos, waltzes, nocturnes, preludes, and mazurkas, which display a poetic fancy and abound in subtle ideas, with graceful harmonic effects. His compositions are strikingly peculiar in melody, rhythm, and harmony, and possess a delicate though powerful charm.

Chopine (chō-pēn'), shoe, sandal, or clog, having a sole and heel of such thickness as to add several inches to the height of the wearer. Those worn in Venice in the sixteenth century had a single pillar replacing sole and heel, and were 6 or 7 in. high. Vecellio, 1590, gives a plate showing a lady wearing chopines at least 8 in. high. The gown usually reached the ground, however, and concealed them.

Choragus (kō-rā'gūs), Athenian citizen appointed by the state to be the leader and trainer of a chorus in dramatic contests. His prize consisted of a crown and tripod.

Choral (kō'rāl), or **Chora'le**, tune written or arranged for a hymn or psalm to be sung by a congregation in public worship; had its origin in the "Enchiridion" of Luther and Walther, 1524. The melody was given to the tenor, and there were at times even five and six parts. The greatest composer of such music was Johann Crüger, 1598-1662. Sebastian Bach, one hundred years later, applied counterpoint to many of these themes, and from his time the old chorals have had great influence on the development of Protestant church music in Europe.

Chord, in geometry, the straight line which joins the two extremities of the arc of a curve; so called because while the arc resembles the bow, the chord may be likened to the bowstring. The chord of a circular arc may be found by multiplying the radius by twice the sine of half the angle which the arc subtends. The use of chords in trigonometry is mostly superseded by the use of sines.

Chorea (kō-rē'ā). See **ST. VITUS DANCE**.

Chorley (chār'lē), town of England, in Lancashire; on the river Chor; 20 m. NW. of Manchester. Pop. (1901) 26,852.

Cho'rus, the union of musicians for the performance of a musical work. In modern music

a combination of voices is called a chorus. It is mixed or complete where it consists of all or part of the four principal voices. There are also choruses for male and female voices. The word *chorus* is not applied to instrumental combinations, but the word *choir* sometimes is when speaking of subdivisions of the orchestra, thus, the "wood-wind choir," "the brass choir," but never the string choir.

The chorus of the ancient drama is not, as is often insinuated, an element of special æsthetic excellence, but a mark of its historical origin from the worship of Dionysus. In the olden times solemn narratives of the exploits of the god were recited between the hymns sung in his honor; the hymns were sung by the chorus; the epic was recited by the actors. The chorus very seldom entered the stage, but was in the orchestra, in the center of which stood the altar of Dionysus, on which a sacrifice was offered before the representation began. Around that altar the chorus was dancing to the flute while singing its songs. Its connection with that which took place on the stage was that of a kind of running commentary; it very seldom took an active part in the dramatic development of the plot.

Chotá Nágpur (chó'tá nág'pór). See CHUTIA NAGPUR.

Chouans (shó-óns'), French royalists of Maine and Brittany who revolted against the French Convention, 1792. Chouan, which signifies an "owl," was perhaps the nickname of Jean Cottereau, who was the leader of the insurgents, or an imitation of a signal cry that summoned men to their rendezvous. This insurrection was called *La Chouannerie*. Cottereau, who had been pardoned for smuggling by Louis XVI, and never forgot the favor, began peasant reprisals in Maine, whence the insurrection spread to Brittany. New movements of the Chouans took place, 1799, 1814, and 1815; and finally, 1830, an insurrection known as Chouan broke out on behalf of the Duchess of Berri and her son, subsequently known as the Duc de Chambord, but these were easily suppressed.

Chrestomathy (krés-tóm'a-thí), collection of choice passages from authors, as of things worthy to be learned. The Greeks frequently formed commonplace books by collecting the various passages to which in the course of reading they had affixed mark χ (*χρηστός*). See ANTHOLOGY.

Chrétien de Troyes (krá-tyán dé trwá'), abt. 1150-1200; French poet; was one of the most learned men and gifted trouvères of his day, and acquired great celebrity in various countries. He was the chief poetic exponent of the ideals of courtesy, chivalric love, and mystical devotion, which, coming perhaps originally from Provence with the famous Eleanor of Poitiers, Queen of France and then of England, were taken up by her daughter, Marie of Champagne, and made the tests of virtue at her court.

Chrim (kríz'm), ointment or oil, consecrated by a bishop, and used in the Roman Catholic, Greek, and Oriental churches in the consecra-

tion of chalices, altar stones, and church buildings, in the blessing of the water for baptism, and in the ceremonies of baptism, confirmation, ordination, and extreme unction. In the Roman Catholic Church it is a mixture of oil and balsam, but in the Eastern Church it contains over forty ingredients.

Christ, title applied in the New Testament to Jesus; derived from the ancient practice of consecration by anointing to the regal, prophetic, and sacerdotal offices. See JESUS CHRIST.

Christadel'phians, small religious body originating in the U. S. abt. 1855, with John Thomas, a man of English birth, after whom the sect is sometimes called Thomasites; attach equal importance to the Old and New Testaments, and believe that the intention of the Creator is to recall to immortal life all who love Him in this life, and with them to people this world. They number less than 1,500.

Christ, Disciples of. See DISCIPLES OF CHRIST.

Christ, Pic'tures of, ideal representations, based on conceptions of their authors derived from passages in the Old Testament. Accounts have come down to us of pictures of Christ in the possession of King Abgar of Edessa and of St. Veronica, also of one ascribed to St. Luke; but these are little supported by historical evidence. Eusebius tells of a correspondence between Christ and King Abgar, and when repeating this story Moses Choronenis adds that Christ sent his portrait to Abgar. Both Rome and Genoa claim to be in possession of the genuine portrait. Another portrait was imprinted on the silken handkerchief of Veronica when she wiped the sweat from Christ's face while he was carrying his cross. That portrait, too, has multiplied, and several cities claim to have the genuine one. Raphael's "Christ in the Sepulcher" and Leonardo's in the "Holy Supper" are considered the most beautiful pictures of Christ extant.

Christian (krist'yán), name of nine kings of Denmark. Since 1513 the Danish kings, on their accession, have assumed alternately the names of Christian and Frederick. The following are the most important of the Christians: CHRISTIAN II, 1481-1559; succeeded to the throne, 1513; made himself master of Sweden; abused his power with cruelty; was expelled by Gustavus Vasa, 1522; deposed by his own subjects, 1523. CHRISTIAN IV, 1577-1648; son of Frederick II; succeeded to the throne, 1588; warred against Sweden, 1611-13; commanded allied armies in war against Austria, 1625-29; defeated by Tilly, 1626; waged war against Sweden, 1641-45, without decisive results; he was an heroic figure in Denmark, and promoted the literary and scientific growth of the country. CHRISTIAN IX, 1818-1906; son of Frederick VII; succeeded, 1863; in war against Austria, Prussia, and other German powers, lost Schleswig, Holstein, and Lauenburg; second son became King of Greece; daughters, Alexandra and Dagmar,

became respectively Queen of Great Britain and Empress of Russia; grandson became King of Norway.

