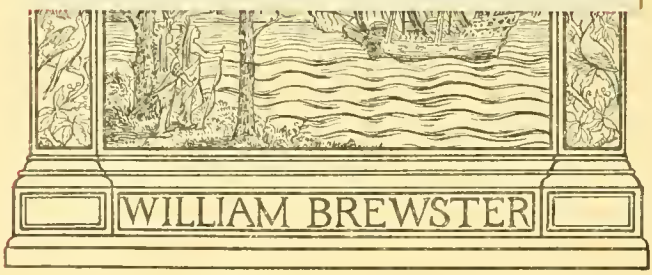

VOL. II. 1895-6.

THE MUSEUM.

A Monthly Science Journal.

Rates, $1.00 a year in advance to all countries.

PUBLISHED THE FIFTEENTH OF EACH MONTH BY

THE MUSEUM PUBLISHING CO., ALBION, N. Y.

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VOL. II.

VOL. II. NO. 1.

NOVEMBER, 1895.

THE MUSEUM.

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Berlin Agency, R. FRIEDLANDER & SOHN, Berlin, N. W, Carlstrasse 11.
London Agency, SWANN & Co., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by
WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

TO EXCHANGE.—Sets of 390, 477, 498, 563, 593, 597, 610, 703, and 761; also have some singles, for sets of other localities. C. R. STOCKARD, Columbus, Miss.

WANTED.—A small bore Winchester Repeater; also a high grade double barrel gun. Will trade specimens or supplies for same. W. F. WEBB, Albion, N, Y.

WILL EXCHANGE both Manton's taxidermy and Manton's insects, for a copy of Manton's beginners with the microscope. Both books are in good condition. H. J. TWIGGS, Summerville, Augusta, Ga.

WANTED.—10 or 12 guage Repeating Shotgun, Damascus' barrel full choke;also Dr.Fisher's "Hawks and Owls" of U. S. Offer finely mounted birds, fresh skins, or eggs in sets from this locality. R. H. BECK, Berryessa, Cal.

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I HAVE a Scott's International Postage Stamp Album, in good condition, covered with leather, which I will exchange for U. S. or foreign stamps. WILLARD DOBBINS, Lock Box 22, Barnesville, Ohio.

WANTED.—Copies of Cones' Key, Ridgeway's Manual or any other book that we list, new or second hand, for which we offer other books, specimens, supplies or possibly cash if a bargain. W. F. WEBB, Albion, N. Y.

I HAVE a good assortment of Florida Sea Shells, etc, to exchange for a good 32 caliber Rifle; rim fire is preferred. Give particulars. H. T. ALLEN, Seven Oaks, Fla.

JUST THINK, twenty varieties of tickets from the World's Fair, for only 12c. Curiosities in exchange for a pair of 11½ ice skates or stamps. CLINTON A FOX, 525 West 61st St., Station O, Chicago, Ill.

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INDIAN STONE and Flint Relics for sale cheap. Five fine arrows mounted on card, 30c postpaid. Axes, celts, clubheads, etc, 25c up. Send for outlines. A. D. GRUTZMACHER, Mukwonago, Wis. 2

WANTED.—Deer, Elk, Moose, Bear and Mt. Sheep heads. Any size but A1 condition. Also Rugs nicely lined. State what you have and what you want to get. W. F. WEBB, Albion, N. Y.

FOR EXCHANGE.—I will exchange 50 good stamps for every good Arrow Point or 100 stamps for each good Spearhead that is sent me; also have fine sets of A. O. U., No. 613, to exchange for Arrow and Spear Heads. WALTER E. MCLAIN, New Vineyard, Me.

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WANTED.—Correspondents interested in diurnal lepidoptera or addresses of persons who can procure the same in the N. W. W. and S. Western states. LEVI W. MENGEL, Reading, Pa.

FERNS.—If you are interested in studying the curious and interesting things about them you should subscribe for the "Linnaean Fern Bulletin," Binghamton, N. Y.

TO EXCHANGE.—Eggs, stamps, minerals, curios, etc, for genuine Indian impliments. Address, L. C. GRANT, 24 Brown St., Springfield, Mass.

COLUMNS. Try our exchange columns. If you have anything you want to sell or exchange here is the place for it. We will accept first-class specimens at one-half rates in payment of space in these columns

BOUND VOLUMES of the MUSEUM. Any of our subscribers who wish to return us the first 12 numbers of the MUSEUM prepaid we will send them twelve numbers of like date neatly bound in cloth, for 50c and 10c additional for postage. Or bound in full leather, law book style for 90c prepaid to you. We will send Vol. I, 12 numbers, being a book of nearly 400 pages, handsomely illustrated prepaid for 1.50. W F. WEBB, Albion, N. Y.

THE NATURALIST AND SPORTSMAN, a monthly magazine, devoted to Natural History and field sports. No. 1 will be ready Jan. 1, 1896. Advance subscriptions will be taken at 25 cents (silver) per year if sent before Dec. 10. Free exchange columns. Correspondence solicited. LEROY NASON, Berwick, Me.

NOTICE.—If you want a good method for Embalming birds, send me a set of eggs worth 30 cents, or more with stamp for one. R. P. SMITHWICK, Merry Hill, Bertie Co., N. C.

WANTED.—Fine complete sets of Hawks, Owls, Grouse, Ducks &c., for cash. Prefer to take in large lots. Send full list and I will advise what I will pay. W. F. WEBB, Albion. N. Y.

FOR EXCHANGE.—I have a good typewriter, pair of boxing gloves and a rifle to exchange. Make me an offer; best offer gets them. M. W. HUGHES, Wanconda, Illinois.

STAMP COLLECTORS.—Send us a trial order, you'll never regret it; 100 rare Stamps, 10c; 20 var. unused, including Columbian and Depts., only 25c. Set of Japan Silver Wedding, unused, 15c. War Dept., unused, complete set, $4.50. 3c Blue Paper, War Dept. env., entire, 6c. Approval Sheets at 40 per ct. discount. MEEKER-TOWE STAMP CO., Box 296, Bridgeport, Conn.

FOSSILS, FOSSILS, FOSSILS.—Have you any fine fossils, large or small, all sizes, in any quantity? If so, send me full list, giving number, condition and price, and what you wish. W. F. WEBB, Albion, N. Y.

WANTED.—Birds in the meat from the Atlantic shore, and other localities not too far from Albion. Rare species particularly desired. I will pay charges and give good exchange or cash for such as can be used. W. F. WEBB, Albion, N. Y.

WANTED.—New or second hand copies of Coues' Key, Ridgeway's Manual or other books on Natural Science for which I offer specimens, instruments, supplies, other books or part cash. Send list of what you want in return. W. F. WEBB, Albion, N. Y.

FOR SALE.—Large Whip Snake, in spirits, $1. Snake Skins, (shed) 3 to 5 ft., 25 to 75 cts. Snake Photos, 10c. Old Navy Cutlass, $2. Old Powder Horn, 50c. Pepper Box Revolver, used in late war, $1.50. All sizes, Glass cover shades for Taxidermists and Flower Makers. J. H. TEEL, Binghamton, N. Y.

WANTED.—At once, for cash or exchange, the following fossils: Fossil Leaves and Ferns, Calamine Plants, Archamides Worthenii, Belemites, Grypheas, Chain Coral, various Fossil Corals, Ammonites, Orthis, Spirifers, etc. Parties having any of above or other good fossils, please write, stating quantity you have, size and price for lot. W. F. WEBB, Albion, N. Y., or Keokuk, Iowa.

FOR EXCHANGE.—A good Inter-collegite Spalding foot ball, cost $5.00 last year, to exchange for a pair of steel lever skates No 2, Barney & Berry, preferred. L WILLIAMSON, Rochester, Ind.

FOR SALE.—A few small birds on showy stands, suitable for Christmas presents Prices, 75c, $1.00, $1.50 and $2.00. Send to which ever priced one you wish and we will guarantee you will be pleased. W. F. WEBB, Albion, N. Y.

I HAVE a large fine pair of Elk Antlers on Skull; also a fine Bison's head nicely mounted to exchange for a good grade of Double Barrel Shot Gun and Mounted Birds, and Skins Eggs and most any thing the collector wants. Address, with stamp, C. F. FITE, Denver, Ind.

W. F. Webb.

Dear Sir:—Find $1 enclosed for subscription to MUSEUM for coming year. Have been very well pleased with past numbers. Yours very truly, F. P. DROWNE, 20 Benefit St., Providence, R. I.

Good Christmas Presents.

All are in stock and guaranteed to suit.

	Price Prepaid
Johnson's Natural History, 2 vol., leather bound	$10 00
Hornaday's Taxidermy	2 50
Davie's Taxidermy	4 90
Davie's Nests and Eggs	1 25
Moorehead's Fort Ancient	2 00
Eastern Persia, covering Zoology, Geology and Biography, 2 volumes	4 00
Pennant's British Zoology, 4 vols., illustrated	6 00
Coues' Key to N. A. Birds	7 50
Ridgeway's Manual to N. A. Birds	7 50
Goss' Birds of Kansas	6 00

W. F. WEBB, Albion, N. Y.

Thanksgiving Offer of BIRDS EGGS

The following list of fine eggs are all in stock, but as one carrying so many kinds must necessarily be out of some, we would be obliged if customers would name a few substitutes. All are strictly first class specimens. Each egg will be numbered to correspond with a printed lis.. All specimens will be sent prepaid by mail or express. As an inducem.nt for several to order together and make orders as large as possible I make the following discounts.

Send	$ 1 00	and	select	eggs	to	value	of	$ 1 25.
"	2 00	"	"	"	"	"	"	2 50
"	3 00	"	"	"	"	"	"	4 25
"	4 00	"	"	"	"	"	"	6 00
"	5 00	"	"	"	"	"	"	10 00
"	7 50	"	"	"	"	"	"	17 50
"	10 00	"	"	"	"	"	"	30 00
"	25 00	"	"	"	"	"	"	82 00

These discounts will not apply to the specimens listed as Miscellaneous unless at least $10 worth are ordered. Smaller than this amount our best discount on them is 50 per cent.

With a $5 order, *in addition to above discounts*, we will give a free subscription to the THE MUSEUM for 1896, providing you mention this offer.

Western Grebe	$ 50
American Eared Grebe	15
Pied-billed Grebe	10
Loon	1 50
Puffin	20
Cassin's Auklet	1 50
Murre	20
California Murre	20
Razor-billed Auk	25
Parasitic Jæger	50
Kittiwake	40
Great Black-backed Gull	60
Western Gull	30
Herring Gull	20
American Herring Gull	20
California Gull	30
Ring-billed Gull	30
Laughing Gull	20
Royal Tern	40
Cabot's Tern	40
Forster's Tern	10
Sooty Tern	25
Bridled Tern	1 00
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Noddy	50
Fulmar	75
Leach's Petrel	20
Gannet	35
Farallone Cormorant	50
Brandt's Cormorant	25
American White Pelican	35
Brown Pelican	20
Man-o'war Bird	1 00
Red-breasted Merganser	50
Mallard	20
Gadwell	75
Baldpate	75
European Teal	20
Blue-winged Teal	20
Shoveller	50
Redhead	35
Canvass-back	1 25
American Scoter	2 00
Canada Goose	1 00
Black-bellied Tree Duck	2 00
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White Ibis	35
American Bittern	75
Least Bittern	20
Great Blue Heron	25
Louisana Heron	12
Little Blue Heron	12
Green Heron	12
Black-crowned Night Heron	12
Limpkin	75
King Rail	20
Clapper Rail	12
Virginia Rail	20
Spotted Crake	30
Sora	10
Corn Crake	20
Florida Gallinule	10
European Coot	15
American Coot	08
Red Phalarope	1 50
Wilson's Phalarope	75

American Avocet	50
American Woodcock	1 00
European Snipe	25
Wilson's Snipe	1 50
Purple Sandpiper	2 00
Dunlin	35
Willet	40
Bartramian Sandpiper	35
Spotted Sandpiper	15
Long-billed Curlew	1 00
Lapwing	15
Killdeer	20
Ring Plover	20
Turnstone	2 00
Bow-white	10
Florida Bob-white	15
Texan Bob-white	10
California Partridge	10
Sooty Grouse	85
Ruffed Grouse	15
Gray Ruffed Grouse	75
Willow Ptarmigan	1 00
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Sage Grouse	50
Chachalaca	75
Red-billed Pigeon	1 00
White-crowned Pigeon	1 00
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White-winged Dove	20
Ground Dove	30
Mexican Ground Dove	50
Inca Dove	75
Mississippi Kite	4 00
Marsh Hawk	35
Cooper's Hawk	30
Harris's Hawk	60
Red-tailed Hawk	50
Western Red-tail	60
Red-shouldered Hawk	35
Fla. Red-shouldered Hawk	65
Red-Bellied Hawk	1 00
Swainson's Hawk	50
Broad-winged Hawk	1 00
Bald Eagle	3 50
Kestrel	20
American Sparrow Hawk	20
Desert Sparrow Hawk	25
Audubon's Caracara	1 00
American Osprey	50
American Barn Owl	30
American Long-eared Owl	35
Short-eared Owl	1 50
Barred Owl	1 00
Florida Barred Owl	1 25
Screech Owl	50
Florida Screech Owl	50
Texan Screech Owl	50
California Screech Owl	50
Great Horned Owl	1 00
Western Horned Owl	1 00
Hawk Owl	1 00
Burrowing Owl	15
Florida Burrowing Owl	1 50
Road-runner	25
Yellow-billed Cuckoo	10

Black-billed Cuckoo	15
Belted Kingfisher	20
Hairy Woodpecker	50
Southern Hairy Woodpecker	1 00
Downy Woodpecker	20
Gairdner's Woodpecker	50
Baird's Woodpecker	1 00
Red-headed Woodpecker	08
Californian Woodpecker	40
Lewis's Woodpecker	35
Red-bellied Woodpecker	25
Golden-fr'ted Woodpecker	50
Flicker	03
Red-shafted Flicker	10
Northwestern Flicker	25
Chuck-will's-widow	1 50
Whip-poor-will	1 50
Merrill's Parauque	2 50
NightHawk	40
Western Nighthawk	50
Florida Nighthawk	1 00
Texan Nighthawk	40
Chimney Swift	12
Ruby-throated Hummingbird	50
Anna's Hummingbird	50
Scissor-tailed Flycatcher	10
Kingbird	03
Arkansas Kingbird	06
Cassin's Kingbird	25
Crested Flycatcher	12
Mexican Crested Flycatcher	40
Ash-throated Flycatcher	25
Phœbe	04
Says's Phœbe	15
Black Phœbe	15
Wood Pewee	12
Western Wood Pewee	20
Western Flycatcher	20
Acadian Flycatcher	15
Little Flycatcher	25
Traill's Flycatcher	15
Least Flycatcher	15
Skylark	15
Prairie Horned Lark	15
American Magpie	15
Yellow-billed Magpie	35
Blue Jay	05
Florida Blue Jay	35
Blue-fronted Jay	75
California Jay	25
Green Jay	1 25
American Crow	05
Florida Crow	35
Northwest Crow	35
Fish Crow	35
Starling	10
Cowbird	03
Dwarf Cowbird	10
Red eyed Cowbird	40
Yellow-headed Blackbird	03
Red-winged Blackbird	02
Bicolored Blackbird	10
Tricolored Blackbird	15
Meadowlark	10
Western Meadowlark	10
Hooded Oriole	50

Arizona Hooded Oriole	35
Orchard Oriole	06
Baltimore Oriole	06
Bullock's Oriole	10
Brewster's Blackbird	03
Purple Grackle	05
Florida Grackle	10
Bronzed Grackle	05
Great-tailed Grackle	15
Boat-tailed Grackle	15
House Finch	05
American Goldfinch	05
Arkansas Goldfinch	10
Lawrence's Goldfinch	20
Lapland Longspur	75
Chestnut-collared Longspur	35
Vesper Sparrow	05
Savanna Sparrow	10
Grasshopper Sparrow	20
Sharp-tailed Sparrow	35
Seaside Sparrow	20
Lark Sparrow	05
Western Lark Sparrow	05
Gambel's Sparrow	15
White-throated Sparrow	35
Chipping Sparrow	02
Western Chipping Sparrow	10
Field Sparrow	03
Slate-colored Junco	20
Black-throated Sparrow	35
Song Sparrow	02
Desert Song Sparrow	35
Mountain Song Sparrow	25
Heermann's Song Sparrow	10
Samuel's Song Sparrow	05
Rusty Song Sparrow	40
Swamp Sparrow	12
Texas Sparrow	50
Towhee	10
Spurred Towhee	20
Oregon Towhee	25
California Towhee	10
Abert's Towhee	75
Cardinal	05
Arizona Towhee	1 00
Gray-tailed Cardinal	1 50
Texan Cardinal	35
Rose-breasted Grosbeak	10
Black-headed Grosbeak	15
Blue Grosbeak	20
Western Blue Grosbeak	25
Indigo Bunting	08
Lazuli Bunting	20
Painted Bunting	10
Sharpe's Seed-eater	1 00
Grassquit	1 00
Dickcissel	05
Scarlet Tanager	25
Summer Tanager	25
Purple Martin	12
Cliff Swallow	02
Barn Swallow	05
Tree Swallow	15
Bank Swallow	03
Rough-winged Swallow	25
Cedar Waxwing	10
Phainopepla	35
White-rumped Shrike	08
California Shrike	08
Red-eyed Vireo	10
Warbling Vireo	15
White-eyed Vireo	15
Bell's Vireo	15
Black and White Warbler	50
Prothonotary Warbler	25
Blue-winged Warbler	1 50
Golden-winged Warbler	75
Parula Warbler	20
Yellow Warbler	05
Myrtle Warbler	75
Magnolia Warbler	50
Chestnut-sided Warbler	15
Prairie Warbler	30
Oven-bird	20
Louisiana Water-thrush	50
Maryland Yellow-throat	12
Western Yellow-throat	25
Yellow-breasted Chat	08
Long-tailed Chat	15
Hooded Warbler	50
American Redstart	15
White Wagtail	10
Meadow Pipit	10
American Dipper	1 00
Sage Thrasher	50
Mockingbird	05
Catbird	02
Brown Thrasher	03
Sennett's Thrasher	15
Curve-billed Thrasher	15
California Thrasher	20
Bendire's Thrasher	75
Cactus Wren	12
Rock Wren	50
Carolina Wren	10
Florida Wren	50
Lomita Wren	75
Bewick's Wren	25
Vigor's Wren	25
Baird's Wren	25
House Wren	05
Parkman's Wren	15
Western House Wren	08
Short-billed Marsh Wren	75
Long-billed Marsh Wren	65
Tule Wren	12
Brown Creeper	75
White-breasted Nuthatch	35
Brown-headed Nuthatch	25
Pygmy Nuthatch	50
Tufted Titmouse	35
Plain Titmouse	50
Chickadee	12
Carolina Chickadee	15
Mountain Chickadee	50
Wren-tit	50
Bush-tit	25
Californian Bush-tit	15
Verdin	35
Blue-gray Gnatcatcher	20
Western Gnatcatcher	50
Black-tailed Gnatcatcher	50
Wood Thrush	06
Wilson's Thrush	12
Russet-backed Thrush	15
Olive-backed Thrush	35
Hermit Thrush	30
Red-winged Thrush	25
American Robin	03
Red-spotted Blue-throat	75
Wheatear	10
Bluebird	02
Western Bluebird	12
Mountain Bluebird	12

INTRODUCED SPECIES.

English Pheasant	25
European Goldfinch	20
English Sparrow	02
European Tree Sparrow	15

FOREIGN EGGS.

Montague's Harrier	50
Swallow	05
Nuthatch	20
Wren	05
Sedge Warbler	05
White-throat	05
Golden-crested Kinglet	15
Whinchat	10
White-spotted Blue-throat	75
Brambling	25
Missel Thrush	05
Song Thrush	03
Blackbird	03
Dipper	15
Pied Flycatcher	15
Red-backed Shrike	10
Jay	12
Magpie	08
Jackdaw	08
Greenfinch	05
House Sparrow	03
Bullfinch	10
Lesser Redpoll	20
Gt. Black Woodpecker	75
Cuckoo	50
Cirl Bunting	25
Yellow Bunting	05
Black-headed Bunting	12
Willow Warbler	05
Robin	05
Common Sandpiper	15
Common Snipe	25
Water Rail	30
Moorhen	15
Sociable Plover	30
Sand Martin	03
Tree Creeper	05
Capercaille	50
Ring Dove	10
Turtle Dove	05
Black Cap	05
Great Tit	20
Blue Tit	15
Marsh Tit	20
Barbary Partridge	10
Red-leg Partridge	15
Carrion Crow	20
Chiff Chaff	05
Rook	10
Quail	10
Long-eared Owl	35
Tawny Owl	50
Little Owl	40
Redshanks	25
Stock Dove	15
Great-crested Grebe	50
Chuckar Partridge	20

MISCELLANEOUS.

Gopher	35
Skate	05
Shark	10
Devil Fish	10
Hammerhead Shark	15
Nurse Shark	50
Egg case of Periwinkle	25
Eossil Fish Eggs, per 12	10
Alligator	35
Mud Turtle	10
Musk Turtle	15
Snapping Turtle	15
Emu (Hole in end)	2 50
Rhea (Hole in end)	2 00

Address WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., NOV. 15, 1895. No. 1

Science Gleanings.

Standing upon the shore of some majestic river, we may trace its waters flowing away, possibly to the South, until its course is lost to our vision; while, as far as the eye can reach, from the opposite direction, we see the same onward flow that has brought them to our feet. But nothing passing before us reveals either the source or destination of the river. Whether beyond this limited view it has been flowing from some hidden fount in an undeviating course and will so continue to flow on till lost in the ocean deep; or whether it may have turned, now to the right, or again to the left, in a deviating channel, it would be hazardous from what we can see to predict. And yet from this single page of its history, seen by us, we might rightly index much in the full volume of that history. Has the small part of it we see, assumed a slow and steady course, enclosed by wide bottom lands of made soil, and has it in the part we see become a great navigable stream; the certainty is we are viewing that part of its course in proximity to the ocean.

Standing upon the shore of Time—the material world, that which is known as Nature, in the countless phenomena we see—fed from an invisible fount, is flowing by us, on and on, down the channel of Time, revealing to us nothing more of its origin and destination than does the river mentioned. Does the shortness of natural life shut in our vision to a mere glimpse of the secret workings in nature, that have been so constant and never set aside during the ages of the past, nor will be during the ages to come? Or will this fleeting present yield up the key to unlock Nature's records of the past, and lisp some prophecy to us of what Nature is to be in the ages to come?

There are axioms in mathematics, upon which we can implicitly rely in solving a problem and there are truths which are foundation principles in natural science upon which we can securely build. To illustrate some of these principles, take that branch of science called Geology. We know of certain agencies, as frost, fire, water, and electricity, by the effects we see them produce. We have no reason to believe that these effects have ever been any different in kind, though they may have been in degree, since time began. For while they retain the properties that make them to be what they are, they could not have done otherwise. And if they ever had properties other than what they now have, they would not then be the agents they now are. Hence the record they are writing in the geological annals of today, is the record they have always and everywhere written.

Is fire melting the rocky strata beneath to feed volcanic eruption? So it always has done. And are these volcanoes mainly arranged along ocean shore lines? So they always have

been in their days of activity, though they may now be far inland as seen in extinct volcanoes. Is water incessantly wearing down the land, and transporting its material from higher altitudes to lower, and into lakes and the ocean bed? So it always has done since land first peered from the briny deep. Yet, if it be true, that in the infancy of our earth life, its surface was one almost universal shallow ocean (and such accords well with the scriptural account as well as present scientific belief), who cannot see that as to relative power to effect a work in world changes, fire must have been constantly on the wane, while water must have been constantly gaining advantage to effect geological changes; for radiation of heat into cold interstellar space caused fire to become continually more deep seated in the strata of our globe, and less and less effective, while elevation of the land, as one effect of this deeply imprisoned heat, caused a constant increasing area for running water to act upon, and as a result larger rivers and streams with corresponding increase of power and more material to transport.

What was not possible, but certainly to happen with the growing age of our planet, was contraction in bulk, caused by radiation of heat, breaking and displacement of the rocky strata by this contraction, and the production and liberation of great heat, by this mechanical motion among the strata. It does not seem possible that any part of the earth's interior should be a perfect vacuum, and if not we may easily believe that the dykes and veins formed in the strata as a result of displacement, would serve as exits to water, steam or melted lava as to which would be more available at that particular place. And such displacement, if considerable, made known by the earthquake shock and volcanic eruption would go hand in hand as we find it in our age.

The crystallization of this melted matter, in these rocky fissures, by the sorting power of crystallization, would give rise to many determinate mineral species. And the arrangement of these, in the early ages of our world, would be in some measure according to their weight and the temperature at which dissociction of their elements would take place. As to weight, the lighter elements, the gases above to form the atmosphere, next gases combined in liquid and heavier form as water, and beneath, the still heavier earths and metals to form the solid crust of earth. As to temperature—those compounds most infusible, and so capable of existing at a higher temperature first and lowest, then the more fusible and varied compounds later on. An increasing reduction in the temperature of the primeval ocean would lessen its power of solution and aid in chemical precipitation and crystallization in any part of its waters shut off (but not in the ocean deep itself) as a natural result.

These are some of the consequences that must as surely flow from such causes, in the earliest geological ages, as they do in our own time. Whenever dry land began to appear on our globe a new factor entered the scene, with a controlling and modifying power, which we experience every day of our lives. An almost universal ocean supposes an almost uniform heat. The appearance of land, owing to the different absorbing and radiat-

ng power between land and water, would set up atmospheric currents, and create much of what we call weather; and these winds in conjunction with the growing shore lines of land, would result in helping to form, and give direction to ocean currents. It is a well ascertained fact, made known by deep borings into the earth, and confirmed by volcanic, and hot spring eruptions on the one hand, and by deep sea soundings, in many parts of the ocean, in recent years, that as we descend in depth into the earth, the temperature rises; while as we descend into the ocean, the temperature falls. Now the result of this natural enough law, is the induction and setting up of magnetic currents through the earth, (or for some distance beneath its surface) and an effect on the deposit of ores in veins, lodes and dykes, over the whole earth; in many cases even to the iridescent hues of coloring they often show; as anyone may witness by exposing a specimen of chalcopyrite (copper Pyrites) to the electric current. If anyone should ask why, in the very earliest geological ages, the plan of the continents was outlined, and this plan was ever after adhered to without deviatian; why, according to this plan, the main bulk of the dry land was to be in northern latitudes, with a tapering form to the south, in continents and peninsulas as well; and why, in arctic altitudes, the elevation of the land is small but gradually increasing in altitude to the region of the tropics; the correct answer no doubt is, there were unseen natural laws by which this was accomplished, but it was law working in obedience to a Divine Purpose; and that Purpose seems to have been prospective organic life upon the planet.

For, imagine a reverse order of things to have been—a vast mass of land in high arctic altitudes, having a great altitude and a small amount of low land in equatorial regions, and we would have such intense cold over the globe as would utterly preclude life upon its surface.

In a future number some of the laws that have regulated, and are still modifying life at the present time, may be noticed. GEO. M. CROFTS,

Keokuk, Iowa.

Among the Rockies.

BY M. J. ELROD.

IV.

The writer has been twice over the road along the Snake river from Pocatello to the Yellowstone National Park, and twice around the park. The first time was in the summer of 1894, when a party of students, from the Illinois Wesleyan University were taken on a scientific expedition in search of specimens, as mentioned in preceding articles. The second was during the past summer, when a second party, including four ladies and the writer's little six-year-old girl, made practically the same trip, though taking in many things not observed on the first expedition. As the Snake river basin is a vast volcanic field full of geological interest, it is best to devote a paper to it before beginning on the wonders of the park.

Pocatello is styled "The Gate City of the West," because the Blackfoot River here cuts the mountains in two, making a passage-way for the railroad. The city is thus in the entrance to the great Snake river basin,

which is destined in time to play an important part in the history of the state of Idaho. The city is located in the midst of the Bannock Indian reservation, which is about as desolate and useless a tract of land as could be chosen. The government has permitted the people to locate because of the railroad shops and railroad interests. The "city" has no imposing buildings, and is considered one of the most wicked places in the world, and the greatest gambling place in the region. We did not pry into the matter too closely, and so let the statement go unrefuted.

The party in 1894 drove from Pocatello to Idaho Falls, a distance of sixty miles, but this was avoided in 1895. The boys wished to travel over the great lava desert of Idaho, and we got our fill of it, and yet no one regretted the trip. The road traverses a region that is mostly sand. Rain does not fall in the summer. The sand is deep and hot, and it rolls over the felloes of the wheels, slips from under the horses' feet, works into the shoes, blows into the eyes and nostrils, and is obnoxious in every way. Progress is slow, and life of any form scarce. The only things growing were a sage bush (*Artemisia tridentata*,) grasswood (*Sarcobatus vermiculatus*), and a rabbit bush, with an occasional composite almost dried up by the heat, and now and then a prickly pear with a few spines above the sand. Horned toads (*Phrynosoma douglasii*) and lizards (*Sceloporus graciosus*) were numerous, but it takes a master hand and a well trained muscle to land many of the latter in the alcohol jar. A large black beetle with red thorax (*Cantharis cooperi*) was very abundant on the blossoms of the rabbit bush, accompanied by almost as many beautiful longicoeus (*Crossidius allgewahrii*). The ride of two days was made fairly pleasant by taking these beetles with nets while riding along. A few flies were seen, and a dragon fly was seen sporting in the air above the hot sand. A single butterfly, (*Papilio oregonia*), a beautiful specimen, was lazily sailing over the sandy waste, a single speck of gorgeous splendor in the desert waste. All hands turned out to bring it in. After a desperate chase it was captured, and now adorns the writer's collection of lepidoptera. Mr. W. H. Edwards says that Papilio oregonia, which is a yellow form somewhat like P. turnus, is almost invariably accompanied by a black and smaller form P. bairdii. It is of interest here to note that one of the latter was also taken in this region.

Ross' Fork is a railroad station about fifteen miles from Pocatello. An irrigation ditch runs through the plain, on the banks of which a few Bannock Indians had pitched their wickieups and were drying pounded cherries in the sun. Camp for dinner on the banks of this small stream gave us a number of dragon flies and several frogs, which are yet to work up.

Idaho Falls, formerly called Eagle Rock, is built upon the banks of the Snake river, which narrows here to a few rods in width. It has cut a channel out of the solid lava. Lewis and Clark, in their expediton, were alarmed when they came to this part of the river, and their boats were let through by ropes, while the men took to the banks. The water here is very treacherous, and no man has yet dared to swim through the passage-way, or

if he has dared has not come out alive Great blocks of lava are here piled up, unmistakeable evidence of volcanic action. One can scarcely believe that the bed of this mighty river, the banks, and even the surface of the whole region, consists of lava of unknown thickness. It is mixed like rock, and is used for building purposes, making very solid and substantial structures.

We spent a day at the "lava beds," some fifteen miles west of Idaho Falls. It was a day well spent. No one who has ever seen this lava region can from any idea of what it is like, even from photographs. The whole state is volcanic. Here and there are high volcanic cones, from 500ft. to 1000ft. above the surrounding country out of which molten lava at one time must have poured over the level plain. At the "lava beds" the lava begins with an abrupt bluff above the surface, from 15 ft. to 30 ft. high. North-west of the city there is a large crater or cone, out of which the lava now forming these beds must have poured. The lava has run down the river plain in great rivers, leaving valleys between ridges, and a plain of such rough surface that nothing can cross it. The lava is as hard as flint, with sharp corners and edges everywhere that cut shoe leather at every step. Here and there are great folds that have cooled and parted in the middle, leaving huge crevices with masses of lava on either side. These crevices are of various sizes and depths. In places they may be stepped over, in other places they are eight or ten feet wide. Several species of ferns find a lodgement in these crevices, and an occasional bush finds enough nourishment to keep alive. In the winter, when the beds are covered with snow, these cracks are filled up, and a straggling buffalo in early days or a wandering deer in latter times, falling through would break a leg on the sharp functions, and there would have its misery finally ended by the viscious wolves or prowling bobtail cats. In one crevice we counted two buffalo and two deer skeletons, not far apart. In the summer the crevices are the home of wildcats and rattlesnakes.

Here and there are depressions or holes in the general lava mass, that appear to have been formed by the collapse of monster bubbles during the process of cooling. These holes are from 50 to 100 feet deep, and perhaps 500 feet across the top. The sides are full of caverns and hiding places, but food for snakes and cats must be scarce. Several pictures were taken of points of special interest, but they do not bring out the main features, such as the hardness of the rock, color, and depth of crevices and caverns. It was a day in the infernal regions, lacking the brimstone and other attendant features.

On the bare masses of lava rock, with scarcely a foothold in the crevices, grow stunted, gnarled, weather beaten cedar trees. These grow from ten to 20 feet in height, and often several feet in diameter. How they gain subsistence is a difficult problem. The people of Idaho Falls go out among these great lava beds with axes, cut these stumpy trees for firewood, drag them to places accessible to trains, and haul them fifteen or twenty miles. People living along the level roads of the Mississippi valley would declare it

impossibe for a team and wagon to traverse some of these roads.

From Idaho Falls we traveled due north some 25 miles, crossing the river at the big butte ferry. Camp over Sunday was pitched at the river here, and the ascent of one of the buttes was made by the entire party the past summer, even the little girl, as all were anxious to study a volcano. Camp was pitched at an altitude of 4850 feet, and the summit of the volcanic cone was just 5500, as measured by our averoid barometer. The interior is a great crater, possibly a quarter of a mile in diameter, and about 200 feet deep. Both the crater and the outside of the cone were of solid lava, worn by the weather into all sorts of fantastic forms. In some places the lava had crumbled, and was ground up into fine dust, in which various desert plants were gaining a foothold. (These plants will be given later). As usual on such occasions our insect nets were left behind, being considered a useless weight. While standing on the summit, photographing the party and scenery, and enjoying the grand panorama to the fullest a gaudy butterfly, a Papilio, the first and only one seen on the trip, flaunted its bright colors in our faces, and even sported around my hat. In vain a chase was given. It was a lost chance. Two other unknown butterflies, and a beautiful dragonfly, were added to the list of lost. Another loss more grievous than all, was met with on the descent. In turning over the lava chunks a brilliant blue lizard was discovered, about nine inches long, and as quick to dodge and hide as lizards usually are. It kept under a stunted weed with sharp dead spines. My hands were badly lacerated in an attempt to pick it up. In despair a stone was held on the weed to squeeze the specimen so it could be captured. Careful work later brought out a few short pieces of a very brittle tail, but the treasure was gone.

Our way next day led between these two large buttes, across a lava region that is awful in expanse and desolateness. Until we entered the park we were not destined to lose sight of lava for an hour, and vast lava plains, with a thin crust of soil, were traversed, extending on either side of the river, devoid of life save an occasional jack rabbit and flock of sage hens. When lava is finally left behind it merely gives way to rock of geyser formation, lighter and softer, but still igneous, and still being formed in regions of the park.

This lava region is of great interest geologically. Ages ago a vast river of fire poured down the center of the state of Idaho. This river consisted of molten lava, was 400 miles long, 100 miles wide, and from 300 to 900 feet thick. Across the corpse of this mighty river of fire a river of water has slowly cut a channel in several places. Born in the melting snow of the majestic Tetons, this river has cut its way for hundreds of miles through lava beds, in its course tumbling over numerous precipices until the great climax is reached at Shoshone falls, where this mighty river makes an awful leap of 210 feet, a magnificent spectacle, in marked contrast to the desolate country on either side.

The animal life on these lava regions is not very abundant. Before coming to the pines three kinds of rabbits were encountered. The white-tailed

and black-tailed jack rabbits (*Lepus campestris* and *L. texianus*), and the pigmy rabbit (*Lepus idahoensis*), found here and there among the rocks. None of these were encountered after entering the pines. Badgers are numerous on the plain at lower altitude, but they are wary and hard to get. In the sandy soil they can dig faster than a man with a shovel. Marmots (*Arctomys*), are not uncommon among the rocks that form the river banks, and the woods were made lively by the chattering of the pine squirrels (*Sciurus.*) Little striped squirrels (*Tamias quadrivittatus*), are frequently seen on the lava rocks, and continue even to the highest limits of timber, having a wide range of altitude. On the mountains there is plenty of large game, if one does not care for ame laws. We were out for other purposes, however, and did not bother them.

The Canada porcupine is fairly abundant among the pines, and it was no uncommon thing for our boys to drag one of the sticky things into camp. From one of these I secured a tape worm. In the mesenteru of the intestines they were quite abundant and some 50 were taken from a single individual. Dr. C. W. Stiles, of the Smithsonian, pronounced it a new species, and gave it a name, *Andrya americana.* Specimens have been sent to most of the important museums of the world so that our expedition resulted in some benefit to science.

The following table of altitudes may be of assistance to the reader gaining a proper conception of the region traversed.

Idaho Falls	4750
Big Butte Ferry	4850
Summit of Butte	5500
Sarilda, 105 miles north of Idaho Falls	5000
Island Park, 25 miles north of Sarilda	6300
Madison River, Park line	6800

Timber begins at Sarilda. This is a ranch in the desert waste, 15 miles north of St. Anthony, which is the county seat of Fremont County. Directly east of Sarilda the bold, rocky, precipitous, and ever majestic Teton, with its three summits, lifts its lofty head above the plains. Though 70 miles away, it is yet plainly visible, and on occasions of exceptionally clear atmosphere the great crags and precipices are plainly visible near its summit. This is one of the most beautiful mountains in the West, and its summit has never yet been pressed by mortal foot.

From Sarilda the road lies through canons and over mountains for some 20 miles. The road is through beautiful gorges with high walls of lava, broken into huge blocks, between and among which tall and stately pines are growing. In the canons there is a great profusion of flowers, an abundance of which were collected, but are not yet worked up. After following the road for 20 miles we reach Island Park, which needs a chapter itself.

Do Birds Reason?

In the Spring of 1894 I put up two high poles in my yard; at the top of these I placed two boxes, each containing two compartments; one of these poles was intended for my old associates the Purple Martins, (*P. Purpurea*) who generally arrived between the middle and last week of April; to sojourn with us, until the

Fall reminds them of their Autumn migration southwards.

The other pole was for the occupation of my little friends the Wrens, (*T. Aedon*) who arrived a little earlier than their above neighbors.

The Wrens (two pairs) duly arrived, and after closely inspecting every knot hole and crevice to be found, in or about the out houses and barn, finally selected the box appointed for them; which although a new one to them, occupied the place of an old one, which had been taken down the previous winter; and in which they had nested for some years. They rapidly commenced work, and soon numerous sticks adorned their respective compartments; when suddenly a pair of English Sparrows (*P. Domesticus*) put in an appearance, and driving away its occupauts, took forcible possession of both compartments. The Wrens retreated and disappeared, but in the short time of ten minutes returned with reinforcements, consisting of about seven or eight other Wrens, who after a sharp conflict, drove the intruders from the field.

The Sparrows, in about fifteen minutes, also returned, they in their turn having picked up about ten recruits and vigorously attacked and put to flight the whole army of Wrens.

Whilst attentively watching the battle, and considering it about time for my interference; I noticed a Wren slip over my bird house, and enter one of the compartments of the Martin box which was upon a much higher pole; and distant about ten yards from their pole, upon whose box the victorious Sparrows were chippering and showing every sign of victory.

The Wren soon stole away and disappeared, and one of the female Martins came out of its compartments, and was soon joined by the other female; in a few minutes the male Martins arrived very closely together; and uttering a few notes all four charged the Sparrows, and in a minute or two had completely routed the aggressors, who never returned again; the Martins returned to their box and soon the the four Wrens came back, and settled down happily.

I thought this was a clear case of bird sense, and bird language on the Wren's part; for finding they could not hold their own, appealed to their neighboring Wrens first, but where they found them so quickly, I could not say, for I only knew of one nest, about 200 yards distant, also their shrewd policy when the enemy was reinforced, in applying for help to their powerful neighbors.

The Martins attacked the Sparrows in a similar way that Bee Martins imploy in fighting Hawks, or other birds who approach their nests.

I would remark that the first English Sparrows ever seen in Hallock, 20 miles from the Canadian Line; was in the fall of 1892, when about 40 suddenly appeared, having evidently arrived within an empty freight car, for they were first discovered by myself close to the station.

E. Kroy,
Kittson Co., Minn.

Changes in Land and Sea.

(CONTINUED FROM AUGUST NUMBER.)

At Kilnsea, Owthorne and elsewhere the sea has played the part of body-snatcher, breaking open the churchyards and scattering the splint-

ered coffins and dismembered remains in all directions. Travellers, ignorant of the cause, have been shocked and startled at the sight of the human remains which strewed their path, and have experienced somewhat of the same sensation as our African explorers did on observing the piles of skulls and bones in the villages of Dahomey.

There is a little church at a place called Hornsea, on the East Coast, which is said to have been built about 600 years. There is a tablet in that church which states that when it was built it was seven miles from the sea. I do not think that at present the distance exceeds a quarter of a mile. The history of the three Sister Churches is to this day familiar to the inhabitants of the same coast. The first of them was taken by the sea so many years ago that there is little known concerning it, but there is a very fine description of the fall of the second church, published in Poulson's *History of Holderness*.. I do not remember the church, but many years ago I used often to visit the village of Owthorne, and at that time, say twenty years ago, a triangular piece of the churchyard, with its rude mud wall, was then in existence, and the beach was strewn with the fragments of the churchyard. It then extended about forty yards from the cliff. About eight years ago, I visited Owthorne, and not a vestige of the churchyard was left. Most of you will have heard of the Goodwin Sands, so dangerous to mariners. This place, now travelled over by our Mercantile Marine, was six or seven centuries ago an immense estate of 12,000 acres, the property of the Earl of Godwin. On the coast of Norfolk and Suffolk the towns are being driven back by the extensive encroachments of the sea. At Cromer the last Government Survey showed that the cliff had been taken at the rate of fourteen feet per annum. Dunwich, on the Suffolk Coast, according to *Doomsday Book*, was once a flourishing seaport, and the record shows that at this point the sea must have encroached several miles. There is an old document extant at Jersey, which is about six hundred years old, which purports to be an agreement entered into by the authorities of that place to keep a plank bridge in repair from the island to the coast of France. I am unable to say what engineering feats could be accomplished at that day in the shape of a plank bridge, but the distance now is fourteen miles. Thus you will readily see what a tremendous waste of coast is continually going on even in our own island, which must, in a large space of time, materially alter the conditions of its surface; and you will at once say then where does this immense amount of lost land go to? It goes to form land in other places, It compensates for the land lost on one shore by throwing it up on another. The proce ss in doingit would take too long to describe. It depends so much on different conditions, for instance the strength of currents, depth of water, and impediments such as deltas and headlands, but anyone who has watched the operations of water in a tidal river, on a small scale, will readily understand the process on a large one.

For instance, at Grimsby, the opposite coast to the one I have been describing, the accumulation of soil is so great that a dredging machine has to be continually kept at work to keep

the entrance to the dock from warping up, and at Cleethorpes on the same coast, you may walk for hours upon the beach, at low water, upon an immense accumulation of matter thrown up by the sea. The Dogger Bank on the coast of Northumberland, which is now used as the northern fishing ground, is an immense bank of sand extending for upwards of three hundred miles, and the charts of our Mercantile Marines will show scores of similar accumulations in different parts of the sea.

The water which is now in the ocean and in the river has been many times in the sky. The history of a single drop taken out of a glass of water on your table is really a romantic one. No traveller has ever accomplished such distances in his life. That particle may have reflected the palm trees of coral islands, and has caught the sun-ray in the arch that spans a cloud clearing away from the valleys of Cumberland or California. It may have been carried by the Gulf Stream from the shores of Florida and Cuba, to be turned into a crystal of ice beside the precipices of Spitzbergen. It may have hovered over the streets of London, and have formed part of a murky fog, and have glistened on the young grass-blade of April in Irish fields. It has been lifted up to heaven and sailed in great wool-pack clouds across the sky, forming part of a cloud-mountain echoing with thunder. It has hung in a fleecy veil many miles above the earth at the close of long seasons of still weather. It has descended many times over its showers to refresh the earth and has sparkled and bubbled in mossy fountains in every country in Europe. And it has returned to its native skies, having accomplished its purpose, to be stored once again with electricity to give it new life-producing qualities and equip it as heaven's messenger to earth once more.

A writer in *Longman's Magazine* says: The Mississippi has in the course of ages transported from the mountains and high land within its drainage area sufficient material to make 400,000 square miles of new land by filling up an estuary which extended from its original outfall to the Gulf of Mexico for a length of 500 miles and in width from 30 to 40 miles. This river is still pouring solid matter into the Gulf, where it is spread out in a fanlike shape over a coast line of 362,000,000 tons a year, or six times as much soil as was removed in the construction of the Manchester ship canal, and sufficient to make a square mile of new land, allowing for its having to fill up the Gulf to a depth of eighty yards. Some idea of the vastness of this operation may be conceived when the fact is considered that some of this soil has to be transported more than 3000 miles; and that if the whole of it had to be carried in boats at the lowest rate at which heavy material is carried on the inland waters of America, or, say for one-tenth of a penny per ton per mile over an average of half the total distance, the cost would be no less a sum than £238,000,000 a year. Through the vast delta thus formed the river winds its way, twisting and turning by innumerable bends until it extends its length to nearly 1200 miles, or more than double the point-to-point length of the delta, continually eroding the banks in one place and building up

land in another, occasionally breaking ing its way across a narrow neck which lies between the two extremities, and filling up the old channel.

CHAS. S. WHITING,
Montreal, Canada.

The Palm-houses at Washington.

The low roofs of the Palm-houses in the Botanic Gardens and Agricultural Department at Washington have made it necessary to sacrifice many rare and beautiful specimens for lack of space. In nearly every case the plants were in the best of health and could only be duplicated by long patient years of cultivation. A few years ago a specimen of Livistonia Chinensis, at that time the largest in this country, had to be thrown out for lack of head-room. A fine specimen of Cocos butyracea was thrown out of the Palm-house of the Department of Agriculture for a similar reason. In the Botanic Gardens there are now three monarchs of the jungle awaiting their sentence. The first of these is a Phœnix sylvestris, a perfectly developed specimen fifty feet high, with a trunk six feet in circumference. It was sunk in the ground a few years ago, but has grown since until its leaves are now pressing against the roof of the house. It is considered the handsomest specimen of the species in cultivation. A noble specimen of the rare Sugar Palm, *Arenga saccharifera*, is the second plant which has outgrown the largest house, and has been kept within bounds by cutting off the ends of the leaves, in the hope that it would flower and ripen seed; but the plant is in too robust a condition, for this species begins to flower only when enfeebled by age or other trying conditions. It then begins to flower at the top and keeps on producing a bunch in the axil of each leaf one after another downward; until the plant is exhausted. This season one of the immense leaves has broken through the glass and now towers twenty feet above the roof outside. The third tree, which will soon have to be removed, is *Acrocomia sclerocarpa*. It is impossible to do anything more with this one, as several years ago it was sunk about six feet in the ground to give it increased head-room, and it has now filled all the space above.—*G. W. O., in Garden and Forest.*

November Literary Note.