Christian and Mis'sionary Alli'ance, organization whose objects are "to bear witness to the Lord Jesus Christ in his fullness, to emphasize the baptism of the Holy Ghost, and to work for the evangelization of the neglected classes at home and abroad"; is "a fraternal union of Christians of all evangelical denominations, and in cordial sympathy with all branches of the Church of Christ"; founded, 1887; merged with the International Missionary Alliance, 1897, when the present name was adopted. The alliance is represented in nearly all of the U. S., Canada, Europe, Asia, Africa, and S. America; headquarters, New York City; special activities, Missionary Training Institute, Institute for the Training of Home Workers, and Berachah Home.

Christian Commis'sion, Uni'ted States, unofficial patriotic organization in the North during the Civil War; founded, New York City, November 14, 1861; to supplement the work of the U. S. Sanitary Commission for, while the object of the latter was the sanitary condition of the armies, the relief of the wounded and sick, etc., the Christian Commission gave attention to the religious needs of the troops, coöperating with the chaplains, while the Sanitary Commission coöperated with the medical officers. The Christian Commission was first proposed by Vincent Collyer, of New York. George H. Stuart, of Philadelphia, was its president. Its disbursements were about \$5,000,000.

Christian Connec'tion. See CHRISTIANS.

Christian Endeav'or, Young Peo'ple's Soci'ety of, organized religious movement, which numbers more than 4,000,000 young people of both sexes, associated in nearly 70,000 societies, chiefly in the U. S. and Canada, but represented in Europe and Asia and in all missionary lands. The first society was started in the Williston Congregational Church of Portland, Me., February 2, 1881. After a period of special religious interest, the pastor, Rev. Francis E. Clark, called his young people together and presented to them the constitution of a society called the Young People's Society of Christian Endeavor, which is substantially the one now used. The society is a purely religious organization, though there are social, literary, and musical features connected with it. In fact, the society is meant to do anything that the church wishes to have it do. The scope of its energies is almost limitless. Each local society is controlled by its own church or denomination.

Christian E'ra, that era from which Christian nations compute their time; once supposed to correspond to the birth of Christ; but, according to the best authorities, Christ was born April 5th, four years before the commencement of our era (others say on December 25th, four or five years before that time). The practice of reckoning time from the supposed birth of Christ appears not to have been introduced into the Christian Church until

the sixth century, when Dionysius the Little (*Exiguus*), a monk of Syria, first made use of it, abt. 527 A.D. It was soon introduced into Italy, and into France in the following century. The first instance recorded of its being employed in England was 680; but the practice did not become universal throughout Christendom until the middle of the fifteenth century.

Christia'nia (*kris-të-ä'në-ä*), or **Kristia'nia**, capital of Norway and of the stift of the same name; at the head of the Christiania Fiord, 55 m. from the sea. The environs are beautiful, and the fiord has magnificent scenery. It contains a cathedral, citadel, royal palace, great arsenal, town hall, theaters, exchange, lunatic asylum, and university, founded 1811. Connected with the university is an astronomical observatory. Here are manufactures of cotton, paper, glass, soap, etc. The chief exports are timber, ice, and fish. It was founded, 1624, by Christian IV on the site of the burned royal city of Oslo. Pop. (1900) 227,626.

Christian'ity, religion of those who accept Jesus of Nazareth as the Messiah, that is the Christ, promised of old to Israel. It is now the dominant religion in Europe (Turkey excepted), in N. and S. America, and in Australia, S. Africa, and many islands, and is making progress in the other parts of the world. It exists in the form of a large number of particular churches, sects, denominations, which may be classified in three large groups: the Roman Catholic Church; the Oriental churches, including the Greek Church; and other churches, mainly those grouped under the name Protestant. The aggregate nominally Christian population exceeds 400,000,000. Of these, somewhat more than half are Roman Catholics, more than one fourth Protestants, and less than one fourth connected with the Oriental churches. Christianity is monotheistic, in distinction from all polytheistic, pantheistic, nature worshiping, or agnostic religions. It claims to be of divine origin, not merely by its having come into existence through the providential guiding of the ordinary forces of nature and the human spirit, but also in the sense of its being the product of divine spiritual operations that transcend what we commonly call nature. Christians hold that God, in addition to his providential manifestation of himself in nature and in human history, makes a spiritual revelation of himself to men in three different forms: in the Scriptures of the Old and New Testaments, in the spiritual illumination and guidance of individuals, and in spiritual supervision of the acts and traditions of the Church in its organic character. Protestants regard the first of these three as supreme; the hierarchial churches exalt the third; among men of certain types of thinking, or among very different men of certain types of feeling, the second is made prominent. The doctrine of divine grace is a part of the system of Christianity on which important differences of opinion subsist, especially as to the relation of grace to individual men. Such are the differ-

ences concerning election, and concerning man's ability or inability to exercise saving faith of himself; but by Christians generally the relation of the believer to Christ and his faith in Christ are ascribed to the Holy Ghost or Spirit of God, the third person of the Godhead. Salvation is viewed as beginning in regeneration, and as carried on in sanctification, and all its joys as connected with the progress of sanctification in this life or in that which is to come. Faith in Christ cannot be unaccompanied with repentance; though believers are holy in contrast to what they once were, yet there is none in this life free from sin, the tempter of our first parents being still the active enemy of men. Among what are termed the means of grace, which form so important a part of the system, the doctrine contained in the Bible first claims attention as the means of conversion and of edification, the instrument by which salvation is begun and carried on. The ordinances of worship, prayer, and sacraments are means of grace, concerning the relative importance of which, as compared with the other means, considerable difference of opinion prevails. See EVIDENCES OF CHRISTIANITY; JESUS CHRIST.

Christians, or **Christian Connec'tion**, sect which arose in the U. S. about the beginning of the nineteenth century. They declared the Bible to be their only creed, and adopted the appellation Christian as their only name. They originated nearly simultaneously in the East, West, and South, at first having no knowledge of one another, and arose from secessions from the Baptist, Presbyterian, and Methodist bodies, of persons desirous of greater freedom of church polity and theological opinion. The three kindred bodies were consolidated soon after, 1804. They are generally antitrinitarians and Baptists, cherish prayer meetings, Sunday schools, and missions, do not confine their fellowship to the baptized, and are congregational in church government. In 1907 they numbered a little over 100,000.

Christiansand (kris'tè-sån-sånd), or **Kris'tian-sand**, fortified seaport of Norway; near its S. extremity and on the Skager-Rack; 160 m. SW. of Christiania; has a good harbor, at the entrance of which is the beautiful island Odderø. Shipbuilding and fishing are the principal industries. It is a bishop's see and the capital of a stift of the same name. Timber, salmon, etc., are exported. Pop. 12,000.

Christian Sci'ence, a doctrinal and curative system promulgated in 1866, by Mrs. Mary Baker Eddy. Her followers acknowledge one Supreme God, and take the Scriptures for their guide to eternal Life. They acknowledge God's Son and the Holy Ghost, and man as the Divine image and likeness. They acknowledge God's forgiveness of sin in the destruction of sin, and believe that sin and suffering are not eternal. They accept the atonement as the efficacy and evidence of Divine Love, of man's unity with God, and the great merits of the Way-shower. The curative system is variously spoken of as "Christian Science Mind Healing," or "Metaphysical Healing," and is based on the theory of the unreality

or nonexistence of matter. All is Mind, and there is, in reality, but one Mind, viz., God. Man is the idea of God. Mrs. Eddy's "Science and Health with Key to the Scriptures" is the fundamental text-book of the Christian Scientist. See FAITH CURE; PSYCHOTHERAPY.

Christina (kris-tè'nä), Queen of Spain. See MARIA CHRISTINA.

Christina, 1626-89; Queen of Sweden; daughter of Gustavus Adolphus, on whose death, 1632, she was recognized as his successor under the regency of Oxenstiern. In 1644 she assumed royal power, and, 1648, concluded the Treaty of Westphalia by which Pomerania was annexed to Sweden. Her subjects wished that she should choose a husband, but she manifested a constant aversion to marriage. Her eccentricity was also exhibited in an extravagant patronage of authors, pedants, artists, and buffoons. In 1650 her cousin, Charles Gustavus, was designated as heir to the throne by the states of Sweden, with the assent of the queen. Impatient of the personal restraint which the etiquette of court imposed on her, she abdicated the throne in June, 1654, while still in the bloom of youth. This act has been variously attributed to levity and magnanimity. She embraced the Roman Catholic religion, and became a resident of Rome, where she patronized artists, founded an academy, and meddled with astrology and other chimerical pursuits. In 1657 she caused her grand équerre, Monaldeschi, to be put to death for treason.

Christ'mas, day on which the birth of Jesus Christ is celebrated. This event was, in the East during the third century, set on the same day of the year with his baptism and the two commemorated on January 6th, which in the West is the feast of Epiphany. The Romans had, like other pagan nations, a nature festival, called Saturnalia, and the N. peoples had Yule; both celebrated the turn of the year from the death of winter to the life of spring—the winter solstice. As this was an auspicious change the festival was a joyous one. It began with the Romans on December 17th and lasted seven days. The giving of presents and the burning of candles characterized it. Like many other popular usages the exact course of Christmas cannot be traced. The authority and example of the Roman Church, and perhaps the inconvenience of celebrating two such different events as the birth and the manifestation of Christ on the same day, caused the Eastern Church as early as the latter part of the fourth century to separate the events and keep the birth of Christ on December 25th. Christmas has always been the most popular of festivals, a time of gift giving and merrymaking. The ceremonies of the day are a mixture of pagan and Christian elements. Thus in England there was a Lord of Misrule, and in Scotland an Abbot of Unreason, appointed to superintend and conduct the Christmas revels. The sports were boisterous and coarse, and extended from All-Hallow eve (November 1st) to Candlemas (February 2d). In Germany, France, and other countries during the Middle Ages, from

the eleventh century on, there were sacred plays at Christmas in which the scenes attendant upon the birth of Christ were enacted. At first they were in Latin, and followed the scriptural story as amplified by legend; later a comic element was introduced, and this part was in the vernacular; later, the entire play was in the vernacular. The Christmas mass, celebrated by the pope in person, is very elaborate. Formerly he said three masses—one in the Liberian basilica at midnight Christmas eve, one in the Church of St. Anastasia at dawn Christmas day, and the third in the Vatican church in the course of the day.

Christmas Island, a lonely islet of the Indian Ocean; 190 m. SW. of Java; it is 12 m. long and 3 to 9 m. wide. The surrounding seas are of enormous depth. It was visited by vessels from 1688 to 1890, but good anchorages were not found, and the island was reported of little value. Later valuable deposits of phosphate of lime were discovered, and about forty persons were living there in 1898, preparing to work the deposits. The island is of limestone and coral formation, with dense forests. It has only five species of mammals (bats), and the land birds, except birds of passage and a small rail, are all peculiar to it. This island is of special interest as a place that has been long uninhabited, and has therefore developed its flora and fauna without the interference of man.

Christology (krîs-tôl'ô-jî), the consideration of the personality of Christ. The early Church did not concern itself with the precise nature of the Christ it worshiped, but was content with worshiping Jesus Christ. In time errors arose: the first was Arianism, which denied the existence of a truly and properly divine nature in Christ. The Arians allowed that He had a highly exalted and superhuman nature united with a human soul and body. As a variant, the Semi-Arians taught that Christ was similar in his essence to God.

The second error was Patripassianism, which asserted the real and strict Deity in Christ's person, but denied His humanity. The Nestorian error regarded Christ as two persons, one divine and one human, in union. But that the two natures, although subsisting in unity, are not so united as to make it admissible to call the Virgin Mary "The Mother of God." Christ was made man and God, a twofold person.

The Eutychian or Monophysite error asserted the unity of self-consciousness in the person of Christ, but denied the duality of the natures, so held that it is correct to say the "God suffered," meaning thereby that Christ suffered in the divine nature.

The Council of Chalcedon, in 451, defined Christ's person: "We teach that Jesus Christ is perfect as respects Godhood and perfect as respects manhood—that he is truly God, and truly a man consisting of a rational soul and body. He was begotten of the Father before creation as to his deity, but in these last days he was born of Mary, the mother of God, as to his humanity. He is one Christ existing in two natures, without mixture, without

change, without division, without separation—the diversity of the two natures not being at all destroyed by their union in the person, but the peculiar properties of each nature being preserved, and concurring to one person and one subsistence." (The positions taken at Chalcedon have been reaffirmed both in the mediæval and the modern church.) See JESUS CHRIST.

Christophe (krês-tôf'), Henri, 1767-1820; King of Haiti; b. a slave in island of Granada; emancipated in youth; joined the insurrection in Haiti, 1793; became brigadier general and governor of a province; united with Dessalines in new insurrection, 1802; succeeded him, 1806; president for life, 1807; crowned king as Henri I, 1811; killed himself to prevent capture in another insurrection.

Chris'topher, Saint, native of Syria or Palestine; supposed martyr abt. 250 A.D. The Roman Catholic Church celebrates his festival July 25th, and the Greek Church on May 9th. In art he is represented as carrying the child Christ on his shoulders, and leaning on his staff to support the great weight.

Christ's Hos'pital, or the **Bluecoat School**, charitable educational institution in London, founded by Edward VI, 1553, as a hospital for orphans and foundlings. The dress worn by the boys at present consists of a blue woolen gown, a red leather girdle, yellow breeches and stockings, a clergyman's bands, and a blue worsted cap, which they seldom wear, generally going bareheaded. The color of the dress was formerly russet. No child is admitted before eight or after ten years of age, and none can remain after fifteen, except "king's boys" (who attend the mathematical school founded by Charles II, 1672) and "Grecians" (the highest class), of whom five are sent on scholarships to the universities. About 1,100 boys can be admitted. Latin and Greek are the basis of instruction, but the modern languages, drawing, etc., are taught.

Chromatic, in music, name given to a succession of notes which are raised or lowered by accidentals—that is, sharps, flats, and naturals, the key being preserved throughout the passage. In the chromatic scale the differences of the notes are all by semitones. The series is formed by dividing the intervals between the whole tones of the natural diatonic scale by means of semitones. These are twelve in number and are all made equal to each other in modern music. The name chromatic is also applied to chords composed of such notes.