A complete and immediate revolution of transportation methods, involving a reduction of freight charges on grain from the West to New York of from 50 to 60 per cent, is what is predicted in the November *Cosmopolitan*. The plan proposes using light and inexpensive corrugated iron cylinders, hung on a slight rail supported on poles from a cross-arm—the whole system involving an expense of not more than fifteen hundred dollars a mile for construction. The rolling stock is equally simple and comparatively inexpensive. Continuous lines of cylinders, moving with no interval to speak of, would carry more grain in a day than a quadruple track railway. This would constitute a sort of grain-pipe line. The *Cosmopolitan* also points out the probable abolition of street-cars, before the coming horseless carriage, which can be operated by a boy on asphalt pavements at a total expense for labor, oil, and interest, of not more than one dollar a day.

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Walter F. Webb, Editor and Pub'r,

Albion, N. Y.

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WALTER F. WEBB,
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NOTES.

With this number we commence Volume II, and herewith desire to extend thanks for the large number of renewals sent in, as well as new subscriptions. Surely THE MUSEUM is appreciated. This number we give over to illustrating some fine species of shells. Have a number of equally interesting illustrations for the December number. We regret the illustrations for Prof. Elrod's article came too late for insertion this month.

We call attention to the ad. of Mr. McIlhenny of Louisiana. He has a fine lot of Southern eggs, and offers them at very reasonble figures. He's "all right" and will do as he agrees every time.

Collectors wishing to get a notice in the December number must mail same on receipt of this paper, to insure insertion. We shall publish a large Christmas edition, and it will probably be mailed by the 5th or 7th of the month, at the latest.

On another page will be seen an ad. relative to the new Western office we have opened at Keokuk, Iowa. We cordially invite all our patrons who live nearer to this office than the home office to write us at that point for anything they need. Our stock is so large and varied we cannot attempt to list everything for some weeks to come, but promise a large and complete illustrated catalogue in the near future, rivaling anything that has heretofore been issued in the Natural Science line.

Mr. P. A. Tavernier of Guelph, Ont., under date of Oct. 10th writes: "I beg to announce the taking of a female Wheatear at Beaumaris, Muskoka Lake, Ont. I believe this is the first record of this bird being found in Ontario. I took it Sept. 25, 1894, and sent it to Mr. R. Ridgway of Washington, D. C., who identified it as above. The bird was in company of a large flock of Titlarks, and when I shot it, took it to be an albino of that species. It was not at all shy. The only note I heard it utter was a loud "kuck" like the Crow Blackbird gives as it flies over."

Mr. E. Kroy of Hallock, Minn., writes as follows:—"I saw in a recent number of THE MUSEUM, your cut of Albino Muskrat from Michigan. Also in the last issue of *The American Field* is an account of an albino Redwing Starling, killed near S. Paul, Minn. Now Minnesota comes again

with an albino Pocket Gopher, killed near Warren, in Marshall County, about 50 miles from the Canadian line, which is now in my possession."

Showy Sea Shells.

Interesting Notes About Shells that are Eagerly Sought for by Collectors.

To anyone interested in sea forms of life, it is a pleasure to note the great increase yearly in the number of collectors who are making a study of shells. Conchology furnishes a field that it is practically impossible for any one man to cover in a lifetime, hence we see the specialist in that branch as much as in any other.

Peopling the high seas or lining the shore, the marine Mollusca, branching out into more than ten thousand species, extend their reign af far as the waves of ocean roll. Though distinguished from all other sea animals by the common character of a soft unarticulated body, possessing a complicated digestive apparatus, and covered by a flexible skin or mantle, under or over which a calcareous shell is generally formed by secretion, yet their habits are as various as their forms. Some dart rapidly through the waters, others creep slowly along, or are firmly bound to the rock; in some the senses are highly developed as in the fishes, in others they are confined to the narrow perceptions of the polyp. Many are individually so small as to escape the naked eye, others of a size so formidable as to rank among the giants of the sea; some are harmless and unarmed, others fully equipped for actual warfare.

It is not our design to go into the anatomy of the various species, but to show by illustrations, from month to month, some of the more interesting

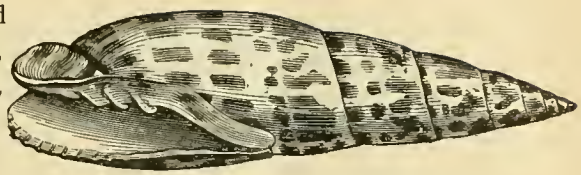

Fig. 1.

forms of Mollusca, the locality where found, and some interesting points about each kind.

We will first notice two of the *Mitra* family. They are so-called from their resemblance to the bishop's mitre. The entire family are chiefly natives of the warm climates, such as the Indian Ocean, the Australian Seas

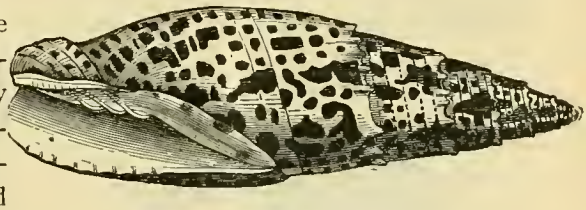

Fig. 2.

and the Moluccas. The shells are usually long, slender and spiral, the spire ending in a point at the summit; the opening is small, narrow and triangular and notched in front. The animal has a very long proboscis; it emits a purple liquid, having a nauseous odor when irritated. The eyes are placed on the tentacles or at their

Fig. 3.

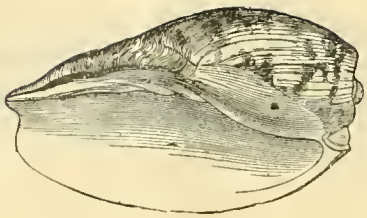

Fig. 4.

base. *Mitra episcopalis* (Fig. 1) from the Indian Ocean, is more commonly known as the mitre shell. It is white, ornamented with square spots of fine red and capable of high polish. *Mitra papalis* (Fig. 2) has dentiform folds round the opening, which also crown each turn of the spiral; the spots are smaller and much more numerous and varied in form from those of *Mitra episcopalis*.

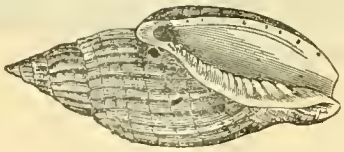

Fig. 5.

In the genus *Voluta*, the shell is oval, more or less tunbellied, the spire is short, slightly mammillate, the opening large, the edges notched,

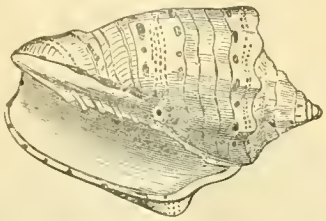

Fig. 6.

without channel; the columellar edge is lightly excavated and arranged in oblique folds. The right edge is arched, thick or cutting, according to the species. The animal has a large head, provided with two tentacles. The mouth terminates in a thick trunk, furnished with hooked teeth. The foot is very large, furrowed in front,

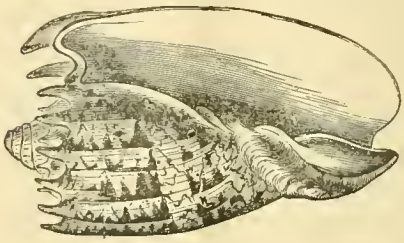

Fig. 7.

and projecting from all parts of the shell, but without operculum. The Volutes live on the sands near the shore; sometimes they are found high and dry left by the retreating tide. The shells of various forms, are ornamented with the most lively colors, the surface covered with irregular lines, the tint of which is generally in

Fig. 8.

strong contrast with that of the ground. Among the many handsome

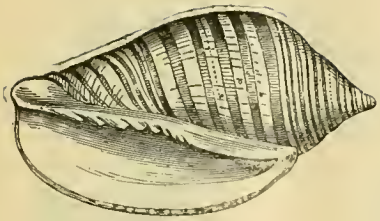

Fig. 9.

species illustrated in this number are *Voluta undulata* (Fig. 3) from Australia; *Voluta cybium* (Fig. 4) from Pacific; *Voluta Delessertii* (Fig. 5), *Voluta musica* (Fig. 6) from West Indies; *Voluta imperalis* (Fig. 7) from Philippines; *Voluta scapha* (Fig. 8) from Singapore, commonly called Fox-

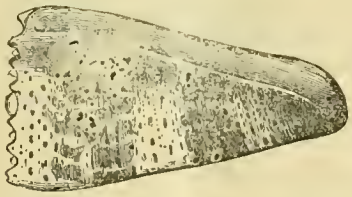

Fig. 10.

head; and *Voluta vexillum* (Fig. 9) from East Indies.

The genus *Conus*, is especially rich in species, as well as numerous in individuals. The shells are much sought after by collectors, many being rare

Fig. 11.

and so command high prices. Those belonging to this group present a very remarkable uniformity of shape, at the same time that the colors are very fine, and much varied in design. The shell is thick, solid, inversely conical, wreathing spirally from the base to the apex, the spire being generally

Fig. 11a.

short, the last turn constituting alone the greater part of the surface of the shell. The opening extends nearly along its entire length, occupying all the height of the last whorl. It is always narrow, its edges quite parallel; the right edge is plain, sharp and thin, detached from the front of the last spiral by a sloping hollow, more or less

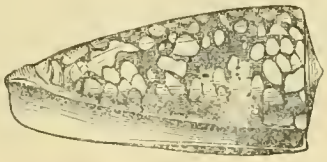

Fig. 15.

deep. The animal creeps upon a foot, elongated, narrow, furnished behind with a horny rudimentary operculum, altogether insufficient to cover the opening. The head, which is large, is elongated into a little snout or muzzle, at the base of which rises on either side a conical tentacle, having

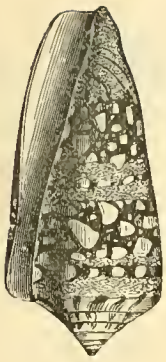

Fig. 12.

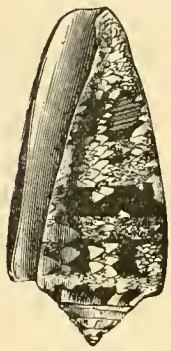

Fig. 13.

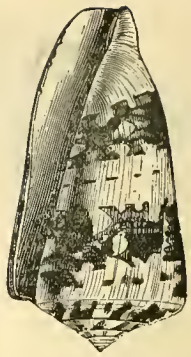

Fig. 14.

an exterior eye upon an anterior extremity. At the extremity of the muzzle is the mouth, which is armed within with numerous horny teeth in pairs, elongate or hastate. The shells inhabit the seas of the warmer countries, especially those lying between the tropics, where they occupy sandy coasts, with a depth of ten or twelve fathoms of water. We have represented a number of fine species in this number. *Conus imperalis* (Fig. 10) is a fine species of white color with bands of greenish yellow or tawny color, ornamented with transverse, cord-like articulated lines of white and brown. Inhabits Philippines and Algoa Bay. One of the largest species is *Conus geographus* (Fig. 11) which sometimes attains the length of six or seven inches. It is shaded with white and brown and found in Ceylon. Among the non-crowned species we have *Conus tessellatus*, (Fig. 11a) common in the Indian Ocean, Ceylon, etc., its anterior part is violet in the interior. The spots with which it is surrounded are of a fine red or scarlet or a red ejad color upon a white ground.

We figure three varieties of *Conus ammiralis* (Figs. 12, 13, 14). They are natives of seas that wash the shores of the Molucces; are beautifully marked varieties, of a brownish citron color, marked with white spots nearly triangular, with tawny bands painted in a very fine tracery. This is a very handsome species, and presents many varieties not here figured.

Among the species which seem almost ready to become cylindrical, may be noticed *Conus nobilis* (Fig. 15) a rare shell of yellowish color approaching citron, ornamented with white spots. The golden drop *Conus textile* (Fig. 16) is yellow in color, ornamented with waving longitudinal lines of brown and white corded spots edged with tawny color. The glory of the sea, *Conus gloria maris* (Fig. 17) is white in color, banded with orange, and reticulated with numerous triangular white spots edged with brown. This is a native of the East Indies, and one of the most beautiful shells of the whole group.

The genus *Oliva* is so named from its resemblance in form to the olive. Its nearly cylindrical shell is slightly spiral, polished and brilliant as in the

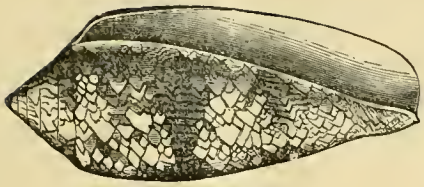

Fig. 16.

cowries; its opening is long and narrow, slightly notched in front, its edge columellar, swollen anteriorly into a cushion, and striped obliquely in all its length. These mollusces belong to the seas of warm countries mainly, where they frequent the sandy bottoms and clear waters. They creep

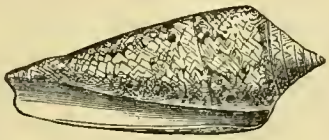

Fig. 17.

about with much agility, reversing themselves quickly when they have been overturned; they live upon other animals and are flesh eaters. They are in fact taken in some localities by using flesh as bait. The colors of the shell are very varied, and sometimes fantastically streaked. *Oliva erthostoma* (Fig. 18) is ornamented externally with flexual lines of a yellowish brown, with two brown bands, combined with fine yellowish tint of gold color within. *Oliva porphyria* (Fig. 19), commonly called Tent Olive, from the Brazil coast, presents lines of a reddish brown, regularly interlaced with spotted large brown marks upon a flesh-colored ground. The shell has a fine natural polish and is highly prized by all collectors. Ranges from 3 to 4½ inches long. *Oliva irisans* (Fig. 20) is painted in zigzag lines, close and brown, edged with orange yellow and with two zones of darker brown, and reticulated. Found at Mauritius. *Oliva Peruviania* (Fig. 21) is a handsome species and furrowed with regularly spaced bands.

A large number of other handsome species will be figured in the December number.

A Handful of Weeds.

FACTS ABOUT SOME ROADSIDE ACQUAINTANCES--FOLK-LORE REMINISCENCES.

"All the idle weeds that grow
In our sustaining corn."—[King's Lear.

Old Noah Webster defines a "weed" as "a useless and troublesome plant," *i. e.*, a vegetable vagabond, not only idle, but mischievous. However worthless a plant may be from a utilitarian point of view, it is hence not a "weed" till it becomes so thoroughly at home in the land as to harass the gardener and the farmer; so it is merely a question of locality whether a plant is a weed or not. It may be quite without honor in its own country, where even beauty is no excuse for its being,

Fig. 18.

yet under alien skies it may find itself the pet of the horticulturist. The lit-

tle pink-tipped English daisy, so tenderly reared in New England gardens, is in its own country a troublesome lawn weed, while our homely mullein, that vagabond of the pastures, is—or used to be--cherished in English greenhouses under the name of "American flannel-plant." I have even heard that there are places west of the Mississippi where wild carrot, despised intruder on Eastern lawns, is cosseted and extolled under the appropriate alias of "lace-flower." It is a pity that we, in the Eastern states, have become blind to the beauty of its feathery leaves, and its wheels of delicate bloom, which in later August fill every field and roadside with unloved loveliness.

Fig. 19.

Indeed, all weeds are much in evidence in late summer and autumn. The flowers of most sorts are inconspicuous, but the seeds which follow compel attention by sheer force of numbers and ubiquity. They are here today to fight the farmers because they practiced ages ago what the farmers have learned only within the present century. Nature has taken extraordinary care that the seeds do not drop, at the roots of the parent plant, into an exhausted soil. The weeds sow themselves broadcast each autumn. Some are provided with feathery plumes, and thus made so bouyant that the lightest breeze will bear them fast and far. Every autumn gust is freighted with a mixed company of these little flyaways. Thistle, sow-thistle, dandelion, milkweed, and

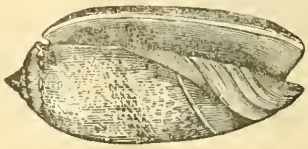

Fig. 20.

goldenrod seeds all fly on feathery wings, and thus the respective families are kept up, and are spread over the country.

Some weeds lay hold on the passer-by, quadreped or biped, and force him, will he, nill he, to sow their seeds abroad. To bring this result about, the seeds are barbed, and they claw the unwary traveller and cling to him with exasperating constancy. When the "stickers" are at last picked or rubbed off, they fall to the ground, probably many rods from the spot where they grew, and thus Nature's purpose with regard to them is achieved. This is the way the ragweed travels. The thorny seed-vessels of the cockle-bur and the burdock also obtain free transportation in return for their close attachment to some wayfarer, quadraped or biped. So success-

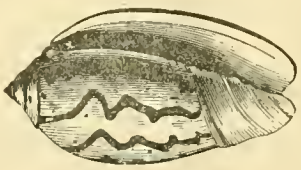

Fig. 21.

ful have been these schemes that the weeds which put them into practice have travelled half around the globe. Like an invading army they push further on despite all the resistance of the owners of the soil.

Some weeds have timed themselves, with wonderful accuracy, to the operations of the farmer. That bugbear of English wheat-growers, the scarlet poppy, has acquired the habit of ripening its seed-vessels at the precise time when the wheat is ready for the sickle. Then when wheat is reaped, the fields are taken possession of by weeds which regulate their affairs with such nicety that they grow, blow, mature their seed-vessels and scatter their seeds, all between the in-gathering of the harvest and the coming of the frost.

"They blow," we say, for all weeds bear flowers. Most sorts belong to that immense and successful botanical family, the *Compositæ*, which produce a very great number of very minute flowers, often so grouped as to resemble single larger flowers. To the unbotanical public the most familiar composite flower is the daisy. Its yellow centre or disk is an assemblage of little trumpet-shaped blossoms, set as close together as possible. In a ring around this disk we see what botanists call the "ray flowers," and what non-botanists call the "white leaves" of the daisy. On closer examination, these will be found to be tiny flowrets with a pistil apiece, but with no stamens, and with their white corollas split open all down one side. So the daisy, which looks like one flower, is really a close mass of very tiny blossoms. The chrysanthemum, that recent favorite of fashion, is another composite flower, and it counts among its poor relations a numerous company of weeds. The cockle-bur, ragweed, sneezeweed, burdock and sow-thistle are all *Compositæ*. So are the groundsel, the dandelion, and the bur-marigold. So is that enemy to the Western farmer and darling of the patriotic Scot, the thistle.

About all these "dooryard weeds," which have followed mankind for ages, there has gathered a wealth of legend, folk-lore, and literary association.

Amaranth, "the flower of death," for instance, is almost as common as death itself. It grows in waste places near towns, and is a coarse weed; topped with a feathery greenish or purplish plume. Some species of amaranth are cultivated in old-fashioned gardens, and called "cock's-comb," "love-lies-bleeding," and "prince's-feather." The gardener knows and hates another variety under the name of "pigweed." All varieties bear blossoms no bigger around than a hair. and these minute flowers grow in compact clusters, each cluster surrounded by a close circle of chaffy leaves, very slow to wither. The familiar "immortelles" are on the same botanical plan, and with their chaffy leaves (a botanist would call them the involucre) being pretty as well as durable, have brought the little blossoms into general favor. The unwithering amaranth was looked upon by the ancients as the flower of immortality. The phrase in the First Epistle of St. Petnr, "a crown of glory that fadeth not away," is in the original, "the amaranthine crown of glory." The purple flowers of the amaranth retain their color always, and regain their shape when wetted, and were used by the ancients for winter chaplets. As

the flower of immortality amaranth was strewed over the graves of old Greece, and Homer relates that the Thessalonians wore crowns of it at the burial of Achilles. Wreaths of it are still worn, and are hung over doors and windows by Swiss peasants on Ascension Day. Milton speaks of

"Immortal amaranth, a flower which once
In Paradise, fast by the Tree of Life,
Began to bloom; but soon for man's offense,
To heaven removed, where first it grew, there grows
And flowers aloft shading the Fount of Life."

And his anglels are

"Crowned with amaranth and gold."

From being the flower of immortality, amaranth became, by a natural association of ideas, the flower of death. In a beautiful poem by Longfellow, "The Two Angels," it crowns the brows of Azrael, the Death Angel, while the Angel of Life wears a wreath of asphodels or daffodils, the flowers of life. Because perhaps death is as strong as love, amaranth is an antidote for the love-philtre. Yet who would expect to find the flower hymned of many poets on the coarse crouching weed which invades the bean-patch, or disfigures the gravel paths, once our pride?

The plantain, or rib grass, that persistent intruder upon our lawns, was once highly esteemed as a healer of wounds, and hence in some parts of England it was known as "wonder-weed." Moreover, whoever will search beneath its leaves at high noon on midsummer's day may find a rare coal there. And with this coal under the pillow, on midsummer's night, the fortunate finder will surely see in a dream the face of his or her future sweetheart. Thence it came about, perhaps, that in the north of England the spikes of the rib-wort plantain were used as love charms.

In English folk-medicine thistles play a creditable part. The blessed thistle is so called because it was an antidote to vemon. The melancholy thistle, a recently arrived immigrant from the Old World, was a sure cure for that vague but distressful malady, "the blues." In rural England the thistle is, or was, used in love divination. "When anxious to ascertain who loved her most," says a Thistleton Dyer, "a young woman would take three or four heads of thistles, cut off their points, and assign to each thistle the name of an admirer, laying them under her pillow. On the following morning the thistle which had put forth a fresh sprout will denote the man who loves her most." The pretty little Canada thistle, now rapidly resolving itself into a nuisance, is, as its name shows, an immigrant from the North. It has probably travelled, with its forbears, from northern France, as it abounds in Normandy.

The nettle, like the thistle, is con. nected with much wonder lore, folk-lore and tradition. Moreover, the family in times gone by has been not only famous but useful. Its name is derived from the passive partciple of a verb common to most Indo-European languages which means "to sew." Closely allied words are "needle," "net," and "knit." Nettle would seem to mean "that with which we sew;" and indicates that this plant supplied the thread used in former times by the German and Scandanavian nations. "We know this to have been a fact," says Moncure D. Conway, "in the Scotland of the last century. Scotch cloth is only the housewifery of

the nettle; and a fabric made from the fibres of the plant was also used till a recent period in Friesland." Flax and hemp bear Southern names, and when they were brought into the north of Europe, the nettles career of usefullness was ended. Like handicraftsmen on the introduction of machinery, it was thrown out of honorable employment. Then it became a vagabond and took to roadsides and wastes. Nettles are said to have been introduced into England by Roman soldiers who sowed the seed in Kent for their own use "to rubbe and chafe their limbs when through extreme cold they should be stiffe and benumbed," having been told that the climate of Britain was so cold that it was not to be endured without some friction to warm their blood.

We are all familiar with the oft-quoted lines: "Tender-handed stroke a nettle and it stings you for your pains," etc. They were written by Aaron Hill on a window in Scotland. Their thought is more tersely expressed in the old Devonshire saying: "He that handles a nettle tenderly is soonest stung," meaning that politeness is wasted on some people. For the physical sting of the vegetable nettle the dock leaf is a remedy, whence the old adage, "Nettle out, dock in, dock remove the nettle sting." In old old-folk medicine nettle-tea was a remedy for nettle-rash, a kind of foreshadowing of the coming doctrine that "similia similibus curantur." Carried about on the person, the nettle was supposed to drive away fear and on this account it was frequently worn in time of danger. "In the Tyrol, during a thunder-storm," says Thistleton Dyer, "the mountaineers throw nettles on the fire to protect themselves from lightning, and the same safeguard is practiced in Italy." Well might this be a potent weed, for it is own cousin to the famous and fatal upas tree of Eastern story.

If the nettle has been thrown out of work by modern industries, other weeds have been superseded by modern science. When the signal service was still far in the unknown future, country people used to forecast the weather by the doings of some common and familiar plants. "Chickweed, for instance," says Thistleton Dyer, "expands its leaves fully when fine weather is to follow, but if they are half closed, then the traveller is to put on his great-coat;" and according to the "Shepherd's Calendar," thistle-down or dandelelion-down "whisking about and turning around foreshows tempestuous winds." "If the down flieth off dandelion and thistles when there is no wind," says another old collection of flower-lore, it is a sign of rain. In many parts of rural England the dandelion is known as "blow-ball," because children blow away the winged seeds to tell the time of day, and another quaint name for this plant is "priests' crowns," because the smooth round white receptacles after the seeds have departed are suggestive of diminutive shaven heads. This flower and a few other weeds have so accommodated themselves to the chances and changes of our climate that a few days of mildness and sunshine in the heart of winter will coax them into bloom. There is no month in the year in which one may not see the flowers of chickweed and sow-thistle and the dandelions' hearts of gold. But the superstitious soul had better leave them to the mercies of Jack Frost, for

it is highly unlucky, according to an old saying, to pluck flowers out of season. E. M. HARDINGE.

Birds as Protectors to Orchards.

By E. H. FORBUSH, ORNITHOLOGIST, OF THE MASSACHUSETTS BOARD OF AGRICULTURE.

PART SECOND.

The woodpeckers and nuthatches which frequented the orchards, were not seen to eat the eggs of the canker-worm moth. As they were not numerous, none were killed. Mr. Bailey observed, however, that the nuthatches were eating scales which they found on the limbs of the apple-trees in a neighboring orchard. In relation to these scales the following note from Mr. Kirkland is of interest:—

"March 20, 1895. Mr. Bailey brought in specimens of apple twigs infested with the bark scale louse, *Mytilaspis pomorum*. He reported that the nuthatch was feeding on them. These twigs were infested in a worse manner than I have ever seen before. They were literally covered with the scales. On one small twig, one-half inch in diameter, I counted 367 scales on one inch of the twig. The eggs contained in a number of scales varied from 62 to 82, with an average of 70."

These scales, when numerous, are very injurious to the apple-tree. Each scale covered a dead female of the preceding year and the hibernating eggs, many of which must have been disposed of by the Nuthatches. I was shown, both by observation and dissection, that birds feeding in the same neighborhood and upon the same trees showed considerable variance in the character of their food. Kinglets taken, had no canker-worm eggs, but had eaten largely of bark borers. Woodpeckers seemed to confine themselves to the larvæ of borers and to wood-ants and other insects which bore into the wood of the tree. Chickadees and Nuthatches ate the pupæ and eggs of insects found upon the bark or in the crevices of the trunks. No birds were seen to eat the eggs of the tent caterpillar, nor were any found in the stomachs of any of the birds examined. It seems probable that these eggs are so protected by a hard covering that they are not eaten by most birds.

It is impossible, in the limited space at our command, to give results of all observations and dissections in detail. We can merely give the apparent results of the presence of the birds in the orchard.

It was found that these birds were not only destroying the eggs of the canker-worm in this orchard, but were feeding on the eggs of the same insect in the woods where bait had been suspended.

As the frost left the ground on the first warm days of spring the wingless females of the spring canker-worm moth appeared in the orchard and began ascending the trees in great numbers. The Chickadees commenced catching and eating the females and their eggs. Mr. Bailey placed twenty-two of the females on one tree, and in a few minutes twenty of them were captured and eaten by Chickadees.

It was noticed as spring approached and insects became more numerous that the Chickadees came very seldom to the meat. They were not as assiduous in their attention to the orchard, and a small portion of their food con-

sisted of the early gnats which were flying on bright sunny days. In early April they had nearly deserted the meat, although they still frequented the orchard in search of the female canker-worm moths. They seemed to prefer animal food to all other, and even in cold weather would hardly notice grain or seeds of any kind, though one individual ate a few oat kernals which were placed near his accustomed feed of meat.

Towards the last of April the English or House Sparrow (*Passer domesticus*) began to make its appearance in the vicinity and apparently drove the Chickadees to the woods, as they disappeared and did not nest in the orchard, but remained in the woods, where they paired and nested.

I believe that the English Sparrow is largely responsible for the fact that Chickadees are not now found nesting in our orchards. Though they still nest in the orchards on the remoter farms and in the villages where the English Sparrow is not numerous, they seem to have disappeared in summer from orchards near cities. At the time of the advent of the Sparrow in this locality, twenty-five years ago, Chickadees were often found nesting in old apple-trees in the orchards in this region where now scarcely any are to be seen in orchards during the summer.

In the latter part of April and in early May the tent caterpillars made appearance on the apple and cherry trees in the neighborhood. Canker-worms were also numerous on the apples and elms and appeared in some of the other trees. It was noticed, however, that while trees in neighboring orchards were seriously infested with canker-worms and to a less degree with tent caterpillars, those in the orchard which had been frequented by the Chickadees during the winter and spring were not seriously infested and that comparatively few of the worms and caterpillars were to be found there.

With the warm south winds of May, many summer birds came and settled in the neighborhood, and prepared to build their nests, among which the following were seen: Chickadee (*Parus atricapillus*), Tree Sparrow (*Spizella monticola*), Crow (*Corvus americanus*), Purple Grackle (*Quiscalus quiscula*), Flicker (*Colaptes auratus*), Red-winged Blackbird (*Agelaius phœniceus*), Robin (*Merula migratoria*), Chipping Sparrow (*Spizella socialis*), Ovenbird (*Seiurus aurocapillus*), Wood Thrush (*Turdus mustelinus*), Catbird (*Galeoscoptes carolinensis*), Brown Thrasher (*Harporhynchus rufus*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Yellow-billed Cuckoo, (*Cuccyzus americanus*; Black and White Warbler (*Mniotilta varia*), Yellow Warbler (*Dendroica æstiva*), Chestnut-sided Warbler (*Dendroica pennsylvanica*), Black-throated Green Warbler (*Dendroica virens*), Pine Warbler (*Dendroica vigorsii*), House Wren (*Troglodytes ædon*), American Redstart (*Setophaga ruticilla*), Nashville Warbler (*Helminthophila ruficapilla*), Golden-winged Warbler (*Helminthophila chrysoptera*), Scarlet Tanager (*Piranga erythromelas*), Rose-breasted Grosbeak (*Habia ludoviciana*), Baltimore Oriole (*Icterus galbula*), Blue Jay (*Cyanocitta cristata*), Least Flycatcher (*Empidonax minimus*), Wood Pewee (*Contopus virens*), Phœbe (*Savornis phœbe*), Kingbird (*Tyrannus tyran-*

nus), and Downy Woodpecker (*Dryobates pubescens*).

It was noticeble that early in the season, when the webs of the tent caterpillar first appeared on the apple and cherry trees, the orioles attacked them and devoured a considerable number of the hairy young larvæ. A little later, when the canker-worms became more numerous, it seemed as if all the birds in the neighborhood were intent on eating canker-worms, neglecting to a certain extent the hairy caterpillars. The Cuckoos, however, seemed to feed impartially on both the canker-worm and the tent caterpillar.

Birds from all quarters in the wood and swamp, orchard and field, flocked into the trees infested by canker-worms, and there spent a considerable portion of their time. In a short time the few canker-worms remaining in the old orchard were apparently eaten by birds, and the birds then directed their attention to the neighboring orchards, which were swarming with the worms. It soon became evident that these orchards would be entirely stripped of their leaves, while the old orchard retained its full foliage. Thus it was seen that the trees to which the Chickadees had been lured during the winter had been so well protected that the summer birds were able to destroy the few remaining larvæ, while the trees at a distance from these contained so many larvæ that the birds were not numerous enough to dispose of them or to make any effective reduction in their numbers. This apparently demonstrated the usefulness of the egg-destroying winter birds, and showed the wisdom of attracting them to the orchard during the winter months. Not only did nearly all species of birds in the neighborhood flock to the trees infested by the canker-worms, but the chickadees living in their retirement in the woods came out to the orchards, flying some distance to procure canker-worms with which to feed their young, and making regular trips to the infested trees day after day.

On May 18 Mr. Bailey saw a female chickadee carry twenty larvæ to its nest. They were apparently all canker-worms but two, which were tent caterpillars. Of this he is certain, for he was within three yards of the nest to which the larvæ were taken. Later, on May 31, he noticed the chickadees feeding their young. It was evident that a large portion of the food consisted of canker-worms. The birds each made a trip to the nest about once in twelve minutes. The male and female came at nearly the same time and went away together. They went in the direction of an orchard infested by canker-worms. A few of the larvæ were dropped on the ground at the nest and proved, on examination, to be canker-worms.

The crow was also observed feeding on the canker-worms.

On May 22 the birds had nearly all stopped feeding in the neighboring woods and were in the orchards feeding on canker-worms.

Early in June, when the remaining canker-worms had finished their transformations and retired to the ground, several species of birds were again noticed feeding their young on the tent and other hairy caterpillars. Of these, three species (both cuckoos and the Baltimore oriole) seemed to be the most useful. On May 17 a cuckoo was seen to take eleven caterpillars out of one nest. Mr. Bailey writes:

"On May 10 a black-billed cuckoo came into a tree near me at 3 p. m. and sat there until 4:40 p. m., then he went straight to a tent caterpillars' nest. He looked it over for a short time and then commenced eating the caterpillars. He picked twenty-seven caterpillars out of the nest before he stopped. The bird ate them all and did not drop one. Then he went to the tree in which I believe he remained during the night, for on Saturday, the 11th, I found the bird in the same tree and in almost the same place at 5 a. m."

The orioles, chickadees and vireos often pecked the caterpillars to pieces and ate portions of them, seemingly feeding to a considerable extent on the internal organs. This being the case, it is quite evident that the stomach contents cannot be depended upentirely to determine the character of the food of these birds, as no one is expert enough to identify the internal organs of caterpillars with such certainty as to determine the species to which they belong.

The following is a list of the birds seen feeding on the tent caterpilla

Crow (*Corvus americanus*), chickadee (*Parus atricapillus*), oriole (*Icterus galbula*), red-eyed vireo (*Vireo olivaceus*), yellow-billed cuckoo (*Coccyzus americanus*), black-billed cuckoo (*Coccyzus erythrophthalmus*), chipping sparrow (*Spizella socialis*), yellow warbler (*Dendroica æstiva*).

During the month of May an attempt was made to render the place as attractive to birds as possible. The undergrowth, which previous to 1894 had been trimmed out, was afterward allowed to grow and in 1895 several low thickets had been thus formed; the mulberry-trees were stimulated by judicious trimming, and bore a considerable crop of early fruit which ripened in advance of the cherries, thus drawing the attention of the fruit-eating birds away from the cherries, and serving to attract them to the vicinity of the orchard. Ten nesting boxes were put up for the wrens and bluebirds; but as the bluebirds were very rare this season none came to the orchard. Two families of wrens, however, were reared in the boxes in place of one family last year. Nesting materials—strings, hair and straw—were hung in the trees and scattered about. Several marauding cats were killed, and an attempt was made to keep nest-hunting boys away from the neighborhood as much as possible. Thirty-six nests of birds were discovered in the neighborhood, as follows:

Three red-eyed vireos, ten robins, four Baltimore orioles, three cuckoos, five chipping sparrows, three least flycatchers, two redstarts, two yellow warblers, two chickadees, two house wrens.

Of these all but three were destroyed probably by boys, the nests being torn down and the eggs missing. The three which escaped destruction were two wren's nests which had been built in boxes upon buildings, and a robin's nest in a maple tree within ten feet of a chamber window. This wholesale destruction of nests discouraged several pairs of birds, and they disappeared from the neighborhood. Those remaining built new nests, and after a second or third attempt a few succeeded in rearing young. One nest of orioles escaped the general destruction, and the birds were busy for a long

time carrying canker-worms to their young. One of them was noticed to take eleven canker-worms in its beak at one time, and fly with them to the nest. The vireos, warblers, chickadees, cuckoos, orioles and chipping sparrows were particularly active in catching canker-worms, and the English sparrow killed them in considerable numbers.

If the thirty-six pairs of birds whose nests were found had succeeded in raising their young, it is probable that they would have disposed of most of the canker-worms in the neighborhood. Five thousand of these larvæ are sufficient to strip a large apple-tree. One hundred and eight young would have been reared, had each pair of birds raised three. According to Professor Augley's experience, sixty insects per day as food for each bird, both young and old, would be a very low estimate.* Suppose each of these one hundred and eight birds had received its sixty insects per day, there would have been 6,480 caterpillars destroyed daily. The destruction of this number of caterpillars would be enough to save the foliage and fruitage of one apple-tree. In thirty days the foliage of thirty apple-trees could have been saved, or 194,400 canker-worms destroyed. This does not include what the old birds themselves would have eaten.

In these observations the influence of insect parasites and predaceous insects has not been entirely ignored. Hymenopterous parasites were not seen to be numerous, and as it was a year when canker-worms were on the increase, it is not probable that these parasites would have been a prime force in reducing the numbers of the canker-worms had the birds not been present. Even had they been numerous they would have had little effect in checking the ravages of the canker-worm during the present year, as their interest is identical with that of the canker-worm, and they remain in its body until it has finished feeding, allowing it to defoliate the trees before completing their deadly work upon it.

We do not know to what extent such parasites are devoured by birds. This we could not ascertain without shooting the birds, which would have defeated our main object. No parasites of the tent caterpillar or canker-worm were found in the stomachs of the few birds which were examined. It is hardly safe to draw conclusions from observations so limited in their scope, but we may infer from what was observed that the egg-eating birds are of the greatest value to the farmer, as they feed almost entirely on injurious insects and their eggs, and are present all winter when other birds are absent. The summer birds which attack the larvæ are valuable also if they can be so protected and fostered as to become sufficiently numerous to do the work required. It is evident also that a diversity of plants which encourages diversified insect life, and assures an abundance of fruits and seeds, as an attraction to birds will insure their presence. In this connection I wish particularly to note the fact that the mulberry-trees, which ripen their berries in June, proved to be a protection to the cultivated cherries, as the fruit-eating birds seemed to prefer them to the cherries, perhaps because they ripen somewhat earlier.

* 1st Rep. U. S. Ent. Com. 1877, p. 342.

I believe it would be wise for the farmer to plant rows of these trees near his orchard, and it is possible that the early June berry or shad berry (*Amelanchier canadensis*) might also be useful in this respect. It is a handsome shrub or tree, flowering early in the season, and would be attractive at a time when other trees and shrubs are not in bloom.

At the present time, July 23, 1895, the trees in the orchard appear to be in good condition. They have not suffered from the slight pruning of their foliage which was effected by the few caterpillars and canker-worms which survived. The fruit is well set, and it now remains to be seen whether the birds will have any considerable effect in preventing the ravages of the codling moth. No other orchard in the neighborhood will produce any fruit this season, with one exception. The nearest orchard, situated directly opposite on the estate across the way, has not been ravaged by the canker-worms. This exemption is due principally to the efforts of the owner, who has banded his trees with tarred paper and has used tree ink faithfully and well upon the paper. He has also taken pains to clear the nests of the tent caterpillar from the trees. This orchard, being nearest to the one visited by the chickadees, was also an object of their attention, and this may account somewhat for the reduction of the pests in this place.

The record of these observation, incomplete as it is, is given for what it is worth as a contribution to the literature on this most interesting and important subject.

VOL. II. NO. 2.

DECEMBER, 1895.

THE MUSEUM

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Berlin Agency, R. FRIEDLANDER & SOHN, Berlin, N. W, Carlstrasse 11.
London Agency, SWANN & Co., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., DEC. 15, 1895. No. 2

SHOWY SEA SHELLS.

Interesting Notes About Shells That are Eagerly Sought for by Collectors.

(Continued from last number.)

In this paper we will review some of the Cassis and Purpura.

In the genus Cassis the shell is oval, convex and the spire is not of considerable height. The longitudinal opening is narrow, terminating in front in a short channel, which becomes suddenly erect toward the back of the shell as in *cassio glauca* [Fig. 22] a fine shell from the Moluccas. The columella is folded or toothed transversely, as in *Cassis rufa* [Fig 23], the right edge thick, furnished with a sort of pad externally, and dentate within. This shell is from the Indian ocean, and is of a fine purple color, varied with black above, the edges of the opening being of a coral red color, the teeth alone being white.

The head of the animal is large and thick, furnished with two conical elongated tentacles, at the base of which are eyes. The mantle is ranged outside the shell, falling back upon the edges of the opening and terminating at its anterior extremity in a long cylindrical channel, cloven in front, and passing by a hollow at the base into the branchial cavity. The foot is large and furnished with a horny operculum.

The animals keep near the shore, in shallow water. They walk slowly and often sink themselves into the sand, where they prey upon small bivalves. There are not very many species, but specimens from the Indian Ocean are often large and beautifully marked.

The shells of the less marked species are frequenly used in India as lime for making mortar, under the name of Chunam.

Our space only permits us to mention, among the more curious species, Cassis canaliculata (Fig. 24] and the curious Casis Zebra (Lam), or Zebra-marked Casque [Fig. 25].

The Purpuras have a classical name and history, having furnished the Greeks and Romans with the brilliant purple coloring matter which was reserved for the mantles of patricians and princes. The genus Purpura is characterized as possessing an oval shell, thick pointed with short conical spiral, as in Purpura lapellus [Fig. 26]. In some it is tubercular or angular, the last turn of the spiral being larger than all the others put together. The opening is dilated, terminating at its lower extremety in an oblique notch. The columellar edge is smooth, often terminating in a point; the right edge often digitate, thick internally, and folded or rippled.

The animal presents a large head, with two swollen conical tentacles, close together and bearing an eye towards the middle of their external side. Its foot is large, bilobate in front, with a semicircular horny operculum.

The species of Purpura inhabit the clefts of rocks in marine regions cov-

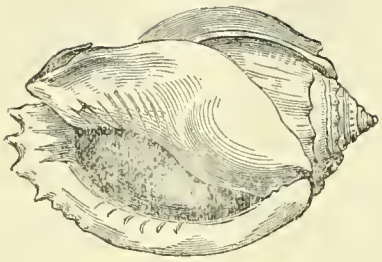


Fig. 22.

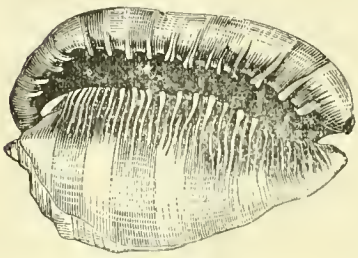


Fig. 23.

Fig. 24.

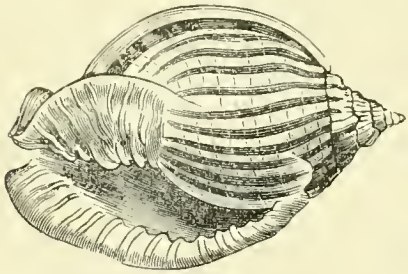


Fig. 25.

Fig. 27.

ered with algae. On occasions they bury themselves in the sand. They creep about by the help of their foot in pursuit of bivalves. They are found in all seas, but the larger species and greatest numbers come from warm regions, more especially from the West Indian and Australian seas. The Purpura of the ancients was not, as is generally thought, a vermilion red, but rather a very deep violet, which at a later period came to have various shades of red. The secret of its preparation was only known to the Phoenicians, that being most esteemed which came from Tyre. Sir William Wilde has discovered on the eastern shore of the Mediterranean, near the ruins of Tyre, a certain number of circular excavations in the solid rock. In these excavations he found a great number of broken shells of Murex trunculus. He thinks it probable that they had been bruised in great masses by the Tyrian workmen, for the manufacture of the purple die. Many shells of the same species are found actually living on the same coast at the present time.

Aristotle, in his writings, dwells upon their purple dye. He says that this dye is taken from two flesh-eating molluscs inhabiting the sea which washes the Phoenician coast. According to the description given by the celebrated Greek philosopher, one of these animals had a very large shell, consisting of seven turns of the spire, studded with spines, and terminating in a strong beak; the other had a shell much smaller. Aristotle named the last animal Buccinum. It is thought that the last species is to be recognized in the Purpura lapillus, [Fig. 27], which abounds in the Channel: Rean-

merr and Duhamel obtained, in fact, a purple color from this species, which they applied to some stuffs, and found that it resisted the strongest lye. The genus Murex is supposed by some to have contained the species indicated by Aristotle.

Up to the present time, the production of the Tyrian purple remains a mystery. It was long thought this fine dye was furnished by the stomach and liver, but M. Lacaze-Duthiers has demonstrated that the organ which secretes it is found on the lower surface of the mantle, between the intestines and the respiratory organs, where it forms a sort of fascia, or small band. The coloring matter, as it is extracted from the animals, is yellowish; exposed to the light, it becomes golden yellow, then green, taking finally a fine violet tint. While these transformations are in progress a peculiarly pungent odor is disengaged, which strongly reminds one of that of assafoetida. That portion of the mantle which has not passed into the violet tint is soluble in water; when it has taken that tint it becomes insoluble. The appearance of the color seems provoked rather by the influence of the sun's rays than by the action of the air. The matter attains its final color, in short in proportion to the power of the sun's rays.

It is a question how far the color evolved under the solor rays remains indelible. It is known that the contrary is the case with the coloring matter of the cochineal insect, which changes very quickly when exposed to the sun. It is probable that it was the remarkable resistance which this purple opposed to the rays of the sun which recommended it to the ancients. The patricians of Rome, and the rich citizens of Greece and Asia minor, loved to watch the magical reflections of the sun on the glorious color which ornamented their mantles.

But to return to our humble shells. Purpura lapillus [Fig. 27] is a thick shell, oval, acute, with conical spire, generally of a faded or yellowish white, zoned with brown, and more or less spotted.

Purpura patula [Fig. 28] is very common in the Phillipines, and is one of the handsomest species; its geographical distribution has been a subject of much inquiry.

Purpura consul [Fig. 29] is one of the large shells of this genus, and of a fine salmon color, with brown brands and a corona of spines. In the January number we will review some of Harpa, Marex, Triton and Stromba.

The Pearl.

Pearls are not only highly prized as objects of personal ornament, but form the subject of an intensely interesting and highly profitable study.

The formation or growth of the pearl has given rise to innumerable and conflicting statements from those who have given the matter careful study. The growth of the pearl is not yet fully explained. It is definitely known that pearls are formed by the deposition of nacreous matter in concentric layers around foreign substances which have happened between the mantle and shell of the mollusc and which had become a source of irritation. It is commonly believed that the disturbing object is a grain of sand, although this popular notion seems untenable. Many eminent conchologists, including Dr.

Gwyn Jeffreys, tell us that in most cases the irritation is caused by the presence of a minute parasite in the muscles of the mollusc. Dr. Kelaart says that the frustule of a diatom or even one of the ova of the mollusc may be the source of irritation. That the disturbing object is a minute parasite seems the more probable. Experienced pearl fishers say that pearls are more often found in oysters of stunted growth, irregular shape and honeycombed by boring parasites. It seems improbable that a grain of sand, or ova, or other than a parasite would effect the growth or shape of a mollusc.

The substance of the pearl is essentially the same as that which lines the interior of many shells and known as mother-of-pearl. The iridescence of this substance is an optical phenomenon, as first shown by Sir. D. Brewster, due to the interference of rays of light reflected from corrugations of the surface.

Only a few molluscs yield true pearls although a large number secrete mother-of-pearl.

The finest pearls are found in the so-called "pearl-oyster," *Avicula (Meleagrina) margaritifera.* Fresh-water pearls are produced by the "pearl-mussel," *Unio (Margaritana) margaretiferus.* Fresh water pearls are greatly inferior to those of marine origin, possessing a dull leaden hue.