Chromium (krô'mî-ûm), one of the elements found in nature in the mineral chrome-ironstone, or chromite; was discovered, 1797, by Vauquelin, who gave it its name from the number of its colored compounds. From chrome-ironstone, bichromate of potash, or potassium bichromate, is first made, and from this, most other chromium compounds. Among the important compounds of chromium are: Chromic oxide (Cr₂O₃) is used under the names chrome green and ultramarine green to

color glass and porcelain, and as a pigment in oil and water colors. Guignet's green and Amandon's green are chromic oxide prepared by special methods. Chrome alum ($KCr(SO_4)_2 \cdot 12H_2O$) resembles ordinary alum closely, but contains chromium instead of aluminum; used in dyeing, calico printing, and tanning. Potassium bichromate ($K_2Cr_2O_7$) is used in the preparation of chrome pigments, in making safety matches, etc. Lead chromate ($PbCrO_4$) is formed by treating a solution of a chromate with lead acetate; used as a pigment under the names chrome yellow and Paris yellow.

Chromo. See **LITHOGRAPHY.**

Chromosphere (krōm'ō-sfēr), layer of gases and vapors which covers the surface of the sun, resting upon the photosphere; is invisible to direct vision, except at the moment of the beginning or ending of a solar eclipse.

Chronicles (krōn'ī-k'ls), two canonical books of the Old Testament, sometimes counted as one book. The first nine chapters are genealogical, and cover a period from the creation to the middle of the Persian times. The remaining chapters consist of selections or abridgments of the matters contained in Samuel and Kings, with much supplementary matter. The last two verses repeat the first verses of Ezra, the author apparently regarding his task as complete when he had brought the earlier history up to the times treated of in Ezra. The book was composed at or soon after the time of Nehemiah. It is written from the standpoint of interest in the Levitical and ritualistic institutions. Its authority was assailed during the first half of the nineteenth century by the rationalists, but it contains valuable contributions to our knowledge of the history of the Israelites.

Chronogram, inscription in which a certain date is indicated by printing some of the letters in larger type than the others, and taking them as Roman numerals. The date 1632 is thus expressed in the inscription of a medal of Gustavus Adolphus: *ChRlStVs DVX ergo trIVMphVs*. If it is a verse, it is called *chronostichon*.

Chronograph, instrument used (chiefly in astronomy) for recording the exact instant of the occurrence of an event, such as the transit of a star over the spider lines of a telescope. The record is made by electro-magnetism. A point or pen, governed by the clock, marks uniformly the seconds. It can be brought into action by an electric key.

Chronology (krō-nōl'ō-jī), the science that treats of the succession of events in time. Before the art of writing was known, dates were matters of mere oral tradition, and even after the invention of letters a period was described as lasting so many "generations," and an event as occurring in the reign or archonship of some king or magistrate. Before the eighth century B.C. dates of events are largely conjectural. The attempts to assign a precise date to the creation of the world led to the most diverse results, of which Archbishop

Ussher's estimate is the most familiar to English readers. From Adam to the birth of Christ he reckons four thousand and four years, a conclusion wholly at variance with modern science. The Assyrian canon determines the chronology of Assyria from 1330 B.C. for the next seven hundred years. The point of time, however, from which Babylonian history is reckoned is 747 B.C. This is the era of Nabonassar, and both the Roman and the Greek eras date from nearly the same point, the former beginning with 776 B.C., when Corcebus was victor at the Olympic games, and the latter from 753 B.C., the supposed date of the founding of Rome. The unit of time in the Greek chronology was the Olympiad, a period of four years, while the Romans designated an event by naming the consuls in whose term it occurred. After 312 A.D., however, the authorized system throughout the Roman Empire was by the Indiction, a period of fifteen years, and its use can be traced in the West as late as the fifteenth century, though the Olympiads were followed in the East till 440 A.D. The simple plan of counting by years was first adopted, 510 B.C. by Eratosthenes. Dionysius Exiguus in the sixth century A.D. was the first to employ the Christian era, beginning with the birth of Christ, which, however, probably occurred from two to four years earlier than the point from which Dionysius reckoned. Down to the middle of the eighteenth century A.D. records are often confused by the fact that at different periods, and among different nations, various dates were selected for the beginning of the year, e.g., March 25th, Christmas, Easter, and January 1st. (See **CALENDAR**.) The Christian era is attended by this inconvenience, that we must count backward for the dates of events prior to the birth of Christ, a difficulty obviated by the Julian system, proposed by Joseph Scaliger in the sixteenth century, which selects 471 B.C. as a starting point. Other important eras are the era of Constantinople, which began with 5509 B.C.; that of the Seleucidæ, dating from the capture of Babylon by Seleucus in 311 B.C.; the Mohammedan era from the Hegira, 622 A.D.; and the Persian era of Yezdegerd, 632 A.D. See **CYCLE**; **HOBOLGY**; **TIME**.

Chronom'eter. See **WATCH.**

Chronophotography, art of recording photographically successive phases of a motion or the changes in an animated scene. The first step in chronophotography was reached when the sensitiveness of photographic plates had been brought to the stage which permitted exposures so brief that during the interval the body which is being photographed shall not have perceptibly moved. In comparatively slow motions it is possible to construct shutters fast enough to fulfill this condition. In other cases, as in the photography of bullets in full flight from the muzzle of the gun, the exceeding brevity of exposure is obtained by the use of the electric spark, the duration of which can be reduced at will almost indefinitely. The earliest example probably of any kind of chronophotography, is due to Feddersen, who,

1862, flashed the image of an electric spark across the face of a sensitized plate by means of a lens and revolving mirror. He succeeded thus in securing photographs which showed the complex character of the discharge and its oscillatory nature. For many purposes, particularly in scientific work, chronophotography can be most easily reached by throwing the image of the moving body upon a plate which travels rapidly through the field of view of the camera. A convenient form of camera consists of the usual lens and camera box, behind which is a box containing a drum on the periphery of which the sensitive film is mounted. This film is driven by an electric motor. A slit in the side of the box nearest the camera admits rays of light from the lens. This slit may be opened at the instant when the chronophotograph is to be begun, and it closes automatically after one revolution of the disk has been completed. See MOVING PICTURES.

Chronoscope, or **Chronophotographic Camera**, kind of chronograph invented, 1835, by Wheatstone for measuring the duration of the electric spark. It consisted essentially of a plane mirror revolving with a high but known velocity, the elongation of the image of the spark as seen in this mirror furnishing the measure of the duration. In 1858 Feddersen substituted a concave for the plane mirror, with better results. In 1867 Rood replaced the concave mirror by a set of achromatic lenses and a plane mirror, and succeeded in measuring intervals of time as small as forty one billionths of a second.

Chrysalis (kris'ă-lis), the pupal stage of all *Lepidoptera* (butterflies and moths), and even of all insects. At first glance a chrysalis bears but little resemblance to the perfect insect, but examination will reveal all the parts. The wings are folded around the body, while between them can be seen the legs and antennæ, and behind, the rings of the abdomen, all inclosed in a hard, horny skin. In some cases the chrysalis is without other protection, but in others the larva, before passing into this stage, spins a silken cocoon, inside of which the transformation is undergone.

Chrysanthemum (kris-ăn'thē-mŭm), composite Japanese flower popular in Europe and the U. S. The chrysanthemum has been grown from the earliest times in Japan, and an open sixteen-rayed chrysanthemum is one of the imperial emblems. The greatest diversity of forms has arisen in recent years, largely because of the free introduction of the loose and odd forms from Japan, which are much unlike the older, stiff, and bell form, or incurved, types, known as Chinese chrysanthemums. In the U. S. the tendency is to breed the Japanese types to the exclusion of the formal kinds, while the opposite is true in parts of Europe.

Chryselephantine (kris-ěl-ă-făn'tin) **Statues**, statues whose surface was of gold and ivory; were made by the Greeks of Pericles's time and later, and were of great celebrity in antiquity, the most important being the statue

of Zeus in the temple of that god at Olympia and that of Athena Parthenos in the Parthenon at Athens.

Chrysoberyl (kris'ô-bêr-il), gem consisting of about eighty per cent of alumina and twenty of glucina; found in Brazil and Ceylon in rolled pebbles among alluvial deposits, colored with oxide of iron or chrome; also in the Ural Mountains, Connecticut, Maine, New York, Vermont, and elsewhere.

Chrisolite (kris'ô-lit), also called **OLIVINE**, and, by jewelers, **PERIDOT**, a mineral consisting of a simple silicate of magnesia and protoxide of iron. It occurs in igneous rocks, such as lava and basalt, and also in meteoric stones, either as grains or in crystals of rather complicated form, having a glassy luster. It is transparent and doubly refracting, of an olive-green color, and a hardness somewhat less than quartz. The finer varieties make beautiful and valuable gems, of a rich olive to golden green. Many fine specimens may be seen in the chapel of the Three Magi in the Cologne Cathedral. Recently small transparent gems have been cut from olivine crystals found in meteorites. It was formerly confounded with emerald, but the tint is entirely different; the *chrysolithus* of the ancients would seem to have been our topaz. It is found in Egypt and other parts of the East, and in New Mexico.

Chrysoprase (kris'ô-prăz), rare variety of chalcedony, the coloring matter of which is oxide of nickel; a beautiful translucent ornamental stone, specimens of which realized a high figure a century ago, when it was most esteemed. It is found at Rabenstein, Silesia; and in the U. S. at Visalia, Cal., and Riddles, Ore. Chrysoprase is mentioned once in the Bible (Rev. xxi, 20).

Chrysostom (kris'ôs-tôm), **John**, 347-407 A.D.; bishop and saint of the Eastern Church; b. Antioch, Syria; studied eloquence and law; induced by Meletius, Bishop of Antioch, to enter the Church; became a priest and began his remarkable course as a preacher, 386; succeeded Nectarius as Patriarch of Constantinople, 398; inveighed against the extravagance and licentiousness of the court; was charged, in consequence, with heresy; was tried, found guilty, deposed, and exiled to Nicæa, 403; was recalled by reason of popular clamor; again banished to the remote desert of Pityus, but died from cruel treatment on the journey. Thirty years afterwards his remains were conveyed to Constantinople with much ceremony. The Greek Church commemorates him January 27th and November 13th; the Roman Catholic Church, January 27th.

Chub, name given in Great Britain to *Leuciscus cephalus*, a fresh-water fish of the carp family, having a stout, round body and broad head. It attains a weight of 5 lbs., and is taken by anglers, although of little account for food. In the U. S. the term chub is applied to various fishes bearing more or less resemblance to their European namesake. In California the chub is *L. atrarius*; in the Middle and S. states it is *Semotilus cor-*

poralis, well known as the horned dace; E. of the Alleghanies it is *S. bullaris*, also called fallfish.

Chu-hi (chó'hě), 1130-1200; Chinese scholar and philosopher, whose influence on Chinese learning and thought is second only to that of Confucius; a founder and the chief ornament of the speculative school of philosophy in China; superintended the compilation of a history of China in fifty-nine books; his philosophical works in sixty-six books were published by imperial authority, 1713.

Ch'ung-k'ing', treaty port of China, province of Sze-chuan; on the Yangtze at its confluence with the Kia-ling; 1,700 m. from the sea; walled city with nine open and eight permanently closed gates; built by the first emperor of the Ming dynasty, 1368-98; opened to foreign trade, 1891; chief exports, silk, salt, *pehah*, or insect wax, tobacco, etc. Pop. (1903) 350,000.

Chuquisaca (chó-kě-sá'ká), Bolivia. See SUCRE.

Church, in its most general sense, the whole collective body of Christians. Its narrower senses are, a body of Christians adopting one creed, and under the same ecclesiastical government: the Christians of a particular province or city, as the Church of Antioch, and a society organized for worship in a single edifice. In the Scriptures the name is also given to the body of Jewish believers, the Jewish Church being composed of all those who followed the law of Moses. For information regarding the different denominations, see under their several titles.

Church, as an architectural term, is applied to any edifice consecrated to Christian worship; but it has become especially associated with certain types of religious architecture. The earliest form was that of the Roman basilica, a purely civic structure serving as a public hall, market place, and court room. It comprised an apse, within which was the tribune for the magistrate, a broad, open space before this for the public, and a long nave flanked by side aisles, separated from each other by columns bearing walls pierced with windows above the side-aisle roofs. From this ground plan, changed slightly by enlarging the central space laterally into transepts, and thus securing a symbolic cruciform outline, was developed the plan of the mediæval cathedral and of the great abbey churches of Europe. A fundamental structural change was effected by substituting vaulting in stone for the timber ceiling of the original type. This led to the use of flying buttresses, pinnacles, and clustered shafts. The *narthex*, or long transverse porch at the front, was exchanged for triple doors; the side aisles were continued around the E. portion of the building, with its apse, or polygonal or semicircular termination, which was assigned to the clergy and singers, and called the choir, also chancel. Vestries for the clergy, a baptistry, a campanile for the bells, or else towers with spires at the W. end, and chapels with altars for particular saints, were added to the original plan.

Church, Fa'thers of the, certain eminent Christian writers, from the second to the thirteenth century; preceded by the Apostolic Fathers, and including several of the scholastic doctors. Protestants usually limit the title to writers between the second and sixth century. The most distinguished of the Greek Fathers recognized by Protestants are Irenæus, Clement of Alexandria, Origen, Athanasius, Cyril of Alexandria, Basil the Great, Gregory Nazianzen, Eusebius, Chrysostom, and Theodoret; of the Latin Fathers, Justin Martyr, Tertullian, Lactantius, Cyprian, Hilary of Poitiers, Ambrose, Augustine, Jerome, and Gregory the Great. The Roman Catholics excluded Tertullian, Origen, and Eusebius, for their partial heterodoxy, but add several mediæval theologians.

Church, Richard William, 1815-90; English clergyman; b. Lisbon; dean of St. Paul's Cathedral, London, from 1871 till his death; his administration brought the cathedral in close touch with the people; most important publication, "The Oxford Movement."

Church'-ale, in mediæval England, a merry-making for the purpose of raising church funds; generally held at Whitsuntide and in the churchyard. Large quantities of ale were sold by the churchwardens, and the people indulged in the popular amusements of the time.

Church His'tory, or Historical Theol'ogy, one of the four divisions of theological science—*viz.*, exegetical (or biblical), historical, systematic (or philosophical), and practical (homiletical and pastoral) theology. Of these the historical is the most bulky, and furnishes material to the rest. In importance it yields only to exegetical theology, which has to do with the interpretation of Scripture. Historical theology begins with the creation of man, and comes down to the present as its relative goal, but will go on till the general judgment or the final settlement of all the affairs of men. It embraces all that belongs to the religious development of the race within the line of revelation—the origin, progress, and fortunes of the kingdom of God, and its relations to the kingdoms of this world. Since the fall of man it has assumed the character of a history of redemption (and is so represented, for instance, by Jonathan Edwards in his well-known popular book). In a narrower sense Church history is the history of Christianity from the birth of Christ, or from the day of Pentecost (A.D. 30), when Christianity first assumed an organized form distinct from Judaism, down to the present time.