The shape of the pearl depends largely upon its manner of attachment in the mollusc. It is readily seen that a perfectly spherical pearl must have remained loose in the soft tissues of the mollusc. Frequently the pearl becomes attached to the interior of the shell, the point of attachment interfering with its symmetry. The nacreous deposits which it receives in this position, will in time, form a pearl of hemispherical shape, flat on one side and convex on the other. During its growth the pearl may become involved in the general deposit of mother-of-pearl, and be buried in the substance of the shell. Very fine pearls are occasionally found by cutting up the mother-of-pearl.

A perfect pearl must be of delicate texture, free from specks or flaws, of a clear or translucent white color with subdued iridescent sheen. It should be perfectly spherical or symmetrical pear-shaped. The most perfect pearl in existence is in the museum of Zosmia in Moscow, it being perfectly globular and of singular beauty, weighing 28 carats. The largest pearl in existence is in the South Kensington museum. It is irregular in shape, weighs three ounces and has a circumference of four and one-half inches.

CLARENCE W. MILLER,
Frankfort, Ind.

Tanning.

To tan Mink, Muskrat, Martin, etc.: Before tanning, all skins should be thoroughly cleansed in warm—not hot—water and all flesh andfat removed; then stretched on a board and smeared with a mixture of 2 oz. each of salt and alum, 3 gills of water and 1 drachm of sulphuric acid. This should be thickened with wheat bran or flour and allowed to dry on the skin, after which scrape off with a spoon. Next take off the board, roll with fur inside and draw it quickly through an iron ring, unfold and roll again the opposite way. Repeat until the skin is soft and flexible.

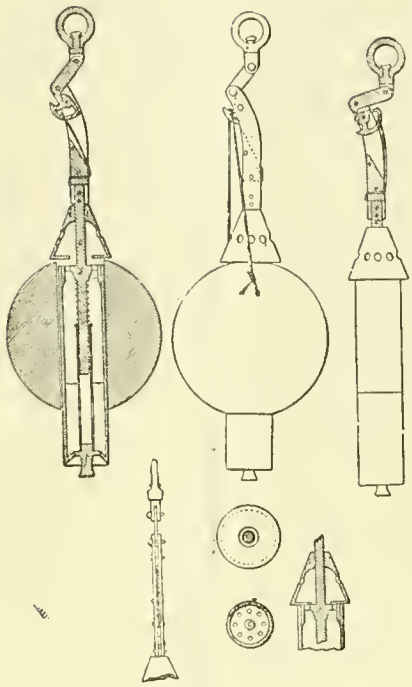
The Summer Cruise of the Albatross.

Among the interesting features of the stories which all explorers of the bottom of the sea have to tell, are the references made at frequent intervals to the accidents happening to the implements used in measuring the depth, bringing up parts of the bottom, recording the temperatures in the depths and gathering specimens of the fauna and flora to be found in this unseen land. And in connection with these accidents will be found descriptions of the various machines and appliances used that are only less interesting than the stories of the haps and mishaps of the voyagers.

When the first attempts at exploration were made, a little over forty years ago, the explorers found themselves, for a time, entirely unable to accomplish even the task of measuring the depth of the water. "The difficulty lies in the friction upon the sounding line, which prevents the lead going to the bottom where the depth is great," said Prof. W. P. Trowbridge in 1859. It was found, he says, that a 32-pound connon ball, dropping freely through the water, fell sixteen feet per second. But when the ball had to drag down a sounding line, even the smallest one that could be trusted to sustain the weight of the ball in the air, the velocity of descent decreased to eight feet per second before 100 fathoms of the line had run out, while at 500 fathoms the speed was but four feet per second. Eventually it was found by actual trial that, although it was a day's work to reach the bottom and haul in the line again, the depth could be measured with sufficient accuracy in water where no current was encountered. But wherever a current, either at or below the surface, existed, the depth could not be more than guessed, after allowing for the bend in the line caused by the current.

To overcome the difficulty caused by the friction of the water on the line, it was proposed by one authority to coil the line in a hollow in the sinker, leaving one end secured on the exploring ship. To measure the depth, a propeller wheel register, on the principle of the speed measurers now used on ships, was to be secured to the sinker and detached and hauled up by the line. This machine did not work in practice. It was proposed also to use insulated wires so arranged that when the sinker reached the bottom a circuit would be closed and the fact announced on board ship; but this, too, failed, for two reasons, if no more. One important one was that an insulated wire would suffer more from friction in going down and from the effect of cross currents than the old-fashioned lines. Eventually a machine was made which was to record the pressure that had been exerted on it when sunk in the water. If this could be accurately done, the depth of water reached would be recorded as well, because the pressure increases regularly with the depth. Distilled water was used in the apparatus as the material to be compressed, but experiments showed that the amount of compression varied at different tests at a known depth, from .000,882 per 100 fathoms of depth up to .000,915, and that was too great a variation for accurate measurements.

Last of all, the makers of pianos came to the aid of the deep-sea explorers, and then the problem of measure-

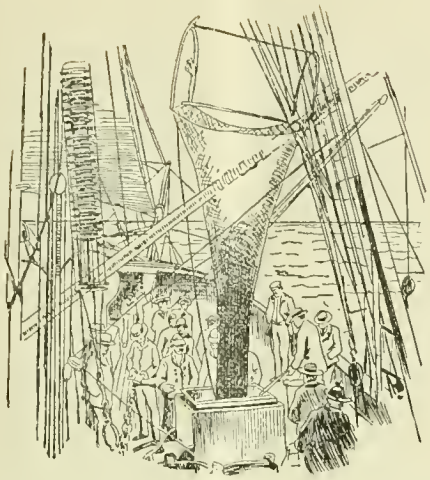


THE SINKER.

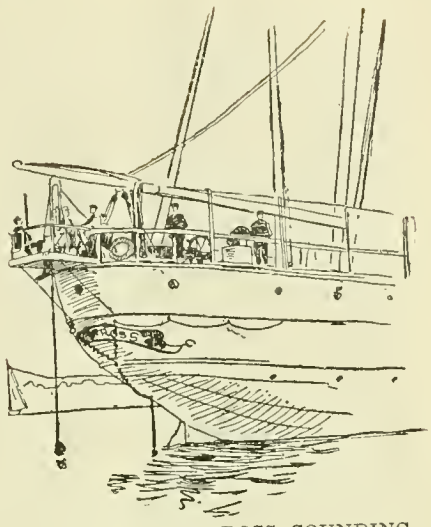
ments was solved. That is to say, the explorers found that piano wire of 21 American guage (.028 of an inch in diameter) had a uniform tensile strength sufficient to bear 200 pounds without breaking. Moreover, it was very flexible, was highly polished and was not easily rusted. Further than that, it was a very light weight cord for its strength, 100 fathoms weighing a trifle less than one pound and a third; the weight of the length to reach the deepest valley yet found in the sea—more then five and a half miles from the surface—was but sixty-three pounds.

Having discovered a line that was practically perfect for the purpose, a machine for handling the line and sinker had to be devised. A Yankee naval officer, Commander C. D. Sigsbee, has the honor of having invented the best thing of the kind. It is a very simple affair. There is a reel that is 22.89 inches in diameter, so that one turn gives exactly a fathom of wire. The wire runs from the reel to a guide pulley that is suspended on long springs, and thence into the sea. The guide pulley is suspended on springs because the vessel is sure to jump and roll about, and so jerk the wire about when the crew are sounding. The springs are at once powerful and easy enough to take up the strain on the wire. Another important purpose served by these springs is to indicate when the sinker reaches the bottom. The moment they are relieved of the weight of the sinker they jump the guide pulley up in a way not to be misunderstood. For the rest, there are a brake to stop the paying out of the wire when bottom is reached, an engine to reel in the wire, and a dynamometer to show the strain on the wire. The whole stands on a platform rigged outboard, where the sinker and wire can run clear of all.

For a sinker merely to measure the depth any old-style cannon ball would do, but since a specimen of the soil encountered is wanted, and the temperature of the water down at the bottom as well, a somewhat more elaborate sinker has been invented, the one in common use being the product of the experiences of Commander Sigsbee and Admiral Belknap, whose work in the Pacific. There is first of all a big iron ball or shot with a two-inch steel pipe running loosely down through its center and projecting some distance below. The pipe is securely fastened to a knuckle-jointed hook on the end of the sounding wire, but the big hollow shot hangs on the hook by a bail. The shot drops down until it



EXAMINING THE CONTENTS OF A TRAWL.



STEAMER ALBATROSS SOUNDING.

strikes the bottom, when the steel tube is jabbed into the mud and the bail of the big ball is thrown out of the hook, a spring that is released as the weight is removed helping to throw out the weight's bail.

But that is not all. There is a valve in the bottom of the steel pipe that shuts in whatever mud or sediment may be inclosed. There is also a registering thermometer fastened on the sounding wire. It need not be described in detail, but it is worth saying that it has to be inclosed in a glass tube that will resist a pressure of a column of water six miles high—a pressure measured by the ton. Moreover, the registering of the temperature is effected by reversing the thermometer. This is done by releasing a catch at the top of it, and this catch is released by a propeller wheel that revolves as soon as the men begin to haul in on the sounding wire.

Measuring the depth and taking the temperature of the water and bringing up specimens of the mud are, however, only a small part of the work of exploring the bottom of the sea. Collections of the plants and animals found there are wanted. When this work of collection was first begun a weighted bag with a scoop-shaped mouth was towed slowly along on the bottom of the sea at the end of a long rope. It was as if a leather mail pouch were tied at the end of a rope and dragged across the fields in order to collect specimens of the fauna and flora. And after thirty years of work nothing better in principle has been invented. They have an improved bag and net trawls; they have an improved shape to the scoop, and a flexible steel rope a quarter-inch in diameter takes the place of the hemp rope five times as large. But if there be any deep-water whales or any be ings as large as a man haunting the depths the appliances in use are not adapted to capture them. However inefficient as the scoop appears to be, the results attained are marvellous, for more than 100,000 different forms of

living beings have been gathered in. And in connection with the scoop it is worth noting that one of the most efficient gatherers of the animals of the deep sea is a common swab used for cleaning the decks of ships—a hairy-like bundle of rope yarns dangled at the side of the leather scoop. The variety of tiny beings that have been tangled in this device and brought up for man's inspection is very great.

Simple, and, on the whole, effective as the modern sounding apparatus is, the crews who have used it report some queer accidents. For instance, when the Enterprise was driving across that region of booming storms and prodigious waves that lies between New Zealand and the Strait of Magellan, the sounding-wire, after a cast in 3,182 fathoms, parted with a jerk, just before the specimen cup that was hooked at the end of the wire reached the surface. At this Captain Barker ordered a large shark-hook baited with salt pork and trailed overboard. In a few minutes a large shark took the hook and was hauled almost on board, when it released itself and disappeared. This, says the captain, was "much to our disappointment, as we had hoped to recover the lost specimen-cup." The captain was confident from the jerk the line had received that the shark had taken the specimen-cup as a bass takes a spoon. During the same passage the wire parted twice from a cause that will seem remarkable to every mechanic. An examination of the broken end revealed on these two occasions that, in spite of the care of drawing the wire, and in spite of the tendency of wire-drawing to eliminate defects in the original billet of steel, a bubble had existed wholly within the wire that reduced the cross-section nearly one-half. On the other hand, when a cast was made one day in 2,711 fathoms of water—a little over three miles—the heavy cast-iron sinker could not be detached. So they reeled in the wire, sinker and all, and the wire brought the whole safely on board ship.

It is worth noting that the time of making even a three-mile cast is in the neighborhood of one hour, instead of being an all-day job, as in old times. Thus, in a cast of 2,789 fathoms the wire ran out for forty-six minutes, but it was hauled up in thirty-six minutes. In the cast where the sinker was hauled up the time of getting it on board was two hours and fifty-eight minutes.

Among the interesting things the explorers have learned definitely is that there are no plants in the greatest depths, and that the plants found anywhere in deep water derive no nourishment from the soil on which they stand. They are wholly dependent on the water. Another thing learned is that some sea animals live in inseparable and fixed communities, as mangrove trees live in the salt swamps of the torrid zone. The scientists believe that no ray of light reaches the lowest deep, even though fish with eyes be found there. They think the eyes are for detecting phosphorescent glows in other individuals of the same race, or enemies of other races. And as to the mental calibre of the deep-sea animals, "there seems to be no sufficient nervous energy to spare from the ceaseless turmoil of the combat which goes on among the creatures of the sea to afford the basis for intellectual development. All the small share of force

which these animals, with their scanty supply of oxygen, can engender goes to the labor of fight and chase, the ceaseless struggle to obtain food, or to avoid falling a prey to their enemies." However, there are other beings in the world besides fish whose "ceaseless struggle to obtain food" prevents the intellectual development that they would like to reach.

The life of the explorer of the bottom of the sea is not on the whole exciting. It is slow work sounding and hauling the drag, but there are few more interesting occupations at sea in these days and occasionally the conditions attending the work make it seem at least adventurous. Soundings have been made in a seaway where the ship rolled 35 degrees to port and 33 to starbord, and in a gale that was "the worst one ever experienced by any of the officers on board." The ship has gone short of fuel, and had to depend wholly on sails; worse yet, it has gone short of food, so that the last bread was served while the ship wallowed in a gale hundreds of miles from port. Part of the work is necessarily disagreeable, for the dredges bring up no end of mud, and there is a mess on deck every time the dredge is examined. But in spite of the weather and all other drawbacks, the men as well as the officers become as interested in the finds as a prospector in a new lead. The records of every voyage of the kind show that where vacancies occur in the crew from any cause, there is found an eager host of volunteers ready to step on board.

W. F. Webb, Esq., Dear Sir: I am very well satisfied with the magazine; it is one of the best I have seen. Wishing you great success in business. I remain Resp. yours, W. J. Fox, Utica, N. Y.

Among the Rockies.

BY M. J. ELROD.

V.

From Island Park to Yellowstone Park.

Island Park extends along the Snake river for about 25 miles. It is an ideal place, for the sportsman or naturalist, and many interesting specimens were found there. The altitude of this park is about 6000 ft. As a consequence the season is short and not suitable for crops, though a large irrigation ditch has already been dug, leading the water out over the river bottom. The river in this park makes innumerable windings and turnings, the short channels and cut offs making many islands, which give the name to the park. Pen cannot protray the beauties of the place and a photograph does not do it justice. The sky is cloudless, of the beautiful azure tint characteristic of mountain regions. The clear water, glistening in the rays of the sun, looks like streams of silver as it flows along, and the slope of the bed gives such a current as to make a continuous hum as of a distant waterfall. Grass grows to the very edge of the water, lending a beautiful contrast, while the ever beautiful pines give a background for it all that would make an artist dance for joy. And beyond these on either side, with all their beauty and majesty, the mountains lift their green summits toward the heavens, with here and there a bald peak above the line of verdure.

A day's camp was made here in 1894, two days in 1895, though the camps were several miles apart. Off toward the southeast the beautiful Tetons may be seen, their bald summits here and there showing patches

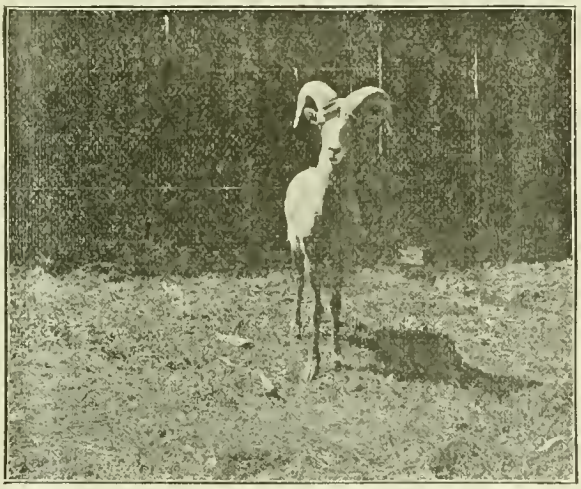
View of Snake River, Jackson's Hole, Wyoming.

of snow, a magnificent sight. Here a golden opportunity was missed. At noon we prepared to make a trial for ducks. As we started out for camp, it was observed how clearly the Tetons showed up in the distance, every canon being visible. At first I turned back to take a picture, but fearing if would cause the others to delay also, concluded to wait until our return to camp. Alas! we did not return until the sun had long since sunk behind the mountains, and the next morning the photographer was so busy that nothing could be done.

The park is the home of water fowl of all kinds. Ducks there are by the thousands. They rear their young in the grass and swamps, and the yonng may be stumbled upon almost any place where the grass is tall. Geese fly overhead at all hours of the day. Cranes and hawks are in sight most of the time. Marmots live in the cracks of the lava rocks. Brine squirrels sit in the branches and chatter at the passersby. Sage hens, in flocks of fifty or more may be flushed frequently. Grouse, beautiful blue grouse, may be had by a little tramp in the mountains. Upon the summits of the mountain ridges elk in abundance may be found. And at one's very tent door the river is full of fish. They are the beautiful and sweet-tasting mountain trout, and to see them is enough to pay for days of toil, but to eat them is an experience one can never forget and loves to dwell on, if only in memory. After our return we would frequently say to each other, "Ah, those days and nights upon the Snake."

Just as we come out of the woods into the level river basin we pass a swamp or lake, a half-mile in diam

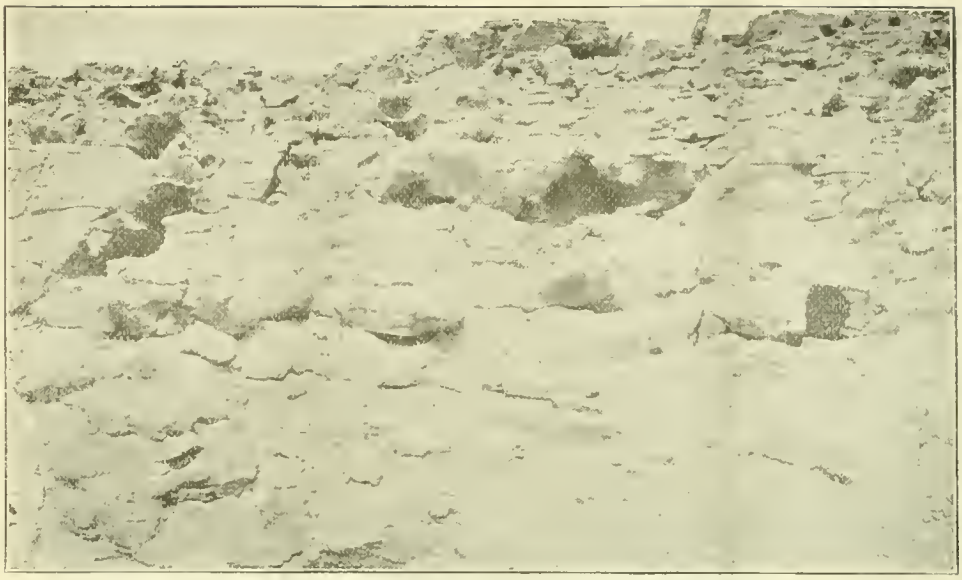
eter, and waist deep in the middle. It was full of rushes, lotus plants, etc., and the air was full of large and fine dragon flies of the genus *Aeschna*. This was the home of the ducks. But it was more. In 1894 we found a place on the margin of the swamp where the western garter snake (*Eutana vagrans*) was abundant. Six were captured, put alive in the insect net, swung over the shoulder, to carry to camp. After going a mile or so we beheld the last one half out, the others having one at a time gone through a hole they had made. The following year I made for the same spot. They were there, thick as I care to see snakes, and of all sizes. At first I tried clubbing with my gun barrel. That was too slow. So I took them by their tails cracked them as one would a whip, and piled them up. I could see them running in every direction As long as I could see snakes I captured them, and in less than a half hour had a dozen, large and small, more than has often been collected on an entire expedition. They show a



Big-Horn or Rocky Mountain Sheep. From Life.

wonderful variation. Some had just shed their coats, and were very pretty —for snakes. This snake is from farther up the river, and even into National Park, as I observed one between Midway and Upper Geyser Basins, and tried hard to catch it, but it escaped in the water. The altitude, 7,500 feet, is the highest I have ever been where snakes were captured. They are a rare thing in the National Park.

In Island Park several Idaho Devils were captured. There is a Mole Cricket (*Stenopalmatus fasciatus*) mentioned by Merriam (N. A. Fauna, Fo 5) and described by Comstock in his manual. Merriam says (See Op. cit.): "It is a large wingless insect, with a large yellow head, powerful jaws, and a banded abdomen. * * * It lives in burrows in the sage plains, and its holes resemble those of the small Pocket Mice (*Perognathus oli-*



Lava Formation, on the South Side of the South Cone, Big Buttes, Idaho.

vaccus) in being clean cut, going straight down at first, and having no mound at the opening. In crossing the plains during cold stormy weather the heads of these curious animals were often seen at the mouths of their burrows and many were met walking about among the sagebrush. They walk much, with seeming dignity and deliberation; and their tracks may be seen in every direction. If two are held together they immediately bite off one another's legs and inflict other serious wounds. They bite a large straw in two at a single nip."

We also found here, and found them in great abundance for 60 miles, the large black cricket common in this region, *Anabrus simplex*. This cricket has at times been very instructive in the Great Basin. On the eastern slope of the Rocky Mountains *Anabrus simplex* disappear and *Anabrus purpurascens* found, is. The anatomy and habits of these two species are discussed in full in the Second Report of the U. S. Entomological Commission, to which the reader is referred if he desires full information about these clumsy and interesting insects. They are large, stout, thick-bodied, dark insects, nocturnal in habits, wingless, hiding under stones, grass, leaves or sage brush in the daytime, coming out in the evening. In 1894 there were tens of thousands visible from the wagon in the daytime, and the great ancient bed of Henry Lake was alive with them. Our horses mashed them under foot, the wagon wheels crushed them, yet the number seemed not to decrease. We filled several boxes to bring home. The females all along the road were busily engaged thrusting their ovipositors in the hard road, and paid little attention to objects passing by. In 1895, in the same month, August, not a single cricket was seen along the road.

Butterflies and Beetles in Island Park were not numerous. A carcass of a buzzard, *Buteo swainsoni*, contained a couple of species of sylpha; an occasional *Buprestis* is found in the dead pines; and fn the dusty road it was no trouble to catch Cicindelas, or tiger beetles. A carcass of an owl brought a species of Dermestis. Ground Beetles were quite common in most places along the river Diligent search was made for beetles all along the road, and a fair list was taken. In view of the fact that much of the road is through a desert region the catch is not bad. The following is a list of beetles including those caught from Pocatello to the National Park, without regard to the order in which the genera are placed.

Elcodes hirsuta, *Lec.*, Rexburg.
" *opaca*, Island Park.
" *extricata Say*, Island Park.
" *hispilabris*, *Say*, Island Park.
" *pimelioides*, Island Park.
" *obsoletus*, *Say*, Rexburg.
" *obscura*, *Say*, Island Park.
Coelocnemis dicaticollis, Island Park, Henry Lake.
Coelocnemis Punctata, Pocaello.
Cicindela montana Lec., U. S. Nat. Park.
Cicindela vulgaris Say, Island Park, U. S. Nat. Park.

Camp near Henry Lake.

Cicindela 10 *notata Say*, U. S. Nat. Park.
Dermestes marmoratus Say, Ross' Fork.
Dermestes marginatus, *Say*, Ross' Fork.
Silpha lapponica Hbst., Island Park.
" *sp.*, Island Park.

Necrophorus marginatus, Island Park.
Iphthimus serratus, Mann., Island Park.
Pterostichus candicalis Say, Island Park.
Pterostichus validens Dej., Island Park.
Corymbites acreipennis Kby., Island Park.
Epicanta puncticollis mann., Island Park.
Trirhabda attenuata Say., U. S. Nat. Park.
Trirhabda hirticollis Lec., St. Anthony.
Coccinella 9 notata Hbst., U. S.
Crossidius allgewahrii, Island Park.
Anclastis latreillei Lec., Island Park.
Harpalus amputatus Say, Island Park.
Carabus oregonensis Lec., Island Park.
Buprestis lang, Mann., Island Park.
Cantharis cooperi Lec., Ross' Fork.
Hydrophilus triangularis Say, U. S. Nat. Park.
Chrysochus cobaltinus Lec., Island Park.

Silpha lapponica, Hbst. seems to have a wide distribution. I have species collected in Bloomington, Ill., at Des Moines, Ia., at Missoula, Mont., and in Island Park, Idaho. It is found all over America. Swartz says this species is not found in the mountains in Europe, but is found in the plains there in the far north, being one of the exceptional insects that are thus distributed.

The genus *Eleodes* are distinctly desert insects. I have some from Kansas, from Colorado, from Idaho and from Algeria, Africa. They are frequently called stink beetles in the west, and a single specimen was taken among the lava beds at Idaho Falls.

Island Park is rich in material for the sportsman, but a poor place for the mineralogist. The valley through which the Snake River here flows is entirely crossed with the stratified basaltic lava, in many places exposed, a very bad surface to pass over either with team, on horseback, or on foot. Our collection consisted of rounded pebbles of various colors and sizes, and of chunks of lava from points of interest. The adjacent mountains probably offer a good field for collecting, but as we were intent on other things, minerals were not sought after very extensively

Our stay in Island Park was too short. It was enjoyed, however, to its utmost. We crossed the Snake for the last time at a clear ford, with a level sandy bottom, with water hub deep. The river is wide and cold, but our dog Buster plunged boldly in and beat us across. A ride of a dozen miles and we came to the beautiful Buffalo River, with lava banks 75 to 100 feet high. In a beautiful and romantic spot we pitched our tents beneath the branches of a majestic fir tree, and spent a day. What with photographing the beautiful scenery, gathering plants, skinning birds, arranging material, etc., the day was entirely taken up. The contrast between this bit of scenery and that we have just left is remarkable. From that which is quiet, level, peaceful, beautiful in its contrast of level green plain and winding streams we changed to bold, rocky rugged banks, with angry waters dashing restlessly against the solid walls. To fetch up a bucket of water is to earn supper, and as we drift away into unconsciousness the last sound we note is the roar of the water as it rushes on, day and night,

or the tinkle of the bell on the picket horse, denoting all well there. This camp brings to mind more beauties of nature than any I have had. The waters of Buffalo River are more beautiful than any stream I have ever seen, not excepting the beautiful and picturesque Lou Lou river in Montana, on whose banks I once spent a fortnight. Up and down we wandered, looking at it from every point of view, now looking up the stream from the top of the basaltic bluffs, now looking down from a different point ef view. Again we climb down to the water's edge, and try to tempt the speckled beauties with a patent fly. Everyone enjoyed the camp to the fullest extent. No fewer than six pictures were taken. All were good save one. Alas! Our cozy camp, which we so much desired, failed to "take."

Early the following morning we struck camp. An hour's drive and we crossed the Buffalo River at a clear ford, with a moderate current. On the road we flushed a flock of young pheasants (*Bonasa*) and captured several. A fine marmot was also taken. The day was good for shooting, and numerous birds were killed. These consisted of sage hens, a blue heron, an Indian hen, a hell diver, several ducks, and a Swainson's buzzard.

Early in the afternoon we reached the level plain bordering Henry Lake on the east, and the first thing our mess wagon stuck fast in the mud, up to the hubs. Our drivers were true mountaineers, aud soon had us out. This level plain extends some 15 miles from Henry Lake eastward and is full of geological interest. It would be useless to attempt to describe fully every place of interest, for every mountain and valley would take a couple of articles. Suffice it for the present to say that we traveled slowly along this level plateau, whose altitude is about 6500 feet, passed several terraces, no doubt the remains of ancient glacial action, crossed numerous streams that are invisible until one comes to the very bank, and early in the evening pitched camp in the canon on the road leading to the Park.

This camp was an ideal spot, but unfortunately the wind was very high, so that little could be done, either in collecting or photography. Ascending the butte on the west of the road, we had a beautiful view of the level plain over which we had come, the lake and the mountains on every side. The sun was just slipping behind the crags in the west. Great banks of cumulus clouds lay above the peaks, and were set aglow by the departing sun's rays with such fire as to eclipse any previous view anywhere. After photographing the clouds, the lake, the plain, and camp, we descended and were prepared to devour the plate of hot biscuits the cooks had prepared.

A half day was spent at R. W. Rock's Elk farm, where may be seen a herd of 100 or more Elk, of all ages, a tame Moose, a Lynx, a pair of young Buffalo, a Rocky Mountain Sheep or Bighorn, a flock of Swan, etc. It was a regular menagerie, and well worth a visit. The Bighorn was a beautiful specimen, clean and trim in appearance, with a proud step and a haughty bearing. His horns were large and massive. He held his head erect and walked straight toward the door when it was opened. He had no respect for individuals, and would have tramped right over the crowd to escape, if giv-

en an opportunity. The enclosure in which he was kept was about 25 feet square and 15 feet high. In the early morning he put in his time trying to butt down the wall, and the deep scars and dents showed how hard he had hit. He had jumped to within a few feet of the top, and if given space for a run could in all probability clear it. It seems a pity to keep the poor animal housed up in such a close pen, yet if this had not been done we could not have seen this beautiful creature, nor have had the fine picture from life which is here presented. The animal was captured in winter when the snow was deep. Mr. Rock can pet him a little, but no one else dares lay a hand on him.

The Elk were captured in the same way, and are kept in a large pasture, where they have become quite tame. It was a fine chance for study, and we took advantage of it. Several peculiar features were noticed in Elks, one being the way the neck is carried. Instead of holding the head erect, as does the Mountain Sheep, the neck has a distinct bend, something like that of a camel, giving the animal an awkward appearance. Ordinarily the bulls and cows hold the head alike, yet when the bull is alarmed and rears his head the appearance changes materially, and he is indeed a proud and stately specimen.

Near this farms lives an old squaw who had a pair ot fine Prong-horn Antelopes. When we were there she possessed but one, wearing a bell whose tinkle could be heard but a few hundred feet. The other was shot by an Englishman out for game. Spying the pair out on the level flat and seeing no houses he drew a bead on one of the pretty pets and pulled the trigger. How he settled it with the squaw we did not learn. But from the fabulous prices she asked for her little trophies it probably was to her advantage.

From Henry Lake it is little more than half day's drive to Riverside, where we give up our guns. It is a lovely ride. We cross the mountain range by a pass with an almost imperceptible incline. The tall pines all along the road, silent, beautiful, even majestic, lend a charm that is always the same. We have become interested in the blazes on the trees, which mark the road when the snow is deep. We turn into lovely glens, cross crystal streams, jump out occasionally to land a fine insect, pluck fine flowers for later study, and the time passes swiftly enough. "Put Out Your Fires" in a conspicuous place by the roadside warns the traveler that he is near the Park. Next "Rules," at the top of a large placard, greets the eye, and we have crossed the line. Fire Hole Basin, which we long so much to reach, is not far off, and we prepare to house our guns.

Riverside, at this entrance to the Park is a queer place. A little log hut, with a log stable, comprise the village. The inhabitants are a sergant and a private. We left them a mess of stuff that filled up much of their available space, but they were jolly good fellows, and said little. The sergant, Frank A. Burns, of Little Falls, New York, had been there eight seasons and had a keen eye for everyone entering the Park by that road. The second time I came to his cabin he walked right out, called me by name and grasped my hand. Through

Carolina or Sora Rail (Parzana Carolina) in their natural haunts.

his kindness we were able to go through intelligently and without trouble.

If the reader consults a map he will find our entrance. The Madison River, coming out of the Park, makes a passage way in. This is on the west side, near the southern line. It is one of the three places of entrance. The Beaver Canon road joins the one over which we came at Henry Lake, and enters at Riverside. Another entrance is on the south via the Tetons, and the third is on the north via Mammoth Hot Springs.

In entering we may take the canon and ford the river seven or eight times, or climb the mountain, which they call a hill, for 12 miles an up hill pull, and an abominable road. We chose the latter in '94, the former in '95. It was about half-past four when we reached the summit. What a sight! Lower Geyser Basin, Firehole River, the soldiers' quarters and grounds, the Fountain Hotel, a grand panorama, at once burst upon the view. The geyser steam spreads in a white cloud against the dark background of pines. We see a great white-floored basin with a silvery thread running through it. Our goal is all but reached. On the morrow we will investigate.

Collecting in a Florida Swamp.

Newmans Lake, a beautiful sheet of water, ten miles long by six wide, lies in all its quietude, surrounded by groves of orange and cypress trees, a distance of six miles from Gainesville, and the road leading to it is one of beauty and loneliness. About a mile inland from the lake are several small cypress ponds, not more than two feet deep, and it is here that the heron finds its home.

Accordingly, about dawn on April 20th last, a friend whom I will call Mac, and I started out to this place on a collecting tour. The morning was clear and pleasant, and everything was fresh and beautiful. Leaving the city, we enter an immense hammock of oak and hickory, with the picturesque Spanish moss hanging from their branches in long silken trains, and from which now and then may be seen a squirrel's head peeping at us and ap-

parently saying: "What right have you to come on *my* land?" It is surprising the number of squirrels that are in these places and you have only to keep quiet a few minutes and they will come forth making the woods alive with their chatter. But we must not stop, as it is getting late for it becomes quite hot here in the middle of the day even at this date.

Passing in succession great hammocks and open pine land, the latter the home of the Gopher (*Gopherus polyphemus*) we come to a road turning to the left and down this we drive. We must be near our destination. Hush! what was that noise? Did you hear it? There it is again. Ah! there he goes, a beautiful Egret—his long plumes fluttering in the breeze. A few hundred yards further on finds us at a good hitching place and we alight with our egg boxes. Ten minutes afterward we are down at the edge of the pond.

What a sight! White Herons, Blue Herons, Little Herons, Big Herons all fly up together in one mass, croaking and scolding at our intrusion. They fly around several times but finally alight in the tops of nearby pine and cypress trees, all the while keeping up an incessant racket. Mac and I boldly wade in and scramble up to a nest, from which we saw a Little Blue Heron fly a few minutes before, and take the four beautiful eggs found therein. Mac is greatly excited, for there are nests to the right of us, nests to the left of us and nests in front of us. Now and then he steps in a 'gaitor's' hole, but with much splashing gets on his feet again. We take several sets of eggs of the Snowy and Little Blue Herons. These are of three and four eggs each, although I found a set of the latter species containing *seven* eggs, but two birds must have nested together. The difference between the eggs and nests of the Snowy Heron and those of the Little Blue Heron is as follows: the former builds its nest—a mere platform of sticks with a slight depression for the eggs—in the tops or higher branches of the bushes. The eggs, generally four in number, are slightly pointed and of a light bluish-green color. The latter builds its nest in the lower branches and lays from three to five round, bluish-green eggs.

A short distance from the pond we found a small colony of Reddish Egrets nesting by themselves. Their nests are similar to those of other herons. The eggs are easily identified elliptical in shape and of a light bluish-green color.

Wishing to obtain a farewell glance at the pond, I climbed a cypress tree and looked out. A beautiful sight met my gaze. The contents of some of the nests were like little balls of cotton (the young of the Little Blue Heron are always white) and others contained beautiful bluish-green eggs so precious to a collector. The old birds getting bolder come and sit close to their nests. What a contrast. White and blue all intermingled. After wishing many, many times for a camera I came down to find Mac vigorously fighting the "cussed things" (mosquitoes) as he calls them.

At 4:30, after eating luncheon and resting awhile, we start for home, leaving behind many pleasant thoughts of a delightful trip.

FREDERICK DAVIS,
Gainesville, Fla.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r, Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

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Entered at Albion post-office as second-class mail matter

NOTES.

THE MUSEUM wishes its many friends and subscribers a Merry Christmas and Happy New Year.

We are pleased to note that our western patrons are quick to recognize the value that our western office is going to be to them. A saving of time and in many cases a great saving of actual cost of specimens and transportation. Already our manager writes he has doubled the daily mail anticipated. Remember we have the finest stock of minerals and shells in the west on sale, also a very complete line of Naturalists Supplies, Curios, Corals, Fossils, &c., &c.

We beg to acknowledge a very pretty souvenir from the Tacoma Academy of Science through the courtesy of Mr. M. S. Hill, the Recording Secretary. Hon. Frank Allyn is President, and Mr. A. N. Fitch is Treasurer. They have established a museum and library which are constantly receiving valuable accessions.

Mr. Robert Moore of Genoa Junctian, Wis. writes: "I saw in the last number of THE MUSEUM an account of an albino pocket gopher found in Minnesota. I want to add to the list of albinos, that I mounted a fine specimen of albino striped gopher in Wisconsin. This gopher was all white except a very faint sign of stripes on the head and neck. The gentleman that I mounted it for found his cat playing with it."

One of our Iowa subscribers sends the following clipping: "While hunting rabbits yesterday a citizen of Mason City named C. Gaines discovered a mound of the Indians' or mound builders' construction a short distance east of Eldora, near the Iowa river. Upon digging into the pile of earth he found a large number of flint knives, axes and pottery. There are several such mounds in the same locality, and further examination will be made. A great deal of interest is created through this discovery, and many curions are expected to be found."

Judging from the flaming advertisement of "*A Christmas Present*" in one of our exchanges it would seem that our brother takes the great horde of Collectors and Naturalists as either blind, or ignorant. We would feel

that we were not doing our duty should we allow the remarkable (?) advertisement to go unnoticed. Our brother is going to send all his friends and patrons a Christmas present absolutely free, not to cost a cent "except 10 cents for pastage." Goes on and details scores of pretty things that can be had *absolutely free*, "to all who will send $1.00 for his paper for '96." *What a remarkable offer.* Have any of our patrons seen anything richer? If so clip and mail to us for review. But after all it is really pardonable, and nothing different could be expected, from the *Pioneer in the Natural History Business.* We now await the final result of running the business under two different "*heads.*"

Michigan Sparrows

As a rule, it is generally conceded that it is better to describe a single species or at most a genus at one time. However, there are many birds which would never appear in print if they did not simply show themselves in a local or state list. There are many common species of birds, which are well known as migrants, which are never mentioned in your columns because observers have had no opportunity to study their nidification. This is not fair to these birds, and as a partial evidence of appreciation of the merits of rare or little observed Sparrows, I am going to give a list of them in our state; making it a point to dwell on the rarer and little studied ones and neglecting those which are well known.

Evening Grosbeak,

Coccothraustes vespertina, Coop.

This rare straggler from the far north has been recorded in Lower Michigan but a few times. It is preeminently a rare winter visitant from the north; coming generally when weather is severe, but not always. I have seen it in mild weather in November, and have known it to remain into the month of May. On one occasion I had the rare experience of observing this bird and the Rose-breasted Grosbeak at the same time in the woods in the spring. Truly an unusual sight, as the southern winter sojourner, and the northern straggler are separated in their limits of migration by at least three thousand miles, if not more. This Grosbeak was first taken near Lake Superior by Henry R. Schoolcraft in 1823. It was known to the natives as *paush kan di mo*, and was even considered a rare bird by them so far south, about forty-seven degrees. It was submitted to the New York and Philadelphia scientific societies and was pronounced a newly discovered species.

Pine Grosbeak,

Pinicola enucleator, Linn.

Another irregular visitor from the far north. It was seen in southern Michigan during parts of six years in last twenty years or so. Feeds like the last on buds and seeds. An interesting bird, unsuspicious, and easily observed. Of those recorded by me there was only about one bright carmine specimen to every thirty or more somber hued birds. Specimens which were captured alive in the gray or drab plumage, assumed a yellowish coat in summer. This bird has a low and agreeable series of notes during spring.

Purple Finch,

Carpodacus purpureus, Gmel.

Arrives from the south in late March

usually. I recall one season, 1885, when the snow was very deep and stayed late. On April first of that year, when snow banks were three feet high at sides of highway, I found a flock of sweet-singing males in the woods. Often appears by March 15, and visits the evergreens of our city. Passing north it is occasionally found summering at forty-three degrees but does not appear common during breeding season, till the forty-fifth parallel is reached. Abundant in Upper Peninsula and on Macinac Island. Southern migration begins in October and lasts even into December. A beautiful singer and very interesting species. Builds a Sparrow-like nest which may be found with eggs in May, June and July.

WHITE-WINGED CROSSBILL

Loxia leucoptera, Gmel.

Another rare species. I have seen but one flock and that one of but a few birds. More often seen as a straggler in flocks of the next species. Once observed a specimen at forty-second degree as late as May third. Like the following this bird is very partial to pine cone seeds, and seems to prefer the evergreen trees, where it feeds on the cones, when in the city. It is a handsome species and may be readily distinguished by the white spots on the wings.

RED OR COMMON CROSSBILL,

Loxia curvirostra minor.

This bird undoubtedly breeds throughout Michigan in the pine belt north of 43 degrees but there are no reports of the finds of nests. I have taken it at all seasons at the north. It is readily distinguished by its peculiar undulating flights and its notes *cleep cleep cleep.* It feeds on seeds preferring coniferous trees.

LESSER RED-POLL,

Acanthis linaria, Linn

Not rare in Michigan from late November to well into April, but of very uncertain appearance. Appears on our southern boundary about one season out of three. Do not think that it remains during the summer in the state. When these birds appear in our southern counties there is about one brilliantly colored male to every twenty dull colored birds.

HOLBELL'S RED-POLL,

Acanthis linaria holbœllii.

A well marked specimen from Kalamazoo county, was submitted to Robert Ridgeway, Esq. of the Smithsonian Institute, for identification. It is remarkably similar to the Lesser Red-poll, except that it is larger in its dimensions. It was secured in the early winter of 1878.

PINE LINNET OR SISKIN.

Spinus pinus, Wils.

Very abundant north of the forty-fourth parallel as late as the last of May. Still I have been unable to prove that they nested, although I am sure they were in breeding plumage, and they sung sweetly and very vivaciously. Not rare in winter in our southern counties. Have seen great flocks in January, particularly were they abundant in 1888. I have seen them here again in May, apparently in migration north. Have never found the birds far removed from pineries. When in the cities the pleasing but plain colored birds flock to our thick evergreens. The distinguishing note is *sque ack* or *squa wee.*

YELLOW-BIRD; THISTLE-BIRD; GOLD-FINCH,

Spinus tristis, L.

A very abundant species. Breeds in both peninsulas. Assumes somber plumage in winter. This bird in common with the last has a note, *sweet*, but the notes can be distinguished by an expert ear. The thistle-bird lays five or six blue-tinged eggs in June, July and August in a most artistic nest, placed generally from eight to fifteen feet up.

SNOW BUNTING; SNOW-FLAKE,

Plectrophenax nivalis.

A very abundant but irregular visitor from the far north. Sometimes appears as early as November and frequently remains well into April, but more commonly observed in December and January. Often appears in mighty flocks and the birds fly so closely, that a well directed shot will sometimes drop a score or more. A very pleasing species and also very beautiful and I know of no bird which makes a better appearance as an ornament when well mounted. The snowflake is never to be relied upon, and generally makes its appearance when least expected.

LAPLAND LONGSPUR,

Calcarius lapponicus, Linn.

Another northern species. I have sometimes thought that this bird was a regular migrant, owing to records of its capture in the fall and again as late as April 21. However, if it is so, it must select various routes for migration, as it is not regularly captured anywhere in southern Michigan. It does not always pass us, however, in its exodus from the north, as it is occasionally taken here in winter.

SMITH'S LONGSPUR; PAINTED LONGSPUR,

Calcarius pictus.

This species is quite common on the southern shore of Lake Michigan according to Butler's "Birds of Indiana," and it is quite reasonable to suppose that it may be yet found in Michigan. A recent list in our state, with the characteristic tendency adopted by amateur compilers of adding possibilities, embraces this species, though it has not yet been recorded within our boundaries.

BAY-WINGED BUNTING; GRASS FINCH; VESPER SPARROW.

Poocœtes gramineus, Gmel.

Appears from the middle to the last of March and remains till late October or later. Found in the upper peninsula. Breeds abundantly, laying four eggs in a shiftless nest, always on the ground. A sweet singer and well known but not appreciated because it is ubiquitous from March to October.

YELLOW-WINGED SPARROW,

Ammodramus savannarum passerinus, Wils.

Not rare in certain prairie sections; in fact we may call it common in some quarters. However, it was not common in Michigan twenty years ago. This is one of those species, and we have many of them, which has increased in number and enlarged its territory within the last few years. I feel safe in saying that this bird is not to be found commonly in the Upper Peninsula, but it will reach that quarter after a time, and when suitable grounds have been cleared. The song of the Yellow-wing is faint and somewhat resembles the notes of an insect.

It is very deceiving, and it is uncertain in location. When hunting for it the bird was often flushed near at hand, when judging from its song it was many rods away; and again the bird proved out of reach while I was searching all about the neighborhood for it.

NELSON'S SHARP-TAILED FINCH,

Ammodramus caudacutus nelsoni, Allen.

This species was not known to Michigan collectors previous to the year 1878. On October 5 of that year two specimens were secured in Kalamazoo county. I believe this the only record.

HENSLOW'S SPARROW; HENSLOW'S BUNTING,

Ammodramus henslowii.

This bird has been known for a few years past in Washtenaw county and a nest and eggs were found by L. W. Watkins near Manchester, Mich. in the season of 1894. We have in the Henslow's Sparrow another bird which was formerly unknown to our state and which, like many others, especially sparrows and other smaller birds, are brought to our notice through the progress of civilization, and the influences resulting from the changed condition of the land. Undoubtedly this species will in time become comparatively common, as many other birds, once unknown have done within my days of observation. The advancement of civilization, while it crowds out a few species, is generally a promotor of an influx of birds previously unknown. This has been fairly demonstrated in the cases of at least twenty-three species of birds.

SAVANNA SPARROW,

Ammodramus sandwichensis savanna, Wils.

Sometimes found in the southern part of the state as early as April 1 and as late as May 18 on its northern trip. In late September in returning from its nesting duties in the far north and may be found here till late October. Do not think it remains in the state in summer. It is partial to prairies when here.

LARK FINCH.

Chondestes grammacus, Say.

Not rare in certain portions of the state south of 44th parallel, but do not know of its being shot north of that line. This, like many other species of Michigan birds, is governed by a choice of territory. It is eminently addicted to a sandy soil and is rarely or never found on clay or lower lands. In Kalamazoo county this bird is rare but in the next county west where there are sandy tracts it is abundant. It arrives in middle April. I have never found it nesting, but I know that it breeds here as I shot a female which contained an egg of nearly full size.

WHITE-CROWNED SPARROW.

Zonotrichia leucophrys, Forst.

A common species in spring and fall migrations. Not known to breed in the state. Arrives in early April and loiters till the last part of May. A beautiful sparrow readily identified by its white crown and red bill. Prefers clearings and edges of forests like the last.

WHITE-THROATED SPARROW,

Zonotrichia albicollis.

Usually appears in the early part of

April and leisurely passes north, stopping to breed anywhere north of 44° north latitude and a few remaining at 43°. A well known species, known to many as the Pea-bod-y bird from a fancied resemblance to this word in its song.

TREE SPARROW,

Spizella monticola, Gmel.

Found generally in November, December and March. Not rarely taken in February and sometimes in January. As a rule the birds pass farther south. It is a lively, pleasing bird from the far north, which seeks the bushes and hedge-rows, much such quarters as are selected by the snow-birds, but if any different, then lower land. The tree sparrow likes to haunt the bushes at the edges of rapid streams which do not freeze over and in these situations may be found throughout the winter even when the snow is deep. The song is a pleasing jingle. The birds all leave us for the north in early April.