Church'ill, Charles, 1731-64; English satirist; b. London; entered the Church; famous by his "Rosciad," a satire on the actors of the day; other works, all popular: "The Ghost," "The Author," "The Prophecy of Famine," "The Conference," and "The Farewell."

Churchill, John. See MARLBOROUGH.

Churchill, Randolph Henry Spencer (Lord), 1849-95; English statesman; son of the Duke of Marlborough; educated at Oxford; in Par-

liament, 1874-85; after 1880 he became conspicuous in the House of Commons by his attacks on the Liberal party, and was the leader of the Fourth party; Secretary of State for India, 1885; Chancellor of the Exchequer and leader of the House of Commons, 1886, but resigned in December.

Churchill, a river of the Dominion of Canada; rises in a lake near lon. 109° W. It flows nearly northeastward, passes through Nelson's Lake, and enters Hudson's Bay in lat. 59° N. Length estimated at 800 m.

Church'ing of Wom'en, public thanksgiving in church by young mothers, both for their motherhood and their recovery from the perils of childbirth. Formerly the practice was usual, if not obligatory, although no formularies for the service have come down to us. It imitated the Mosaic regulation (Lev. xii), and, as childbearing defiled, the woman was not to be church'd till forty days after her parturition.

Church of England. See ENGLAND, CHURCH OF.

Church of God, body of Christians organized at Harrisburg, Pa., 1830, by the followers of John Winebrenner, formerly a minister of the German Reformed Church. Its doctrines are a belief in the Bible as the authoritative revelation of God; also in the Trinity, in human depravity, the vicarious atonement, and the freedom of the will (rejecting the Calvinistic doctrine of election); recognizes adult immersion as the only baptism, and administers the Lord's Supper to all Christians who desire it. Literal washing of the feet is practiced as one of the ordinances of the Church. The congregations of this denomination are in part independent in church government, but are united into "elderships," which are again joined into one "general eldership," which owns the church property. The ministry is itinerant, and under the appointment of the elders. The church has a college at Findlay, Ohio. Membership (1906) 41,500.

Church of Scotland. See SCOTLAND, CHURCH OF.

Church of Scotland, Free. See SCOTLAND, FREE CHURCH OF.

Churubusco (chō-rō-bōs'kō), village of Mexico; on the Rio de Churubusco; 6 m. S. of the city of Mexico; scene of a battle, Aug. 20, 1847, between the U. S. forces under Gen. Winfield Scott, marching on the City of Mexico, and the Mexicans, defending the approaches to their capital, under Santa Anna. The battle of Contreras was fought on the same day, and in both instances victory remained with the U. S. troops; 3,000 prisoners were taken; 4,000 were killed or wounded, and 37 pieces of ordnance were captured; the U. S. loss was 1,053 killed and wounded.

Chusan (chō-sān'), principal island of the Chusan Archipelago; near the E. coast of China, province of Chehkiang, 45 m. N.E. of Ningpo; nearly 50 m. in circumference; mountainous, but mostly fertile and well cultivated;

products, tea, rice, cotton, tobacco, etc. The camphor tree and bamboo flourish; Tanghai, the capital, taken by the British, 1840, and again, 1841, but restored to the Chinese at the end of the war. Pop. abt. 200,000.

Chutia Nagpur (chō'ts-ā nāg'pōr), division of Bengal, British India; comprising four districts and seven tributary states, and occupying the SW. quarter of Bengal; British district area, 26,941 sq. m.; pop. (1901) 4,899,000. A large part of this district occupies a plateau 2,000 ft. in elevation, containing forest and jungle. Coal exists in large quantities, and much placer gold has been found. Two thirds of the population are Hindu, the remainder largely aboriginal tribes. The tributary states have an area of 16,054 sq. m., and a population of abt. 700,000.

Chyle (kil) and **Chyme** (kim), liquid products of digestion. Food after its complete digestion in the stomach is converted into a yellowish liquid mass known as the chyme. This passes into the duodenum, and is there acted upon by the pancreatic secretion and bile, which complete the digestion of the starches and proteids and emulsify the fatty foods. An opaque yellowish-white liquid known as chyle is the result.

Cibber (sib'ēr), **Colley**, 1671-1757; English poet; b. London; son of a noted sculptor; became actor, manager, and poet laureate, 1730; adapted about thirty plays, including "Love's Last Shift," "Love Makes a Man," "The Careless Husband," and the "Non-juror"; wrote autobiography, "Apology for my Life."

Cibola (sē'bō-lā). See ZUÑIGA INDIANS.

Ciborium (si-bō'ri-ūm), in the Roman Catholic Church a vessel used to contain the consecrated host. It is of gold or silver, and its cover frequently surmounted by a cross. The name is also given to a canopy over the altar, sustained by four columns, to which the pyx, in the form of a dove, is suspended by chains.

Cica'da, called also **CICALA**, name of a genus of *Hemiptera* noted for the shrill noise which they make. The cicada noted for its shrill song is the species (*Cicada orni*) of S. Europe. Their organ of sound is situated on each side of the under and anterior part of the abdomen. Cicadas abound in tropical and subtropical regions. They mostly have transparent and veined wing covers. There are several species of cicada in the U. S., commonly termed locusts or harvest flies. The most remarkable is the "seventeen-year locust" (*C. septemdecim*), a species abundant at times in portions of the U. S. There are two races, the N. appearing at intervals of seventeen years, the S. every thirteen years. There are several broods of each, so that each year is somewhere a cicada year. The eggs are deposited in grooves in the twigs of trees, and hatch in about six weeks. Almost immediately after liberation the young leap from the boughs, and burrow into the earth, where they live for thirteen or seventeen years, at depths of from 2 to 20 ft., feeding upon the roots of trees or plants. They then tunnel

upward, issue from the ground by thousands, climb the nearest tree, shed their skin, and emerge as perfectly formed insects. They are at first soft and creamy white, but soon harden and assume the colors of the adult. The ascent takes place about the last of May, and between sunset and midnight.

Cicero (sĭs'ĕ-rĕ), **Marcus Tullius**, 106-43 B.C.; Roman statesman; b. Arpinum; studied philosophy and rhetoric in Athens; afterwards traveled through Asia Minor; returned to Rome, 77; obtained the office of quaestor, 75; elected aedile, 69, and had charge of the temples and public edifices; later elected first praetor urbanus; delivered an important political oration for the Manilian Law, the object of which was to appoint Pompey commander in chief in the war against Mithridates, 66. After the expiration of his term of office he prepared to compete for the consulship, and was chosen; succeeding in forming a political alliance between the Senate and the equites, or knights, and thus promoted liberty and order; defeated the conspiracy of Catiline, whom he denounced in four eloquent orations; returned to the Senate as a private individual, 62; exiled, 58, but a bill for his restoration was adopted, 57. Between 57 and 52 he pleaded several causes in the courts, and found leisure to write two important works, "De Republica" and "De Oratore." He was proconsul, or governor, of Cilicia and Pisidia, 51; returned to Italy, 50, and joined the army of Pompey against Cæsar. Of his orations, fifty-seven are extant.

Cicero, Marcus Tullius, b. 65 B.C.; only son of the preceding; joined the army of Pompey, 49, and received the command of a squadron of cavalry; appointed a military tribune by Brutus, 44; defeated C. Antonius, and did good service in the Macedonian campaign; became consul, 30, and was governor of Asia (Syria), 29-8.

Cicero, Quintus Tullius, 102-43 B.C.; brother of Cicero, the orator; elected praetor for the year, 62; governor of Asia, three years; returned to Rome, 58; appointed legate to Cæsar, 55; commanded a legion in Gaul, 54. In the civil war he took arms against Cæsar, but made his peace with him, 57; proscribed by the triumvirs, and killed.

Cid (sĭd), proper name was **RODRIGO** (or **RUY**) **DIAZ DE BIVAR**; surnamed **EL CAMPEADOR** ("the champion"), 1040-99; most celebrated national hero of Spain; a Castilian; b. Burgos; commanded the army of Sancho II; banished by Alfonso VI, abt. 1085; while in exile commanded a retinue of knights and vassals, and waged war with success against several princes; gained a victory over the Moors, and became sovereign of Valencia, 1094. He is the hero of Corneille's famous story of that name.

Ci'der, a beverage made from the juice of apples. The apples are cut or crushed, and the juice pressed out. The juice first formed (sweet cider) is turbid. This is placed in casks, and allowed to ferment at a temperature not exceeding 40° F. The sugar contained

in the juice is thus converted into alcohol and carbonic-acid gas. After the liquid begins to clear up on account of the interference with the fermentation due to the accumulation of alcohol, it is drawn off and kept at a lower temperature, when a further fermentation takes place. Good cider contains from eight to ten per cent of alcohol, and from two to three per cent of sugar. It may be mentioned that the presence of malic acid in cider distinguishes it from wine.

Ciénaga (sĕ-á'ná-gá), marshy tract on a slope otherwise arid. The term is widely used in California, Arizona, New Mexico, and Mexico. The occurrence of a cienaga depends on the existence, not far below the surface of the ground, of a stratum impervious to water, by which an underground current is brought near the surface. Cienagas have proved serviceable in directing exploration for artesian water.

Cienfuegos (sĕ-ĕn-fwá'gōs), seaport of Santa Clara province, Cuba; named in honor of a former Cuban governor; on Jagua Bay; 111 m. SE. of Havana; has harbor area of 26 sq. m., and is the best, though not the largest, in Cuba. The town is the center of trade for S. central Cuba, and the fourth commercial port of the island. Pop. 59,000.

Cigar. See **TOBACCO**.

Cilia (sĭl'ĭ-á), the hairs which grow from the margin of the eyelids; also the microscopic filaments which project from animal membranes, and endowed with quick, vibratile motion. In vertebrates cilia occur upon the epithelium of the mucous membrane of various organs; their movements are apparently independent of the nervous system, and will continue long after the animal is dead. Among minute invertebrates, cilia serve by the rapid vibration, as organs of locomotion, or to create currents by which particles of food are brought within reach. The embryos of many of the lower animals are also frequently provided with cilia by means of which they move about.

In botany, cilia are long hairs on the margins of vegetable bodies; in entomology, fringes of hairs such as are found on the legs of some beetles.

Cilicia (sĭ-lĭsh'ĭ-á), ancient division of Asia Minor; bounded N. by Mt. Taurus, E. by Mt. Amanus, S. by the Mediterranean, and W. by Pamphylia. The ancient Cilicians were distinguished for maritime enterprise and piratical habits. In early ages Cilicia was an independent kingdom; afterwards a part of the Persian Empire, and was reduced to a Roman province in the time of Pompey.

Cimabue (chĕ-má-bó'á), **Giovanni**, 1240-1302; Italian painter; b. Florence; called the father of modern painting; painted in distemper and in fresco; adorned the church of St. Francis at Assisi with his work; excelled in design and expression.

Cimarosa (chĕ-má-ró'sá), **Domenico**, 1755-1801; Italian composer; b. Naples; composed sixty-nine operas; most celebrated are "Il Matrimonio Segreto" (The Secret Marriage)

and "L'Olimpiade"; four oratories, three cantatas, two requiems, much sacred music, and 500 minor pieces.

Cimbri (sím'bri), warlike people of ancient Europe whose origin is obscure; regarded as Germans by Cæsar and Tacitus. In 113 B.C. the Cimbri and the Teutones issued from the N. of Germany, crossed the E. Alps, and invaded the territory of the Romans, whom they defeated in battle. They afterwards moved across the Rhine, and pillaged Gaul. The Cimbri and Teutones gained another victory over the Romans, 109. Within a period of six years they defeated four consuls and routed five Roman armies. In the battle on the Raudian fields near Vercelli, July, 101, the invaders were annihilated by the united Roman armies under Catulus and Marius, 140,000 men being killed. The Cimbri in the time of Tacitus lived near the North Sea, and in Jutland, which was called the Cimbric Chersonese.

Cimmerians (sím-mě'ri-āns), originally a mythical people living on the confines of the world, where they were shrouded in mist and cloud, untouched by the rays of the sun; hence the expression "Cimmerian darkness." There were the groves of Persephone, the entrance to Hades, a rock (Mt. Taurus), "and the meeting of two roaring waters" (between the Sea of Azof and the Euxine Sea). The historical Cimmerians inhabited the Tauric Chersonesos (Crimea) and the country E. of the Straits of Kerch. They gave place to the Scythians, who in turn were banished by the Greek colonists.

Simon (sí'mōn), 502-449 B.C., Athenian commander and statesman; son of Miltiades who commanded at Marathon; served with distinction at Salamis, 480 B.C.; became commander in chief of the allies; gained a naval victory at the mouth of the Eurymedon; was for some time the most prominent statesman of Athens, and a rival of Pericles.

Cinalo'a. See SINALOA.

Cinchona (sín-kō'nā), genus of trees of the family *Rubiaceæ*, from many of the species of which is derived the bark called Peruvian bark, from which are obtained quinine and cinchonia. It was introduced to Europe through the Countess Chinchona, and then taken up by the Jesuits and long known as "Jesuit's Bark." Cinchona trees are indigenous to parts of S. America; chiefly on the E. slope of the central chain of the Andes in Bolivia and Peru; is also grown for its bark in Java, India, W. Africa, Mexico, Central America, and the Straits Settlements. The chief use of cinchona is in the treatment of malarial infection.

Cincinnati (sín-sín-nā'ti), chief city of the Ohio Valley; on the Ohio River, in Hamilton Co., Ohio; about 300 m. from Chicago and St. Louis. It is chiefly built on two plateaus nearly surrounded by hills, but most of the fine residences are on the neighboring highlands. The front of the city extends 14 m. along the river, while N. of it the average width is about 3 m., but it extends up the

Mill Creek Valley about 5½ m. The most notable buildings are the U. S. Govt. building, city hall, music hall, Chamber of Commerce, county court house, Cincinnati College, Ohio and Miami Medical colleges; public library, St. Peter's Cathedral (Roman Catholic), Central Union Railroad depot, Masonic Temple, Odd Fellows building, Scottish Rite Cathedral, city hospital, and art museum in Eden Park. Educational institutions include the Univ. of Cincinnati, College of Music, Art School, five Roman Catholic colleges, and several academies. There are seventeen hospitals. The principal libraries are the Public, Young Men's, Mercantile, Law, Historical Society, and Mechanics Institute. At Mt. Lookout, a suburb, is an astronomical observatory, one of the oldest in the U. S. The net public debt is about \$37,000,000; assessed valuation of taxable property, \$215,000,000; annual clearing-house exchanges, about \$1,192,663,000. The river navigation is important; coal, iron, lumber, salt, and crude merchandise being received in vast amounts. Every important railway system has lines passing through Cincinnati. There are about 2,170 factories, with capital of \$130,271,811, and 58,584 employes, yielding products to the value of \$166,059,000. Cincinnati was settled, 1788; originally called Losantiville; made the county seat and received its present name, 1790; became a city, 1819; received a large influx of German immigrants, 1845-60. Pop. (1900) 325,902.