CHIPPING SPARROW, HAIR-BIRD,

Spizella socialis, Wils.

It is to be doubted if anyone has ever written a complete account of this little, unobtrusive sparrow. Yet, though so throughly ignored, it is a very interesting bird, and undoubtedly fills its position in bird-dom as well as the most gaudy, noisy members of bird-life. From the time of its arrival throughout nest-building, the care of its young, and in its daily life among us, it furnishes an unsurpassed example of uprightness, and devotion. The excellence of its architectural skill is scarcely paralleled and the spotted blue eggs which it lays are almost unequaled by those of any others of our birds. At times this confiding, unsuspicious bird cocks its head, and utters its characteristic song or rather twitter. The notes *chip chip* repeated ten to twenty-two times in a monotonous key, undoubtedly express as deep a feeling of joyousness, and may answer for as great a tribute of praise, as does the louder and more complicated offering of the gaudy Rose-breasted Grosbeak. Dear little chipping sparrow, ever faithful in your return to our door yard; you occupy a niche in my feelings as well as do your larger associates. It arrives in March usually, but sometimes in April, and stays till late in October. In the month of May it builds a nest which may well excite speculation in the minds of the lovers of the curious. In this tree or bush nest are deposited four eggs of a lovely shade of blue, spotted and blotched with black and sometimes brown markings.

FIELD SPARROW,

Spizella pusilla, Wils.

A very interesting but shy and retiring bird. It has three distinct, clear, ringing songs, the best known of which starts in slowly and ends in a rapid twitter. Arrives in early April and builds a nest generally intirely of grass in the month of May. This nest with four spotted eggs is usually placed in a crotch of a low bush at from one to four feet from the ground, but is occasionally built on the level or slightly above it.

CLAY-COLORED SPARROW,

Spizella pallida, Swain.

Embraced by three lists in the state, but I know nothing of the species.

*Black Snowbird,

Junco hyemalis, Linn.

Breeds abundantly from 44 degrees north latitude, north. As a rule the black snowbird migrates south, but often a few remain and in southern Michigan it is not uncommon to find birds in December, January and February. In fact it is safe to say that the birds are seen seasonally in Dec. and Feb, at the 42d parallel. A lively bird, and always gregarious in migration; frequenting hedgerows and gardens and often visiting the city yards. It is almost entirely a ground feeder. It builds its nest nearly always in a bush and from one to six feet from the ground. Sometimes on the ground.

*Oregon Snowbird,

Junco hyemalis oregonus.

Embraced by two or three state lists. I know nothing of it.

European or English Sparrow,

Passer domesticus.

Preeminently English; peculiarly pernicious; possibly predaceous; positively pertinacious; breeds extravagantly; increases preposterously; spreads sporadically. Condemned eternally, Selah,

The idea of an idiotic man or set of men advocating the importation of the english sparrow (spelled with a letter e.) It beats all comprehension, and could only result from ignorance, and the attendant want of judgment that results from a foolish fad. *'Tis English ye know.* Yaws! and we are bound to get our pay for entertaining this bloody Britisher, "ye know."

Swamp Sparrow,

Melospiza georgiana, Lath.

Abundant in suitable sections, generally about the marshy borders of streams, lakes and ponds. Have met with it in several counties and believe it fairly well distributed. Only found in the neighborhood of marshy tracts. It is a later arrival than the song sparrow and usually gets here about April first and remains till the middle of October or later. Its notes, a chattering song, are rarely recalled.

Song Sparrow,

Melospiza fasciata, Gmel.

I have yet to meet with this pleasing singer in January and February, but I shall not be much surprised to learn that it occasionally winters here. My earliest date is March third. By March tenth they are common as a rule, and by the middle of the month are heard singing in abundance. Song sparrows have been seen about most places in December. Breeds plentifully in both peninsulas.

Lincoln's Finch.

Melospiza lincolni, Aud.

On May 16, 1875, I secured two specimens, 42 parallel, 85 degrees longitude west. On Sept. 28th and again Oct. 9th, 1879, specimens were also secured. This is a rare migrant, and I cannot say as to its remaining in Michigan during summer.

Fox Sparrow,

Passerella iliaca.

A common species in the Lower Peninsula, both spring and autumn,

* The late Dr. H. Atkins of Locke, Mich., wrote me that he had taken the Red-backed Snowbird in Ingham Co. I cannot think that this species belongs in a Michigan list, and so place it in this foot-note.

yet to the careless stroller and collector the fox sparrow may remain an unknown bird, for it is a shy and retiring species and rarely shows itself to the passerby. Sometimes in late March, but more often about the middle of the month, these plump brown birds appear in our southern counties. They loiter on their way and may be found occupying suitable quarters in a grove for some weeks. The situations chosen are the edges of woods, which hold thickets of underbrush. Here the fox sparrow may be found in April and October. If a collector appears on the scene in the spring, the birds dash out of sight in the tangle, but emerging on the other side, will tune up and furnish good music to the srtoller, if he is patient and close enough to hear the finer notes. First there are some low, half articulate notes, then follows *chu chee chu chu chree chree chu*, after which follow some more of the low notes. The whole being very melodious as well as inspiring. The birds are not known to remain in the state during summer.

CHEWINK; TOWHEE; GROUND ROBIN,
Pipilo erythrophthalmus, L.

Abundant and quite generally distributed within the great Lake Region. Nests commonly and its habits are well known to all observers. Its cheerful, sprightly notes are heard from early March until late October.

CARDINAL; VIRGINIA REDBIRD,
Cardinalis cardinalis, Linn.

A few stragglers have been taken north of the 42d parallel in Michigan, but it is very doubtful if nests have ever been found excepting on our southern boundary, Undoubtedly some of the specimens taken were escaped cage birds. Jerome Trombley has found the eggs in Monroe Co.

ROSE-BREASTED GROSBEAK,
Habia ludoviciana, Linn.

A brilliantly colored species with a loud and musical song. Known to all, and found in both Peninsulas. It has often been commented upon that the male of this species is frequently found incubating the eggs. I would say that it is because of the marked distinction in color between the sexes of this species that this supposed peculiarity has been observed; and I may add, that with all of our sparrows and other smaller birds, and with many of the larger species this habit is common, in fact, so far as I can observe, invariable.

INDIGO BIRD; INDIGO BUNTING,
Passerina cyanea, Linn.

An abundant and generally distributed species and well known to all from its fine coat and charming song. Found throughout the state in suitable quarters.

VARIED BUNTING,
Passerina versicolor, Bonap.

Once taken by Dr. H. A. Atkins, at Locke, Michigan. A rare straggler.

BLACK-THROATED BUNTING; DICKCISSEE.
Spiza americana, Gmel.

Once rare or unknown in many quarters where it is now abundant. Previous to fifteen years ago it was known to but few observers in the state and still unknown to a large share of collectors. One of the many species which are becoming more com-

mon through the changes resulting from civilization.

In conclusion it may be said that this family of birds is a very useful one, and that there are no species of sparrows and finches that are not deserving of our protection. They are of great benefit to the agriculturist, and their scope of usefulness is wide because there are myriads of the birds and they are found everywhere.

VOL. I. NO 3.

JANUARY. 1896

THE MUSEUM

A Journal Devoted to Research in

Natural Science.

RATES:—$1 00 per year to all countries, in advance. Single numbers, 10 cts.

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Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

TO EXCHANGE.—Ohio eggs in sets or singles, for first class sets with full data of other localities. Send list and receive ours. R. C. RUSH, Hudson, Ohio.

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TO EXCHANGE.—A fife in first-class condition, will exchange for a 32 or 38 caliber revolver. HERVEY L. SMITH, Smith's Ferry, Mass.

CHOICE Pacific Coast bird skins for exchange. Can use light shot gun, large rifle, 38-cal. S. & W., reloading tool or anything in that line, photographic apparatus, 5 x 8, or larger. No specimens wanted in exchange at present. GEO. G. CANTWELL, Puyallup, Wash.

WANTED.—A pair of climbers, strapped preferred; will give good exchange or cash. HERVEY L. SMITH, Smith's Ferry, Mass.

SIOUX INDIAN relics, of all kinds, to exchange for good black point eagle feathers. E. C. SWIGERT, Gordon, Neb.

100 specimens, illustrating the manufacture of arrowheads and spearheads, and including perfect specimens of each, also knives and scrapers, cores and discs, sent by express for one dollar. F. I. BROWN, Hayden Bldg., Columbus, Ohio.

WANTED TO EXCHANGE.—First-class Indian relics and part cash for No. 5 or 6 Remington typewriter. E. C. SWIGERT, Gordon, Neb.

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WANTED.—I desire to form a collection of curios, such as Indian relics, ancient firearms, swords, etc. Send me a list of what you have, giving description and lowest prices. A SCHAUF, 198 Vernon Ave., Brooklyn, N. Y.

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MAINE BIRDS and mammals in the meat. Will exchange for good offers or for cash. Send your list of wants in these lines immediately to R. H. ROCKWOOD, Waterville, Me.

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NO ONE ever thought of introducing so expensive a feature as lithographic color work in the days when the leading magazines sold for $4 a year and 35 cents a copy. But times change, and the magazines change with them. It has remained for The Cosmopolitan, sold at one dollar a year, to put in an extensive lithographic plant capable of printing 320,000 pages per day (one color). The January issue presents as a frontispiece a water-color drawing by Eric Pape, illustrating the last story by Robert Louis Stevenson, which has probably never been excelled even in the pages of the finest dollar French periodicals. The cover of the Cosmopolitan is also changed, a drawing of page length by the famous Paris artist Rossi, in lithographic colors on white paper takes the place of the manilla back with its red stripe. Hereafter the cover is to be a fresh surprise each month.

FOR EXCHANGE.—Sand dollars and calcareous tufa for eggs or curios. Send list of Spec. you have for exchange. W.E DEWEY, 148 W. Jefferson St., Los Angeles, Calif.

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PETRIFIED moss, fossils on limestone, to ex. with dealers or will send specimens if you will pay the postage and return me the cancelled stamps. CORA JEWELL, Shannondale, Indiana.

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WANTED.—A small launch (suitable for use on Mississippi River) and a canvas boat; also a cabin boat, of parties on Illinois River. W. A. JOHNSON, Galesburg, Ill.

FOR SALE.—Cheap, for cash, a nice lot of mounted birds or would sell for part cash and balance in any specimens I can use. Please send for list. I also want papers and bulletins treating on the birds of Texas; all answered. NATHAN L DAVIS, Taxidermist, Brockport, N. Y.

FOR SALE.—Cheap or exchange for something useful: One mounted alligator, one mounted porcupine fish, one fine mounted horned toad, one large saw fish saw, one botanical collection of 56 specimens, all labeled and mounted, also Indian relics, alligator teeth, whale and elk; also all kinds of souvenirs. Write for prices and what you have to exchange. CLARENCE BRETSCH, 1000 Island Park, N. Y.

GEODES, petrified moss, many varieties of fossils, minerals and curios to exchange for Indian relics, sea curios, large sea shells, dry goods and useful articles. CORA JEWELL, Shannondale, Indiana.

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TO EXCHANGE.—3 scrap albums, about 4,000 pictures and photographs, colored plates and one elegant bound magazine of art, (new) 500 illustrations, albums and book worth $13. Wanted Columbian stamps, U. S., showy shells, printing press or anything interesting or useful, for best offer. H. L. HANSEN, Griswold, N. Dak.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., JANUARY 15, 1896 No. 3

SHOWY SEA SHELLS.

Interesting Notes About Shells that are Eagerly Sought for by Collectors.

(Continued from last number.)

The genus Buccinum resembles that of Purpura in many respects. Its shell is oval or conical, much notched in front. The species inhabit every sea, especially those of Europe. The animal has a small flat head, furnished with lateral tentacles or horns, bearing the eyes upon an external swelling, situated near their central length. We need only refer to [Fig. 30] Buccinum senticosum, and Baccinum undatum, the well known welk of our markets [Fig. 31] for their general form.

Fig. 30.

The genus Harpa contains shells from the Indian Ocean, richly enameled within, and ornamented externally with slightly oblique longitudinal stripes in gay colors, with finely-sculptured forms in the intervals; spire very small, and opening large. Among the more attractive species are Harpa Ventricosa [Fig. 32], and Harpa inoperialis [Fig. 33] and Harpa articularis [Fig. 34].

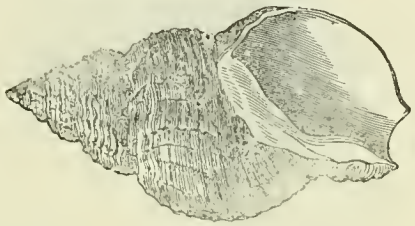

Fig. 31.

The fifth family, Muricidæ, contains Fusus, Pyrula, Triton and Murex.

The genus Murex, or Rock Shell, include a large number of species, all remarkable for their bright colors and somewhat fantastical and varied forms. They are found in all seas, but become larger and more branching into the seas of warm regions. The shell is oval, or rather oblong, the spire more or less elevated, its surface genenerally

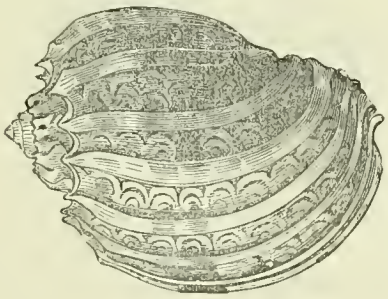

Fig. 32.

covered with rows of spines, or tubercular ramifications. The opening which is oval, is prolonged in a straight canal, often of very considerable length, as in Murex haustellum [Fig. 35; the

external edge is often smooth or rippled, the columellar edge sometimes callous.

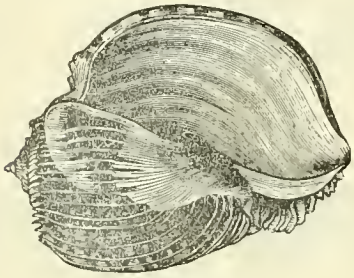

Fig. 33.

The head of the animal is furnished with two horns or tentacles, with ocelli upon the external side, the mouth elongated in the form of a proboscis. The foot is large, round, and furnished with horny operculum.

Among the species with long slender tube, covered with spines, one of the most notable is Murex tenuispina [Fig. 35] which is a native of the Indian Ocean and the Moluccas.

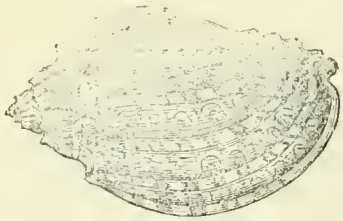

Fig. 34.

Among the strong-tubed species with long canal and no spines, from the same regions is Murex haustellum [Fig. 36],

Among the short-tubed species, furnished with foliaceous and jagged fringes, is Murex Scorpio [Fig. 37].

One more typical species may be noted namely Murex erinaceus [Fig 38] which is found on all the coasts of Eu-

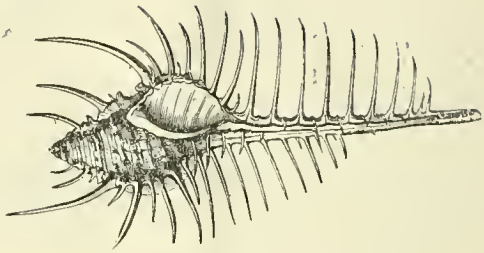

Fig. 35.

rope, and especially in the British Channel. Other species worthy of notice are found in the Mediterranean and Adriatic, some of them, according to Cuvier and de Blainville, species which furnished the true Tyrian purple of the ancients; but our space prevents us from dwelling on them.

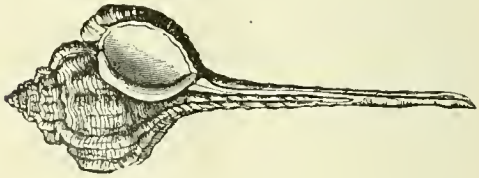

Fig. 36.

The genus triton is ranged beside the genus Murex in this system. The shell irregularly covered with scattered swelling excrescences, not as in Murex, in longitudinal rows, but scattered all over the surface. About 100 species of Triton are known. They inhabit many seas but more especially those of warm countries. Triton tritornis,

Fig. 37.

Fig. 38.

commonly called the Marine Trumpet [Fig. 39] is a very large shell, which even attains the length of 16 inches; it is enameled with great elegance in white, red and tawny brown. It comes from the Indian Ocean, where the shells are very common. Triton lotorium [Fig. 40] is of a reddish-brown externally and white within. The triton anus [Fig. 41] is of a whitesh color, spotted with red.

Fig. 39.

The sixth family is Strombidæ, of which we give typical genera Rostellaria, Pteroceras, and Strombus. Strombus is a marine genus, belonging to the equatorial seas, of whose habits and manners very little is known. It is probably that the species are very long lived, for their shells, when found perfect, have acquired a very considerable thickness and weight. They are even found encrusted in the interior

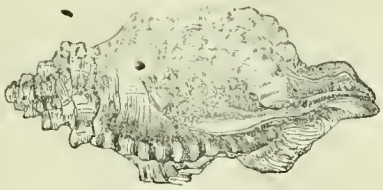

Fig 40.

with numerous layers of soft earthy sediment, and covered externally with small corals and other marine productions. Strombus gigas is represented in [Fig. 42]. Some species of Strombus attain great size, and are placed as ornaments in halls and dining-rooms. In some of them the opening is brilliantly shaded, and those are chiefly sought after to decorate grottoes in gardens, or for collections of shells, where, from their size, they necessarily occupy a prominent place.

Fig 41.

These shells are rather ventricose, terminating at their base by a short canal, notched or truncated; the right edge gets dialated with age; simple on one wing, loped cuneated in the upper part, and presenting in its lower part a grove or cavity separated from the canal or from the notch at the base. But these shells are not merely ornamental, for some of the streets of Vera Cruz are said to be paved with Strombus gigas.

The animal which inhabits these shells presents a distinct head, provided with a trunk or snout, and with two tentacles or horns, each bearing a large and vividly colored eye. The foot is compressed and divided into two portions, the posterior one, which is the longest, bearing a horny operculum. In the eagle-winged Strombus or Common Cauch represented in [Fig. 43] these several peculiarities are well developed. This shell is large turbi-

nate, distended in the middle, with an acutely pointed spire studded with conical tubercles, the right edge very broad, rounded off below. The opening is of a vivid rose purple fading into white. It is a native of the antilles.

Fig. 42.

Strombus gallus, or the angel-winged [Fig. 44] is veined with stripes of white and red, and comes from the coast of Asia and America. Strombus euhuanus [Fig.] is fawn-colored, marked with white, externally the right edge is red and striped, inside the columella is shaded purple and black.

The Museum of the Cincinnatti Society of Natural History.

When visiting the city of Cincinnati the naturalist would do well to visit the Natural History Museum, located near the corner of Sycamore and Fourth streets. To be admitted the visitor has to ring the door bell, state his wish to the attendant and sign his name on the register.

The principal part of the museum is contained in four large rooms or halls. The ground floor is occupied with study rooms, office, etc.

On the first floor is the first room for the inspection of the visitor. The center of this room, for its entire length is occupied by a good collection of shells, special attention being paid to *Unio*. At one end of the room is a poor collection of bird's eggs and miserably prepared nests. This is the only thing in the building which does not deserve approval unless it be the collection of fishes and other animals preserved in alcohol, spoken of later.

The walls are occupied by cases of well mounted birds, forming a large collection. There are also several large cases of massive and beautiful corals, for the most part pure white.

In the immediate center of the room on the next floor are two large glass cases, containing a good collection of prehistoric and Indian relics. The space on either side of these cases is filled with ten cases of showy minerals some polished and all good typical specimens. About the walls are cases of minerals, curios, etc.

The third room, on the third floor, is occupied by a geological collection. This is truly a fine exhibit and delights the heart of the geological student.

One wall of the hall about sixty feet long is decorated by a long glass case filled with stuffed mammals. The top of the case is ornamented with mountings of large fish, reptiles, etc.

One end of the hall is occupied by a collection of fishes, snakes, etc. preserved in alcohol. Many of the bottles and jars are not full of the fluid and some of the specimens are not completely covered.

The fourth room is filled with remains of mastodons and other ancient animals. There is also a collection of skeletons and some large stuffed mammals and birds.

The above will give an idea of the museum, but to realize what is in it the reader must pay it a visit.

OTTO GRADY, Ludlow, Ky.

The Birds of Bermuda.

Hamilton, Bermuda,
January, 1896.

While Bermuda offers many attractions to the tourist, one of its greatest charms is its birds. Although the native family is not large, the Bermudas afford an excellent position from whence to observe the annual migration of many species of the feathered tribes of America. Equidistant, or nearly so, from the shores of Nova Scotia, the United States and the West Indian Archipelago (but nearest to the Carolinas), they present, as it were, a casual resting place to many birds, while traversing the broad expanse of ocean which forms the eastern limit of their great line of flight. Some species, as the American golden plover, the American snipe, sora rail, nighthawk and yellowshank, seldom fail to appear every autumn, and may be set down as regular visitors, probably from the fact that their line of migration is direct from the northeastern coasts of the continent to the West Indies and tropical South America; but the great bulk of the recorded species are irregular or accidental visitors, whose migratory journeys are less ambitious, and who are blown off the mainland by unfavorable winds.

An American gentleman who has made a study of the subject says that all of the birds recorded in the Bermuda list are included in that of North America, and no species has as yet been discovered peculiar to the islands. But an officer of the Royal Berkshires now stationed here, thinks there are one or two exceptions.

The catbird, here locally termed blackbird, is one of the most abundant. It is said that its harsh, mewing cry may be heard all the year round, relieved in spring by a weak but commendable roundelay. After a shower of rain in May or June, says my informant, the marshes appear literally alive with these sprightly birds, and a most agreeable concert takes place among the males, prolonged till dusk should the weather continue fine. On ordinary occasions they sing a good deal, but rain seems to delight them beyond measure. They are at most times remarkably bold birds, and follow an intruder through the swamp or cedar grove, perching close to him and scolding most unmusically; but when a pair have a nest they are far more suspicious, and silently leave the neighborhood of their home. The hen bird sits very closely on her eggs, but when disturbed darts rapidly away, returning as quickly and noiselessly when danger is past.

The eastern bluebird is a resident, and very common. It is also migratory, arriving in small flocks after heavy gales in the fall and early winter months. It is truely one of the most delightful of birds, and certainly the flower of the limited flock of the Bermuda residents. Its brilliant plumage, vivacious manners and pleasant warble make it a welcome returner to the States, and render it an object of interest to all; while its confiding and fearless nature in the building season, and the number of noxious insects it destroys, cause it to be strictly protected here throughout the islands. The male bird is perfectly lovely. The other day I saw the dazzling blue plumage of one illumined by the sun's rays as it flashed across the road like a ray of vivid azure light, and seemed actually

to blaze with intense color from the depth of the sombre foliage of the cedars. His spouse is far more sober in her attire; but they say here that she, too, puts on nuptial attire and looks uncommonly smart in April and May, when she acquires on unusually vivid blue and much suffusion of reddish brown about the head.

The water thrush is one of the commonest, yet most interesting, of autumnal visitors. It appears regularly early in October, and a few remain all winter. Throughout the early winter there is hardly a mangrove swamp, great or small, whence its sharp but musical "chip" may not be heard at any time during the day. Early in the morning, especially when the ebbing tide has left bare the strange, tangled roots of the mangroves and their muddy surroundings, it is comparatively easy to approach this wary little bird; but latter in the day it requires great caution and a certain amount of activity to acquire a specimen. These birds wag their tails as they feed on the edges of the tidal pools and flit from root to root, uttering at times their loud, monotonous cry.

The white-eyed vireo is one of the smallest and one of the commonest resident Bermuda birds, familiar to all through its sprightly ways, loud song and astounding impudence. The other day while I was walking in the road, one lit on my shoulder and fell to my feet. I picked it up and thought it was hurt, but the saucy little thing bit my finger and flew out of my hand at a lively rate. A passing colored man told me that it was locally called the "chick-of-the-village," or "chick-choo-willi," from its note. This variety asks for "ginger-beer-quick," a call very much adapted to the climate of Bermuda.

Of the American crossbill, Major Wedderburn says: "A specimen of this bird was captured in the dockyard at Ireland Island, and grew quite tame and lived for several days in my room, but poisoned itself by eating part of a composite candle, which it had cut nearly in half with its strong bill during the night."

Some few years ago a number of European sparrows were imported into the islands from New York, and they have rapidly increased in numbers. About a dozen of them have taken up their abode in an outhouse near the Princess Hotel, but I give them credit for locating in a very pretty spot. However, many natives have questioned the propriety of introducing these quarrelsome birds into the aristocratic society of the brilliant blue and red birds.

The cardinal red-bird is a well-known and abundant resident of Bermuda, everywhere conspicuous by its brilliant plumage and loud but not unmusical song. This bird is a general favorite with all classes, and is in great esteem as a cage bird. Red birds breed twice a year in Bermuda. Their nest is bulky, built of twigs and roots, and lined with dry grasses. The sight of the red-bird is a great treat, and will ever be associated in my memory with the bright sun, white houses, dark cedars and fragrant sage-bushes of Bermuda. The red-bird is said to change its notes with the season, in winter the call being "way-too," and in the spring "too-too." In spite of his strength the red-bird allows himself to be ignominiously driven from his nest by the smaller blue-bird.

The boblink or rice bird is said to be found here in small flocks during September and October. They frequent the marshes, where the ripe seed from the reeds and sedge offer an ample abundance of their favorite food. They are always found in winter plumage.

One Baltimore oriole was shot here several years ago. The bill and feet of this bird were said to be a bright livid blue.

There were three crows sat on a tree,
And they were black as crows could be;
Says one old crow unto his mate,
"What shall we do for grub to eat?"

"Just over there, on yonder plain,
There's an old hoss, just lately slain;
We'll pounce upon his sharp backbone,
And pick his eyes out, one by one."

The early history of the American crow, so far as the Bermudas are concerned, is somewhat obscure. If you will turn to Smith's History of Virginia, to which colony Bermuda at one time belonged, you will find crows mentioned as being numerous in the islands. But at present only a few are seen, and these are occasionally noticed hovering over the rough, steel-pointed cliffs on the south shore. At one time a price was set on their devoted heads by a colonial enactment—half a crown a bird, and sixpence an egg. This was considered a wise and necessary measure, because they did much damage in the breeding season, by destroying young poultry and the eggs and young of the other resident birds.

The night-hawk visits the Bermudas in the fall and spring in its migrations from North to South and return.

Several years ago a Mr. John Darrell saw a ruby-throated humming-bird under the windows of his father's house, were it was busily employed entering some large, white, bell-shaped flowers, its tail only at times being visible. The bird seen by Mr. Darrell was described as greenish in color, with its tail—the only part visible at times—tipped with white. How such a little bird ever got to Bermuda is a marvel. They have powerful wings for their size, but one would think that such a long flight across the sea would induce weariness in so small a frame, and leave them at the mercy of the wind and waves.

There are many other birds which stop here on their annual flights, but the blue-bird and red-bird are the pets of the islands.

T. B. D.

The Limestone Boulders of Central Vermont.

In the central part of Vermont is to be found the largest deposit of clay slate that is to be found in the state, and probably in New England.

Beginning in the town of Royalton, it stretches northerly, in a slightly serpentine course, for a distance of nearly eighty miles, and enters Canada at Lake Memphremagog. It passes through about twenty different towns, forming a narrow strip, nowhere exceeding seven miles in width, and, in places, it diminishes to less than one mile. It is bounded, easterly, by calciferous mica schist, and westerly by talcose schist. Throughout its entire course it is interspersed by beds of blue limestone, granite and milky quartz.

These formations will be carefully studied in a future article, but for the present it will be sufficient to study the characteristics of some of the loose

Prairie Hens—Tympanuchus americanus.

boulders that are found within the borders of this strip.

Scattered over its entire area are to be found immense numbers of loose stones, varying in size from minute pebbles to huge boulders of many tons weight. Although there are many varieties which have been brought from beyond the limits of the strip, yet, by far, the greatest number of boulders consist of the same material as the underlying rock, viz: clay, slate, blue limestone, granite and milky quartz. Of these, perhaps the blue limestone boulders are the most interesting to study. They certainly present the most difficult problems to solve.

In shape these boulders are nearly always thin, flat and more or less circular. Ordinarily they are not over eight feet in diameter and six or eight inches in thickness, but it is not uncommon to find them much larger.

The largest one that I have ever seen measures a little over twenty-six feet in its longest diameter. The thickness bears some proportion to the diameter, and this stone is not far from fifteen inches thick. When exposed to the action of the elements, the stone disintegrates and forms a soft, porous, gritty substance, of a dark brown or black color, commonly known as "rotten stone." Hence, it is that small stones of this variety are seldom found unless they have been recently broken.

A stone with a diameter of less than ten inches or a thickness of less than one inch is rare. The stone is easily broken in the line of its longest diameter; it breaks less rapidly in the line of its shortest diameter; with

great difficulty, diagonaly; and not at all, in a line paralel with its flat surface.

In nine cases out of ten, these boulders will be found lying upon one of their flat sides with its long diameter in a nearly north and south line, and the south end of the stone slightly elevated. I have examined more than two thousand boulders of this class and know of but one instance where the north end is elevated, and but four or five where the long diameter extended in any other direction than that just described. Sometimes these boulders will be found in an upright position, resting upon a thin edge which is imbedded in the earth. In such cases the flat surfaces are almost invariably towards the east and west, respectively. I know of but two exceptions to this rule.

Now, if we accept the theory, that, at one time the continent was covered with a vast sheet of ice, the formation of which had broken these stones from their original resting places; and that they had become firmly frozen into the solid mass; and that the continent then sank below the level of the ocean, the waters of which penetrated beneath the ice, raising it, and bearing it towards the south; and that the warmer water gradually softened the under side of the ice, until the stones were released and dropped to the ground, then the similarity of position is readily explained. In fact it forms a substantial corroboration to that theory, for a little reasoning will show that the position in which the stones are generally found is the one in which they would most naturally fall when loosened and dropped.

But there is another feature, which, though in no way disputing the theory, is not so easily explained. In a large proportion — probably one-third — of all the instances, the stones are found in nests of three, five, seven, or nine, and sometimes more. An even number of stones, is seldom, if ever found. The stones are always lying with their flat surface together, with a thin layer of "rotten stone" between, and the central stone is always much the largest, while they decrease regularly and rapidly both above and below.

This disposition of the stones presents two interesting problems, which, at present, I make no attempt to solve. The first is, why do the nests always contain an odd number of stones? The second is, why are they always in the same relative positions as to size? I shall be glad to receive, through the columns of the MUSEUM, any hint as to their solution.

C. O. ORMSBEE,
Montpelier, Vt.

"Do Birds Reason?"

Under the above caption in your November number Mr. E. Kroy of Kittson Co., Minn., gives a very interesting article, which would seem to prove that birds do reason, at least so far as to the protection of their nests and young, and in other respects they seem to be void of reason. I have similar experiences as Mr. Kroy with the Sparrows and Wrens. A few years ago we had Bluebirds, Wrens and Swallows breeding in the yard, the Bluebirds and Swallows have disappeared while the Wrens hold their ground with the English Sparrows but I imagine it is on account of the boxes I put up for the Wrens—I now make the entrance

hole only one inch in diameter—which enables the Wrens to enter but excludes the Sparrows, although they will try a long time to evict the Wrens after they have their nests nearly completed. Two years ago an old male Sparrow after trying a long time to get into the box occupied by a pair of Wrens stationed himself on the wire clothes line about two feet from the box and when the Wrens came he would drive them away. I watched the operation for some time, and then took the little collecting gun and putting in a number 12 shot shell, and getting him in line of the end of my neighbor's barn, I soon put an end to that dispute, and the Wrens lived in peace the rest of the season.

Last year I put up two new boxes for the Wrens on top of the grape trellis, leaving an old one on one end and placing a new one on the other end, the other in the middle. When the Wrens came they examined them all and decided on occupying the middle one. As usual the Sparrows tried to drive them away, and right here I want to say that it is not because the Sparrows want to use the box themselves for I have never known them to occupy a box after driving the Wrens out. I think it is merely P.(ure) domesticus(sedness).

When the first brood was three days old, the female turned them over to the care of the male, and commenced building another nest in the other new box. This box had a partition through the center, and a hole in each end. The second day after the female commenced building I noticed that she carried material in both holes, and I thought that I would investigate, when I found that she was building two nests, and the condition of them were about the same. Thinking it was only a waste of time and labor for her I took the material out of one side and laid it on top of the box and closed the entrance—this was done during the absence of the bird—on her first return she went to the hole that was closed and being unable to get in, she went to the other entrance with the material she had and immediatel carried in all that I had put on top of the box. Afterward I regretted that I did not let her go on with both nests, and see if she would deposit eggs in each, and the usual number six, which would have answered my querry of a few years ago in *Forest and Stream*, "Can Birds Count?" which was suggested by finding an Ovenbird nest containing three young of the Ovenbird and one young Cowbird, and on the ground near the nest an egg of the Ovenbird.

The building of the two nests by the Wren goes to show that it did not reason in the matter, but was instinct. Will the readers of THE MUSEUM give views on the Ovenbird, nest of young and egg outside? I would like to know how they correspond with mine, which I will enclose with this, but will not be published until answers are received from others.

J. L. DAVISON,
Lockport, N. Y.,

Notes from the Fulton County Natural History Society.

Not long since a lad brought us a a female Saw Whet Owl. (*Nyctala acadica.*) He found it perched in an old shed on Big Creek a tributary of Spoon River, three miles from Lewistown. He had stunned it with a stone

and it was yet alive when brought to us. Its skin is now in the writer's cabinet. If this species has ever before been found in this county we have not heard of it. In the nothern tier of counties, and in Chicago and vicinity it is not uncommon, but its presence this far south has heretofore been in dispute.

We received our first Short-eared Owl this year about October 20th. Another was killed near this place the last of November. Two Snowy Owls were taken within the county about November 25th. Three Great Horned Owls, killed by boys, have been brought to us within the last ten days.

This winter our club is studying the ducks. We meet every Monday night. The first Friday night in each month we have an open meeting at which papers are read, and the meetings are well attended.

W. S. STRODE, M. D.,
Lewistown Ill.

Crane Mormonism.

While collecting among the alkai lakes and sandhills of Cherry County, Neb., and Lugerbeel County, So. Dak. last spring, I saw what I took to be a case of mormonism among birds, which beats everything I ever heard in the line of peculiar breeding.

In the afternoon of June 24th, while wading among the tules and rushes near the shore of a lake, (locality known as North Lake) located about 200 yards north of the Nebraska line, in Lugenbeel County So. Dak., I flushed a female Sandhill Crane from a small clump of tules.

I went quickly to where the bird arose from, expecting to find a set of eggs, and found the nest, and to my sorrow and joy saw upon the nest five young cranes. These young birds apparently about four to six days old, were about the size of adult Meadowlarks and were partly covered with down of a grayish yellow color.

Upon my picking up one to examine it, it let out a squak that started the old birds calling in their low gutteral notes and one of them flew around me in a very threatening manner.

The nest was a large platform composed of dry tule stalks and top of nest was twelve inches above the water which was ten inches deep. Nest was ten inches wide by sixteen long, slightly hollowed on top, and resembled the nest of American Bittern but was much larger.

I stayed near this nest for some time, watching the birds and observed that there were *three Cranes* who apparently had an interest in it (two females and one fine majestic plumed male).

When I returned to the cattle ranch where I was stopping I remarked that I had found a Crane's nest; and was told that *three Cranes* had been around the North Lake every summer for the past five years and after thinking the matter over, I have come to the conclusion that it is a case of Crane mormonism and that the five young are the product of polygamous breeding.

I would like to hear from other naturalists who have observed anything in this line and am sure that the editor of THE MUSEUM will give space for you to relate your experience or voice your opinions regarding the above observations.

ISADOR S. TROSTLER,
Omaha, Neb.

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A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r, Albion, N. Y.

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WALTER F. WEBB,
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NOTES.

We are pleased to note that our Western friends appreciate our office located in their midst. Schools will find they can save from $\frac{1}{4}$ to $\frac{1}{3}$ by buying from us at that point. We are making up very complete collections of minerals, shells, fossils, etc., and carry a fine line of naturalist's supplies. Write us when in need.

We are indebted to Mr. Richard Mausill of Rock Island, Ill., for a copy of his Almanac of Planetary Meteorology and Weather Forecaster's Guide, being a new system of science. Some of our older subscribers will here find food for deep thought. The price is 25cts. prepaid.

The Ontario Archæological Museum of Toronto will please accept thanks for a copy of "Notes on Primitive Man in Ontario." It is a very neatly gotten up pamphlet, highly illustrated and cannot fail to be of great interest to all archæologists throughout North America.

A "Naturalist in Mexico" is the title of a neat little book by Frank Collins Baker of the Chicgo Academy of Science. The tour which Mr. Baker describes was unkertaken by the Academy of Natural Science of Philadelphia, he acting as zoologist. The expedition was under the charge of Prof. Angelo Heilprin, the object being to collect data and specimens illustrating the fauna, flora and geology of Yucatan and Mexico. Mr. Baker gives minute descriptions of the cities and people visited as well as a general idea of specimens collected. An invaluable help to anyone intending to visit that country.

Blue Mound, South Dakota.

In the valley of the James River in South Dakota about two miles north of Forestburg and rising abruptly from the bed of the river is a small hill locally known as "Blue Mound." The hill is composed almost wholly of clay, and is overlaid with a stratum of sand which varies in thickness from two or three inches to about four feet. Intermixed with the sand is a sufficient amount of loam to support a scanty vegetation. In slope this hill bears some resemblance to a large loaf of bread; and, by a survey made in 1883 in which the writer assisted, it was ascertained that the highest point was ninety-eight feet above the river.

In the summit of the hill is a huge depression or hollow, nearly fifteen feet deep and forty or fifty feet wide. It extends transversly about two-thirds of the way across the hill in a slightly diagonal direction. It is evident from its appearance that some force has scooped the dirt from this channel and transported it from the immediate vicinity. Yet the hill gives no hint as to the means by which this was accomplished, or the agent which was employed.

About three miles south-west of the hill, on the opposite side of Silver Creek and nearly in a direct line with the channel is a small circular hummock about ten feet high and not far from six rods in diameter. It is formed of clay, identical in its composition with that of Blue Mound. Beneath it is the black loamy soil of the surrounding prairie. It is evident that at no very distant period some agency has taken this little hummock from the channel in Blue Mound and transported it bodily to its present position.

We are accustomed to read of the tremendous hurricanes which frequent that section of the country but it would be a bold hypothesis to assume that this is the result of a hurricane or a wind-storm of any kind. Yet when examining these hills and the surrounding country the convictions irresistibly forced upon the mind of the observer that wind was the agent employed; although so far as I know there is no record of a wind-storm even approaching in severity what this must have been. Still when we reflect upon the description of water-spouts often seen in the Indian Ocean and which are caused by winds, it is easy to conceive of a wind sufficiently violent to produce the results described.

It should be remembered that this article has been written from observations made in the spring of 1883, when the country was practically unsettled. Since then nearly the whole country has been brought under the plow and no doubt these features would be less easily distinguished.

Notes from the Mohawk's Country.

P. M. VAN EPPS.

During October past I made, in company with Mr. V. Hallenbeck, a visit to that most interesting precolonial village site of the ancient Mohawks, Camp Cayadotta in Fulton County, N. Y. Well ransacked as this place has been, it still yields much of interest. At the occasion of this visit I made the fortunate find of a handle fashioned from antler, probably for a knife, though possibly for a perforator.

This curious and interesting specimen is precisely $2\frac{3}{4}$ inches in length and has been made from a prong of antler having the smaller end cut off to an obtuse point with many facets much as a small boy sharpens a lead-pencil. The whole surface has been scraped and polished until all original roughness has been removed and the example has certainly been a neat and very efficient handle.

The oblong perforation for the insertion of the stone (?) blade is in the larger end, and has a depth of $1\frac{1}{4}$ inch or nearly half the entire length of the handle. The surface of the specimen conforms nearly to the original taper of the prong whence made and its greatest diameter is 11-16 of an inch. In outline it is slightly curved and is not exactly round.

By forcing in the tang of the blade or by rough usage of the completed tool, the handle has been split at the perforation in four places, exactly as an unferruled file or chisel-handle of wood would check with similar usage. A few such handles fashioned from sections of antler have been reported by Dr. Metz and Protessor Putnam from mounds in the Miami Valley, Ohio, but I have yet to learn of any example from this vicinity or State. As to flint knives, a few fine examples have been received from Camp Cayadutta, an exceptionally fine example of very rare form having been procured at this site by Mr. William Fisher on May 30, 1895, and on the occasion of my last visit I had the good fortune to find a larger example of a very unique form with a tang, but far too large to fit the above descibed handle. These two flint knives will be described and figured in a later paper.

Many other pieces and fragments of antler have been found at Camp Cayadutta, nearly all showing some traces of cutting or abrasion. I have from this site a large basal section of antler having a channel or groove over 4 inches in length which has been cut or scraped to a depth of $\frac{3}{8}$ of an inch with the apparent idea of dividing the section longitudinally. The striæ made by the flint (?) tool in cutting are very plainly to be seen in the sides of the groove. On one side of this same specimen can be seen where a prong or point has been separated by cutting with a stone axe.

* * * *

In these days and in this vicinity the sight of a flight of wild geese is such a novelty that it is always noticed and is sure to bring out many comments. Maintaining their V-shaped lines intact in mid-air in spite of high winds such a sight is well worth pausing to observe.

Just dusk on a Sunday eve in November past, an unusually large flock or aggregation of flocks passed over this vicinity flying very low and towards the southwest. This flight numbered from 150 to 200 and was made up of a number of V-shaped alignments (five or six) flying in irregular order as to each other and with a few scattering geese in lonely flight but still keeping abreast of the procession; perhaps marshals.

A very noticeable peculiarity of this flight was that some of the V-shaped alignments were made up of a double row of geese on either side as though one flock had come up from the rear into the angle of a preceeding V and had retained this position while in continuous flight. Has this been noticed before?

During the last week in November many small flocks were noticed flying southward. On a bright day in the early part of the month my attention was called to a flock in the characteristic V-shaped form, passing to the east. Though flying quite high their honking could be plainly heard and far above them at a tremendous elevation, in fact just discernable, was a second and much larger flock passing in the same direction.

Dr. J. D. Hooker F. R. S., traveling in the Snowy Himalayas on the frontier of Thibet, speaks of viewing from the summit of Mount Bhomteo that vast, desolate and nearly unknown region toward the valley of the Varu, where the kite and the raven wheel through the air; and still higher

A Typical Scene in South Dakota.

in the pale transparent sky. "Long black V-shaped trains of wild geese cleave the air, shooting over the glacier-crowned top of Kinchinjhow, and winging their flight in one day, perhaps from the Vrau to the Ganges, over five hundred miles of space and through twenty-two thousand feet of elevation."

* * * * *

Now that we have geese on the table, it might be well to repeat the somewhat ancient story of how Barnum bought the Honk, which may be new to some of the readers of THE MUSEUM. Barnum, the irrepressible, figured in a story at which nobody laughed more heartily than himself. He was riding on a Long Island railroad, and overheard two passengers talking in a way that caused him to prick up his ears: "Yes," said one of them, "Ed. Smith has the best honk on Long Island." "Never knew anything to equal it. When I was down on the Chesapeake there was nothing there to beat it," rejoined his companion. "Yes, I guess Ed. has the finest honk in the United States." All this was caviare to Barnum. When the men got off at Patchogue he asked the conductor if he could tell him who they were. Yes, one of them was Si Hawkins and the other was his cousin, but he didn't know his name. Down went the names of the men and of the railroad station inBarnum's note-book. He was going to have that honk for his "greatest show on earth;" if money could buy it. On his return to New York he sent for his agent, told him what had occurred, and sent him with carte blanche to Patchogue to secure the curiosity.

The agent was as ignorant as his employer of what the "animal" was. But he faithfully hunted down Si Hawkins and inquired in turn for Ed. Smith's whereabouts.

"He has a splendid honk, hasn't he?" inquired the agent. "There is no doubt about the matter," said Hawkins. "Do you think Mr. Smith would sell it?" "W-h-a-a-t?" exclaimed the Long Islander who began to think his questioner either demented or a singularly sober jester. "Why I should like to buy it if Mr. Smith would sell it reasonably," was the agent's serious reply. Hawkins, who was a quick-witted fellow, saw that the agent had been imposed upon in some way. "See here, if this was the 1st of April I would understand you. But even if it is the middle of December you have been sent on a fool's errand by somebody. A 'honk' isn't an animal, it's the cry with which the gunners call wild geese to the stools."

Glenville, N. Y.

Extermination of the Buffalo.

The game of the West has rapidly disappeared before the hunter's rifle. It is a fair estimate that four million buffaloes were killed within the five years between 1874 and 1879, from what was known as the Southern herd, which roamed through northern Texas, the Indian Territory, Kansas and Nebraska. Between 1878 and 1883, the great Northern herd—quite as numerous—roaming through the Dakotas, Wyoming and Montana, were destroyed in like manner. The hunters received on an average from $2.50 to $3.50 per hide, to be shipped out of the country and sold for leather making, belting, harness, and kindred purposes. Many thousands of men were engaged in this enterprise. The most successful hunting parties consisted of a hunter and about six men known as strippers. The time usually selected for taking the buffaloes was just after they had been grazing in the morning, had gone to the water and then returned to the high ground, lying down to rest in bunches of from twenty to a hundred. The hunter, with the longest range rifle of the heaviest caliber he could obtain, would fire from the leeward side, so far away that the crack of the rifle could not be heard by the buffalo, and being behind a bush or bunch of grass, could not be seen. In that way he would kill from a dozen to a hundred a day, without disturbing the herd to any great extent. The buffalo receiving a mortal wound would bleed to death, while the others about him, smelling the blood, would sometimes come near him and paw the ground, and so stand until they too would receive their death wounds. The strippers would then come on with ox teams, take off the hides, place them in the wagons, and transport them to the nearest railroad station whence they were shipped to market. At one station alone on the Atchison, Topeka and Santa Fe Railroad as many as 750,000 hides were shipped in one year.

After the hides were removed, the carcass would be poisoned in many cases, some yearling buffalo being generally selected, and next morning there might be found forty or fifty dead wolves lying scattered around, victims of strychinne. In this way large game was rapidly destroyed, together with countless numbers of wolves that had thrived only by preying upon them. This might seem like cruelty and wasteful extravagance, but the buffalo, like the Indian, stood in the way of civilization and the path of progress, and the decree had gone

forth that they must give way. It was impossible to herd domestic stock in a country where they were constantly liable to be stampeded by the moving herds of wild animals. The same territory which a quarter of a century ago was supporting those vast herds of wild game is now sustaining millions of domestic animals which afford the food supply to hundreds of millions of people in civilized countries.—*North American Review.*

CRATER LAKE.

One of the Worlds Greatest Natural Wonders.

A trip to Crater Lake, to the lover of the grand and beautiful in nature is important event, around which will an ever cluster memories of unalloyed happiness, thoughts of little adventures and weired experiences that go to make life worth living. It is situated in the northwest portion of Klamath County, Oregon, twenty-two miles west of north of Ft. Klamath, and about eighty miles northeast of Medford, which is the best point to leave the Oregon and California railroad. The Jacksonville and Ft. Klamath military road passes the lake within three miles, and the road to the very walls of it is an exceptionally good one for a mountainous country, while in near proximity may be found remarkably fine camping grounds. The Indians of southern Oregon have known of it for ages, but until lately none have seen it, for the reason that a tradation, handed down from generation to generation, described it as the home of myrids of sea-devils, or as they were called Slaos, and it was considered certain death for any brave even to look upon it. The superstition still haunts the Klamaths. While a few of the tribe have visited it they do so with a sort of mysterious dread of the consequences. It was discovered by a party of twelve prospectors on June 12, 1853. These had left the main party and were not looking for gold, but, having run short of provisions, were after wherewithal to stay the gnawing sensation that seized upon their stomachs. For a time hunger forsook them, as they stood upon the cliffs and gazed in awe at the scene stretched before them. After partaking of the inspiration fostered by such a wierd granduer they decided to call it mysterious or deep Blue Lake.

It was subsequently called Lake Majesty, and, being constantly referred to as a Crater Lake, it gradually assumed that name, which is in itself so descriptive. At times when gazing from the surrounding wall, the skies and cliffs are seen perfectly mirrored in the smooth and glassy surface over which the mountain breeze creates scarce a ripple, and it is with great difficulty the eye can distinguish the line dividing the cliffs from their reflected counterfeits. The lake is almost egg-shaped, ranging northeast by southwest, and is seven miles long to six in width. The water's surface is 6,251 ft. above the sea level, and is completely surrounded by cliffs, or walls from 1,000 to 2,000 ft. high, which are scantly covered with coniferous trees. To the southwest is Wizard Island, 845 feet high, circular in shape and slightly covered with timber. In the top is a depression or crater, the "Witches Cauldron," 100 feet deep and 475 feet in diameter. This was evidently the last smoking chimney of a once mighty volcano. The base of the island is cover-

ed with very heavy and hard rocks, with sharp and unworn edges, over which scarcely a score of human feet have trod. Farther up are deep beds of ashes and light spongy rocks and cinders, giving evidence of intense heat. Within the crater, as without, the surface is entirely covered with volcanic rocks, but here it forms one of the hottest places on a clear day in August, one could scarcely imagine. Not a breath of air seems to enter, and the hot sun pours down upon thousands of rocksand stones that reflect the rays with an intensity that seems to multiply beyond conception.

Directly north of the island is Floe rock, a grand old sentinel, standing boldy out on the west side of the lake and reaching over 2,000 ft. perpendicular. From the top of it you can drop a stone and it will pass down and grow smaller, until your head begins to swim and you see the stone become a mere speck and fade entirely from view, and at last, nearly half a mile below, it strikes the unruffled surface of the water, and sinks forever from sight in the depth of a bottomless lake.

Soundings of the lake are as follows: The greatest dpeth recorded was 1,996 ft. of the whole number made eighteen were over 1,900 ft., thirteen over 1,800 ft., eleven over 1,600 ft., and nineteen over 1,500 ft. It was found at the bottom of the northeastern end lies a plain of several square miles perfectly level, while south of the center is a cliff about 900 feet high, and west of the center seems to be a cinder cone, nearly 1200 ft. in height, with a crater in the top 250 ft. deep. Its summit is 600 feet below the surface of the water. Crater Lake is but a striking momento of a dead past.

Imagine a vast mountain six by seven miles through, at an elevation of 8,000 feet, with the top removed and the inside hollowed out, and filled with the clearest water in the world to within 2,000 feet of the top. Then place a round island in one end 845 feet high, then dig a circular hole tapering to the center like a funnel 100 feet deep and 475 feet in diameter, and you have a perfect representation of Crater Lake.

What an immense affair it must have been ages upon ages ago, when long the hot breath of a volcano soiled its hoary head, standing as a proud monarch with its feet upon the earth and its head in the heavens it towered far, far above the mountaian ranges, aye, looked down npon the snowy peaks of Hood and Shasta and sniffed the air beyond the reach of Everest.

Then streams of fire began to shoot forth. Great seas of lava were hurled upon the earth beneath.

The elements seemed bent upon establishing hell upon earth and fixing its throne upon the great mountain. At last its foundation gave away and it sank forever from sight. Down, down, down deep into the bowels of the earth, leaving a great black, smoking chasm, which succeeding ages filled with pure, fresh water, giving to our day and generation one of the most beautiful lakes within the vision of man. In conclusion I will say, Crater Lake is one of the grandest points of interest on the earth. Here all the ingenuity of nature seem to have been exerted to the fullest capacity to build a grand, awe inspiring temple within which to live and from which to gaze upon the surrounding world and say, here would I dwell and live forever; here would I make my home from

choice; the universe is my kingdom and this is my throne.

J. A. Cottle,
Fort Klamath, Oregon.

A Few Useful Bits of Knowledge for Collectors of Lepidoptera.

Collectors of butterflies and moths have doubtless noticed that many specimens become very oily after they have been mounted and put away in a collection. In some specimens the body only is thus affected, while in others the wings also become saturated with oil. This renders an otherwise perfect insect very unslightly, and it becomes an eyesore to a well kept collection.

The fact that insects become oily is probably due to the separating out of the fatty matter in their bodies on drying. An insect collection is usually kept in a warm dry room, and the fatty matter in the insects bodies becomes melted by the warmth penetrates the body walls and appears on the covering of hairy scales outside, thus making them very unslightly appearing.

Formerly, when such an insect was noticed in my collection it was promptly removed, and a new one put in its place, unless the insect was very rare and no dnplicate was obtainable, in which case it was suffered to remain. Some species, of which I will cite *Samia ceanothi* as an example, will become oily before they have been in ones collection a year. As it costs too much time and money to be obliged to replace such specimens with fresh ones every year, I determined to find some cheap and sure method for removing the oil from these insects. As a result I have lately discovered the following remedy:

When an insect is noticed to be getting oily, go to the nearest paint or hardware store and buy a quart of benzine which will cost about ten cents. Next take a bowl large enough to admit the insect to be treated, and half fill it with benzine. Put the insect into the liquid, and see that it is entirely immersed, cover the bowl with a plate and allow to remain for about an hour. As the vapor of benezine is imflammable, the above operations must be done in a room where there is no fire or flame of any kind. When the insect has remained for the time stated, take it out of the liquid and allow it to dry. In about five minutes it will be dry, and ready to go back into the cabinet, while all traces of the oil will have disappeared. Benzine does not relax the muscles, so mounted insects may be treated by this method without their wings drooping any.

If anyone has the misfortune to break a wing or antenina off of an insect, take an insect pin or a needle and dip it into a little liquid glue. Some of this will adhere to the pin, so that by rubbing it across the fractured end of the wing or antenna and replacing the member in its proper place on the insect, it will readily adhere. Insects can thus be mended so neatly that it will be impossible to discover that they were ever broken.

All imperfect rare insects caught should be saved, as it is often possible to make a good cabinet specimen from two ones. A nick in the wing of one can be concealed by rubbing a little liquid glue on the under surface of the defective wing near the nick, and then cutting a slight piece from the oorresponding part of another poor speci-

men and applying it to the nicked wing so as to cover the defect, when the glue will speedily cause it to adhere in place. Such a job neatly done will often make a poor specimen nearly first class. Many of the rarest insects in large collections have been patched in the above manner.

I always use an insect pin to apply the glue with, as I can thus get enough to do the work and avoid getting too much.

If one wishes to catch plenty of certain species of moths in his own garden, he has only to set out a bed of sweet rocket plants, another of evening primrose, and in addition have two or three honeysuckle vines. By watching the flowers through the summer evenings, one can be sure of catching with a hand net many rare insects which come to the sweet scented flowers.

By watching the electric lights, many species which do not visit flowers can be caught.

If one smears a little molasses on the trunks of various trees, and then visits them with a light after dark, many moths will be seen feasting on the sugared spots, and can be readily induced to drop into a cyanide bottle suddenly clapped over them. While visiting these sugar spots, I usually use a bulls eye lantern, as it throws the light anywhere desired, and enables one to see much better.

O. W. Knight,
Bangor, Me.

Natural History Jottings.

COMPILED BY CHAS. T. WHITING.

Camphor is obtained by distillation from the wood of *Cinnamomum camphora*, a tree from Japan and China. It grows freely, however, in many parts of Southern Europe, and is suitable for planting in any warm temperate climate.

The Chinese strawberry bird, so called because of the resemblance of its plumage to a strawberry, is very small, and sings a little piping tune. Its bill and breast feathers are blood red, and the entire plumage is flecked with white spots, like the seeds of a strawberry.

A specimen of the entomological rarity known as the Lunar May Moth (*Ophiodes lunaris*), which was captured in Stratton Strawless Wood in 1878, has just been sold in London for £6. This insect, which fell to the net of Dr. F. D. Wheeler, the well-known collector in the Pen district, is only the fifth taken in England. Its home is in Hungary and Dalmatia.

A telegram from Berne says that a plague of field mice is reported from Trikthal, in the canton of Argovia, and poison, traps, and hunting seem powerless to check it. In certain communes, such as Zemingem, Mochlin and Wallbach, thousands and thousands a day having been killed without any appreciable results. It is reckoned that in Wallbach 100,000 have been killed since the beginning of the month. All the fields and meadows are mined with the winter quarters of these rodents, and there is fear for the spring crops.

The oyster at the commencement of its career is so small that two millions

would only occupy a cubic inch. In six months each separate oyster is large enough to cover half a crown, and in 12 months a crown piece. It bears its age upon its back, and it is easy to tell the age of an oyster by looking at its shell as it is that of horses by looking at their teeth. One to two million oysters are produced from a single parent.

Belgium has over 50,000 draught dogs, drawing milk-carts, and vegetable-carts. In Brussels there is a dog market, where a large number of common dogs are for sale cheap. The pure dogs of the breed of St. Bernard and Newfoundland, Great Danes or English mastiff are worth too much money to work in a market cart. They rear Belgian horses almost exclusively, and have no small cheap horses; hence they use dogs where we use horses, and where France uses cheap donkeys in the town and horses on the farms, Germany uses dogs and cheap horses, and is now rapidly increasing her importation of American cheap horses, that they can make into sausage when done working, while the dogs are not so popular for eating purposes, especially with tourists.

A good story illustrating the ingenulty and intelligence of elephants is contributed to the *Spectator* by Mr. Mossop, of Newport, Salop. He says that a child at the Zoological Gardens, in throwing a biscuit to the elephant, dropped it between the cage and the barrier, and out of reach of the child or the elephant. When the latter blew the biscuit with its trunk till the child could reach it, and again attempt to throw it into the elephant's mouth. This happened not once, but several times. Not that elephants have perfect reasoning powers, as the sequel to this story will show. After the small child had made many vain attempts to throw the biscuit far enough, a good-natured lad thought he would help, and took the biscuit from the child. This displeased the elephant, who thereupon dealt the lad a severe blow on the arm.

Notes from Lewiston, Illinois.

For a week before Christmas time rain had fallen almost continually in this state. The creeks and rivers everywhere were bank full and the Illinois river was overflowing the bottoms doing great damage to fields of corn that were not yet gathered. Previous to this big rain the rivers and lakes had been frozen up solid and the water fowl had taken their departure for the South. Warm weather and open water however brought a few flocks of geese back again. The night of Dec. 23d was extremely dark and rainy. Several flocks passed over the city flying quite low and at Nubbin Ridge out in the country a large flock became confused and flew about for an hour or two passing quite low over houses where lights were burning. Several farmers got out with clubs and poles and tried to knock some of them down but were unsuccessful except in one instance when one was secured by its flying into a cherry tree and falling to the ground and being secured before it had time to rise again. It was quite fat and used for a Christmas dinner.

Bird life in this vicinity has been unusually quiet for the last few weeks, the winter residents seeming to have hidden themselves away somewhere.

Dec. 30th I took a ten mile tramp out

across the Big creek country and the only birds observed were two or three each of the Downy, Hairy and Red-bellied Woodpecker, a half dozen Black-capped Chickadees, two pairs of Cardinals, a few Tree Sparrows, five or six Crows and about a dozen Horned Larks. Another trip of seven or eight miles on New Year's day was almost a blank. A few Chickadees and Sparrows, two Cardinals, a Hairy Woodpecker, a Flicker, a Rough-legged Hawk and a Barred Owl. However on each of these trips a good many specimens of the smaller mollusks were obtained under old logs, such as the zonites, polygyraes and hirsutas. W. S. STRODE.

Mounting Objects for the Microscope in Canada Balsam.

Every one after having prepared his objects or sections, is desirous of preserving them in a permanent form in as neat a manner as possible and that with the least trouble. The following manner of proceeding will assist in obtaining good results.

Turn a circle on the back of the slide in ink with a pen, being careful that the circle is rather smaller than the thin glass it is intended to employ, so that the refraction of the balsam at the edges of the glass do not interfere with placing it true in the center; the best turn-table to employ is the concentric turn-table, made by Alyward, of Manchester, Eng. The slides must always return absolutely to the same center.

When the ink is dry, wipe the front of the slide well with a clean cloth, and press or drop two or three drops of balsam or balsam dissolved in benzole in the center of the glass slide, take your object out of the turpentine it is soaked in, with a small pair of pliers, and place it in the balsam with the hollow curved side of the preparation down if it is not quite flat. Then turn it over on the other side to release any air bubbles that may be enclosed underneath, then adjust it well in the center with a needle point, put a drop of balsam on the top, and place the slide on one side protected from the dust for 24 hours.

Clean a cover-glass the size you wish to use, see that the preparation is well centered. If it is not right it can be moved by the needle point, the balsam not being hard enough to prevent it, but if the preparation is very delicate, it will be necessary to warm the slide on the hot table to soften the balsam before attempting to disturb it; when everything is right, place a drop of balsam on the top. This is to fill up any hollow that may form in the center of the balsam, which would hold the air when the cover is put on it. Place the cover gently in the middle of the slide, letting it sink down by its own weight at first, press gently with the needle, being careful to have the cover properly in the center. If not quite centered, shift it with the needle point till it is quite true. The preparation will not move in the balsam for some time till the fresh balsam has penetrated through the dried balsam put on the day before. If you find that the object has moved out of the center then comes the difficulty of getting it back again without beginning the whole process over again. Have two needles by you, as one is sure to get messed with balsam which will get on the front of the cover-glass and bother you in centering the object.

Notice to which edge of the cover-glass the object is nearest, and with the needle point draw the cover-glass by pressing on the top towards the edge of the slide. In this way the cover will slip over the object without displaying it. Then push the cover back by the edge when it will take the preparation with it. In this way, by a little patience the object can be shifted to any part of the slide. If you try to get it in the center by pushing the cover first from the edge, you will soon find that the object will work right out of the field. Having got everything right and true, put a light brass clip on to hold the cover in its place to dry. If you put too strong a spring on the preparation it may force the cover up when the spring is released. It is better to remove the surplus balsam with a knife, at once, while it is soft, wiping the balsam off of the knife with a piece of paper. Place the slide away for a few days to allow the balsam to harden, when you can clean off the slide with methylated spirit, or benzole. When the slide is nice and clean, put it on the turn-table and run a ring of gum water round the edge of the cover-glass. When dry, give it another coat. This is to prevent the white zinc or other cement being dissolved by the benzole and running in under the cover-glass. If pure balsam is used, there is much less risk of this occuring. A very neat finish is given with white zinc cement. It is easy to work and gives a good, hard, brilliant surface, on which can be put a ring of black or any other colored varnish. When you have finished, clean the brush well by means of benzole; wipe the brush on a piece of paper between the fingers first, when the brush can be cleaned with a very small quantity of benzole and very quickly.—*The Microscope.*

VOL. II NO. 4.

FEBRUARY, 1896.

THE MUSEUM

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Berlin Agency, R. FRIEDLANDER & SOHN, Berlin, N. W, Carlstrasse 11.
London Agency, SWANN & CO., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

TO EXCHANGE.—A pair of climbers for good pair of roller skates. Also want good pair of ice skates, No. 11, and rubber pistol pocket. W. G. STUTZMAN, Kent, O.

TO EXCHANGE.—Remington double-barrelled shot gun, nearly new, a fine shooter, for articles valued at $20. Want field or opera glasses, climbing irons, datas, colored cotton, egg cabinet, books on natural history, eggs or part cash. First two wanted in particular. Make offers. No postals C. G. SARGEANT, Winnebago City, Minnesota.

EXCHANGE.—Southern bird and mammal skins for others. Medical books, manuals on all subjects, for skins or museum specimens. J. J. WIRZ, Taxidermist, Augusta, Ga. 2m

FOR SALE.—One fine golden eagle and other birds, and mammals, captured and mounted in Pennsylvania. Send best offer for eagle soon; also for young grey foxes. MISS LEAH BERKHEIMER, Osterburg, Penna.

COLLECTORS make your own cement, for 20c silver or stamps I will send receipt. Just the thing for mounting specimens on card board; will exchange. C. F. ALKIRE, Box 228, Mt. Sterling, Ohio.

WILL take desirable sets of nicely prepared eggs in exchange for extra fine White Plymouth Rock fowls or eggs for hatching. W. J. B. WILLIAMS, Holland Patent, N. Y.

BIRDS, Mammals and Reptiles mounted true to nature. Those wishing to buy or to have first-class work of this kind done cheap will do well to get my prices before sending elsewhere HARRY A. WEISS, Taxidermist, Owego, N. Y.

FOR SALE.—Kombi and printing frame, price $3.25, prepaid; cost me $3.95; good as new. CHAS. H. FINNE, Box 280, Little Rock, Arkansas.

TO EXCHANGE.—75,000 U. S. stamps of different denomination, 5,000 cigarette pictures, one black walnut cabinet with 95 compartments, 28 x 18 inches, for singles, eggs or minerals, in exchange for the best offer of Indian relics or single eggs of New England birds. Address HARRY A. DORR, 306 Pine St., Providence, R. I.

EXCHANGE.—Marine, land and fresh-water shells, for same; especially desire Cypraea, Cones, Olives and foreign land shells. Send lists and receive mine. CHAS. S. HODGSON, Albion, Ills.

FIFTY species of the finest fresh water and land shells to exchange. Will take sets, skins of birds or mammals, minerals, fossils, curios or offers. W. S. STRODE, Lewistown, Ill.

WANTED.—Indian relics and curiosities. Will give good exchange or cash. Would like to correspond with Southern collectors. J. H. MERRILL, 20 Tufts St., Cambridgeport, Mass.

TO EXCHANGE.—I have a large supply of pipe stone relics, carved by the Sioux Indians, in the form of pipes, daggers, hatchets, watch charms, etc. Will sell or exchange for birds, animals, etc., stuffed. Write and get terms at once. C. A. MALLORY, Taxi., Flandreau, So. Dak.

FOR EXCHANGE.—Tenth, eleventh and twelfth annual reports U. S Geological Survey for good arrow and spear points, with notes where from. FRANK R. RATHBUN, 42½ Franklin St., Auburn, N. Y. 2m

10 vol. old books, literary, leather backs, 1½ in. thick, London print 1826-1832, for showy minerals, shells, corals, marine curios, for private collection. Write. M. INGALSBY, Custer City, McKean Co., Pa.

A CORRECTION.—In my paper in the January issue of THE MUSEUM, "Notes from the Mohawk's Country," the name of the ancient Mohawk village should read, Camp Gayadutta. It has been well named thus, by the archæologists of the valley, for the stream on which it is situated. Also in the same paper, for "Varu" read "Yaru." P. M. V. E.

WANTED.—I will give good exchange for sets, with nests, of A. O. U., No.'s 465, 501, 552, 593, 594, 601, 622a, 705, 706, 707, 718, 725, 751, 761a, 610, 597, 474b, 474c, 474d, 474f and 457. For any of above I offer fine sets and showy insects. Parties having above, please write. O. W. KNIGHT, No. 384 Hammond St., Bangor, Maine.

STAMPS.—100 all different, 5c; 25 well assorted, 5c; 1,000 well mixed, 35c. Agents wanted at 50 per cent. commission. EDWIN G. COREY, 30 E. 129 St., New York City.

WANTED.—Skins of 211, 215, 224, 226, 234, 393d, 395, 396, 399, 406, 409, 684, 477, 478, 483, 484, 441, 384. Offer skins in exchange. P. K. GILMAN, Box 322, Palo Alto, Cal.

Mr Webb, dear Sir: Enclosed please find exchange notice. The latter I wish inserted in your valuable paper, THE MUSEUM. My last "ad." brought me more replies than I could deal with. Yours truly, PHIL. K. GILMAN.

TO EXCHANGE.—For sea shells, bird skins or offers, several hundred magazines, including natural science magazines, "Scientific American," "Cosmopolitan," "Once a Week," and books on natural history. FRANK STUART, Ritzville, Wash.

FOR SALE OR EXCHANGE.—Tarpon rod, with two tips, VonHofe reel, Springfield rifle, with bayonet, S. & W. 38 cal., old magazines, Ithaca Hammerless, 10 ga., new, $35, or 12 or 16 ga. Hammerless in exchange. H. I. BENEDICT, 18 Main St., Lockport, N. Y. 2m

TO EXCHANGE.—Collection of eggs and nests, value over one hundred dollars, for Magazine Camera, Magazine Rifle, Shot Gun, Revolvers, High Grade Microscope or Koshkonong Hunting Skiff. J. P. FEAGLER, Waterloo, Ind.

FOR EXCHANGE AND SALE.—Fine Fossil Fish, Indian Pipes, War Clubs, Moccasins, Stone and Flint Tools, U. S. Dept., Sets, Rare U. S., all issues U. S. Postal Cards, War Relics, Curios, Mounted Birds, U. S. and Foreign Coins. O. D. WALBRIDGE, Marseilles, Ill.

A SNAP.—A good house and lot, good location, in the live town of Ritzville, Wash., county seat of Adams Co., business and dwelling house combined, two story, 22 x 40, with addition back, 14 x 30, well worth $1000, will take $800, one-half cash, one half in sea shells and curios. FRANK STUART, Ritzville, Wash.

MESMERISM HYPNOTISM.—Being an advanced student of one of the foremost American Hypnotists, I will be pleased to give instructions in Mesmerism and Hypnotism (by mail.) For a short time I will accept desirable Natural History specimens in payment. Every person can learn. Very useful to physicians, dentists, etc., and amusing to all. ISADOR S. TROSTLER, 4246 Farnam St., Omaha, Neb.

FOR SALE OR EXCHANGE.—One large caterpillar, one fine doubled-headed chicken, one alligator, one horned frog, one snake from South America, and one scorpion in alcohol, for best amount in cash or exchange for best offer in minerals. Write soon, giving me your price, or list of minerals. ALFRED M. KNAPP, 1232 Lafayette Ave., Baltimore, Md.

WANTED.—Cocoons and Chrysalides, all kinds. Will pay cash for desirable species. Write to PROF. CARL BRAUN, Naturalist, Bangor, Maine.

SPECIMENS from the Arctic Circle. With the beginning of this season we shall be prepared to furnish collectors, dealers and institutions with choice specimens of Alaskan birds, eggs, mammals, furs and natural history specimens generally. We are to be permanently located and mean business. Watch these columns for an Alaskan address. Correspondence solicited. GEO. G. CANTWELL, Puyallup, Wash.

WANTED TO EXCHANGE.—10 volumes of "The New Monthly Magazine and Literary Journal," published by Colburn and Bentley, of London, in 1826-32, leather back, with paste board cover, in good condition for age, 8½ in. long, 1½ to 2 in. thick, for ores, sea curios, corals, etc. Write what you have for exchange. M. INGALSBY, Custer City, McKean Co., Pa.

INDIAN RELICS.—Special bargain. 1 flint hoe, 1 flint hatchet, 3 war points, 1 drill, 1 spear, 1 scraper, 1 piece pottery, all perfect relics, and sent prepaid, for $1. Have a few genuine copper spears and needles, also a nice lot of hoes, spades, war clubs, axes, etc. Outlines for stamp. A. D. GRUTZMACHER, Mukwonago, Wisc.

Bucknell University, Lewisburg, Pa., Jan. 17, 1896. Walter F. Webb, Albion, N. Y. Dear Sir:—Enclosed find $1 (bill) for my renewal to the MUSEUM. As a premium per your ad. on back of December issue send me O. & O. Manuel, leather bound. I think the MUSEUM quite a success and I have mine bound, and forms quite an addition to my library. Yours truly, Harry C. Simons, Lewisburg, Union Co., Pa.

CASTS of large and rare birds' eggs. For the next thirty days I will sell at the following low rates: Great Auk, 60 cts.; Æpyornis, $2.50; Dyornis, $1.75; Rhea, 45 cts.; Emue, 45 cts.; Ostrich, 45 cts.; Golden Eagle, 50 cts.; Bald Eagle, 45 cts. These casts are so perfect that they can hardly be distinguished from the genuine egg. Dealers please send for wholesale rates. N. P. BRADT, Hindsburgh, Orleans Co., N. Y.

WANTED.—"Auk's" complete file "Archæologist," (except No. 1 of Vol. 2) 17 "Oologists," 5 "Ornithologists & Oologists," for 1891, for best offer. Address, V. H. CHASE, Wady Petra, Ill.

I am still offering fine cabinet specimens of Elastic-Sand-Stone at 25 and 50 cents each, or I will exchange for crystalized minerals; will send the same size specimens as those seot me. Address, P. R. CAMP, Marietta, Ga. P. S. Wanted a small job printing outfit.

100 specimens, illustrating the manufacture of arrowheads and spearheads, and including perfect specimens of each, also knives and scrapers, cores and discs, sent by express for one dollar. F. I. BROWN, Hayden Bldg., Columbus, Ohio.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

Vol. II. ALBION, N. Y., FEBRUARY 15, 1896. No. 4

Science Gleanings.

A previous number traced briefly some of the laws of world forming; this will treat mainly of life as the foundation of world inhabiting. Matter and force were the factors that evolved a chaotic world. But, so far, it was a physical force operating through physical laws, and the result was an unhabitable world, and therefor not a completed world; not finished according to the Divine Record. A world repulsive to our very thoughts. Banish every form of life, animal and vegetable from our globe; wrap all life in the shroud of death; and the human mind shrinks back instinctively from such a picture.

Physicial power, operating through natural law, could fit up a world for living occupants, but physicial power through natural law could never take one of the infinite number of particles of matter that make up our earth and mould it into a living form. No change of its substance or in its environments, no chemical action or process of evolution, or acquirement of energy could turn one atom of dead inorganic matter into a thing of life.

Vital force only can do that; possibly in unison, but at all events, controling physical force. For if there is a well established fact in science at the present time, it is that life springs only from antecedent life; and that the will only is, and can only be, our standard of measuring any kind of force or power. When we attempt to do even the simplest act, it is our will that judges of the amount of force or power necessary to do the act, and commands forth the muscular force sufficient to that end, and neither more nor less than needed, if the will has not misjudged or been imposed upon by false appearances.

If these are facts, our globe must have forever rolled in its orbit, a thing devoid of life and living beings, with all its physical machinery and natural laws, perchance complete, had not a vital force gone forth, guided and operated by a Divine Will, to animate, and bring into being.

But all kinds of matter are not capable of being so animated. The stone from its quarry, the mineral from its mine, the dust on which we tread, the soil in our field, must always remain lifeless matter. These, too, have a useful record in the volume of nature which may be traced at another time.

Life has a "physicial basis," a certain assemblance of elements combined chemically, to which the name protoplasm — meaning first moulding— has been applied, for which life—the vital principle—has a liking, and aside from which, it is never found. Without protoplasm, life as an isolated thing does not exist on our globe.

We may say for sake of illustration, protoplasm is the dwelling, life is the

guest; and viewed in this light, something that comes into the dwelling and fills it, is life and there is living protoplasm and a living thing. Ere long, this guest goes out of its dwelling, and there is left dead protoplasm, and a dead thing.

It may seem strange that all the diversity we see in living things, from the microscopic fungi, to the Giant Pine of California, from the animalcule in a drop of water, to the whale that flounders in the ocean deep, should originate, and be built up, from the same structureless unit, a bit of unorganized jelly like protoplasm, into all these diversified forms under the controling principle of life; but science has not yet, and possibly never may furnish the key to unlock the mystery.

Whether the 76 atoms of carbon, hydrogen, oxygen and nitrogen, that make up dead protoplasm, are in any way changed in their relative grouping in the combination, whether they have any new powers conferred on them by the life principle, is left for us only to surmise.

The chemist finds himself powerless to analyze living matter, and thus solve the problem; but not more powerless than the physicist, to explain, how this vital force called life, has the power, silently and constantly, to transform lifeless mineral matter, and from it, build up, and, for a time, use it as a habitation of life and beauty.

The mechanics of physics are not the mechanics of life. We have been taught to believe that if the same thing be added to equal things, the results must be equal. Not so, however, in things of life. That particle of protoplasm, animated by the principle of life, developes perchance into a worm; this particle, animated by the same principle of life, developes into a dog, a horse or a human being; for the great architect has commanded a law, "after its kind," conformity to type, and stamped it upon every atom in the world.

Here, it seems to me, is suggested a possible mistake running along the whole current of scientific literature. Do not such facts rather point to a variation in the very nature and composition of protoplasm, undiscernable thought it may be to our senses and tests; and that be these differences what they may, vital function is not a product, yielded up as a result of chemical or physical structure or composition.

Having made these observations about life in general, let us proceed to trace it on our globe. That which is possessed of life, is an animal or a plant, and belongs to the organic kingdom, because all such individuals have some organ, to accomplish their work and mission in living. The structure may be so simple, that there appears to be complete identity in every particle of it. In the lowest forms of life, it is merely a particle of structureless protoplasm, or jelly-like substance; yet small finger-like processes of this may be thrust out in all directions and again withdrawn; proving conclusively the presence of a nervous matter and muscular contractility, acting under vitality.

There must be digestion, too, or absorption into its substance of material necessary to sustain it, though there is no stomach.

In a creature so small, very much of

it must be surface, when compared with its bulk; and when surrounded by, in fact floating in, a pabulum ready prepared, absorption through its exterior surface is ample. If its nervous matter is uniformly diffused through its whole body, and is susceptible to the influence of light, what does it need for eyes;—it is virtually all eyes! And so our poor, pitiable, bit of jelly-like amorba, is not so bad off after all.

If the substance is of a jelly-like or semi-fluid nature, as it almost universally is in the low forms of life, it will likely approach the globular form; for the particles, being free to move, will each press by the most direct route to the center, and the result must be a drop a round cell—such as hangs from the blade of grass in early morn, and for the same reason.

It may be safely asterted that in such low forms of life, physical force and law overcomes, in some degree, vital force, and comes off so far victorious, as to dictate shape to the body.

The border line between animal and plant life is very indistinct, yet it is not the less complete. No single criterion can be seized upon that will hold universally, in drawing the distinction between animal and plant, sensation fails, for some plants seem to be sensitive; motility fails, for some plants are motile, and some animals are permanently attached. Digestion fails, for while some plants live on animal food which they trap, or at least make use of it as a part of their support, the whole class of carnivorous animals do the same. Respiration fails, for while plants take in carbonic acid by their leaves, which correspond to the lungs of animals, and give back the oxygen during the day light, the reverse of this is the case in the dark; and there is an exception, at best, in the whole class of the fungi, which are true animals in respiration. But there is one fact so broad and general in its application it may be taken as the guiding star, on which to turn the eye in this line of investigation.

Plants take material from the inorganic world—dead mineral matter—air, water, gas, and salts, fabricate these into the structure of their tissues, and thus stored up, turn it over to the animal as food, in seed, or fruit, or leaf, or root, as the case may be; while the animal has no power to make use of anything as food, except what is thus prepared by the plant.

The wrought products of the animal or vegetable are often so closely like the results of crysallization in the mineral, as to be very imposing, yet one is wholly the result of a molecular force, guiding each particle to its appropriate place in the crystal, while the other is made under the influence of vitality.

Here are some microscopic quartz crystals scattered in a silicious earth, and there are some microscopic vase and urn-like vessels, sculptured all over in beautiful patterns of wonderful design. They, too, are quartz;—the crystals stand for the inorganic world and the power of crystallization. If broken to pieces a thousand times and melted in the furnace, the same forms may be reproduced. The little urn-like Polycystine shells, stand for the organic kingdom and the work of life. If broken or melted, no inorganic power on earth can mend or reproduce them.

GEO. M. CROFTS,
Keokuk, Iowa.

The Science of Geology and the Bible Account of Creation.

The science of Geology is perhaps one of the most interesting and the most varied in its character in all the range of scientific study. Embracing as it does, almost every other science, it is not to be wondered at that more or less it has found enquirers in almost every country. It is only of recent date as a science but the rapidity with which its startling discoveries have been made known and the important bearing which each has had upon the historical records of our planet have caused it to be popular amongst every class of students. In its early stages, from the crude and imperfect manner in which the great geological facts it made known were presented to the world, it was received with great hostility by the Christian scholar, and was eagerly laid hold of by the sceptic as an argument against the great truth of Biblical authenticity. I am glad to say that further search and study has dispelled all doubts on the matter and like all other greater scientific discoveries it has only to be thoroughly investigated to make it the hand maiden to revelation.

Although the Bible was not given to us as a book of science, it frequently makes allusion to the effects and operations of the laws of nature; the allusions are not made for scientific purposes and they are often made in such a way that during the crude state of a science they are misunderstood and misrepresented; and it is only when the full light of the revelation of science is thrown upon them, that we discover the full force and beauty of their hidden meanings. For instance, the Psalmist calls the earth round, yet it is well known that for ages persecution raged against the men who asserted the world was round; and it was left for the science of later times to demonstrate its truth. The theory of the winds and atmospheric circulation, which has only been made known in our own time, since Fitzroy made it a science, was told by the Psalmist in his day, and has remained until now sealed to the scientific mind—"The wind *goeth toward the south*, and *turneth about towards the north;* and the *wind returneth again to its own circuit.*" So it has been with every other science. We may find at times, and especially in the case of new discoveries in science, an apparent jarring with sacred history; but the difference is only apparent, and on further development of facts we find the correctness of sacred history breaking out as the revealer of this very fact, but which from our want of scientific light, the world would have understood centuries ago; and thus science becomes the witness of these very statements before apparently contradictory.

Although I heartily recommend the science of geology as a most interesting study to all, I shall not in my present essay devote more to its details than is consistent with my object. I aim to show that modern discoveries in the science of geology agree with and support the Biblical account of creation contained in the first chapter of Genesis. My object in treating upon this subject is to meet the argument of the sceptic, and to dispell the fears of many who feel alarmed at the supposed disagreement between science and revelation; and which alarm arises from a false interpretation of the chapter itself, and also from a

false delicacy on the part of those who should expound it correctly; that is, the prejudice in favor of a popular error, that this earth of ours was made and completed as we see it, and that all its varied productions, its immense deposits, and its great planetary system was created in the short space of six literal days. This error—a fundamental one—is still extensively believed and its continuance is a constant source of weakness on the part of the assailed, in every attack made by the sceptic upon the authenticity of the sacred writings.

Again too, as to the number of years this old world of ours has been in existence, we have always believed that the earth was created some 6,000 years ago; but Lord Kelvin the President of the Royal Society of England, believes otherwise. His estimate, based on dates necessarily incomplete, was that the created earth, fit for the support of animal or vegetable life, could not be less than 10,000,000 or more than 400,000,000 years old. Since he published this result, which was discredited at the time, geologists have modified their conceptions, and even come to the conclusion that after all, the time allowed is quite, if not amply sufficient. Dr. Clarence King, one of the most eminent American geologists, has calculated from geological datas, that all the stratified rocks could very well have been produced by the action of water in 24,000,000 years. Quite recently, however, Professor John Perry, F. R. S., has questioned Lord Kelvin's estimate, and assuming that his Lordship did not allow enough for the greater conducting power of rocks for heat and high temperatures has calculated that the age of the earth is one hundred and twenty times what Lord Kelvin made it, or a matter of thousands of millions of years. Lord Kelvin, thus challenged, has reverted to the subject, and made experiments, only to discover that so far from rocks conducting better when heated, they appear to conduct worse, so that if anything, the lower figures of the estimate are probably more correct. This result also agrees with Dr. King's conclusions, and with the age of the sun as calculated by Holmbolt, Newcomb and Kelvin, at fifteen or twenty million years, for in accordance with the nebular hypothesis of Laplace, the sun and planets originated in the same nebular.

My article may be termed in a great measure a compilation, as I intend to depend upon many of the best authors for what I require for my subject; and in order that my geological theory may not be charged with bias from any connection with orthodox authority, I shall prefer to take the geological history as given by science from those authors who have been appealed to by the sceptic as the opponent of revelation.

THE ARGUMENT.

Let us suppose an intelligent person cast upon an island, which, from all previous knowledge, had never before received the foot of human being. In his perambulations round this island, and while viewing the natural beauties of the place, suppose this person to come accidentally upon a building—say a house, which has all the appearance of being built and adapted for the habitation of man, furnished throughout with every requisite for his comfort, and lacking only the inhabi-

tant himself. The person thus viewing so strange a phenomenon would naturally turn his thoughts to a consideration of the questions which would at once suggest themselves to an enquiring mind. How did that house get there? When and by whom was it built? In order to solve these questions, the stranger would minutely examine the house itself. He would bring to his aid all his previous knowledge of the different modes of constructing buildings in different ages and in different countries. He would note the style of architecture—of what period; he would examine the stone and other materials of which it was constructed, and thus ascertain from whence each had been obtained. There might even be peculiarities about the workmanship by which he would ascertain not only the nationality, but even the workshop of the builder. He would examine the interior—the furniture, carvings, and the kind of wood each article was made of. There might be coins found in the drawers, with dates of coinage, and other matters which might enable such a visitor to write as perfect a history of the house named as if he had known its history from written or oral account.

Roman coins, tesselated pavements, tumuli, vases, pottery, and implements of war have been dug up from the ground in different parts of Great Britain, which tell us as distinctly of the Roman invasion and occupation of Britain as history can give it us. And if no history had been written of it, these relics would have told us nearly as much as we at present know on the subject. We have no complete historical record handed down to us of the destruction of Herculaneum and Pompeii, yet after these two cities had lain beneath the accumulated lava for seventeen centuries, we are told that in 1738 workmen were excavating a well and struck upon the theatre of Herculaneum, and in 1750 Pompeii was disencumbered of its volcanic ashes, presenting to view a once magnificent city, its temples, its forums, its amphitheatres, its tombs, its shops of traffic and of arts,—its houses, furniture, pictures, personal ornaments, streets, pavements—wheelmarks worn in its streets,—its wine, food, its dungeons and skeleton prisoners chained to the walls, with here and there a victim in positions as if overtaken in their attempt to escape the storm of fire which at the time enveloped the city. What more perfect history could be told of this great calamity than the ruins themselves tell us?

In the same manner we reason respecting the physical phenomenon of our planet. The structure of the planet itself, the materials of which it is composed, the position of those materials, the fossil remains of plants, fishes, reptiles, birds, and animals found embodied in them, and their gradual development from early periods up to our present time, lay themselves out like the leaves of a book before the scientific mind, and disclose as perfect a history of themselves as a written history could give us; and yet, if in a science so young, and having so much yet to explain and attain to, is shown to present a counterpart to that short and concise introduction to sacred history which we find in the first chapter of our Bibles, how marvelous, and in what a striking manner must the authenticity of that book present

itself to the thinking mind, when thousands of years it could give as it were in a mere commonplace introduction to a book—the design of which was to chronicle other events—a complete history of the creation of our planet, which, up to within half a century of our own time—as far as scientific investigation is concerned—has never been explained or understood.

(TO BE CONTINUED.)

The Unionidae or Fresh Water Mussels.

BY DR. W. S. STRODE, LEWISTON, ILL.

The most important and interesting family of the fresh water shells is the well known mussels or unionidæ. Important because of its universal distribution, of the variation in size, form and coloration and more particularly on account of its usefulness as a scavenger and purifier of our rivers and lakes.

About 1200 species have been described, over half of which belong to North America. The United States from the Ohio river south is particularly rich in this branch of mollusk. The Duck, Holston, Tennesee, Little Red and Arkansas rivers are headquarters for scores of interesting species. The rivers and lakes of Florida and Texas have in the last 20 years afforded more new species than any other part of the world.

Nicely and systematically arranged a cabinet of shells presents more diversity of form and variety and beauty of coloration than can be obtained in any other branch of natural history. All the tints of the flowers, the grass, the leaves of the trees, the changing hues of the clouds and sky, the silver lustre of the moon, the colors of the rainbow are reproduced in the splendid irridescence of the shells of sea and land.

There is hardly a stream or lake of any considerable size within the United States that does not contain representatives of the mussel family.

There are about one hundred species in the state of Illinois, and in the classic little river, the "Spoon," where my researches have mostly been conducted, I have found fifty of these species. Some of these attain a development in size, form and coloration, not equalled in any other stream in the world. This is due to the fact that the different forms here find the environment most suitable to its perfect growth.

The Unionidæ must be sought for in all sorts of places. Some will be found only in deep, still water, others in the more shallow swift running currents; some prefer the soft black mud, others the gravelly places; some will be found only under the edges or in clefts of massive rocks and others in whirlpools and eddies; some species are great travelers while others do not appear to move from one year's end to another.

The muskrat and mink will often materially assist the collector in finding a variety of shells. Along side an old log projecting out of the water, or under a snarl of roots in the bank where their den is located, a great quantity of shells may be found so deftly opened that they are but little or not at all injured. As a rule, however, it is best to collect only live shells from which the animal must be removed and the shell thoroughly washed inside and out. The valves must then be tied together or closely wrapped in strips of newspapers, label-

ed with the name of species, state, county and stream taken from. If you wish them to look as fresh and nice as they did when taken from the water, give them a coating of white vaseline or French nut oil.

The mussels are divided into three great families, Anodontas, Margaritanas and Unios; no teeth, single teeth and double teeth. There are also two other general divisions called symphonate and non-symphonate, winged and non-winged.

As an actual experience is always more interesting to the collecting naturalist I will briefly describe a trip made to the "Big Rocks" on Spoon river near Bernadotte not long since by myself aud wife and W. C. Morley, a young lawyer and his best girl. It was ten miles from Lewiston to this locality on the river but by 10 a. m. we had arrived. The writer was the only one of the party with a collecting fad, the others having come along to have a day's picnicing in the woods and boat riding on the river.

The "Big Rocks" are a half mile below the village of Bernadotte, where a ten foot dam has spanned the river for three quarters of a century. There is no other obstruction from here to the Illinois river thirty miles below. The shell fish have gradually worked up stream until the bed of the river in some places is almost paved with them, and there is everything needed, found here to meet the wants of the different species; lime rock, sand stone, black mud, blue clay, sand and gravel and deep and shallow water. Perhaps there is not a locality this side of the mussel shoals of the Alabama river that can equal this place on Spoon river for its numbers and variety of fresh water shells. The banks of the stream are well shaded with elm, silver-leaved maple, hackberry, willow and many gigantic sycamores. The "Big Rocks" on the south bank jut out over the river for a quarter of a mile. After we had made camp I modestly retired under a ledge of the rocks and attired myself for the work of shell hunting. Donning an old coat, pants and shoes and with a large coffee sack I was quickly out in the stream crawling around feeling for shells and they were here by the scores, but only about one in ten was young and fine enough to go iuto the bag. The water was warm and in three hours' time two sacks were filled with choice specimens, all that our buggy would well accommodate, and after eating a hearty dinner the animals were removed and we were then ready to return home.

Perhaps a partial list, without authorities, of the species found will be of interest to the shell loving readers of the MUSEUM.

Unio alatus.
" anodontoides.
" cornutus.
" crassidens.
" donaciformis.
" ebenus.
" elegans.
" gibbosus.
" gracilis,
" lacrymosus.
" lævissimus.
" ligamentinus.
" luteolus.
" metaneverus.
" multiplicatus.
" obliquus.
" occidens.
" parvus.

Unio plicatus.
" pustulatus.
" pustulosus.
" rectus.
" rubiginosus.
" solidus.
" trigonus.
" tuberculatus.
" undulatus.
" verrucosus.
Margaritana complanata.
" confragosus,
" hildrethiana.
" marginata.
" rugosa.
Anodonta decora.
" edentula.
" ferussaciana.
" fragilis.
" grandis.
" imbecillis.
" plana.

A New Classification.

At times, we have all had a sort of sneaking idea that our present system of classification is all wrong. This feeling is especially strong just after a conversation with one of that large class which politicians tell us is the support of the government, the reservoir from which all our physical, moral and political strength flows—the farming community.

The farmer is the one to settle the question. He is the one that lives among nature's children. He lives, labors and dies with the voice of nature ringing in his ears, until it permeates his whole being. What right have we who live cooped up within a narrow city's walls, getting out in the open country only at stated intervals to lift our voice against those who spend their life surrounded with such influences?

Accordingly, I submit the following improved classification which continued contemplation, combined with the natural poetry of his disposition, has implanted within the breast of nature's born naturalist—the farmer. You will notice the simplicity of it all. It does away with many species which you see are quite unnecessary.

A bird, if it is small and plainly colored is a "*sparrow.*" If it has any red on it, it is a "*fire bird.*" If it has yellow on it is a "*wild canary.*"

A large bird if it has a hooked bill is either a "*hawk*" or an "*owl.*" There are two kinds of both these birds. Large hawks are "*hen hawks*" * and small ones "*chicken hawks.*" The same way large owls are "*cat owls*" and small ones "*screech owls*"

If a bird has webbed feet it is a "*duck.*" If it has long legs and neck it is either a "*crane,*" *shite-pook*" or "*snipe,*" the size determining—a crane standing about six feet tall.

A small bird, dark colored is a "*blackbird;*" a large one a "*crow.*"

If a bird cannot be referred to any of these species it is a cross between some two. Another important point is that a bird seen yesterday is "*four times as large as that one there.*"

This system, though new to science, has been known in a fragmentary way to most of us. It has been a well guarded secret and it was only by dint of an untiring perseverance that I have been able to get the whole system. What has made the task more difficult has been the fact that there is no liter-

* A hen hawk flying over is an "*eagle*" and a chicken hawk in the same position is a "*hen hawk.*"

ature relating to the subject—the science being diffused by word of mouth and then only to the fraternity. But by picking up slips of the tongue here and partial admissions there I have been enabled to submit it in its entirety to the world, deeming it one of the most wonderful discoveries of the age, throwing the elaborate and complicated systems of Audubon, Wilson and others into the dim and ignorant past to rank with Herodatus and Pliny the elder.

PERCY TAVERNIER,
Guelph, Ont.

One of Nature's Curiosities.

Two miles south of this place is what is now known as Alachua Lake. Many years ago it was a beautiful prairie called Payne's Prairie, from old King Payne, a noted Seminole chief. It was the Indian's pasture, and hundreds of horses could then be seen enjoying the luxuriant grass; for this was one of the most fertile spots in all fair Florida.

Tradition has it that De Soto passed through it on his exploring expedition, and there met a band of Indians, as this part of the state, at that time, was their favorite dwelling place.