Cincinnati Society of the, patriotic order founded in the Verplanck House, near Fishkill, N. Y., May 13, 1783, by officers of the Revolutionary army; to perpetuate the remembrance of the war and "the mutual friendships formed under the pressure of common danger"; membership included only officers who had served three years and the eldest male descendants of officers who had been killed. Societies were organized in each of the original states; and representatives from these convened in a congress in Philadelphia, 1784. Washington held the office of president general till his death. An allied society of French officers who had served in the American army was organized in France. One by one the state societies disbanded or became dormant until 1881, when only those of Massachusetts, New York, New Jersey, Pennsylvania, Maryland, and S. Carolina remained, and an original membership of over 1,500 had fallen to 315. Afterwards the societies in Rhode Island, Connecticut, and France were revived.

Cincinnatus (sín-sín-nā'tūs), Lucius Quinctius, Roman dictator; b. abt. 519 B.C.; belonged to the patrician order; consul, 458; consul suffectus, 460; dictator two years later; gained a victory over the Æqui; chosen dictator, 439, to oppose the machinations of Spurius Melius, accused of treason. He cultivated a small farm with his own hands and was regarded as a model of pristine virtue and simplicity of habits.

Cinematograph (sín-ě-māt'ō-grāf). See MOVING PICTURES.

Cinna, Lucius Cornelius, Roman patrician; partisan of Marius in the civil war between

Marius and Sulla. He became consul in 87 B.C., while Marius was in exile and Sulla was in Asia. By an effort to reinstate Marius he provoked a violent conflict, and was driven out of Rome, but he and Marius soon returned with an army and obtained the mastery in that capital. They massacred many friends of Sulla. Cinna was reelected consul. Afterwards he usurped the consulship for himself; raised an army and marched to oppose Sulla, who was returning from Asia, but was killed by his own soldiers in 84 B.C.

Cin'nabar, mercuric sulphide, composed of 86.2 per cent of mercury and 13.8 per cent of sulphur; occurs in rhombohedral crystals and also in the granular and massive states; is the principal ore of mercury, found in many localities, but the deposits have commercial value only in a few countries; conspicuous among them Spain, whose Almaden mines are controlled by the Rothschilds; Austria, with the ancient Idria mines; and California, with the New Almaden, the New Idria, and other mines.

Cinnamon (sin'nā-mūn), drug and flavoring mixture derived from the inner bark of shoots of *Cinnamomum zeylanicum*, a tree some 20 to 30 ft. in height, with branches mostly horizontal or drooping. Most cinnamon is obtained from Ceylon, although there are other sources, as China, from which immense amounts are exported. Cinnamon bark has also been cultivated in Java, the Cape de Verde Island, Brazil, the W. Indies, and Egypt. The oil of cinnamon is largely employed in the preparation of cinnamon water, used as a palatable vehicle to carry other drugs.

Cinnamon Bear, reddish-brown or yellowish-brown variety of the black bear (*Ursus americanus*); name occasionally applied to small varieties of the grizzly bear.

Cinq-Mars (sānk-mār'), **Henri Coiffier de Ruzé** (Marquis de), 1620-42; son of Marquis d'Effiat, Marshal of France; came to the court, 1639, as a protégé of Richelieu, who intended to make him the favorite of the king, and to use him as a spy. The cardinal, however, mistook the man. Cinq-Mars, proud, noble, and brilliantly gifted, had an ambition of his own, and a deadly hatred soon sprang up between the favorite and the minister. Cinq-Mars joined the Orleans party; a conspiracy was formed for the overthrow of Richelieu; an alliance was concluded with Spain; Cinq-Mars and his friend De Thou were arrested at Narbonne, June 13, 1642; Cinq-Mars was executed at Lyons, September 12, 1642.

Cinque Cento (chēn'kwā-chān'tō), term used by the Italians to designate the sixteenth century. The same term is also applied in English to the literature and architecture of that period. By careful writers it is distinguished from the Renaissance, which closed in Italy with the beginning of the cinque cento.

Cinquefoil (sīnk'fōil), a plant of the genus *Potentilla* and of the family *Rosaceæ*. Some of the species are shrubby, as in *Potentilla fruticosa*, but nearly all are perennial herbs, as *P. canadensis*, *P. argenta*, *P. palustris*, etc. Many of the species are quite ornamental, especially the exotic *P. nepalensis* and *P. atrosanguinea* from the Himalaya region, the first with rose-red and the second with brown-purple or crimson flowers.

Cinque Ports (sīnk-pōrts), the five English seaport towns of Dover, Sandwich, Hastings, Romney, and Hythe, to which William the Conqueror granted important privileges. Winchelsea, Rye, and several minor towns with the name of Limb or Member were subsequently added to the original five ports. They are under the government of a lord warden. The Cinque Ports in early times were required to furnish at their own expense such shipping as the sovereign required for the public service.

Cin'tra, town in Estremadura, Portugal, 15 m. NW. of Lisbon; has an ancient castle, originally occupied by Moorish kings and afterwards by Christian sovereigns. On two hills are the Penha Convent, now a royal residence, and a Moorish castle, and within the town is a palace. The Cintra Convention of 1808, which aroused indignation in Great Britain, was a capitulation under which the French army in Portugal was landed in France with its arms and effects and without conditions as prisoners of war. Pop. (1900) 5,918.

Ci'pher. See CRYPTOGRAPHY.

Circars (sēr-kārs'), **North'ern**, obsolete subdivision of Madras presidency, British India; was a coast district on the Bay of Bengal, granted to the French, 1757, by the ruler of the Deccan, overrun by Clive, ceded, 1766, to the E. India Company, and permanently British since 1823.

Circassia (sēr-kāsh'tā), name applied to a territory of Russia, on the NE. side of the Black Sea, and comprised mainly in the Kuban province of Circassia; area, about 36,600 sq. m.; pop. (1905) 1,928,419. The name Circassians has been widely applied to the mountaineers of the whole NW. of the Caucasus, of which the Russian form of name is Tcherkesses. In this large sense it included the Adighè, or Circassians proper, and the inferior but related tribes of Abkhasians who dwell in the SE. as far as Mingrelia, and of Kabardans living on the N. slopes, in the valleys of the Kuban and Terek, and beyond. The language of the Circassians, like that of nearly all the races of the Caucasus, is apparently unconnected with that belonging to any other people. It is mainly agglutinative. Among the Circassians previous to the Russian conquest there were three distinct ranks of the free people—namely, the princes, the nobles, and the peasants. The Circassians are handsome, strong, active, and temperate, and are characterized by self-dependence, courage, and prudence.

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