A mile to the northeast lies the beautiful Newnaus Lake which is a little higher than the Prairie, and a stream from the lake finds its way, after much twisting and turning, into the Prairie, through which it winds like a shining serpent and finally empties into one of the most wonderful curiosities—the "Sink" or "Jug" as the Indians called it—to be found in this State. This "Sink" is an opening under huge rocks at the base of a steep hill, and the waters go through this opening into a subterranean passage and thence no one knows where; but it is supposed they rise again to the surface and go their way rejoicing to old Ocean.

The progress of civilization drove the Seminoles far south to the Everglades, and this country became the domain of the Pale Face, who saw at once the advantages that a fertile plain, watered by such a stream, gave to farming, and they began immediately to cultivate it. But alas? They were soon doomed to disappointment, for there came a protracted rainy season, causing the great Newnaus Lake to overflow, the water naturally finding its way into the Prairie, and the tendency of the waters being towards the "Sink," all the *debris* floated on and on until it came into the "Sink," and this, together with an old water-mill which was washed away, tried to go through the passage and the latter became clogged. The waters rose on the Prairie, destroying cultivation, flooding roads, and transforming the beautiful Florida plain into a lake ten miles long and four or five miles wide. Now this is not all. Three years ago this "Sink" hole suddenly and unaccountably opened, the waters passing gradually out, leaving only here and there little pools of water; but the stream was the same as in former days. These pools were overstocked with all kinds of fish, turtles and alligators making the water seem alive with them. The little pools dried up and the fish were left to perish; the turtles and alligators finding for themselves another home. This was a scene which once viewed was never to be forgotten; thousands and thousands of fish writhing and dying on dry land.

In some places they were piled up two or three deep.

Vultures? Well, I should think so. They must have come from hundreds of miles around, and if any of my brother collectors noticed a decrease in the number of "Buzzards" in their vicinity about that time, it may be surmised that they came to pay a visit to their black friends out at the Prairie; and no doubt they had a picnic for many became so gorged that they could not fly. It was a favorite pastime for the little negro boys to catch the gorged "Buzzards" and "decorate" them with strings, old rags or any thing they could get. Some time ago I saw an article asking if the Black and Turkey Vultures associate with each other. They do, for a short distance from this city they congregate in great numbers every evening about sundown at their favorite roosting place; but they never fuss and the Black and the Turkey sleep together as peaceful as can be.

But I have wandered from my subject. The Sink became clogged again, the Prairie filled, and now we have Alachua Lake in all its beauty.

F. DAVIS,
Gainesville Fla.

Notes From the Mohawk's Country.

P. M. VAN EPPS.

II.

THE BROKEN HATCHET.

A few years ago I received a package of stone-age implements from Western France, sent me by M. Gaillard that indefatigable explorer of the wonderful dolmens and other interesting remains which so plentifully abound in the vicinity of Carnac, Brittany. In this lot was a very small stone celt, or rather the half of a celt, having the cutting edge intact being $1\frac{3}{8}$ inches across the slightly ovaled blade, while the extreme length of the implement is $1\frac{5}{8}$ inches. Without doubt originally socketed in a piece of deer-horn, this little celt, or more properly hatchet, has served its purpose as such until broken by some unlucky blow, after which it would appear that the blade had been made to serve a far different purpose.

In fact, judging from the indentation made by repeated pounding in the fractured end, it would seem that this little blade had done service as a wedge or chisel, and what more natural than to suppose that it had been used for splitting bones. Among the ancient folk it seems to have been a common custom to fracture and split bones of the various animals killed in the chase to obtain the marrow, for very many examples of bones so broken have been obtained from the various rock-shelters and other sites of prehistoric occupancy in Europe and also in other countries. By placing a bone on some hard or solid surface, as on a boulder, and by holding this little remainder of a hatchet in place as a chisel or wedge, with the finger and thumb of one hand; a blow given from an oval pebble or hammer-stone (*percuteur*) held in the other hand would with facility split longitudinally any of the smaller bones.

Such secondary adaptation of weapons and implements, accidently broken, to other than their original use has been many times noted. To mention another instance, a friend has in his collection the base of a lance or spear-head of flint which originally has had a length of nearly four inches judging

from the converging angle of the sides, but this weapon after loosing its point has been remodeled into a drill or perforator. To effect this change the Iroquoian artizan has from a point distant two inches from the base chipped the edges down with a sharp curve until a typical perforater point was produced, resulting in the odd looking figure of the broad base of a notched spear-head terminating abruptly with the point of a perforator. This curious implement was a surface find from the Flats of the Mohawk River: the Flats which have yielded so many thousands of specimens of the handiwork of the Iroquoian people.

GLACIAL STRIÆ.

The mechanical effects of the great ice invasion are well evidenced in this part of the state. Thousands of large boulders of varying materials, sandstones, quartzites, and granitic, probably all derived from the north or northwest are seen on every hand, and now and then we meet with one of truly enormous proportions. In certain localities grooved and striated rock surfaces can be seen, and on some of the low limestone cliffs in the west portion of the town of Glenville, the grinding and polishing action of the ice mass with its infrozen graving tools has left an evident record.

I have recently found a locality where a most excellent illustrative series of parallel striæ on slate rock *in situ* are exposed. This came about by the digging of a broad and shallow ditch on the west side of the highway between Schenectady and Galway. The exact locality is about midway between the "Scotch Church" and the village of West Charlton. This ditch was opened on a declivity and by the action of the running surface water after heavy rains, the bottom was soon washed clear of remaining earth leaving the underlying rock finely exposed. The striæ are sharp cut, are very distinct and cross the ditch at right angles having a direction almost exactly east to west. The direction of these marks of striation while at first sight somewhat confusing, yet only tend to strengthen the position taken by many authorities, that while the general direction of the movement of the great ice mass was to the south or the southeast, yet it being a semi-plastic mass, the course of at least the lower portion of the glacier conformed somewhat to the most prominent ranges and valleys then existing, as the troughs of the Hudson and the Mohawk.

Glenville, N. Y.

1st Feb.

Albinos.

Several months ago parties living about three miles from this place noticed in the woods near their residence a White Squirrel. After patient watching it was seen to enter a hole in a tree. The tree was cut down, the hole plugged and the section of trunk containing the prisoner was carried to a tight room. The hollow chunk was found to contain two white female squirrels, and after they had been taken out there were still indications of life within. An investigation was made resulting in the discovery of three young ones. Instead of being white they were gray, one being spotted with white. The old ones both have pink eyes. I can vouch for the truth of the above.

CHAS. S. HODGSON,
Albion, Ills.

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A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r

Albion, N. Y.

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NOTES.

The senior member of the firm of Southwick & Critchley, Mr. James M. Southwick, retires from the business, which will be carried on by Mr. Critchley. As many of our readers know, Mr. Critchley is a Taxidermist of ability, having had large experience with all classes of work in his line. We wish him success.

Now comes an exposition to be held at Montreal in May next. Some of our readers may not be aware that this colony of Great Britain covers more area than the United States. Have we any subscribers in Montreal or any friend of a subscriber, who can represent us? If so write full particulars.

A new Natural History Journal will soon be n the field, *The North American Naturalist*, to be published at Newark, N. J. They have our best wishes. These journals that survive the existing hard times will have no trouble when the times are better.

One of our subscribers sends in a clipping from a Connecticut paper which has the startling announcement that Mr. H. H. Verrill of New Haven, Conn., is a thief of considerable note, having stolen from the Yale Museum specimens estimated to be worth $10,000. Mr. Verrill is a son of Prof. Verrill, one of the curators of the Yale Museum and one of the ablest scientists in the world today. We were not much surprised at the information, as it is only two years ago that we received from him some of the rare Hawks, that proved to be colored by hand, and such other products as Carolina Paroquet (Kingfisher) eggs. We were surprised recently to see some of our exchanges running his full page ads. and were sorely tempted ourselves to secure some of his bargains in Echinoderms, etc., which we knew he could not substitute. Mr. Verrill was a graduate of Yale and was a very bright fellow, and it is unfortunate that he has allowed himself to travel in the wrong path. We also beg to warn our subscribers from having anything to do with one F. H. Carpenter, whose home used to be at East Providence, R. I. He was practically a stranger to the Editor at the time of publishing the first number of the MUSEUM, and we were tempted into accepting and printing an article from his pen. He succeeded in securing quite a lot of specimens from us, which he may or may not have dis-

posed of but which he has never paid for. He is now a fugutive from justice, and if any of our patrons learn of his whereabouts they will confer a favor upon us as well as the United States Attorneys by writing or wiring us promptly.

The Ostrich.

The other day I saw the skeleton of an Ostrich in the Yale Museum, which has led me to write something about this wonderful bird. The Ostrich is the largest of all birds now existing, being from six to eight feet in height to the top of its head, and an adult male weighing from two to three hundred pounds. The male is rather larger than the female. The head and upper part of the neck are scantily covered with a thin down, through which the skin is visible. The young have the head and neck clothed with feathers. The general plumage is glossy black in the adult male, dark gray in the female and young, with a slight sprinkling of white feathers; the long plumes of the wings and tail are white, occasionally marked with black. On each wing are two plumeless shafts, not unlike porcupine's quills. The inner toe is very large, about seven inches long, and its claw hoof-like.

While the sternum is destitute of a keel, and the muscles which move the wings are comparatively weak, those which move the legs are of prodigious strength, so that the Ostrich is not only capable of running with great speed, but with striking such a blow with its foot as to make it too formidable for the leopard and other large beasts of prey to assail it. It has been known to rip open a dog by a single stroke, and a man is recorded to have suffered the same fate.

The eyes of the Ostrich are large, and the lids are furnished with lashes. Its sight is keen, so that it descries objects at a great distance in the open desert.

The Ostrich shuns the presence of man, but is often to be seen in the near proximity to herds of zebras, quaggas, giraffes, antelopes and other quadrupeds. It is gregarious, although the flocks are not generally very large.

The Ostrich is polygamous, one male usually appropriating to himself, when he can, from two to seven wives, which seem to make their nest in common, scooping a mere hole in the sand for this purpose. Each female is supposed to lay about ten eggs. The eggs are all placed on end in the nest, which often contains a large number, whilst around it eggs are generally to be found scattered on the sand.

By a remarkable instinct the Ostrich sits upon the eggs by night, when the cold would be too great for them, and leaves them to the sun's heat during the day.

It feeds exclusively on vegetable substances, its food consisting in great part of grasses and their seeds; so that its visits are much dreaded by the cultivators of the soil in the vicinity of its haunts, a flock of Ostriches soon making terrible devastation of a field of corn.

The speed of the Ostrich, when it first sets out, is supposed to be not less than sixty miles an hour, but it does not seem to be capable of keeping up this speed for a long time. It is successfully hunted by men on horseback, who take advantage of its habit of running in a curve, instead of a

straight line, so that the hunter knows how to proceed in order to meet it and get within shot.

It is often killed in South Africa by men who envelope themselves in Ostrich skins, and admirably imitating the manners of the bird, approach it near enough for their purpose, without exciting its alarm, and sometimes kill one after another.

The eggs of the Ostrich are much esteemed as an article of food by the rude natives of South Africa, but civilized man has failed to cultivate a taste for them. Each egg weighs about three pounds. They are usually dressed by being set upright on a fire and stirred about with a forked stick, inserted through a hole in the upper end.

The thick shell is applied to many uses, but particularly for water vessels. In taking Ostrich eggs from the nest the South African is careful not to touch any with the hand, but uses a long stick to draw them out, that the birds may not detect the smell of the intruder in which case they would forsake the nest.

The great value of the feathers has induced men of late years to engage in the domestication of this bird, and Ostrich farming is now a most lucrative employment at the Cape of Good Hope. It is said that a full-grown bird yields one hundred feathers at a picking, which sell at Cape Colony for about two hundred dollars.

T. B. D.

A Set of Owl's Eggs.

On the 19th of March, 1895, while pursuing my favorite study, ornithology, I came across a large nest high up in an oak tree. I thought that this nest was a deserted hawk's nest, but on looking closer, saw a feather fluttering from one of the sticks which composed the nest. This discovery brought up hopes of a beautiful set of hawk's eggs, but imagine my joy, when on sounding the tree with a club, I saw an immense bird rise up and fly off, without even so much as a scream.

I could have shot the bird, but as I had no climbing irons along, and as the weather was very cold, I thought that I had better leave the old bird to keep the eggs from freezing.

On the way home I concluded that my immense bird was the Great Horned Owl *Bubo virginianus*. I planned to get this set of eggs on the 21st of the month. So, taking a companion along with me, we steered our course for old *Bubo's* nest. As we neared the place we looked for signs of life and sure enough over the edge of the nest we saw the two "horns," or ear tufts of the owl, from which it gets part of its name. The old bird, however, did not wait for us to come within range, but rising in the nest to its full height, and spreading its great wings, it sailed away silently and majestically until it was buried in the tangle of dark and leafless branches.

My companion attempted to climb the tree but it was so large in circumference that he could not get his arms half way around, we gave it up for that day and determined to get both bird and eggs the next day we could get off from the town, which happened to be the 23d. This time we went with a little better preparation. We had prepared a lot of sticks to tack to the tree, and we also had a rope to encircle the tree. These things, be-

side the climbers and a collecting box, ball of twine, tape measure and some cotton, belonged to the climbing department. There were three weapons along this time, two shot guns and a repeating rifle. Just imagine a battalion of soldiers going out fully equipped to wage war on one small bird! But "where there is a will, there is locomotion," and that owl and its eggs had to be added to be cabinet.

As we approached the nest we heard hundreds of crows cawing all at the same time. Soon we saw that they had some object that they were worrying, which proved to be the object of our search. Now this was the "modus operandi." We scattered around in the woods and kept still until the crows drove our quarry toward one of us. It was not long until a shot rang out and a cry of victory followed it. The owl had flown the wrong direction for his own good. He dropped on his back and held up his talons for a defence. This is where the ferocious nature of the bird of prey can be seen to the best advantage. When wounded they try to drop on their back and fight with beak and talons. This owl could look right at the sun without even blinking, and when a gun barrel was presented to him he seized it and clung to it with wonderful tenacity. He was soon dispatched however, and then we turned our attention to the nest.

I tried to climb this time. First we nailed strips on the tree until we had no more. Then the "rub" came in, and it was a hard one. The climbers were brought into activity and in about half an hour I found myself about half way up. But to make a long story short I finally got to the nest, and another cry of victory was heard. I lowered the two large eggs the nest contained and then took measurements. Meanwhile the friends were telling me how nice it was down there on solid ground with no danger of breaking their necks, and how nice the weather was, and many like things. Perhaps if I had not had my mouth full of bark and lichens I would have said something too. But I came down soon, and what a sight I was. My wrists were bleeding from being chafed by the bark, all the buttons were off my coat and I looked as if I had been drawn through a knot hole.

The following measurements were taken: Nest, situated 63 feet from the ground in an oak tree, measured 44 inches in diameter. It was composed of sticks and twigs, some of them quite large; it was lined with fur, feathers and bones of birds and animals and had a strong odor of skunk. The eggs, two in number, measured 2.00x1.45 and 2.25x1.90. The eggs were of a dirty white color, and the incubation was two thirds advanced. But a little caustic potash soon turned the young birds to liquid. The old bird measured 4 feet 4 inches from tip to tip, and 32 inches in length. The bird captured proved to be a male. He now lies in my cabinet with a neat little label attached to his legs.

PAUL W. ROTH,
Class of '99 at Thiel College, Pa.

W. F. WEBB,
Albion, N. Y.

Sir:

Please find enclosed $1.00 to pay for the MUSEUM for '96. I would not be without it.

Very Truly,
S. W. Harris,
Reading Ave.,
Hillsdale, Mich.

210	Brucite	25	2 00
231	Buhrstone. France	05	30
247	Byssolite	40	1 50
569	Cacoxenite. Bohemia	50	2 00
231	Cairngorm. Colorado	05	5 00
361	Calamine. New Jersey	20	3 00
715	Calcite. Europe, United States	05	5 00
715	Calcareous Tufa. U. S	05	75
494	Campylite. England	75	4 00
304	Cancrinite, Maine	10	1 00
147	Carnallite. Stassfurt	40	1 00
831	Cannel Coal. Eng., Kentucky	05	30
715	Calc Spar. Eng., Nova Scotia.	05	3 00
316	Cassiterite. Pennsylvania	15	50
231	Chert	05	50
231	Carnelian. U. S., Brazil	10	3 00
373	Carpholite. Bohemia	1 00	3 00
792	Cassiterite. Mallacca, Eng	05	3 00
244	Castorite	2 00	5 00
	Catlinite. Minnesota	10	1 00
410	Caladonite. Verona, U. S	1 00	3 00
631	Celestite. Sicily	05	2 50
140	Ceragyrite. Nevada	1 00	10 00
367	Cerite. Sweden	50	2 00
414	Cerolite. Silesia, Pennsylvania	20	1 25
729	Cerussite. England, Mex., U. S.	15	4 00
227	Cervantite. Spain, California	50	3 00
386	Chabazite. Bohemia	50	3 00
669	Chalcanthite. Chili	50	2 00
231	Chalcedony. Ger., Fla., Colo	05	5 00
61	Chalcocite. England	10	3 00
407	Chalcodite	50	3 00
	Chalcophanite. New Jersey	10	1 00
548	Chalcophyllite. Cornwall	1 00	3 00
78	Chalcopyrite. Australia	05	2 50
568	Chalcosiderite. England	1 00	2 50
172	Chalcotrichite. England	60	3 00
715	Chalk. England	05	50
721	Charbite. U. S., England	10	2 00
469	Chamoisite. France	50	1 25
316	Chesterlite. Pennsylvania	10	1 00
322	Chiastolite. Massachusetts	25	2 00
560	Childrenite. Devonshire	50	2 00
83	Chloanhite	50	3 00
361	Chlorastrolite. Lake Superior.	15	1 00
452	Chlorite. Pennsylvania, Mass.	10	75
408	Chloropal. Hungary	70	1 50
159	Chlorophane. England, U. S	05	5 00
319	Chrondrodite. New York	05	1 25
189	Chromite. New Zealand	05	1 25
191	Chrysoberyl. New Hampshire.	10	10 00
246	Chryscolla. Chili, U. S	10	2 50
259	Chrysolite	30	3 00
231	Chrysoprase. Silesia	50	3 00
411	Chrysotile. New Jersey	30	1 50
64	Cinnabar. California	10	3 00
269	Cinnamon Stone. Maine, N.H.	05	3 00
315	Clevelandite. Mass	05	1 00
	Cleveite. Norway	1 50	2 50
450	Chlinochlore. United States	30	1 50
431	Clintonite. New York	10	75
241	Cummingtonite. Mass	25	50
458	Chlorotoid	15	2 00
419	Clay. Various	05	25
	Clay-stones. Vermont	05	25
273	Cyprine	50	1 00
831	Coal. United States, Europe	05	2 00
100	Covellite. Australia	10	50
	Coquina. Florida	05	1 00
526	Cobalt Bloom. Saxony	25	2 00
85	Cobaltite. Norway, Sweden	25	2 00
238	Coccolite. New York	15	75
831	Coke, Native. Virginia	05	30
474	Columbite. Connecticut	30	3 00
377	Comptonite	40	2 50
12	Copper. Michigan	05	3 00
71	Copper Nickel	50	2 50
78	Copper Pyrites. Australia, U.S.	05	2 50
287	Cordierite	25	3 00
179	Corundum. Greece, Pa.	05	5 00
145	Cotunnite. Chili	40	2 00
249	Crocidolite, South Africa	05	4 00
642	Crocoite. Siberia	50	5 00
456	Constedtite. Cornwall	75	2 00
164	Cryolite. Greenland	05	60
77	Cubanite. California	10	50
798	Copalite. Africa	10	50
172	Cuprite. Cornwall, Arizona	10	3 00
324	Cyanite. Conn., Ala., Pa., N. H.	05	2 00
670	Cyanochroite. Vesuvius	1 00	3 00
669	Cyanosite. Chili	50	2 00
327	Datolite. New Jersey	10	2 00
218	Dendrite. Colorado, Dakota	05	1 00
413	Deweylite. Pennsylvania	05	1 50
238	Diallage	50	1 50
722	Diallogite	1 00	2 00
24	Diamond. South Africa	1 50	10 00
203	Diaspore. United States	50	2 00
287	Dichroite	25	3 00
375	Dillnite. Hungary	60	1 25
338	Diopside	1 00	2 00
345	Dioptase. Siberia	3 00	40 00
716	Dolomite. England	05	2 50
715	Dogtooth Spar. U. S., Eng	05	3 00
159	Derbyshire Spar. England	05	6 00
568	Dufrenite. Virginia	25	1 50
185	Dysluite	50	1 75
247	Edenite. New York	20	1 50
543	Ehlite	25	3 00
304	Elaeolite. Arkansas	05	1 50
782	Elaterite. Derbyshire	75	1 75
254	Emerald. Brazil	1 50	10 00
247	Electric Stone	05	1 00
234	Enstatite. Pennsylvania	05	1 00
747	Emerald Nickel. Pennsylvania	50	1 50
179	Emery. Greece, Mass	10	75
132	Enargite. Chili	75	2 00
	Enysite. Cornwall	50	1 75
276	Epidote. Tyrol, New York	05	3 00
661	Epsomite. Austria	25	2 00
49	Erubesite. Austria	10	1 50
526	Erythrite. Saxony	1 00	3 00
269	Essonite. Maine, N. H	10	3 00
540	Euchroite. Hungary	1 50	4 00
255	Eudialyte. Greenland	25	2 00
479	Euxenite. Norway	10	3 00
571	Evansite. Hungary	70	2 00
125	Fahlerz. Germany	25	3 00
446	Fahlunite. Sweden	50	1 60
238	Fassaite. Tyrol	50	1 50
316	Feldspur. U. S., Europe	50	3 00
483	Furgnsonite. Greenland, Swe.	10	2 50
323	Fibrolite. France, Pa., Conn.	05	1 25
231	Flint. Nevada, England	05	50
724	Flos Ferri. Greece	05	5 00
159	Fluorite. Eng., Saxony, U. S.	05	6 00
159	Fluorspar. England	05	6 00
241	Fowlerite. New Jersey	10	2 00
188	Franklinite. Franklin, N, J	05	2 50
	Friedelite. France	50	4 00
259	Fuchsite. Tyrol	05	2 00
231	Flexible Sands'ne (Itacolumite)	10	1 50
218	Forest Rock. Colorado, Dak	05	1 00
282	Gadolinite. Sweden	1 00	3 00
185	Gahnite. Sweden, N. J	50	1 75
44	Galenite (Galena) Eng., U. S	05	2 50
	Ganomalite. Sweden	1 00	2 00
369	Garnet. Tyrol, Ceylon, U. S.	05	3 00
416	Garnierite. New Caledonia	10	2 00
739	Gay-Lussite. Thuringia	10	1 50
	Gedanite. Prussia	1 00	2 00
416	Genthite. Pennsylvania	10	2 00
231	Geodes. Iowa, Tennessee	10	5 00
86	Gersdorffite. Westphalia	70	1 50
	Garnetiferous Granite. N. Y	05	50
	Garneriferous Mica Schist	10	1 00
16	Gneis. United States	05	50
332	Geyserite. Yellowstone Park	25	2 50
222	Gibbsite. Massachusetts	10	3 00
715	Gibralter Stone. Gibralter	10	1 50
372	Gismondite. Italy	1 00	3 00
95	Glancodot. Chili, Sweden	50	3 00
409	Glauconite. New Jersey	10	75
387	Gmelinite. Ireland	1 00	3 00
1	Gold. Brazil, California	20	10 00
214	Goethite. Michigan, Colorado	10	3 00
25	Graphite. Ceylon, Eng., N. Y.	05	1 00
89	Greenockite. Missouri	30	2 00

269	Grossularite	50	3 00
315	Granite. Nova Scotia	05	50
716	Garnetite	25	1 25
413	Gymnite. Europe, U. S	05	2 50
651	Gypsum. Europe, U. S	05	2 50
420	Halloysite. Indiana	15	1 00
	Hell Fire Rock. Utah	10	3 00
1[illegible]	Hagemanite	30	1 50
133	Halite. Tyrol, Spain, U. S	05	2 00
245	Hallite. Pennsylvania	10	1 50
390	Harmotome. Scotland	1 00	6 00
785	Hartite. Styria	1 00	3 00
779	Hatchettite. England	1 00	2 00
195	Hausmannite. Hartz Mts	10	1 50
307	Haüyne. France	50	2 00
630	Heavy Spar. England, U. S.	05	4 00
238	Helvite. Norway	50	2 00
231	Heliotrope. South India	10	3 00
180	[illegible]. Elba, Ger., U. S	05	2 50
[illegible]	[illegible], Micaceous. Mich	05	1 00
[illegible]	[illegible] Crystals. Isle of Elba	10	1 00
504	Heulandite. Nova Scotia	10	3 00
247	Hexagonite. New York	50	1 00
235	Hisingerite. Sweden	75	2 00
237	Hornblende. United States	05	2 00
140	Horn Silver	25	3 00
231	Hornstone	05	60
310	Humite	25	2 00
271	Hyacinth	10	3 00
232	Hyalite	25	2 00
741	Hydrodolomite. Tyrol	50	2 00
214	Hydrotalcite. Norway	10	1 25
749	Hydrozincite. Spain	10	1 50
236	Hypersthene. United States	25	1 50
231	Honestone. Arkansas	05	25
715	Iceland Spar. Iceland	05	10 00
273	Idocrase. Maine	10	2 50
181	Ilmenite. United States	10	2 00
399	Indurated Clay. Maryland	05	35
284	Ilvaite. Elba	50	1 50
287	Iolite. Connecticut	10	3 00
7	Iridosmine. Columbia	1 50	5 00
3	Iron, Meteoric. Virginia, Miss.	25	12 00
13	Iron, Native. Greenland	50	10 00
75	Iron Pyrites. Elba, Eng., U. S.	05	2 00
231	Itacolumite. North Carolina	10	1 50
280	Jade. New Zealand	10	10 00
231	Jasper. California, Canada	05	2 50
447	Jeffersite. Pennsylvania	15	70
238	Jeffersonite. New York	10	1 50
231	Jet. Spain	05	2 00
73	Kansas	10	1 00
494	Kampylite	50	1 00
419	Kaolinite. Indiana, Tennessee	10	60
241	Keatingine. New Jersey	25	1 50
231	Kielhauite. Norway	1 00	3 00
655	Kieserite. Stassfurt	50	1 00
422	Killinite. Ireland	60	1 50
468	Klipsteinite. Nassau	1 00	2 00
263	Knebelite. Sweden	1 00	3 00
501	Kuhnite. Sweden	1 50	3 00
324	Kyanite. Nova Scotia	05	2 50
311	Labradorite. Labrador, N. Y	05	5 00
702	Langite. Cornwall	75	3 00
306	Lapis Lazuli. South America	25	5 00
343	Laumontite. Nova Scotia, N.J.	15	2 50
238	Lava	15	1 50
526	Lavendulan	75	2 00
551	Lazulite. Georgia	50	3 00
15	Lead, Native. Sweden	2 00	5 00
	[illegible]	05	1 00
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Leucite. Vesuvius	00	2 00
91	Leucopyrite. Saxony	10	2 00
535	Libethenite. Libethon	25	3 00
284	Lievrite	10	1 50
831	Lignite. [illegible], U. S., Mich	05	50
[illegible]	Limonite. [illegible], Mass.	05	2 50
[illegible]	Linarite. [illegible]	10	5 00
[illegible]	Linnæite. [illegible]	40	2 00
[illegible]	Lipscombite. Hungary	1 50	3 00
[illegible]	[illegible]	50	2 00
[illegible]	[illegible]	10	60
1[illegible]	[illegible] Arkansas	05	2 00
595	Ludwigite. Austria	1 00	2 50
715	Lithographic Stone	05	50
715	Landscape Marble	50	5 00
715	Lumachelle. Black Hills	30	5 00
231	Lydian Stone. Pennsylvania	50	1 50
322	Macle. Massachusetts	25	2 00
718	Magnesite. Silesia	50	1 00
68	Magnetic Pyrites	30	1 50
186	Magnetite. N. Y., Pa., Ark	05	2 50
751	Malachite. Siberia, Conn., Nev.	05	5 00
205	Manganite. Harz Mountains	25	3 50
	Manganosite. Sweden	50	2 00
715	Marble. Tenn., Va., Italy	05	1 00
90	Marcasite. Australia, Illinois	05	2 00
759	Margarite. Massachusetts	05	1 25
[illegible]	Margarodite. Connecticut	10	60
411	Marmolite	10	75
190	Martite. New York	35	1 50
231	Mocha Stone. (Moss Agate)	05	1 00
[illegible]	Masonite. Rhode Island	10	1 00
134	Mica Schist. United States	05	25
150	Matlockite. England	1 00	6 00
402	Meerschaum. Asia	75	2 00
297	Meonite. Vesuvius	25	2 00
178	Melaconite	50	2 00
271	Melanite. New Jersey	20	2 50
	Melanosiderite. Pennsylvania	50	1 00
634	Melanterite	75	2 50
268	Meliphanite. Norway	70	3 00
628	Mellite	50	2 50
181	Menaccanite. N. Y., R. I	15	2 00
8	Mercury, Native. California	75	3 00
381	Mesotype. New Jersey	25	2 50
381	Mesolite. Nova Scotia, N. J	15	2 50
61	Metacinnabarite	50	2 00
724	Mexican Onyx. Mexico	10	2 00
293	Mica. N. H., Va., Black Hills	05	2 00
316	Microline. Colorado, Penn	10	5 00
66	Millerite. New York, Penn	50	4 00
91	Mispickel. United States	05	3 00
34	Molybdenite. Saxony, N. H	05	1 50
314	Moonstone. Pennsylvania	25	3 50
231	Moss Agate. Colorado, Wash.	05	2 00
293	Muscovite. United States	05	2 00
510	Nadorite. Algeria	10	3 50
39	Nagyagite. Nagyag, Hungary	1 00	5 00
378	Natrolite. New Jersey	05	2 00
715	Nail Head Spar. U. S., Eng	15	3 00
736	Natron. Egypt	10	1 50
210	Nemalite	25	1 00
304	Nephelite. Germany, Ark	05	2 00
71	Niccolite. Saxony	10	2 50
193	Nigrine. Arkansas	10	5 00
231	Novaculite. Arkansas	05	1 00
376	Obsidian. Liparil Isles, Mex. Cal.	05	1 00
180	Ochre, Red and Yellow. Mo., France	05	60
184	Octahedrite. Tyrol	60	4 00
314	Oligoclase. Norway, Conn., Pa	25	1 50
536	Olivenite. Cornwall	25	3 00
259	Olivine	10	3 00
231	Onyx. Brazil	10	3 00
715	Oolite. Iowa, England	05	1 50
233	Opal. Mexico, California	05	10 00
232c	Opal, Precious. Mexico	10	10 00
231	Opal Wood. Hungary, Calif	05	1 50
27	Orpiment. Hungary	10	2 50
278	Orthite. Virginia	10	2 00
316	Orthoclate. United States	05	2 00
269	Onvarovite. Canada	10	3 00
780	Ozocerite. Galicia	10	1 25
[illegible]	Pachnolite. Greenland	25	1 50
16	Pearl Spar. U. S., Eng	05	2 00
718	Peastone	25	4 00
750	Pectolite. New Jersey	05	2 00
448	Penninite. Tyrol	05	2 00
315	Pericline	25	3 00
182	Perofskite. Arkansas	10	2 00
316	Perthite. Canada	10	1 50
244	Petalite. Sweden	25	1 50
707	Petroleum. Canada	25	50
556	Pharmacolite. Bohemia	1 00	3 00
558	Pharmacosiderite. England	1 00	3 00
537	Phenacite. France	25	5 00

389	Phillipsite. Italy	25	1 50
741	Pennite. Pennsylvania	10	50
831	Peacock Coal. Pennsylvania	05	25
234	Petrified Wood. Colorado, Cal.	05	5 00
316	Porphyry. United States	05	2 00
	Pseudomorphs. United States	10	1 00
316	Pumice. Lipari	05	1 50
288	Phlogopite Can., N. Y., N. M.	05	1 25
830	Piauzite. Styria	40	1 25
411	Picrolite. Pa., N. Y., Indiana	05	1 00
658	Picromerite. Stassfurt	25	1 00
277	Piedmontite. Piedmont	10	1 50
422	Pinite	05	1 50
715	Pisolite	05	3 00
276	Pistacite	40	3 00
190	Pitchblende	25	3 00
109	Plagionite	1 00	3 00
3	Platinum	25	8 00
25	Plumbago. New York	05	1 00
199	Pollanite	50	2 00
656	Polyhalite. Austria	50	1 50
231	Prasiri. France	50	2 00
363	Prehnite. N. J., U. S.	05	3 00
118	Proustite. Chili	50	8 00
543	Pseudomalachite. Hungary	75	2 00
217	Psilomelane. United States	10	1 50
325	Pycnite	25	1 25
117	Pyrargyrite. Hungary	10	5 00
75	Pyrite. England, Mexico	05	2 00
199	Pyrolusite. Germany	10	2 00
493	Pyromorphite. England, Pa	25	3 00
269	Pyrope. New Mexico	10	3 00
400	Pyrophyllite. North Carolina	10	1 00
369	Prosmolite. Sweden	75	5 00
238	Pyroxene. Canada, U. S	05	2 00
68	Pyrrhotite. Pennsylvania	10	1 50
269	Polydelphite	10	1 00
	Pudding Stone (polished)	50	5 00
231	Quartz, Milky. United States	05	25
231	Quartz, Cellular. U. S	10	1 00
231	Quartz, Granular. U. S	10	1 00
231	Quartz, Glassy. United States	05	50
231	Quartz. Europe, Asia, Africa	05	5 00
231	Quartz, Ferruginous. Eng	05	1 50
231	Quartzite. New York	05	30
231	Quartz, Rose. Dakota	05	1 50
231	Quartz, Smoky. Colorado	05	3 00
26	Randite. Pennsylvania	35	1 00
26	Realgar. Hungary	1 00	5 00
61	Redruthite	10	3 00
399	Rensselaerite. New York	10	60
722	Rhodochrosite. Hungary	10	2 00
241	Rhodonite. England, U. S	10	2 00
247	Richterite. Sweden	50	2 00
459	Ripidolite. Pennsylvania	05	1 50
231	Rock Crystal. N. Y., Ark	05	15 00
138	Rock Salt, Tyrol, U. S.	05	2 00
320	Rubellite	25	3 00
179	Ruby	25	5 00
193	Rutile. United States	05	3 00
716	Rhomb Spar. United States	05	1 00
129	Sal Ammoniac. Vesuvius	50	2 00
478	Samarskite. North Carolina	15	3 00
179	Sapphire	25	5 00
594	Sassolite. Tuscany	10	1 00
654	Satin Spar, Eng., Japan, Colo.	05	3 00
269	Scapolite. Massachusetts	10	2 00
614	Scheelite. Europe	10	3 00
379	Scolecite	50	3 00
654	Selenite. France, U. S	05	1 50
23	Selensulphur. Sicely	50	5 00
232	Semiopal. Hungary	10	1 00
220	Senarmontite. Algeria	1 00	5 00
402	Sepiolite	75	2 00
411	Serpentine. New York, N. J.	05	3 00
231	Sandstone. N. Y., O., France	05	25
323	Sillimanite. Connecticut	10	75
716	Stalagmite. Penn., Virginia	10	3 00
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81	Siegenite	50	2 00
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2	Silver, Native. Lake Superior	30	7 00
458	Sismondite. Piedmont	75	20 00
715	Slate. United States	05	2 00
83	Smaltite. Sweden, Saxony, Bohemia	30	3 00
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305	Sodalite. Maine	10	1 75
417	Soapstone. United States	05	75
591	Soda Nitre. Peru	10	60
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180	Specular Iron. Europe, U. S.	05	2 50
48	Sphalerite Eng., Mo., Ct., Pa.	05	2 50
329	Sphene. New York	10	5 00
184	Spinel. New York	10	3 00
243	Spodumene. Mass., Conn	05	2 00
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80	Stannite. England	10	2 00
715	Statuary Marble. Italy, Vt	10	1 00
333	Staurolite. New Hampshire	05	3 00
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148	Tochhydrite. Stassfurt	50	1 00
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662	Tecticite. Saxony	75	1 50
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169	Thomsenolite. Greenland	25	1 50
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320	Tourmaline (brown). N. Y	35	1 50
320	Tourmaline (red & green). Me.	15	3 00
247	Tremolite. United States	05	1 50
498	Triphylite. Bavaria	75	2 00
499	Triplite. Bohemia	25	1 75
232	Tripolite	10	80
738	Trona. Egypt	50	1 50
266	Troosite. New Jersey	15	1 00
715	Tufa, Calcareous. N. Y., Dak.	05	2 00
292	Turgite. Pennsylvania	10	1 00
563	Turquois. Persia, New Mexico	15	3 00
692	Ulexite. Peru	10	1 00
87	Ullmanite	20	2 00
190	Uraninite	10	3 00
572	Uranite England	10	3 00
565	Variscite. Arkansas	05	1 50
411	Verde Antique, U. S., Italy	05	1 50
153	Vesbine. Vesuvius	25	2 50
273	Vesuvianite. Vesuvius	10	2 50
238	Violan. Piedmont	25	2 00
524	Vivianite. New Jersey	10	2 50
218	Wad. United States, Austria	10	90
800	Walchowite Moravia	1 00	2 00
600	Warwickite. New York	20	1 50
554	Wavellite. Arkansas	05	2 00
688	Websterite	25	1 50
299	Wernerite. New York	05	2 00
266	Willemite. New Jersey	05	1 50
411	Williamsite. Pennsylvania	05	1 50
726	Witherite	10	2 00
610	Wolframite. France	50	1 50
237	Wollastonite. New York	05	1 50
830	Wollongongite. Australia	10	70
617	Wulfenite. Utah, Nevada	10	5 00
207	Xanthosiderite. Thuringia	50	1 50
747	Zaratite. Pennsylvania	50	1 50
56	Zinc Blende. Pennsylvania	05	2 50
176	Zincite. New Jersey	05	2 00
272	Zircon. Pennsylvania, Colo	15	3 00
280	Zoisite. United States	10	2 00

VOL. II. NO. 5.

MARCH, 1896.

THE MUSEUM

A Journal Devoted to Research in Natural Science.

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London Agency, SWANN & Co., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

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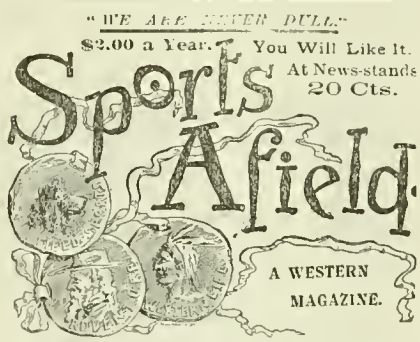

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., MARCH 15, 1896. No. 5

Notes from the Mohawk's Country

P. M. VAN EPPS.

(III.)

A LACUSTRINE SWAMP.

"Where hardly a human foot could pass,
On the quaking turf of the green morass,"
—*Longfellow.*

Due north from the Mohawk river about six miles, and lying near the western border of Saratoga County is a swampy tract locally known as "Consalus' Vlaie," so named from the original purchaser of the tract Joseph Consalus or Gonzalez who settled here in 1770. This swamp, or "vlaie" as the Dutch settlers called it, embraces a tract of from six to eight-hundred acres in extent, and is the peat filled bed of a pleistocene lake, and althongh now completely overgrown, yet probably at the period of the occupancy of this region by the Mohawks some open water yet remained, as traces of ancient camping sites have been noticed on or near the borders of this former lake.

Numerous swampy areas of this character are to be met with in northern New York, of which many were doubtless in former time sheets of open water. Some were wholly or partially drained by the gradual erosion and lowering of their outlets, while others have been filled by the slow washing in of detritus by surface waters and streams, and by the growth of sphagnum and other allied water-growing plants which encroaching on the lake from every side eventually bridged all remaining open water, until in lieu of a lake we find a morass, swamp or vlaie. The central portion of such lakes being generally the last to become filled or overgrown, often remain for a long time as treacherous quaking bogs, in which many animals become entrapped and perish.

The economic products obtained from such swamps in this latitude consist principally of peat, bog-iron ore (limonite) and shell marl. But little is done however in the way of procuring these, as the expense of drainage often exceeds the commercial value of the products obtained. Many years ago a company was formed to explore and drain the Consalus vlaie, a few drainage ditches were excavated at great expense; some little quantity of peat was taken out and dried, and the experiment was made of burning this peat in the locomotives of the New York Central Railroad at Schenectady; but the works were soon abandoned, and the ditches have been allowed to fill with silt and vegetable growth. It is possible that in the future an element of some commercial value may be obtained from swamps of this character, in the supply of diatomaceous earth which is known to exist in such areas, also phosphatic nodules are supposed to abound on the floors of these filled lakes.

Regarding the Indian occupation of

this region, their fondness for lakes is well known to all who have ever had occasion to search for relics, as at nearly every small lake can be found remains of camp or village-sites. That during the Mohawk's time a considerable sheet of open water yet remained in the Consalus swamp seems highly evident. At any rate it is certain that the place was resorted to by some primitive people; if not by the Mohawks then by their predecessors, possibly by the men who constructed the ancient hearth found lying on a bed of glacial clay at a depth of fourteen feet below the surface at Saratoga Springs. Mr. Hawley McWilliam has done some interesting work in this locality. He has located a camp-site on the eastern shore-border of the former lake and has hopes of finding one on the western margin as certain indications lately noted would seem to denote that such a site exists, and to his efforts do we owe the preservation and association of the numerous surface finds of the immediate vicinity. The major portion of these objects have been disclosed by the plow, and among them we will now and then meet with a specimen whose material and workmanship would seem to lend color to the idea that the lacustral occupation of the region was pre-Mohawk. Notably among these latter I would mention a chipped and polished celt of flint, such being of the most extreme rarity in the Mohawk Valley; an extra large spear-head worked from a piece of beautiful smoky quartz, and sundry other objects differing somewhat from the common type of implements and weapons found everywhere in the Mohawk Valley.

IMPLEMENT OF YELLOW JASPER.

($\frac{1}{2}$)

The cut shows at half-size a leaf-shaped implement chipped from a beautiful yellow jasper of firm texture. This object was found in association with a few flint implements near the northern margin of the vlaie in the town of Galway. Such objects of jasper are, in general, only remarkable for the material whence fashioned and differ but little in general form from the ordinary types of flint objects. A description of the above figured implement and others, with notes on the occurrence of jasper implements in this region were published by the author in Vol. II *The Archæologist*, pages 29-30. But in the absence of other data, and taken alone, these few objects in their uniqueness offer us no direct proof as to an occupation of the region by any people previous to the coming of the Mohawks. They may be only oddities or exotics procured by barter, or as trophies of battle. Better proof in this line might be had could the approximate time of the closing of the lake be worked out, and possibly by a thorough examination of the contiguous camp-sites; for as yet the investigation of these has been but superficial.

During the summer of 1890 an interesting "find" was made by Mr. McWilliam at a point but a short distance from the camp-site mentioned as being

on the eastern margin of the vlaie. This was an isolated *cache* numbering about one hundred large leaf-shaped implements. Such "finds" of a varying number of implements, all in the particuler deposit usually being of one pattern, are occasionally reported from this and the adjoining states, but are not common, and when such a discovery is made the objects are usually scattered at once to the four corners of the earth. Thanks to the foresight of the finder, this nest of flints was zealously kept together in its entirety, and was last year deposited *en masse* in the National Museum at Washington. The manner of their discovery was curious, Mr. McWilliam in passing hastily over a field just under the plow for the first time in many years, noticed or thought that he caught a glimpse of an object of worked flint lying in the freshly upturned sod, but not being sure he passed on. However them atter troubled him, as it would any true-born archæologfst, and after going a short distance he fortunately retraced his steps, and on nearing the debatable ground he was rewarded with the sight of a few finely chipped leaf-shaped implements lying scattered in the loose soil. Subsequently thorough search being made, the entire number recorded was recovered.

Dr. Thomas Wilson in speaking of these occasional finds of leaf-shaped implements (*feuille de laurier*) says;—

"They have always been considered as Indian, and the possibility of their belonging to the paleolithic period has never been contemplated. It would become intensely interesting if, now that the attention of the public is directed to these implements, if they should be found so associated with other paleolithic implements, or with the fauna, or under circumstances which would point to their belonging also to the paleolithic period."

A study of Prehistoric Anthropology, page 641. And again in the same work, while speaking of the beautifully chipped and fluted implements of the Solutrian epoch, (page 614).

—"It is remarkable that these leaf-shaped implements should be found in France in nests or *en cache*, and that great numbers of similar instruments should be found in the United States likewise frequently in nests."

To the working botanist and geologist, the peat-filled lake basins of northern New York offer a tempting field for study, and in some of them as at the Consalus vlaie, the archaeologist will have his hands full in solving the problems that will confront him.

If during the past ages we had had in this land as dense a population, as did Europe during the epochs of stone and bronze, we might well expect to recover from our lacustrine swamps many ancient canoes with their associated relics. As it is, doubtless a few such may exist, to be possibly disclosed by drainage works of the future. Doubtless much of interest could be gathered from a study of the ancient fauna obtained from these deposits. From a slight excavation made near the margin of the Consalus vlaie during the summer of 1895 by Mr. Robert Hartley and Mr. McWilliam, the following species of fresh-water shells were obtained, as determined at the National Museum.

Planorbis campanulatus Say;
Planorbis bicarinatus Say;
Planorbis exactus Say?;
Planorbis parvus Say?;
Physa ancillaria;

Valvata tricarinata Say;
Pisidium compressum Prime?;
Limnaea desidiosa Say.

While all lacustrine deposits of this nature have many features in common, yet each one will be found to have a distinctive individuality, either as to its past or present fauna; its flora; its peculiar deposits of marl, bog-ore, and other economic products; also while it is true that the particular morass treated of in this slight paper is very small in extent. yet if any reader is ambitious to make investigations in the muck line; or has thoughts of becoming a "bog-trotter" and desires a larger field in which to spread himself; it can easily be found, for only a few miles to the northward lies the great Sacandaga vlaie, which is said to contain an area of 13,000 acres.

Glenville, New York,
1st March 1896.

RARE BIRDS IN ONTARIO.

Read at the Canadian Institute on Monday Night, November 22, 1895.

In years gone by the neighborhood of this large and beautiful city of ours was noted for the immense number of game and other birds visiting us during the spring and fall.

The bay of Toronto and Ashbridges Bay being covered even to their Northern shores with large flocks of wild ducks of all species, also wild geese, and even occasionally the large White Pelican has been taken.

Then the shores of our Island and the beaches extending East to the lower end of the last named bay abounded with all kinds of Plover, Snipe and even Woodcock.

In those days the trees afforded quiet and protection for the land birds owing to the shade and extent of woodland growth thereon, a continuous belt of trees extending from the lighthouse at the Western point down to the extreme Easterly end of Ashbridges Bay.

It can easily be imagined to what extent the rare birds at that time must have congregated there.

It is hardly possible that any point on Lake Ontario could have had the attraction either in the way of feed or otherwise for certain species of birds, many of which are now extinct.

Hitherto the game law has almost been a dead letter, but we now, I am pleased to say, have a very good prospect that the requirements of the amended game act (and which act is really a good one) will be carried out as they should be.

The Ontario government have lately made a very wise choice in the selection of Mr. Edwin Tinsley as chief game warden. Being an old sportsman himself his knowledge of the game birds breeding in, and those visiting our province, will be of great value towards their protection, and it only now remains for the heads of the government to supply him with the necessary machinery and salaried assistants as will enable the work of his department to be carried out as it should be, and as I am certain he fully desires, and which would without doubt be the means of restocking this province with all kinds of game birds.

In a conversation I lately had with the gentleman named, he was of the opinion that it would assist greatly in the preservation of game and other birds, if a clause could be inserted in

the game laws which would debar boys under sixteen years of age carrying fire arms. Such a change he thought and no doubt would also be the means of preventing many such deplorable accidents as we see recorded every year in the public press.

It is to be hoped that at the first session of our Legislature some action may be taken in the direction suggested so that it may become law.

I will now take up and give a description of a few very rare species which have been taken within the past year, the first on the list I find being:

The Perigrine Falcon or Duck Hawk (*Falco Perigrinus*). These birds are becoming very scarce in the vicinity of Toronto, so far as I can learn the last one was shot by Mr. George Pierce on our Island this year. The specimen before you was killed at Port Rowan by Mr. J. R. Well last month.

This bird is no doubt the most powerful bird of prey for its size that flies, and its courage is not less than its power, once it singles out a duck or Coot for a meal, it travels almost like a bullet in pursuit and seldom misses securing the prize.

Cassel's book of birds says no bird from a wild goose to a Lark is safe from its attacks.

I have on several occasions witnessed these Falcons strike and carry off both ducks and Coots at the St. Clair marshes, and when out shooting some years ago on our lower or Eastern sand bar I had one of these birds carry off a Golden Plover that had fallen only about seventy or eighty yards from where I stood, the noise of the gun not seemingly disturbing his lordship in the least.

On another occasion during last winter my attention was called to one of this species that took up its abode on the tower of St. James Cathedral in our city. It remained there for about two months and roosted on the stone ledge on the north side of the tower immediately above the clock. In company with one of my friends we watched the bird with a spy glass several times. Even the striking of the clock or the ringing of the large bell did not seem to disturb it in the least. When hungry it would dart after the tame pigeons and sparrows in the neighborhood and thus supply itself with food.

It seemed to be quite at home and contented, even with the constant noise and bustle of our main thoroughfare.

This alone would show how independent and courageous the Perigrine Falcon is.

There is no doubt that the Falcon we have here is the typical bird used for many ages in the old world for the capture of wild birds and animals.

The sport of Falconry dates back almost beyond our comprehension.

In China it appears to have been practiced some two thousand years B. C., and the records of King Wen Wang, who reigned over a province of that country in six hundred and eighty-nine B. C., prove that the art was at that time in very high favor.

In Japan it appears to have been known six hundred years B. C. and at an equally early date in India, Arabia, Persia and Syria.

Sir A. H. Layard in his work on Nineveh and Babylon speaks of finding in some ruins a bass relief of a Falconer bearing a hawk on his wrist, which would make it appear the sport dated back there some seventeen hundred B. C.

Records show also clearly that Falconry existed in Europe between the years three hundred and eighty-four B. C. and 40 A. D. supplied by the writings of Pliny, Aristotle and Martial.

The sport was probably introduced into England from the Continent about 360 A. D., and was followed from that time down to the seventeenth century with an ardor that probably no other sport called forth.

In the reigns of William the Conqueror, Edward the Third, Henry the Eight and Elizabeth stringent laws and enactments were passed from time to time in the interest of Falconry. Falcons and hawks were alloted to degrees and orders of men according to rank and station, for instance to royalty the Jer falcons, to an Earl the Perigrine (our friend present).

About the middle of the seventeenth century the sport declined in England, but again revived somewhat, but no doubt the improvements in the art of gun making, etc., has done away to a great extent with falconry there, but in Mongolia, Chinese Tartary and Central Asia the sport still flourishes.

Properly trained falcons commanded a very high price in olden times, owing to the training of the birds, requiring great skill, patience and judgment by those engaged in the work.

We must, without doubt, hold our friend *Falco peregrinus* in great respect owing to his ancestors being held in such high esteem by kings and queens and nobles of high degree.

The next to engage your attention will be the Double Crested Cormorant (*Phalacrocarax Dilophus*).

The specimen now shown is a young female and was shot by Mr. Hume at Ashbridges Bay in October last.

Although the Cormorant is a sea shore bird they occasionally visit our inland lakes and of course take in our city.

The young of this species, strange to say, are hatched blind and are covered with an inky black skin. While in the squab condition they are highly esteemed for food by the Laplanders, thus showing that there is "no accounting for taste." Torontonians would certainly prefer fish and fowl served separately.

Taken when young from the nest this bird is easily tamed and in olden times in England was trained to fish for his keeper, and the master of the cormorants was one of the officers of the royal household.

When the bird was taken out for sport a strap was fastened round its neck so as without stopping its breath to prevent it from swallowing its captures. On getting a fish into the pouch it would return to its keeper, who secured the prize and started the bird off to work again.

In China the cormorant is also trained to catch fish, but in that country a ring was used in place of a strap for the neck. It takes three years for these birds to get their full plumage and then the feathers are green and beautifully marked.

The Chinese fishermen go out on rafts made of large bamboos about two and a half feet wide and fifteen or twenty teet long, which they propel with a paddle. On each raft three or four cormorants are generally used.

Buffons or the Parasite Skua (*Lestris* [*Stercorarius*] *Parasitica*). The specimen you now see was shot at Ashbridges Bay and is considered a very rare visitor indeed in this section.

The Skuas although resembling the Gull in shape and somewhat in plumage, differs so much from them otherwise that they must be regarded as forming a separate family, the principal points of difference lie in the peculiarity of color in plumage and in their mode of life,—in old birds the central tail feathers are elongated and sharp pointed.

The Parasite Skua is met with in the Arctic Regions of both hemispheres. It is found in Spitzbergen and Greenland extending thence to the middle of the coast of Norway, in Iceland, in the Islands north of Scotland, off the coast of Labrador, in Newfoundland and in Behring Straits. In England and Ireland it is very rarely seen.

The flight of this species is erratic and in that respect differs entirely from the Gull family.

Its gait when walking on the shore is also hurried. They are bold and vallorous, but unfortunately are covetous and thievish, for they follow the Petrels, smaller Gulls, Terns and Guillemots and make them disgorge any prey they have swallowed and obtain the booty for themselves.

The Pigeon Guillemot or Greenland Dove (*Cephus Grylle*). This specimen was killed early last spring on the lake shore at Ashbridges Bay in an opening in the ice.

It is, from all I can learn, the first bird of the kind even seen or secured at or near Toronto and is a representative of a distinct group, recognizable by its small size and straight beak.

In Greenland and Iceland they are numerous, and although the flesh is said to have a strong flavor of train-oil, yet they are eaten by the inhabitants of the countries named.

These birds visit the British Isles, but according to Macgillivray have no breeding place south of the bass rock at the mouth of the Firth of Fourth and the Isle of Man.

American Rough Legged Buzzard (*Archibutes lagopussancti Johannis*). Through the kindness of Mr. Myers, a sportsman of our city, we lately got from him a rare specimen of the above species, also shot in our marsh.

The usual plumage of the Buzzard varies from light brown, to brown with dark brown or black patches, but the bird now mentioned is almost all black. It is the first one of the color I have ever seen. Having only lately been mounted, the skin had not dried sufficiently to enable its being exhibited.

This fall the common Buzzard have visited the marsh in great numbers.

I cannot close these notes without touching on a curious circumstance that occurred last month. Sir Casimer Gzowski mentioned to me that one of his servant men, who was engaged milking a cow in a lot back of his residence on Bathurst street, observed a cat that was near him crouch down and spring at something on the ground. On going over to the animal he took a Woodcock (*Philo hela minor*) out of its mouth, and while he was examining the bird the cat made another spring and caught another similar bird.

J. MAUGHAN.

The Clay Slate of Vermont.

BY C. O. ORMSBEE, MONTPELIER, VT.

Those whose aim it is to collect a cabinet of beautiful and showy specimens, without regard to scientific value, would pay but very little attention to

a fragment of clay slate, for it is one of the plainest and least attractive of all minerals. Yet a careful study of it *in situ* is very interesting, at least to me, and develops many problems not easily answered.

In this state clay slate occurs in long, narrow strips, the principal one of which is in the central part of the state, extending northerly in a serpentine course, from the town of Royalton far into Canada. In some places it is but a mile in width and in others it has a breadth of nearly six miles. It is this strip that will be studied in the present paper, not because it is the most interesting, for such may not be the case, but because I chance to live not far from the center of the strip and, in consequence have had vastly better opportunities for original study.

Clay slate, as it is found in this strip, is interstratified with beds of an impure limestone of a bluish, or grayish tint, and, also by beds of milky or hyaline quartz, and, in places of beds of granite. Other kinds of rock are found but they are of small extent. It is coarsely laminated, and is divided, by joints which cross each other at different angles, into rhomboided blocks varying in size from two or three inches, to several feet in extent. It is composed of very fine clay with just enough organic matter to give it a dirty black color, but so thoroughly have the organic been decomposed that no fossils have ever been found in this strip. It was deposited as silt, in horizontal strata, and afterwards tilted at various angles. In some places the strata are nearly horizontal and in others they are nearly perpendicular, but always the dip is towards the east. Another peculiarity of this formation is that, starting from any point upon the surface, the elevation of the rock gradually increases towards the south in the form of an inclined plane, and then suddenly drops by a perpendicular descent. It then begins to ascend only to drop again. Take a flight of stairs having very broad and comparatively low steps, and lay it flat upon its back and you will have a very good representation of this peculiarity. Again it will be noticed that the entire surface of this strip consists of a succession of hills and valleys all extending in a northerly and southerly direction, following the general trend of the strata. Yet very few of the streams follow the course of these valleys. With very few exceptions they follow deeper, and transverse valleys across the strata

This much may be seen by a casual glance at the surface of the country. Now for a little theory. For several years I have been studying this formation very carefully and have just about learned enough so that I can begin to work intelligently. I intend to devote considerable time to field work as soon as the weather will permit and I believe, that, before the end of another year, I shall have made some interesting deductions.

From what I have already learned, I believe, as I have stated, that the clay slate was deposited as silt upon the bed of an immense body of water, possibly the ocean itself, and that by some internal force coming from the east the entire mass was tilted to its present position. This operation evidently produced the joints, and, not only this, but, by allowing the layers to slide freely from their positions, produced the hills and valleys as well.

It has been asserted that the tilting was a result of lateral pressure. This formation, taken alone, gives no evidence that such was the case. It seems to have been raised by some upward force coming from beneath the eastern side. In many places the layers are bent as though, when the rock was in plastic condition, it had been subject to a lateral, or rather longitudinal pressure which was exerted from north to south. I know of no place where such pressure was sufficient to produce a dislocation, or where there is any evidence of an easterly pressure. The entire formation may form a part of an immense anticlinal but we must go many miles to find any indications that such is the fact.

As before stated, beds of limestone, milky quartz and granite are found interstratified with the clay slate of this formation. It is said that the milky quartz is but a metamorphic form of the limestone, and it seems very probable that such is the case: but the question as to how came the limestone to be interstratified with clay slate still remains. For myself I am satisfied that the limestone is of organic origin. I believe it to be composed of the shells of certain species of mollusks which then inhabited that body of water in which this formation was deposited. The limestone has been so changed in its character by the action of heat and other agencies, that there is nothing in its appearance to indicate that such was the case. Nevertheless, a chemical analysis shows that it is possible, and, in absense of any more positive information I shall continue to advocate this theory.

Admitting the possibility, there is yet one difficulty in the way of a perfect understanding. I can, as yet, give no satisfactory reason for the limestone occuring in regular strata one above another. It seems most natural to suppose that the deposition of silt and shells would have been simultaneous and continuous, in which case the limestone and clay slate would have been intermixed instead of interstratified. I am in hopes that further study will enable me to solve this problem, and I believe I shall be able to do so after another season in the field.

The Science of Geology, and the Bible Account of Creation.

(CONTINUED FROM LAST NUMBER.)

The first traces of life appears in the Silurian formation, composed of sandstone, limestone, slate, &c. In England this formation is of immense thickness—something near thirty thousand feet, and the first signs of life are a few simple marine plants, of a class similar to the sea-pens of our modern seas. In this formation too is found in great abundance a lowly kind of star fish, fixed upon the top of a flexible stalk, the root of which is fixed in the bottom of the sea; here too we have a few graptolites, brachiopods, trilobites, and crustacea.

The upper Silurian presents similar fossils to the lower, but in the Devonian we become acquainted with corals in great abundance. It may be remarked that up to this period we have no traces of land plants. From what we at present know of geology, the flora and fauna of this period is of a marine character. But a writer on the subject, who is not favorable to the Scripture account says—"There are reasons, apart from the fossil his-

tory, for believing that great masses of land had been exposed to the atmosphere for ages, but was only a scene of life in rare and favorably situated places." And when we come to consider the remarkable features of the next group of rocks, forming the carboniferous era, we have great reasons for concluding that land plants to a large extent did exist, and had existed even during the period we have named.

The next series of rocks is the *Carboniferous* formation. It commences with the mountain limestone, is of great extent and thickness, and alternates with beds of sandstone, shale, and coal. The remains of corals, crinoidea, and shells, in some parts compose three-fourths of the mass. Above the limestone commence the large beds of coal, the immense formations of which are known to be the composition of putrified vegetable matter, decomposed under water, and in the absence of air. These rocks tell strikingly of the features of the earth at the time of their formation. They tell us of a time when carbonate of lime was formed in abundance. Next we have a brief period of volcanic disturbance; then the causes favorable to so great a production of limestone: dry land increases, the atmosphere is charged with an unusual abundance of carbonic acid gas—the material of vegetation; immense forests grew rapidly, and every piece of dry land was rank with foliage. From the investigations of eminent naturalists, about 500 distinct species of plants have been discovered in this formation, the most conspicuous being the fern or bracken, of which 150 species have been found. Trees of immense growth have also been found; one was dug up in a quarry at Edinburg, the trunk of which measured two feet in diameter, and forty feet in length.

The carboniferous formation exhibits a scanty zoology: the commencement shows an abundance of the mollusca class, but as we get higher we find the first and most simple forms of fish; next we have a few specimens of insects or "creeping things," and an instance or two of a scorpion-like creature. But these insect deposits are few, and may have been the result of the volcanic disturbances to which the world was at that time subject. The insects which have been found in this formation are of the frog and toad class. It is generally thought that the conditions which allowed of such abundant terrestrial vegetation had ceased at the time this formation was completed.

The next formation is the *Permian*. Here nearly the whole of the numerous fossils common to a previous era disappear, but fish appear in abundance.

Next we have the *Trias*, in which reptiles of various kinds and forms are found. We find slabs marked with the feet of animals, resembling the impressions of the fingers and thumb of the human hand. We have the Enaliosaurian and the Saurian tribe, marine animals of great bulk, some reaching thirty feet in length. We find too the Plesiosaurus, an inhabitant of the seas, partaking in form of the bird and fish, and measuring about eighteen feet in length. An American author has stated that the footprints of about thirty species of birds have been discovered in this formation.

We then come to the *Oolite*. Here a beautiful class of plants appears, be-

tween the conifers and the palms, a sort of tree ferns. The lower class of marine animals present themselves in abundance; corals are scanty, the crinoids are numerous, and show an advance of organization. Now we have the first fossil of the winged saurians, or the flying lizard, a sort of bat-like animal; crocodiles of the species of our own time were also common. In the highest part of the Oolitic period we have what is termed the *dirt bed;* above this bed lies the wealden, which is chiefly remarkable for the additions which it makes to the list of reptiles presented in previous formations. Here we have, besides some new crocodiles, the *Megalosaurus*. This animal is about thirty feet long, and by far the most formidable creature of its age. Then we have the *Iguanodon* of Mantell, another immense animal of the mammalian type.

The *Cretaceous* era presents beds of sand, alternately with clay and chalk. The distinctive feature of the upper chalk is the presence of flint. It is remarkable that the chalk with flint abounds in the north of Europe, and that without flint in the south. All the ordinary orders of the inhabitants of the seas have been found in the cretaceous formation, whilst the land reptiles seem to diminish in number. Fuci abounds, and terrestrial vegetation. Of terrestrial animals the specimens are rare. Professor Owen, in 1860, discovered some vertebræ of the whale, in the lower green sandstone, near Cambridge; and in the slate of Glavis, in Switzerland, corresponding to the English galt, the remains of birds have been found.

We come now to the era of the *Tertiary* formation. The end of the *Secondary* formation, which we have just concluded, presents a sort of finish to one epoch, and a new order of beings at once springs up. All appears to have undergone a total change. We witness a difference in the shelly inhabitants of the seas, and many forms previously abundant, disappear entirely. It has been stated by geologists that at this period there was an entire renewal of life on our planet; but it is evident that a few of the previously existing species do pass into this strata. In this formation we find the elephant, the ox, deer, camel, fox, wolf, badger, otter, the bear, and numerous other species of our own times.

The era of the superficial formations presents very little difference to the former ones in regard to its zoology. The remains found are generally those prevailing or merging into the species at present existing. At Market Weighton and in the Vale of York there have been found bones of the elephant, rhinoceros, bison, wolf, horse, birds, nearly all presenting peculiarities differing from existing species, though associated with many species of land and fresh water shells now living in the vicinity. The superficial deposits show as near as possible remains identical with the existing species. Still there is even here an absence of the sheep, the goat, and many of our domestic animals; and above all it lacks the remains of man. We thus learn that his existence upon the earth is but of yesterday. Attempts have been made to prove the contrary, but without proof. It was stated that the remains of man had been found at a stage of the drift prior to the extinction of the animals of the bone caves,

but it has never been authenticated. At various depths, up to twenty feet, in the naturally deposited chalk gravel near the banks of the Somme, in Picardy, have been found multitudes of flint implements, rudely chiselled by the human hand, and apparently designed to serve as spear heads. To the same purport has been the discovery of certain similar flint implements in bone caves in Sicily and England; but the discoveries are so rare, and surrounded with circumstances which render their authenticity as to time and circumstances so doubtful, that geologists have not thought it necessary to account for them in any way but as out of the time of geological development.

We thus conclude the wondrous section of the earth's history which is told by geology. We have told it briefly, omitting those many features of its changes in volcanic convulsions, upheavings of stratas, dislocations, chemical actions, atmospheric changes, and other important features which the science of geology teaches us; but we have endeavored to give so much of what geology teaches as bears upon the Biblical account of creation; and we have given it from a point of view which has been put forth and developed by the Darwinian school of modern geologists. Therefore in our attempt to prove that this wondrous history corresponds with the Mosaic account of creation, the reader must bear in mind what was said at the outset, that if science does not appear now to reconcile itself with revelations, it is not because the Word of God is at fault, but because we do not know sufficient of the book of science to give us a true conception of the word that is revealed.

We have thus, as briefly as possible, sketched out the bare outlines of the history of creation, as presented to us by the science of geology. We see that the earth is replete with the entombed remains of animals and vegetables, from entire trees to lichens and ferns, from coal beds to mere impressions of plants,—from the smallest shellfish to the largest reptiles; it is chequered with fragments, from the finest sand to enormous blocks of stone; it exhibits in the materials of its solid strata every degree of impression, from the slightest abrasion of a thin edge or corner to the perfect rounding; it abounds with dislocations and fractures, with injections and filling up of fissures, with elevations and depressions of strata in every position, from horizontal to vertical; it is covered with the wreck and ruin of its upper surface; and as ancient fires for periods dormant have never been extinguished but still struggle for exit from their numerous volcanic outlets. All these tell a history of their own and present to our mind evidence of the state of the globe we inhabit millions of ages ago, and long before our species became its inhabitants.

My readers will observe well not only the order and position of the various stratas composing the earth's crust which I have described, but also the nature of the different kinds of organized beings discovered by the geologists in each strata from the lowest upwards. There is no doubt as to the certainty that the remains once lived and moved to the very part where they were discovered, and whether animals or vegetables, whether deposited on land or in seas or lakes, all the causes necessary to produce the

event were in successive operation, and were produced in the order in which we find them; put in the same manner an edifice having granite for its foundation, sandstone for its basement, marble for its upper structure, wood for its roof, and slate for its covering, shows that it was actually constructed of these materials by the architect, and connected in that order by his intelligent design.

The view I have taken now of the first chapter of Genesis tends to deepen my confidence in the unqualified revelations of the Bible. For if the acts of apart of eternity have been so faithfully revealed by the divine spirit, that nature says, "*It was ever so*," have we not a striking proof before us that He who *could make* known the *part*, can also reveal the future! And is his omniscience foretell not only the changes yet to come on the face of the earth, but what still more concerns man, his immortal destiny in another world.

The great German astronomer, Kepler, having beheld creative glory manifested in the movements of the heavenly bodies, poured forth at the conclusion of one of his astronomical works, a thanksgiving prayer. And, cannot, I at the close of this short essay on the earth's wonderful construction, suitably adopt his words of homage and request?

"It remains only that I should now lift up to heaven my eyes and hands from the table of my pursuits, and humbly and devotely give thee thanks O Lord and Creator, that thou hast gladdened me by thy creation. If anything unworthy of Thee has been said by me, a worm, born and nourished in sin, do thou teach me, that I may correct it, and finally grant this favor, that my words may never be injurious, but may answer to the glory and good of souls," amen.

CHAS. S. WHITNEY,
Hinsdale, N. H.

Do Birds Reason?

While reading the interesting article under the above heading by Mr. E. Kroy in the November number of the MUSEUM it brought to my mind an incident that came under my own observation a few years ago.

In the house where I lived there was a small hole under the eaves where the outside boards had rotted away leaving quite a cavity inside.

A pair of Purple Martins took up their abode in this cavity and reared their brood. They came regularly after that every spring for three or four years. One winter while repairing the house the Martins were forgotten and the opening was closed with boards. The next spring I noticed the single pair of Martin's flying about the house for several days, seeming very uneasy. At last I got a ladder and made a small opening in the new boards over the cavity when they at once took possession of their old breeding place and brought forth their brood and have come regularly since.

Although it is the habit of many birds to return to their old breeding place year after year, I think that these birds coming back and finding things changed must have used reason or why would they stay around for a week without finding another nesting place.

J. H. MERRILL.
Cambridgeport, Mass.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r
Albion, N. Y.

Correspondence and items of interest on above top ics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

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NOTES.

Watch for nests of the Great Horned Owl this month. It's cold weather here in the North we know, but the Owls won't stop for that.

It's getting time to look over your tools and supplies, and see what is needed for '96. We can quote you the lowest figures on anything you need. Write us.

Mr. E. G. Tabor, of Cayuga Co., N. Y., writes that Pine Grosbeaks have been in his section from Jan. 31 to Feb. 27. A number have been shot in our own vicinity between above dates.

Mr. Harbron, of Hamilton, Ohio, writes that about the middle of November there was an Acadian Owl shot in that city. He is not aware that it has been found so far south before and wishes to hear from other Ohio collectors in regard to it through the columns of the MUSEUM.

Mr. Fred Jorgenson, of Grand Rapids, Wis., sends a photo of a fine specimen of a 2-headed calf that he has just finished mounting. We quote from the Centralia (Wis.) *Enterprise:*

"The curiosity seekers of the twin cities have been all agog during the past week over the wonderful two-headed calf now on exhibition at Fred Jorgenson's taxidermist's shop. The calf is indeed a genuine curiosity. It was born in the town of New Rome, in Adams county, and was owned by a farmer there. It has two distinct heads, joined at the throat at an angle of about ninety degrees. Each head is separate and distinct in all parts except the ears. In that respect there seems to be a double ownership of one of these organs. In other words the calf has two heads, two mouths, four eyes and three ears. For several days after its birth it seemed to flourish like a Green Bay tree, and probably would yet be in the land of the living had it not been for the unaccountable superstition of its owner, who thought that to let it live would surely bring ill luck or misfortune of some kind. He accordingly killed it. The hide was brought to Mr. Jorgenson, who had to build an artificial frame to give it a natural appearance. He did a very creditable job. The calf in its present mounted state is the property of Mr. Wm. Anderson, of Hazelhurst.

The ornithologists of Maine have organized into a state association and the officers for '96 are Pres., Jas. C.

Mead North Brighton; V. P., E. E. Johnson Lewiston; Sec. and Treas., O. W. Knight, Bangor.

If any of our subscribers want to join a live, energetic and enterprising Natural History Association, write to Albert Schneider of New Britain, Conn., who is secretary of the N. B. N. H. A. Annual dues 25c.

We are in receipt of Natural History Notes No. 2 and No. 3 by A. G, Wetherby of Magnetic City, N. C., being extracts from proceedings of the Cincinnati Society of Natural History. No. 2 treats in an able manner on the land shells of Roun Mountains, N. C., and No. 3 is a continuation of No. 2. We hope to have some notes from Mr. Wetherby in the MUSEUM on the collections they are forming in that interesting field.

Allow me to call your attention to the article in this number on the Peabody Museum at New Haven, which was written expressly for the MUSEUM. We have at the present time subscribers in nearly all the large Museums in the United States and some of the Eastern Continent. We desire one article each month of '96 giving a general outline of some large museum in which the writer is employed or has ready access to. These will be of special interest to all our readers. Dwell on any rarities contained in the Museum and any points of unusual interest. Advanced students in our universities and others have exceptional opportunities to aid us. We will gladly pay for same in books or specimens. We have never asked our correspondents to send MSS. entirely gratis, although we have had many such sent in and given them space.

Will Hunt in Central Africa.

Prof. Daniel G. Elliot, curator of the Department of Zoology in the Field Columbian Museum, has been commissioned to conduct an extended expedition into Central Africa in search of animals for the museum. He will go about March 1st in company with C. E. Akeley, the museum taxidermist. After visiting the British museum and making plans for penetrating the Dark Continent passage will be taken to Zanzibar or Beira, where the expedition will be organized.

At least six months will be devoted to stalking lions, rhinoceri, and hippotami, and special pains will be taken to secure valuable animals now becoming so rare their pelts cannot be purchased. A company of 300 will be taken on the hunt and Mashonaland up to the border of Mashukulumbo will be stalked for other specimens.

Prof. Elliot is a native of New York City, is 60 years old, and holds membership in the Royal Society of Edinburg and the zoological societies of England and France. Mr. Akeley is also a New-Yorker, 31 years of age, and has hunted in several countries.

More Albinos.

In the February number of the MUSEUM, page 112, I noticed an article on Albinos relating to squirrels and almost hinting that some might doubt the truth of the statement. I don't propose to doubt that any one writing on natural history would risk his reputation in any intended misstatements; furthermore years ago when the Western Reserve and Fire Lands of Ohio were covered with forests, both black and white squirrels were found among the gray.

The black were by far the most common. The white had pink eyes, and to day unless killed recently there is a pet white (grey) squirrel with pink eyes living with grey, red and fox squirrels among the trees surrounding the State House at Columbus, Ohio.

Several white sparrows have been shot this winter in this locality. There are four white animals, known in this locality, as meadow moles, meadow mice, prairie mice [they are probably *Arvicola Austerus*, Le Conte, (*Pedonys*)] in private collections of which I am acquainted. We hope Mr. Hodgson may be able to grow more of this strange freak in nature.

E. E. MASTERMAN,
New London, Ohio.

Notes From Ohio.

In his article, "Do Birds Reason," in the January number of the MUSEUM Mr. J. L. Davison asks the readers to give their "views on the Ovenbird, nest of young and egg outside,"

As he says, (see page 78) the nest contained three young of the Ovenbird and one young Cowbird.

No doubt most, if not all, of your readers have noticed that the young Cowbird is nearly always larger than the young of the bird in whose nest it is found, and, therefore, the nest is always more or less crowded, which causes the young birds, especially the smaller ones, to move about in the nest in their efforts to hold possession or prevent being crowded out by the young Cowbird.

The nest of the Ovenbird being closed on the sides and top, the young birds had not the room to spread themselves that they would have had in an open nest so, in this case had probably forced the egg—which perhaps would never have hatched, or, in other words, was rotten—from the nest.

Had Mr. Davison told us how large the young birds were, and, stated whether the egg was fresh or otherwise, one might have known better what views to express.

The above are my views. Am I right?

I shall anxiously await the replies of others, also, Mr. Davison's views of the subject.

L. B. GILMORE,
Ducat, O.

[Above note omitted from last number.—ED.

My Solution of the Ovenbird.

I found the Ovenbird egg on the ground and never having seen the eggs of this species I did not recognize it and commenced looking for a nest in the tree above. Not finding any I concluded it was on the ground and was that of Ovenbird—I had not moved my feet after picking up the egg which was whole—noticing a tuft of grass I raised it up and out scrambled four young birds which I had some difficulty in catching, and when I had succeeded the parent Ovenbirds were on hand and very much excited. I put the three young Ovenbirds back in the nest and threw the young Cowbird as far as possible—as I do with the eggs when I find them in nests that I do not want.

The Ovenbird probably found the Cowbird on the nest and unable to retain her egg any longer deposited it outside the nest as is often done by domestic fowls. J. L. DAVISON,
Lockport, N. Y.

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Spondylas	1 25
Tent olive	30
Conch	15
Milk Stromba	11
Spider	10
Tiger Cowry	15
Lord's Prayer Cowry	22
Magpie Trochus, polished	20
Red Ear, polished	50
White Ear polished	30
Blue or Green Ear, pol.	50
Black Ear, polished	40
Melon	20
Lettered Cone	20
Marbled Cone	20
English Scallop	7
Crown shell	16
Rostellaria	25

Remember above are all four inches long or over, some are 6, 8 and 10 inches.

Two to Four inches long.

Rose Murex	15
Black Murex	25
Trunculus Murex	6
Cameo	10
Turks Cap	10
Green Snail, fine	15
Fulgar	6
Tulip	6
Strombus alatus	5
" pugilis	5
" granulatus	5
Orange Spider	12
Mourning Cowry	15
Panther Cowry	12
Tiger Cowry	6
Mole Cowry	12
Arabian Cowry	10
Calf Cowry	8
Magpie	5
White Ear, small	5
Black Ear, polished	15
Green Ear, polished	20
Pearly Nautilus	40
Japanese Eburna	8
Lettered Cone	4
Yellow Cone	4
Marbled Cone	8
Blued Cowry	6
Atlantic Pecten	2
California Pecten	3
6 assorted Olives	10
Cardium consors	17
Harp shell	15
" "	25
Yellow Elax, pair, a right and left	25
Turritella	8
Mitre	6
Crown shell	4
Silver Lip	4
Quoit shell	4
Pyrula	10
Bag of mixed, containing quart small shells	25

Nice Corals.

Branch coral, 6 in.	$ 12
Rose coral, 4 in	15
Organpipe, 4 in	15
Red Coral, 3 in	15
Pink coral, 3 in	15
Yellow coral, 3 in	15
Propeller, 4 in	15
6 assorted small corals, 2 to 3 in	50
Coralline package	10
Sea Fan Yellow, 10 in	10
Sea Feather, 2 to 3 ft.	15

Starfish, Urchins, Etc.

Calif. Asterias brittle	$ 15
Black Star	15
Chinese Star, imperfect	10
Mex. Sun Dial, imperfect	20
" " Star	30
California Star, fine	15
Atlantic Star	10
Red Star, California	25
Flat Star, California	25
Atlantic Urchin	6
" " spiney	15
Mammoth Calif. Urchin	20
Black Urchin	15
Philipnian Urchin	10
Sand Dollar	4
Keyhole Urchin, imperf't	10

Curios.

Glass Sponge, imperfect	50
Shark Eggs, Leopard	8
King Crab, fine	20
Acorn Barnacles, pair	6
Goose Barnacles	3
Alligator Teeth, 3 for	10
Hermit Crab, in shell	20
Skate Egg	4
Devil Fish Egg	5
Alligator Egg	15
Turtle Egg, 3 kinds each	8
Porcupine Quill, Africa	6
Porcupine Fish, small	20
" " larger	1 00
Hawk Bell Turtle Back, finely polished	4 00
Mammoth Sponges, 2 to 3 feet	2 00
Cup Sponges, per cluster	25
Shark Teeth	5
Porpoise Teeth	10
Lucky Teeth	6
Whale Teeth	30
Tarantula in box	40
Scorpion in box	25
" on card	15
Trapdoor Spider Nest, in box	50
Trapdoor Spider, unmounted	20
Cassia Bean, package	8
Miamosa Bean package	8
Jobs Tears, package	8
Precious Coral	10
Big Tree Bark, 4x4 in.	16
Pods of Sabre Bean, 15 in	16
Sea Bean Pod	8
6 different Sea Beans	10
4 " Foreign Curio Nuts	16
Ressurection Plants, small	5
Botanical collection, containing 54 specimens, mounted on 11x14 paper	1 50
Gun Flints, from a small island in Ohio River	8
Pueble Indian Idol	26
" " " imp'ct	15
Piece Pottery, Pueblo, imperfect	15
Apache Arrow, fine	15
So. Amer. Amazon Bow	2 00
6 assorted Arrows, 60 in. long	2 00
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Collection of 100 kinds of minerals, all labeled	2 25
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filled with shells 20
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50 " " " .. 3 00
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Stamp Purses of pearl... 20
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" " agate..... 1 00
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VOL. II. NO. 6.

APRIL, 1896

THE MUSEUM

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Berlin Agency, R. FRIEDLANDER & SOHN, Berlin, N. W, Carlstrasse 11.
London Agency, SWANN & Co., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

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MR. W. F. WEBB, Albion, N. Y.

I enclose in a sealed paper 50 cts. Please give me credit for the MUSEUM for '96. I am sorry I couldn't attend to this before but I have been so busy that I have neglected it. I have found the MUSEUM a most valuable scientific journal, and I think it well worth the old subscription price, $1. Hoping you future success with your most excellent paper, I remain as ever, truly yours. T. L. HANKINSON, Agricultural College, Mich.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., APRIL 15, 1896. No. 6

Notes From the Mohawk's County.

P. M. VAN EPPS.

IV.

A DOOMED LAKE.

All night long he sailed upon it,
Sailed upon that sluggish water,
Covered with mould of ages,
Black with rotten water-rushes,
Rank with flags and leaves of lillies,
Stagnant, lifeless, dreary, dismal,
Lighted by the shimmering moonlight,
And by will-o'-the-wisps illumined."
—*Longfellow.*

Although, as mentioned in the MUSEUM for March, there exists in this region many swampy areas that in former times have been lakes of varying size and contour, yet it is seldom we meet with one in which the actual process of occlusion or invasion by vegetable growth can be seen and studied. In nearly all and with very few exceptions the process has been completed ages ago. Yet many small lakes abound which still retain approximately intact their ancient shore lines, and which under present physiographical conditions would seem destined to remain as beautiful lakes for ages yet to come. Prominently among these are Ballston Lake, Round Lake and Lake Luzerne; Thompson's, Lawson's, and Efnor's Lakes; Lake Saratoga, Lake Desolation and scores of others which dot the southern Adirondack region.

Why then were not all of these lakes metamorphosed into dreary and desolate bogs? Why should some of the larger have perished while many lesser ones yet remain? Their immunity from the fate which befell their unfortunate fellows is owing to different reasons. Probably with some the great depth of water near the shores has prevented any considerable growth or lodgement of sphagnum or rushes, and in such the ice of winter has destroyed all growth of a preceding summer. But with others the accident of direction and consequent exposure to the prevailing winds has been a most important factor in their preservation. Such lakes as have a moderately level tract to the westward, or whose longitudinal direction is from east to west, or such as by reason of size or length are exposed to the prevailing winds, have no doubt been preserved from closure by the size of the waves generated, making it impossible for water-growing plants to obtain any permanent growth or increase unless it be in sheltered nooks or bays.

As a very instructive instance of lakes of this class could be mentioned Lake Saratoga. Having a length of about six miles, with an average breadth of a mile, and situated longitudinally from northeast to southwest; its surface is swept by every storm from the west and southwest, raising such waves as only those who have had the pleasure ? of being out amongst could believe possible on so small a body of water.

Owing to this peculiar direction in length *i. e.*, from northeast to southwest, the westerly winds generate waves, which though rolling toward the east, yet continually break, in part, against the southern shore; consequently that shore-line is perfectly free from any growth of water-plants; while on the northern side which is in part protected by a high bluff, there are a few places where lilies and rushes have found a lodgement, and a large area of many acres formerly an open bay has been in past time completely filled, and thanks to the lowering of the level of the lake in recent years this tract has partly been brought under cultivation. The filling of this bay has however been expedited by the quantity of detritus and silt brought down by the Kayaderosseras Creek, a stream of considerable size which here enters the lake.

When a lake of the class first mentioned is met with, *i. e.*, one in which the process of invasion by vegetable growth is yet in actual progress;—a swampy tract enclosing an open sheet of water which is generally, though not always, centrally located;—we find such swamp-bordered lakelets to be generally difficult of access. The surrounding marsh being a tangle of cranberry vines, lilies and sphagnum, with here and there a stunted tamarack. Progress on foot over such a tract is both slow and dangerous, nearly every foot-print made immediately fills with water, and if one persists in reaching the border of the enclosed lake great caution is necessary, for the nearer we get to open water the thinner and less coherent do we find our mat of vines. If by great good luck we do not tread on some unusually thin place —slip through, down and out of sight in the under-muck—if we reach the water's edge in safety, we may find that the entangled mat of vines forming this strange sort of a shore actually floats on the water. Regarding this singular property of sphagnous growth I will take the liberty to quote a few lines from Prof. N. S. Shaler's interesting and valuable paper on the fresh-water morasses of the United States. 10th Annual U. S. Geological Survey, pp. 285-287:

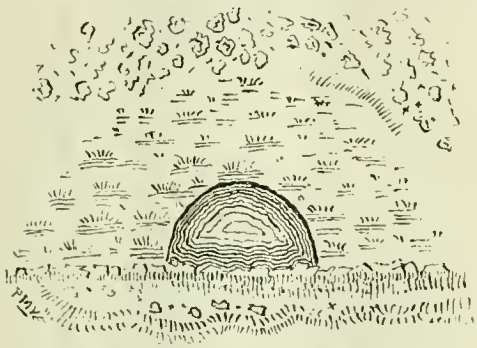
"This is due in part to the fact that sphagnum can tolerate water more perfectly than any other of our important palustrine forms of plants, and in part to the peculiarity of its habit, which enables it to grow rapidly and form a thick sheet of vegetation without any of its roots being embedded in the under soil, they may remain pendant in the water." * *

* * "As the sphagnum grows from its first lodgement on the shore outwardly towards the center of the lake, the mat it forms floats upon the water and constantly contributes the waste of its dead stems to the peaty accumulation which takes place upon the bottom of the basin. In this way, providing the pool be not originally deep, it requires but a few thousand years to close over the surface and reduce the original expanse of water to the condition of quaking bog. In this state the basin is covered by a continuous sheet of sphagnum dense enough often to afford a lodgement to many other aquatic plants, the mass continually thickens, and the sheet sinks gradually towards the bottom of the water."

Some few years ago while camping at one of the southern Adirondack lakes, accompanied by two friends I visited a morass of this description with its enclosed lakelet. This particular example varied somewhat from the ideal standard, in that the lakelet was not centrally situated in the morass but yet retained on one side its primitive shore-line; a low ridge of archean rock whose broken cliffs descend to the water's edge and probably far below. The depth of water along this rocky

escarpment may be considerable and to this reason probably is owing the peculiar form of the lake as it remains, the great depth and rock-bound margin having made impossible any growth or lodgement of vegetation.

Against this rocky barrier which exists as a straight base line, the lakelet lies imprisoned with a beautiful semicircular outline, while out over the marsh far beyond, though not having as exact an outline, is the enclosing forest-wall.



Lake in Saratoga County, N. Y., in active process of occlusion.

Our first sight of this secluded lake was had as we came out of the forest onto the marsh at a point nearly opposite the center of the rocky, wooded shore-line. The view from here was most peculiar, a large expanse of marsh-land dotted near the border with a few stunted tamaracks, while directly in front like a jewel in green setting was the small body of dark blue water lying against its forest-clad barrier of ancient gneiss and looking as though it might at a word, or touch, rush down over the marsh and engulf the beholder; for certainly it had the appearance of lying at a decidedly higher level than was our point of view. I cannot explain this appearance or illusion unless it was due to the uniform level of the intervening marsh, and that the water level of the lake was but a few inches below that of the surface of the surrounding marsh. At any rate it was a strange and curious sight, and once seen—a sight not soon to be forgotten. As we advanced over the marsh we noticed that by jumping one could cause all of the stunted tamaracks within a radius of many feet to sway to and fro. This however, besides being rather uncanny business, is perhaps dangerous sport as the jumper might come down too hard and go through into the soft stuff below.

Nearing the water's edge we found boards lain on the moss so that we were able to go to the very verge. This had been done by fishermen, as this little sheet of water is, or rather, was, famous for the numbers and size of the pickerel taken therein, in fact our visit was partly due to our knowledge of this. Standing on these hemlock boards which lay so near the margin that our weight would cause them to settle until actually under water, we could reach over the bog-edge and move our fish-poles about in the open water underneath the very mat on which we stood.

This interesting little lake—it is nameless so far as I know—though doubtless very slowly decreasing in size due to the encroachments of the morass—will probably retain some open water for a century or more, but its ultimate fate is certain: unless some change come about in the physical condition of the region it is a doomed lake.

Glenville, N. Y.,
April 1, 1896.

More Eggs Outside of Nests.

The recet remarks regarding Mr. J. L. Davison's Ovenbird egg were very interesting and reminded me of a somewhat similar instance which occurred several years ago.

In latter April 1893 while collecting in a "diamond willow" thicket near the Missouri river I flushed a female Towhee off her nest which was built on the east side of a gnarled root of a large diamond willow. The nest contained two eggs of the Towhee and two Cowbirds' eggs.

While kneeling down to inspect the nest closer I saw a Towhee's egg with a small "clear hole" in the side, lying about six inches away from the nest and upon further investigation I found another Towhee's egg on the side of tree and over 15 inches away from the nest.

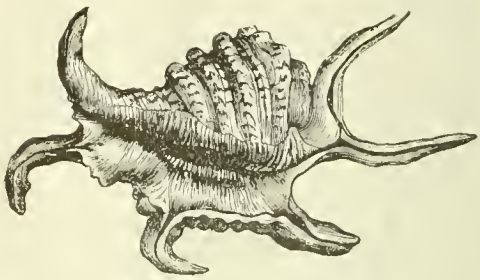
The eggs in the nest showed considerable incubation, but the eggs outside were fresh and it is my opinion that the *Cowbird* (or birds) *took the two eggs out of the nest* when they were about to deposit their parasitic eggs.

I smashed the two Cowbird eggs and after placing the two fresh eggs in the nest retired to watch the Towhee. After a few minutes the Towhee settled down upon the nest and as she was setting upon ner nest one week afterwards I believe she hatched out her little Towhees O. K.

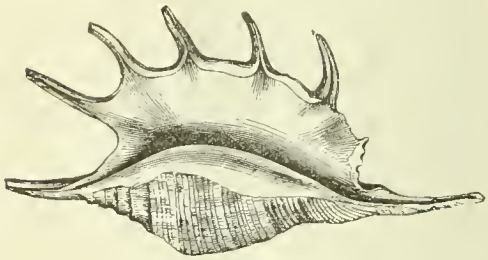
Like Mr. Davison I have made it a practice to destroy all eggs (or young) of Cowbirds (when I do not take the set) and I think if more of this was done the numbers of the rascally parasite would be reduced to a considerable extent.

Now brother oologists, let us all follow this practice and see if we can not rid our little friends of their most troublesome enemy. Let our motto be, Death and Destruction to the Lazy Cowbird.

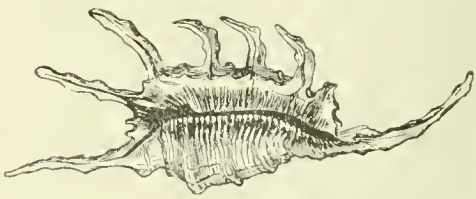
ISADOR S. TROSTLER.
Omaha, Neb.



Pterocera chirogra—Hooked Scorpion.



Pterocera lambis—Spider.



Pterocera scorpio—Purple Mouth Scorpion, rare and handsome.

Pterocera millepeda.

The Peabody Museum.

NEW HAVEN, Conn., Mar., 1896.

In 1866, George Peabody, of London, but of Massachusetts' birth, entrusted to a board of trustees, selected by himself, the sum of $150,000, "to found and maintain a museum of natural history, especially in the departments of zoology, geology, and mineralogy, in connection with Yale college." Of this sum, $100,000 was devoted by Mr. Peabody to the erection, "on land to be given for that purpose by the president and fellows of Yale college, of a fire-proof building," to be, when completed, the property of Yale college. Of the remainder of the gift, $20,000 was set apart to "accumulate as a building fund" and $30,000 to meet by its income from investment the expenses attending "the care of the museum, the increase of its collections, and the general interests of the departments of science before named."

Ten years later, in 1876, the first wing of the museum—the part now standing—was completed and furnished with cases at a cost $175,000, the whole outlay being met by the accumulated building fund.

The central part of the structure and the south wing remain to be built whenever the means available for the purpose shall be adequate. The central part is much needed, as only a small part of the specimens secured can now be placed on exhibition in the first wing.

The first floor of the building is devoted to the department of mineralogy and to the purposes of a lecture room. The minerals occupy cases in the west room, the door of which fronts the entrance to the museum. The minerals of the Gibbs' collection, deposited by Colonel George Gibbs with the college in 1809-10, and purchased in 1852 at a cost of 820,000, and the extensive accumulations since made, are here preserved and for the most part on exhibition, making it one of the largest public collections in the country. The private cabinet of Prof. Brush, arranged in drawers in his private room on the same story, although not open to general exhibition, adds greatly to the means of study and investigation in this department.

Besides minerals, the exhibition room contains one of the largest collections of meteorites in the country. Among the specimens, there is the famous mass of meteoric iron from Texas, weighing 1635 pounds; some hundreds of meteorites, large and small, all of which came from a single fall in Iowa in May, 1879; the interesting Weston meterorite, which fell in Weston, Conn., in 1807.

An important recent addition is a collection of meteorites, numbering nearly one thousand, which came from the great meteoric fall of May 2, 1890, in Winnebago county, Iowa.

A case in the center of the room contains the large and beautiful collection of Chinese artistic work in stone, chiefly in jade and agate, with other like objects bequeathed by Dr. S. Wells Williams, who was for forty-three years in China as Christian philanthropist, editor, author, and attache to the American legation, and for some years before his decease was professor of Chinese in the university.

The large room on the same story adjoining the mineral room, on the north side of the hall, is arranged for

mineralogical and blowpipe instruction, with desks and a students' cabinet of minerals.

The second floor is given up to geology and palaentology. The southern room contains vertebrate fossils. The latter are mostly collections made by Prof. Marsh, in the Rocky Mountain regions and other parts of the West.

In this room a case contains specimens of toothed birds, discovered by Prof. Marsh in the cretaceous rocks of Kansas.

Nearby, in a case against the wall, are the bones of a large mastodon from the Post-Plioclen of southern New York. In the next case are the huge bones of the Miocene *Brontotheridae* from Dakota and Nebraska. In another case are the remains of the *Dinocerata*, large horned mammals from the Eocene of Wyoming. Then comes a case containing two skeletons of gigantic Moas (Dinornis), extinct birds from New Zealand. In the center of the room are part of the bones of an enormous Dinosaur, sixty feet in length, from the Jurassic of Wyoming, and a large slab, standing vertically, showing the skeleton of a Mosasaur from the Chalk of Kansas. There is also a case containing the bones of the feet of the three-toed and four-toed horses from the Tertiary of Nebraska and Kansas.

The Western exhibition room is occupied mainly by a collection of invertebrate fossils, arranged zoologically. The first vertical case on the south is devoted chiefly to fossil sponges. Then follow two cases with corals, with many fine examples from Kentucky, Ohio and New York. The nine succeeding cases contain collections of crinoids, trilobites, crustacea, bryozoa, and fossil shells. One case contains many type specimens illustrating the structure and development of the trilobite. Two large wall cases on the eastern side of the room exhibit slabs and tablets of crinoids, mostly from Indiana. A third wall case encloses a large slab measuring four by six feet, showing nearly thirty species of fossils represented by upwards of one hundred and forty individuals. The museum also has an extensive collection of brachiopods.

Of the large collection of foot-prints belonging to the university, only a few fine slabs are on exhibition, part of them in each of the two exhibition rooms of the second story. One of the most interesting is a slab about twelve feet long, covered throughout with raindrop impressions, and, besides these, two series of foot-prints of biped reptiles, one line of them extending the whole length of the slab.

The third story is occupied with the zoological collections, so far as there is room for their exhibition. The general zoological collection occupies the western room. The specimens are well arranged for exhibiton and all labelled. Facing the south door stands a case devoted to the sponges, among which are many species of the siliceous or glass sponges. Beyond the sponges, twelve cases are filled with the collection of corals, which is one of the most extensive in the country. These are followed by the Echinoderms, etc. Several cases are devoted to a collection of the marine invertebrates of New England, which is nearly complete. Other cases contain special collections of the shells and corals of the Pacific coast of America; of the corals of Bermuda; of

the shells of Florida, etc. The collections are rich in species from the deep-sea dredgings in the Atlantic, but only a small part is on exhibition.

Overhead are models of two of the huge Cephalopods of the world,—one of twice the natural size, an Octopus from California, 28 feet in diameter (between the tips of opposite arms), and the other, of natural size, a species of the Newfoundland seas, related to the Squids, having enormous eyes, and a length, from the posterion extremity to the tips of the longer arms, of 42 feet.

The southern exhibition room of the zoological story contains a collection of skeletons in cases on its east and south sides, beginning near the door. The skeletons of mammals, beginning with man and the apes, occupy all the east side; and then come the birds, reptiles, and fishes. The rest of the cases are occupied with collections of vertebrates, both mounted and alcoholic, and include a nearly complete series of the species inhabiting New England.

NUTMEG.

A Rock with a History.

In many places in the United States are found huge boulders resting upon the top and sides of hills, where they have been deposited after having been brought, sometimes many miles, and often taken from a much less elevated location, and by means of some mighty force, raised and transported to their present position. Such boulders are so common that they do not form objects of curiosity. Speculation as to the agencies by which they were removed and transported can evolve but one reasonable theory, and that is, that, at some time in the geological history of the globe, that section was submerged, and that at some period during the submergence the water was covered with immense sheets of ice into which the boulders were frozen, and which as it gradually melted dropped their loads.

In the spring of 1881, there occurred a remarkable corroboration of this theory.

In the northwestern corner of Iowa, about ten or twelve miles south of Rock Rapids, and in the valley of the Rock River, was a boulder of quartzite similar in appearance to the rock quarried at LuVerne, Minn., about thirty miles north. This boulder was about four feet in diameter, and rested in the center of a circular depression about sixty feet in diameter and having a depth of about three feet at its deepest point. The bottom of the depression was of clay and impervious to water; so that, in the autumn of 1880, when the fall rains came, the depression, or basin, became filled with water, which became frozen fast around the boulder.

The following winter was what is, even now, known as the "Hard Winter." Snow fell to a depth of four feet. The temperature remained unusually low until the last week in April when it suddenly moderated. Warm winds blew and in ten days the snow almost wholly disappeared. This resulted in a tremendous flood. Rock River was out of its banks and spread itself entirely across the valley from the bluffs upon one side to those upon the other. The ice in the basin had not melted, but the water flowed under it, and raised it to the surface with

the boulder still firmly frozen in its grasp. Thus it was borne down the valley for a distance of two miles when the rock struck against a small hill which rose about ten feet above the level of the valley. Here the boulder became detached, and here it remains, to tell how, on a grander scale, some of the mighty changes which have taken place in the surface of the earth, were caused.

The Boomerang and its Freaks.

The singular instrumeut of hunting warfare and sport peculiar to the aborigines of Australia, and by them commonly called the "wango" or "kilee," but more generally known elsewhere as the boomerang, has always excited great curiosity and wonder among other peoples. Indeed, so remarkable is the flight of the boomerang after it leaves the hands of a skillful thrower that it seems possessed of actual life or of some supernatural power.

The boomerang was first described by Capt. Philip King, in a "Narrative of a Survey of the Intertropical and Western Coast of Australia," 1818-1823, although others, a few years earlier, had briefly referred to it. Strange to say, neither Capt. Cook nor any navigator of that period mentioned this implement in their accounts of Australia (then called New Holland) and the natives, unless the mention of a "wooden sword of cutlass shape" had reference to the boomerang, perhaps before they had seen it in actual use.

The boomerang is always made of the hardest and heaviest wood obtainable, and for this purpose a certain kind of *acacia* is commonly chosen. A natural crook is invariably selected, which is trimmed to the proper dimensions and further toughened by exposure to fire. The size and shape vary greatly, and what is quite remarkable no two are ever exactly alike. The length varies from 18 to 36 inches, the width from 2 to 3 inches and the thickness from $\frac{3}{8}$ to $\frac{3}{4}$ of an inch.

The crook or curve varies, according as the implement is designed for returning to the thrower or not, for, contrary to the common belief, all boomerangs do not have a backward flight. The different kinds may be divided into three classes, as follows: One, large and but very slightly curved, used exclusively in warfare; another, of similar shape, but lighter, for hunting, and a third, used mainly for pastime, still smaller and lighter, with more of an "elbow"—often nearly a right angle. The latter class alone return to the thrower, the former two being used for straight throwing and delivering a paralyzing blow.

One side of the boomerang is flat, and the other slightly convex, the latter being often elaborately carved. The edges all around are sharpened, to overcome resistance to the air when thrown, and the whole is highly polished, for the same reason. All taper slightly toward the ends, which are either round or pointed.

In throwing the boomerang of the third class, it is grasped by one end, with the curve toward the thrower and the slightly convex side uppermost. As it is brought forward (generally over the shoulder) it leaves the hand in nearly a perpendicular plane, which gradually becomes horizontal. At the last moment a peculiar rotary as well progressive jerk is imparted to it, and the missile speeds away like a bird to distance of forty to fifty yards or more,

rotating rapidly and rising in the air. From this point it sometimes returns directly to the thrower's feet or passes over his head to the rear; at others it returns to within a short distance of the thrower, and then, rising again, repeats its first flight, on a smaller scale, before finally falling to the ground near the starting point.

It requires much practice to throw the boomerang with skill and accuracy. In the hands of an inexperienced person it is quite apt to return and hit him in the head unless he is good at dodging! Indeed, none but an expert can tell where it is likely to fall.

The native performs almost incredible feats with this insignificant-looking instrument. From long and constant practice, he is enabled to calculate with astonishing certainty the course and length of its flight and where it will end. He can even hit one object which is concealed behind another; this is accomplished by throwing the boomerang so that it will go over or past the intervening obstruction and return by a back-stroke to the desired mark. The native is also expert at hitting an object while he is standing with his back toward it, throwing the implement in front with such nice calculation that it returns to his rear with great accuracy and force. While the "returning" kind is commonly used for pastime, it is also employed to some extent in hunting.

One cannot form an adequate idea of the wonderful and eccentric flight of the boomerang unless he is an eyewitness to its various performances in the hands of a skillful thrower. Its long continued and erratic movements seem to be independent of the common law of gravitation. We can partially account for its flight by considering that the air impinges on the convex side of the rapidly revolving missile and cause it to gradually ascend, just as a raft with one side straight and the other side bulging will constantly veer to the latter side. But it is not so easy to explain the *successive* rises of the boomerang, or its continued flight after the propelling force is spent.

From the discovery of this curious inplement, much interest has been manifested by scientific men in all parts of the world regarding its mechanical theory. According to some, an agreement has never been arrived at; indeed, more than one scientist has declared it impossible to solve the entire problem. When the mysterious soaring and extended flight of the turkey buzzard (*Cathartes aura*), who navigates the heavens without flap of wing, is fully explained, perhaps we shall thereby more clearly understand some of the vagaries of the boomerang.

The writer of this article has devoted considerable practice to throwing the boomerang and believes that many of his readers would enjoy this rare good sport. After experimenting more or less any person who is handy with tools can make a boomerang from the description given. The principal tools needed will consist of a rip-saw, planes and spoke-shave. The art of throwing the implement so that it will return is not so difficult to acquire; to know just where its flight will end, however, requires the nicest calculation, which alone comes from experience.

The first boomerang I owned was fashioned from the limb of a cherry

tree, and although it was far too light, it would fly to a distance of 150 feet; but to my disappointment it would not return! Probably the best wood we have in this country for boomerang-making is the common persimmon, but any hard and heavy wood will answer for your first experiments.—*Chas. H. Coe in Popular Science News.*

West Coast Species of Haliotis.

The recent revision of the genus *Haliotis* and the changes of some specific names since the publication of my little book on West Coast Shells, make it proper to place the matter anew before the members of our Chapter. Those who have the opportunity of consulting Vol. XII of the "Manual of Conchology," will find a full discussion of the subject; but as there are some who cannot consult that excellent authority, I propose to use some of the statements of Prof. Pilsbry in connection with this report.

There are six species of the genus in question to be found upon our Western coast, only three of which, however, are sufficiently abundant to be called common. The first of these species, and probably the best represented in respect to the number of specimens, is *Haliotis Cracherodii* Leach. This is the common "black abalone," so called on account of the dark color of the outer layer of its shell. The "Manual" gives the limits of locality as "Fallarones Is. to San Diego." Probably the Farallones Is. off San Francisco are meant, a natural mistake having been made in the spelling, but I think the species reaches much farther to the northward than the latitude of these islands. I should like to have my suspicions confirmed or refuted by those who have made northern observations.

One morning during the last summer I took advantage of the low tide and explored the granite rocks that form the promentory beyond the Point Pinos lighthouse near Monterey. The waves have been breaking for ages over those venerable cliffs, and the results of their work are distinctly seen. Out in the water, quite far from land, you get glimpses of sunken rocks, the very bones of the ancient cape. Nearer are a series of small and precipitous islands, most of which you can reach at low tide. Strewn all over the bases of the cliffs are masses of granite, some of them loose boulders, while others are the seamed and weather-worn outcroppings of the underlying ledges. Many of the rocks are covered with a thick mat of sea-weed, but others are gray and bare.

Venturing out as far as safety would allow, I was amazed to find the available roosting on some of the cliffs almost literally covered by young specimens of the species under consideration. The shells averaged, perhaps, three inches in length; a few were twice that size, but many were much smaller. Their keen instinct teaches these animals to seek the least exposed positions, a deep and narrow cleft in the rock being the favorite retreat, and there away from danger, they congregate in great numbers. As the tide came in I was obliged to leave them, and so could not continue my observations, but I fancy that when they were well covered with water they loosened their firm hold upon the surface of the rock and began to move around in search of food. It is evident that this species is very prolific, and

though large specimens are not so common as formerly, there seems to be no danger that the species will soon become extinct.

The next species is the red abalone, *H. rufescens* Swainson. This animal has a much larger shell than the last, some of them reaching the length of nine or ten inches; possibly more. They were formerly very common about Pacific Grove, but they have been so persistently collected that adult specimens are rarely found. They live at a somewhat lower level than their black brothers, and are not often seen on the rocks above the water, even at low tide. The Chinese fishermen cruise around in their boats at such times armed with a hook on the arm of a long pole, with which they secure the coveted prize. The large shells are mostly collected from the more unsettled parts of the coast, and there is danger that the supply will soon become seriously diminished. Last summer I saw a two-horse wagon loaded with these shells, which had been drawn up to Pacific Grove from a point some thirty miles down the coast.

The third species, named from its beautiful internal color the "green abalone," has generally been known to scientific circles as *Haliotis splendens*. It was given that very appropriate name by Reeve in 1846, but it has been found that in 1845 it was named by Philippi *H. Fulgens*, and so the latter name must stand. This beautiful shell abounds in southern waters, but as I have never had an opportunity to study its habitat, I cannot report upon its prospective decrease. The only live one I ever saw was an aged specimen which was found upon the rocks near Cypress Point. Monterey Bay seems to mark its extreme northern location, and even then I have never found a specimen in the Indian shell-heaps, though *rufescens* and *Cracherodii* are found by the thousands in all stages of decomposition.

H. corrugata Gray, does not come so far north as the last species. A fine specimen before me from San Pedro, Cal., measures $6\frac{1}{2}$ in. in length, $5\frac{1}{2}$ in breadth, and $2\frac{1}{2}$ in convexity. The shell has strong ridges upon its back, and there are four large open holes. I have never seen a living specimen, and know very little concerning its habits.

H. assimilis Dall, is now considered to be a distinct species. The Manual reports it from "Monterey to San Diego in deep water." A specimen before me from San Diego is 4 inches long and $3\frac{1}{4}$ inches wide. It has seven open holes. The exterior of the shell is marked by many threads like Brussels carpeting, and the spire is short but distinct. The interior is smooth, silvery, and without visible muscle-scar. The shell is tolerably thick, and appears very compact and solid.

The last species to be noticed is *Haliotis gigantea* Chem. Var. *Kamtschatkana* Jonas. The large typical form of this species belongs essentially to Japan, but the variety seems to have come around with the warm current past the Aleutian Is., and down the coast, at least as far as the middle of California. My best specimens I purchased in Victoria, B. C., where I was told that they were gathered on the west coast of Vancouver Island. My largest specimen is 5 inches long, $3\frac{1}{2}$ inches wide, and $1\frac{1}{2}$ inches high. In shape it appears long and narrow

when compared with other species. The shell is thin, the edge sharp, the spire quite prominent, the surface uneven, and the open holes are four in number, large and surrounded by high walls. A deep channel runs under the line of holes. The interior is very iridescent, light color prevailing. The muscle-scar is not distinct.

Concerning at least half of our species there is need of further information respecting the habits of the living animals, as well as obervations concerning localities where specimens are to be found. In the gathering of information of this kind, even about our more common species, I believe the members of our Chapter may be able to do much good work. While a few great men may do the important work of determining the correct names and classification of the species, each one of us in our more humble sphere may make observations and collect information which will help to swell the total amount of knowledge concerning the molluscan world. I shall personally be grateful for any further information concerning any of our species of the genus Haliotis.—*Josiah Keep in the Nautilus.*

Electricity in Modern Warfare.

BY E. R. CHADBOURN, LEWISTON, ME.

While conjectures are rife as to what electricity and high explosives could do in modern warfare, it is interesting to glance at the marvel in the war record of photography. A quarter of a century ago, on the 21st of September, Paris was completely shut off from the rest of the world, but two days later a balloon and pigeon post was established, and regular balloons thereafter left the city at intervals of three to seven days with letters for the provinces, and carrier-pigeons for bringing back replies. The return messages were written on thin paper and enclosed in a quill tied to the pigeon's tail, but the carrying capacity of the birds for such messages was very limited. Some weeks later, Dragon, skilled in photo-micrographic work, carried out the idea of printing a great many messages on a large sheet of paper, and then photographing the whole in a greatly reduced form upon a thin film of collodion four inches square. Each pigeon carried 18 of these collodion pellicles, with a total of more than 50,000 messages, the whole weighing less than a gramme. On arrival in Paris, the messages were enlarged on a screen, when they could be read, and were published in the newspapers. During the seige 64 balloons left the city, of which seven were lost or captured by the Germans, while the others carried 4,000,000 letters and the pigeon post returned about 2,500,000 messages. Even money orders and drafts were transmitted by the micro-photographic pigeon post, and were paid in Paris. —*The Observer.*

Mr. Oldfield Thomas, an official of the British Museum, has just made a most interesting discovery in relation to the smaller mammals of South America. In the course of his researches he found a small rodent, about the size of a rat, closely related to the fossil marsupials recently discovered by Professor Ameghinion Patagonia. It represents a new family entirely different from any known at the present time.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r

Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

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NOTES.

Mr. T. Hewitt of Monmouth, Ills. writes, "A Good Mouse Trap"—Mar. 20, 1896 being out of feed for my cattle I went into the field after corn fodder, that had been left in the shock all winter. I noticed a kingbird perched on the fence close by, and said to my friend, Mr. Powell, let us watch that bird and see what he is going to do, as the bird seemed to be interested in us. As soon as I commenced to load the fodder on the wagon the bird flew high in the air. It hovered around fully 50 feet over our heads, and about the same time a little mouse ran from under the shock. Quick as a flash the bird darted down down, siezed the prey in its bill and then took flight and was gone. [We should like to hear further from Mr. Hewitt, whether he is sure this was the species mentioned. This is an unusual proceeding for a Kingbird but quite the habit of the white-rumped shrike. Then too March 20 is pretty early for Kingbirds to be in Illinois.—Ed.

A white crow is one of the latest acquisitions of Mr. Fite of Denver, Ind. He secured it on Sept. 10, 1894, the shot disabling the point of one wing. The bird is lead-colored white, slightly barred in the breast. He has it in a cage with a black crow, which causes no end of comment.

The enormous circulation of such a magazine as the *Ladies Home Journal* can, in a sense be understood when it is said that during the last six months of 1895 there were printed, sold and circulated over four million copies. (In exact figures 4,058,891). Figures such as these give one some idea of the influence which may be exerted by even a single one of the modern magazines.

The Museum don't expect to get 4,000,000 circulation but we do hanker after 5,000. If we could by any amount of urging or coaxing, or offering premiums get every subscriber to to send us right off, within 48 hours after they read this notice, three to five names of friends, acquaintances, or correspondents, that are collectors or greatly interested in Natural Science who in their judgment would subscribe if a sample copy were sent them, and possibly a letter outlining the scope of a year's numbers, we have no doubt that we would have pretty close to 5,000 paid subscribers within 60 days from now. You may say, "what good

will that do me?" Simply this that with 5,000 circulation to paid subscribers, we would increase our journal to 70 or 80 pages more thoroughly illustrate it, and you would get *double what you are getting now* without extra cost. All you will be out will be a 2 cent stamp and 10 minutes time. *If you* can get us a club of two to five new subscribers at the reduced price of 50 cents we will pay you cash for so doing. These are not idle boasts but are facts. Here is the secret in a nutshell. We could secure enough more cash advertising with a 5,000 circulation, to more than warrant doubling the actual cost of each edition. *Large advertisers* will not buy space of a paper under 5,000 circulation, and some won't patronize under 10,000 circulation.

With these remarks we leave the matter with you. Can we not hope for you to write us if only on a postal, the names and address of five active naturalists, and also state their specialty. We will file all replies in a separate case and you can rest assured the favor will not be overlooked. To those who will send me frequently lists of names of parties they are personally acquainted with and know to be collectors we will give a commission on all we induce to subscribe. We have some correspondents who have sent in from 10 to 30 names, most of which subscribe and we give them a credit card for each subscriber we get through their influence. Let us hear from you at once.

March 24 Mr. Elliot of Tallahasse, Fla. writes, "The collecting season is near at hand. The following has already been taken in this vicinity: March 5, Ward's Heron, 2 sets of 3 eggs; Mar. 7, Mockingbird, 1 set of 3; Mar. 14, 2 sets Black Vulture, 2 each.

Mr. Chittenden of Mill River, Mass., Mar. 29 writes, "The Pine Grosbeaks have been very numerous here this winter. Can a crow *caw* while he is flying? I have watched a number and they all stop moving their wings and sail while cawing. A pair of Broad-wings have been flying around here for a week, and as they always return to the same piece of woods a mile away am inclined to think they will nest there.

Mr. Van Epps able articles in past two numbers have been of great interest to our New York collectors. Won't some of our Ohio, Illinois, Wisconsin and other western states write up the Indian mounds, forts, implements &c. of their section. We have lately secured some interesting Indian trappings and relics from Arizona which are listed in our advertising columns. Some notes on the Indians and tribes of Arizona and New Mexico written by parties who have lived near them for some time will be of interest.

We would advise all collectors who have any dealings with Wm. B. Carilk, 1932 North 10th St., Terre Haute, Ind., (but who we believe is now working in Columbus, O.) to get cash first, or if it is a trade, get his goods first. He will try every known scheme to get your material first and do as he pleases about adjusting same. A number of MUSEUM subscribers have written us and sent batches of correspondence, all of which go to prove that he is up to the same tricks he was some years

ago when he attempted to get away with a lot of goods belonging to ye editor, but we brought enough influence to bear on him so they were returned.

MY BUBO'S OF '96.

Or Notes on the Nidification of Bubo Virginianus in Southern Texas.

In this summary, I shall resort only to my notes of 1896, which I suppose, from the lateness of the season, are complete.

Nest No. 1, Feb. 3.—Nest situated in small black-jack tree, on horizontal limb. It was a renovated nest of Caracara, therefore composed entirely of weed stalks, as that is the sole constituent of the nests of that bird in this (Refugis county, Tex.). It was nicely lined however with feathers from the parents' body; placed twelve foot from the ground. This tree stood out about 100 yards from a large belt of oak trees. The bird was on the nest and left only after several sticks had been thrown into the tree, when she arose from the nest and sailed over the oaks. The nest contained three eggs, far advanced in incubation.

Nest No. 2., Feb. 4, '96.—Situated in a oak tree about thirty-five feet from ground. This was a nest of red-tailed hawk, used, I am told, the previous season. Composed of sticks with a lining of feathers. These feathers were plucked from the old bird, for I shot her and noted that the feathers had been removed from a space about half as large as my hand. Tree was situated near center of a large belt of oaks. Three eggs; fresh.

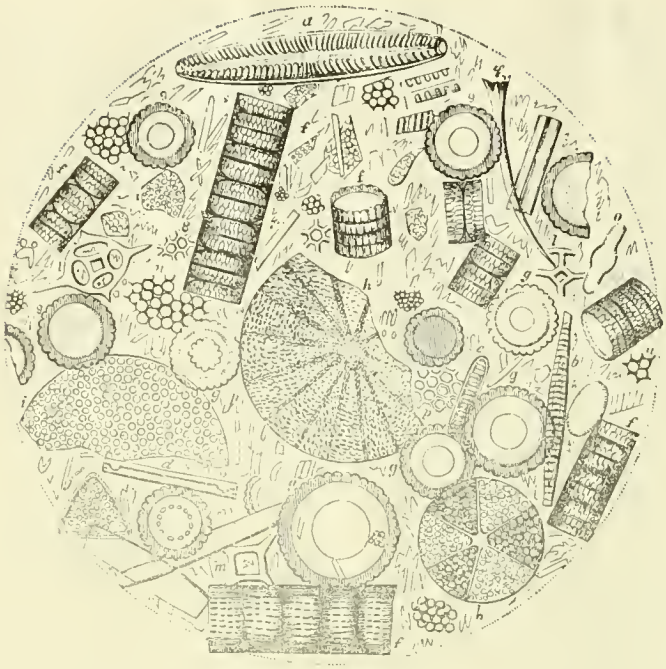
Nest No. 3, Feb. 4, '96.—Old hawk nest. Situated on or near end of projecting limb of black Jack, near the Arroya Medis (Middle creek). Bird was on the nest, which was composed of sticks and lined with feathers, as usual, and situated about fifteen feet from ground. Nest contained three eggs, which were fresh.

Nest No. 4, Feb. 7, '96.—Old hawk nest. Situated about eighteen feet from the ground in mossy oak, in edge of belt of timber. Composed of sticks and contained the customary lining of feathers. Bird did not leave the nest until I had almost reached it. This belt of timber borders on the Rio Mission and Arroya Blanca(in Spanish) White Creek. Nest contained three eggs which were fresh, or nearly so.

Nest No. 5, Feb. 28, '96. Nest situated in oak tree, fourteen feet up in Rattlesnake Motte, (so named because of the great numbers of this venomous reptile infesting it) in San Patrico county. This motte covers about one-half acre; all else, for miles, is prairie, with sparse growth of chaparal. Nest contained young birds about two weeks or twenty days old.

Nest No. 6, March 2, '96.—This nest was situated in a prairie motte, though of smaller size than former. San Patrico county, near Arroya Chittapin. Presumably an old hawk's nest. Composed of sticks and lined with feathers. The bird was on the nest, which was situated on horizontal limb of oak tree, sixteen feet up. 3 eggs, in which incubation was advanced.

Nest No. 7, March 3, '96.—This nest I had seen being repaired Feb. 7th by a red-tailed hawk, but I suppose the owl "jumped his claim." In crotch of oak tree near top, thirty-four feet from ground. Situated in the



Infusorial Earth, highly magnified.

the same belt of timber from which I took set No. 4, and only about thirty or forty yards from the other nest. As I had seen no other owls in this wood I think it was the same pair that furnished this set for my cabinet. Bird left nest when I threw stick up near her. Nest poorly built, though nicely lined with feathers. Two eggs, fresh.

Nest No. 8, March 5, '96.—Situated in crotch of Black Jack, thirty-six feet from ground, in large belt of timber bordering the Arraya Blancs. This nest was quite a flimsy affair and the bird could be seen very plainly from the ground. Had some moss as well as feather lining. Bird was on the nest, which was that of a hawk. Three eggs, in which incubation was advanced.

Nest No. 9, March 7, '96.—This nest was situated in the top crotch of a small blackberry, near the Chocolate Creek, only about thirteen feet from the ground. Hawk's nest of usual compaction and customary lining—owl feathers. The bird left the nest only when I was about to put my hand into it. Contained two eggs about one-third advanced in incubation.

Nest No. 10, March 8, '95.—Poorly made hawk's nest of sticks, though nicely lined with feathers and moss. Situated sixteen feet from ground in Black Jack. The bird was on the nest which contained two eggs, in which incubation was begun.

From the foregoing I decided that the horned owls begin housekeeping soon after Christmas and near New Year in this country. That they move often, appropriating the nests of hawks and the Caracara, though the the nests of the later are as pleantiful as the former, therefore their reason is best known to themselves.

That they sometimes add a little moss to the never absent lining of feathers.

That they do not nest at such altitudes as to arouse the ire and abuse the credulity of one, William Henry, thereby saving the poor collector notary public fees for affidavits, etc.

That sets of two are about as common as three.

That they do not leave the nest with the same readiness that many bubos do when the collector raps upon the tree trunk with his climbers. They frequently will not leave the nest until the collector arrives within a few feet of the nest, no matter how many missils are thrown. I also found the odor of the skunk more or less prevalent in all nests examined.

This is my first season in Southern Texas and I am succeeding well, with many varieties of hawks, Caracara, etc., and later in the season I am confident of having equal success among the smaller birds.

JAMES J. CARROLL,
Refugio, Tex.

BARGAINS! BARGAINS! BARGAINS!

We continue our page of bargains this month, offering an entirely new lot of material. The prices in March list were net, but this month's bargains we will send all prepaid (unless article is marked net) where order is over $1.00. Orders under $1.00 must contain 10c extra for postage and packing. Articles marked net, really ought to be sent by express, but most can be mailed if necessary. Send orders at once so as to get the cream of what is offered.

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12-100 drill, home made..$ 6
8-100 drill, home made.. 5
3-32 in. burr, long or short handle..... 25
5-32 in. burr, long or short handle..... 30
6-32 in. burr, long or short handle..... 35
8-32 in. burr, long or short handle 45
12-32 in. burr, long or short handle..... 75
16-32 in. burr, long or short handle..... 95
Blower, white metal..... 15
" best nickel..... 21
" cheap..... 8
Embryo hook, nickle.... 12
Climbing Irons, s't'p net 2 00
Book of Tissue Paper.... 8
Hand Blowpipe..... 1 40
Data Blanks, small per C 8
" " medium.... 12
" " large..... 20
Checking lists, doz 15
" " hundred. 1 00
Cotton, per roll, pink.... 60
Caliper, 4 in. meas. 100th 90
" 4 in. meas. 100th and MM..... 2 25
Trays in flat, easy to make up, prepaid.
No. 1, per hundred.... 40
" 2, " " 50
" 3, " " 70
" 4, " " 90
Davie's Nest and Eggs, cloth..... 1 00
Ornithologist's and Oologists' Manual 20
Same, leather 40

TAXIDERMISTS' SUPPLIES.

Scalpels, ebony handle.. 40
" engraved " .. 50
Oil Stones, small 10
" " large..... 40
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Pins, per hundred..... 15
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" larger..... 40
Spring Forceps..... 65
Scissors..... 40
Wire Cutters, best, net.. 1 50
Glass eyes, assorted lot, list $1.50..... 1 00
Arsenic, per lb., net..... 11
" and alum mixed, per lb., net 15
Artifical Leaves, grass .. 40
Napthaline balls, box ... 15
Cork Bark, net, per lb... 12
Cops, six for..... 20
Glue, pulverized, net, lb. 20
Grasses, assorted bunch. 15
Mica Snow, fine, 3 lbs net for..... 1 00
Gold Paint, Bottle and Brush..... 25
Tube Paint, 12 assorted colors and a bottle of gold paint 1 00
Shell Sands, 12 lb net for 1 00
Smalts, 3 lbs., assorted colors, net..... 60
Tanning Liquor, qt., net. 75
Tow, A1 for stuffing:
10 lbs net for..... 50
50 lbs net for..... 2 25
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Taxidermist outfit, including 1 scalpel, 2 pair tweezers, 1 pair scissors, 1 set chain and hooks, 25c worth glass eyes, a package tags and an O. & O. Manual. This outfit would ordinarily cost $3. All in a neat box.. 1 95
Ridgeway's Manual, the standard work on North American Birds, revised to 1896. Regular price $7.50. A special cut tor April and good till May 15, prepaid... 6 75

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Forceps..... 75
" Blake, new pattern..... 2 25
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Cops, each..... 6
Cork, ½ in. 4x8, doz..... 35
" best ¼ in. 4x8, doz. 1 50
Cyanide Cans..... 90
Killing Can, new design, made of Japanned tin with glass in side.... 90
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Same, per thousand... 95
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Drying Paper, quire..... 30
Mounting Paper, quire.. 40
Microscope, hand..... 20
" acromatic lens, reg. price $5..... 4 50
Microscope, large size, magnifies 240 diameters, with dozen slides, all in large box with lock and key, list $25 .....12 00
"The Queen" Plant Press, finest ever gotten out, list $2.50, net..... 2 00
Cheaper style, Plant Press at 60c, net 1 00

Miscellaneous.

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Here is a splendid chance to get a nice start in Mineralogy.
Minerals and How to Study Them, a new book just out..... 1 50
A few showy specimens in minerals are offered as follows:
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Native Gold..... 50
" Silver 50
Rubellite..... 25
Rhodocrasite and Pyrites..... 35
Malachite..... 25
" velvets ....50 & 1 00
Opal Wood, pretty 25
Geode, fine, prepaid..... 35
Fine Calcite Crystals, in clusters from Colorado. 36
Herkimer Co. Quartz Crystal with carbon inclusion..... 20
A clear Crystal..... 20
Chalcedony, Wyoming .. 25
Graphite, Ceylon..... 25
Salida Garnets..... 20
In Indian Relics we have some *new arrivals:*
Fine Stone Axes from Arizona at..... 1 25
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Continued on next page.

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We append a few unsolicited testimonials received within the past two weeks. Could print hundreds of such received since November 1895. *Moral:* Ask your friend to subscribe. Remember price only 50c. for the paper, or $1 with a large premium.

Dear Sir:—"The "Bird Life of Labrador" received. Am very well pleased with it. Quite a bargain THE MUSEUM and the above for $1 00. Hoping you will have a very successful year, I am, yours very truly, JAS. B. NEAL.

Dear Sir: Yes, I had decided to renew my subscription to THE MUSEUM some time ago, had neglected doing so, for one cause or another, but think that now is the time, so I enclose you the yearly subscription, and wish you the best of success. Yours truly, H. W. BEERS, Conn.

Dear Sir:—Enclosed find 50c. in two-cent stamps for which please renew my paper for 1896. I was not going to renew my Oölogy and Natural History papers this year but you having kindly sent me the January '96 number makes feel I must have it. You are the first of my four papers to get 1896 renewal. Yours respectfully, WM. GRINER, Ont.

Dear Sir: Enclosed you will find 50c. in stamps for which please extend my subscription to THE MUSEUM one year. It is a very valuable paper to say the least. Yours Truly W. A. HORROM, Ill.

My Dear Sir: Please find inclosed 50c. for Vol. 2 of THE MUSEUM. I read the first Vol. with pleasure and profit. Your liberal and enterprising spirit will doubtless make it even more successful this year. With all good wishes I am very truly yours, REV. H. C. MEREDITH, Calif.

Dear Sir: I enclose 50c. for the renewal of my subscription to THE MUSEUM. With best wishes for the prosperity of your excellent magazine during '96, I am very truly yours, BENJAMIN HOAG, N. Y.

Dear Sir: Copy of THE MUSEUM at hand. Was not aware that my subscription had expired. I cannot understand your reason for reducing the price of subscription. The paper is well worth $1 per year. Will not impose upon your generosity too much but herewith inclose $1 for the renewal of subscription. Yours faithfully, GUY K. BARNES, Iowa.

Dear Sir: I like your magizine THE MUSEUM, and believe it is doing a grand work A G. WETHERBY, Zoological Labratory, N. C.

Dear Sir: Please find $50c. for subscription to THE MUSEUM for 1896 and coupons. I value the magazine very much and do not wish to be without it. Hope it may have continued success and a long life. Yours very truly, FRANCIS R. COPE, JR., Phila., Pa.

VOL. II. NO. 7.

MAY, 1896.

THE MUSEUM

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Berlin Agency, R. FRIEDLANDER & SOHN, Berlin, N. W, Carlstrasse 11.
London Agency, SWANN & Co., 1 and 2 Bouverie St., Fleet St., London, England.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

FOR SALE:—A newspaper published in Kingston, Ulster County, N. Y., by Samuel Freer and Son, Saturday, Jan. 4th, 1800. The name of the paper is the Ulster County Gazette. This paper is bordered in mourning for George Washington. Price $20. Correspondence solicited. FRANK TURNER, 1727 Pearl Street, Joplin, Mo.

WANTED:—Binney's Land Shells of the U. S. and copies of the O. & O. Cash or exchange. Enclose stamp for reply. W. E. SNYDER, Naturalist, Beaver Dam, Wis.

IF YOU HAVE any birds eggs or skins to exchange why hunt around a corner for someone you never heard of to arrange an exchange? I want many common skins and eggs, and can offer some very desirable skins and eggs for same, and at even rate if you have anything equally as desirable List of duplicates for stamp. J. P. BABBITT, Taunton, Mass.

WE WONDER if any of the "boys" enjoy practical jokes? We have several hundred "joker articles" and novelties, such as Trick Whistle, Pharaoh Serpent Eggs, Coin Holder and "Electric" articles of various kinds that we secured at "snap" prices. Rather than list them up, which would require several pages, we will make them up into $1, $2 and $5 packages all prepaid, guaranteeing to send over $2 worth for one, according to the prices charged by New York Novelty Houses. Send remittance in whatever way is convenient, to W. F. WEBB, Albion, N. Y.

VALUABLE works on recent explorations among the mounds for sale cheap. Illustrated works on Mound Builders. Drop postal for list. W. K. MOOREHEAD, O. S. Univ., Columbus, O.

HELIX FIDELIS is catalogued from 15 to 25 cents each; I send at five cents each prepaid in any guantity. For 60 days will send 100 shells, 25 species, for $1.00; with the *Oregon Naturalist* one year $1.25. FRED H. ANDRUS, Elkton, Oregon.

FOR EXCHANGE:—A fine collection of Indian relics to exchange for Winchester repeating rifle. Collection consists of axes, celts, pestles, war clubs, spears, drills, points, ornaments, etc:, taken from mound in Ohio. B. WEAVER, Columbus Grove, Ohio.

MACROPNEUSTES BRISSOIDES is the name of a Fossil Sea Urchin recently discovered on one of the Keys off South Florida. It is so perfect you would declare it was the common sea biscuit we have sold for years. It is rare and we have but a few. As long as they last will sell at $1.00 each prepaid. W. F. WEBB, Albion, N. Y., or Keokuk, Iowa.

WANTED:—Fine sets with full data from the original collector, Nos. 27, 219, 221, 325, 360 and 364. Have fine sets to exchange. E. F. WATSON, Kennebunk Beach, Maine.

FOR EXCHANGE:—Fine specimens of Rubellite, Hyalite, banded Obsidian, colored Obsidian, actinolite, pink gypsum, Ruby blende, Calamine wernerite, chiastolite, Hexagonal arogonite, Birdseye and fish egg marbles and others, for minerals or relics. H. C. MEREDITH, Fresno, Calif.

WANTED:—A Pocket Kodak, also developing outfit for same, a 22 cal. revolver, back numbers of natural history papers, bulletins of the Department of Agriculture and of State Experiment Stations. Can offer eggs, sets or singles, and land, fresh water and marine shells. FRED H. ANDRUS, Elkton, Ore.

WANTED;—Letters, documents or relics of Abraham Lincoln by collector. C. F. GUNTHER, 212 State St., Chicago, Ills.

WANTED:—California bird skins not already in my collection, many common ones desired. I have for exchange mounted specimens and some rare skins. J. F. ILLINGWORTH, Pomona College, Claremont, Cal.

COLLECTORS, buy your trays in flat. Note prices, 1½ x 2 per hundred, 35c; 2 x 3 per hundred, 40c; 3 x 4 per hundred, 45c; 4 x 6 per hundred, 50c. Green, black, red or white paper. Add one-fourth of order for postage, or we will send by express. Any child of 10 years can make up these trays. W. F. WEBB, Albion, N. Y.

FOR EXCHANGE:—Fine wampum, photos Pomo Indians. Sets of eight 7x9, photos showing finest collection ever made of the world-famous Pomo baskets, for stone relics. Correspondence solicited. All letters answered. H. C. MEREDITH, 2413 Fresno St., Fresno, Calif.

WANTED.—Copies of Cones' Key, Ridgeway's Manual or any other book that we list, new or second hand, for which we offer other books, specimens, supplies or possibly cash if a bargain. W. F. WEBB, Albion, N. Y.

FINE SETS of Colorado eggs from this locality to exchange for novels and other reading matter. Send list. All letters answered. N. R CHRISTIE, Rouse Junction, Colorado.

FOR SALE OR EXCHANGE:—"Hawkeye" camera, 4x5, cost $15 00, for good shotgun, medical and scientific books, or for A1 sets of Grebes, Rails, Herons, etc., taken by standard collectors. WILMON NEWELL, Ames, Ia.

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WANTED FOR CASH:—Old *Youths Companions*: July 6, 1876; July 9, 1874 and all prior to 1869. Will exchange or pay cash. Address E. A. MELENDY, So. Londonderry, Vt. 4t A-96

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WANTED.—All kinds of odd, old, and curious Pipes (except Indian), in exchange for Rebellion arms and relics, or cash. Old clay specimens especially desired. C. W. GRAHAM, 5 Forest Ave., Haverhill, Mass.

TO EXCHANGE.—Have a large variety of finely stuffed and mounted birds and mammals Heads on shields, collections in cases, or will mount to order, in exchange. Also have fine Bb Cornet, watch and stamps. Wanted: bicycle, medical books, surgical and taxidermist's instruments. All letters answered. Address, F. A. HAGGART, Taxidermist, Chagrin Falls, O.

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Fine Sets, some being 1896 collecting, at low rates:

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., MAY 15, 1896. No. 7

Notes from the Mohawk's Country.

P. M. VAN EPPS.

(V.)

CAYADUTTA.

At last we are to have the long deferred and anxiously awaited account of the discoveries at Camp Cayadutta, the third found of the pre-Colonial Mohawk village-sites in New York. The first instalment of Mr. Robert Hartley's paper appears in the *Popular Science News* for May. This ancient living-place of the Mohawks is situated on the east bank of the Cayadutta Creek, a tributary of the Mohawk and lies at the extreme southern border of Fulton County just over the line from Montgomery county, and its discovery was certainly the most important archæologic "find" made in eastern New York state in many years.

Two prehistoric Mohawk village-sites of considerable size have been known to the archæologist of the valley for some years; one on the Otstungo Creek, south of Fort Plain; the other on the Garoga about two miles north of the Mohawk.

Mr. S. L. Frey had published a paper in 1894, in which he predicted by analogy that a third site was yet to be found, not knowing that it had already been discovered, as for some little time the knowledge of its discovery was kept quiet, and only gradually spread among the collectors of the region. Mr. Geo. W. Chapin, of Fondo, N. Y., was the one who made the fortunate discovery.

These three ancient Mohawk village sites are all strictly pre-Colonial, and at all of them there have been found many finely made implements of stone, bone and deer's horn. Cayadutta has yielded an unusual number of awls and needles made from bone. Bone tools have not been found in any great abundance at the camp and village-sites of late date in the valley, in fact they are very rarely found. This is due doubtless to the perishable nature of the material under ordinary conditions, but at the Cayadutta village-site, buried in the ash-beds and refuse heaps, in soil naturally dry and that has never been disturbed by the plow, these bone implements have been remarkably well preserved.

The soil at Cayadutta is filled with innumerable fragments of pottery of which the larger part are ornamented with a quite uniform pattern. This village-site would certainly have been discovered long ago had the ground been cleared, but it is under a heavy forest growth; this makes all research by digging, very laborious as the ground is filled with a mat of roots which have to be cut out before one can get at the underlying ash-beds. This condition of the ground at once makes plain the utter impossibility of

any regular or systematic research of the site; such as has been wisely recommended by Prof. Putman and others. Such investigations as have been made, are, by every collector choosing a spot for himself, and going it on the root-hog-or-die plan. This has resulted in much of the ground being dug over many times, but at the first digging some of the smaller relics are usually overlooked and some fine objects have been had by such secondary research. If some genius would only invent some modification of the X-ray machine whereby one could perceive what lies under the soil—under which particular refuse-heap that beautiful pipe lies, or near which stump that perfect vase, ornamented with its diamonds of cross-hatching, reposes—then the amateur archæologist would have an easy task at Cayadutta. It is to be regretted that all of the objects gotten at this ancient resort could not have been associated in one collection and deposited *en masse* in some good museum. Really, enough material has been recovered from this place to stock a small museum.

Mr. Hartley's paper is accompanied with a map of the village-site, showing its lines of fortification, etc., and will probably run through several issues of the journal. All the New York collectors should procure and read the series. The first number was well received by those interested in the vicinity, and the papers of the valley have reproduced the article nearly entire.

THE HELDERBERGS.

To the many who often visit the Helderberg range in Albany and Schoharie counties, the news that an electric railway is soon promised to connect Albany with the Schoharie valley, will be very welcome.

This road it is proposed to build from Albany across to Clarksville, whence it will probably scale the range turning toward the northward and passing to the west of Countryman Hill (the highest peak of the Helderbergs) will by this course reach Thompson's Lake. It is confidently asserted that this portion of the road will be in running order before autumn.

In the making of the road-bed for this new enterprise, should any rock cuts be necessary, how eagerly will the debris be scanned by the fossil hunters of Albany and vicinity. Generally weathering is necessary to best bring out in relief the fossils on a slab of limestone, yet certain layers present a good exposure on being freshly quarried.

The best known parts of the Helderbergs have been gone over so often by fossil and mineral seekers, that it is becoming difficult to find many good specimens, but certainly many secluded localities remain where choice finds will yet be made, as the majority of those who visit the range follow certain beaten paths from which they seldom wander far.

The Helderbergs also are not without attraction to the archæologist, a certain locality on the shores of Thompson's Lake has yielded on search many relics. This may have been a camp-site, but as yet no pottery has been found to my knowledge. The place abounds in flint chips of a peculiar purple color, the material probably having been obtained in the near vicinity. Farther to the south as we near the northern slopes of the Catskills, are localities that would probably

repay the search after Indian relics. Here on the meadow flats bordering the Hannakrois Creek I have noticed on hasty examination traces of aboriginal occupation. This region is situated over the mountain to the southwest of Lawson's Lake.

The Helderberg region is a paradise for the cave hunter, as many small caverns and some of considerable size and length have been explored, while probably a far greater number are yet unknown. Some of the Helderberg caves have their entrance-way situated on almost inaccessible ledges.

Thompson's Lake has a subterranean outlet, leading no one knows where. This mysterious conduit receives the total discharge from the lake except in times of unusually high water when a portion of the outflow finds escape by an old watercourse, which was probably the ancient outlet of the lake before the water found its subterranean channel. This brings to mind the description published in THE MUSEUM of the lake in Florida, with a subterranean outlet, which at times would become closed, and then again would be open. Perhaps our lake in the Helderbergs has undergone similar changes in by gone times.

EL LAGARTO.

Our genial friend Louie has been up to one of his old jokes again. It is well known in the vicinity that Louie keeps an alligator-yard, inhabited by a "gator" somewhat less than a meter in length. The other day Louie was accosted by old Mrs. Persimmons who inquired as to the health of the saurian. Louie replied that the reptile was flourishing muchly and furthermore was laying right along:—"Two eggs yesterday and one again this morning." Mrs. P. at once thought she saw her opportunity and inquired if she conld not get a "sitting" of the eggs, saying that she had a bantum hen, or rooster. that wanted to set. Louie was cornered, but thought that he had gotten "out of it" by telling her that he really did not believe the eggs to be fertile.

Evidently this term was greek to Mrs. P., for in a short time she sent her daughter around (a four-mile walk by-the-way) after "that settin' of alligator aigs." Some explanations followed, but probably not quite satisfactory for we learn that Louie has since sent down a setting of eggs taken from the dove-cote. What success the bantum rooster will have in raising a brood of pickaninny-chasers from these, the future will disclose.

Glenville, N. Y., May 1, 1896.

QUERIES AND SUGGESTIONS.

Heavenly Phenomenon.

When I was a boy a regular diary was kept, and for many years every event of any moment, and thousands of items of no earthly use were jotted down. But in the course of a series of years many points of interest will be noted, and in later times will form food for thought and speculation, and at least good reading for the reminescent reader who wrote the collection. The writer is proud of his early diary, both because it indicates a determination on the part of a youngter to carry out a course of written reasoning, and also gives an insight to the daily life and doings of a boy and youth. My advice to every boy, is to keep a diary; and though it may seem crude to an

outsider; still, in later years the writer will find many items of interest, as well as topics for pleasing recollection.

In looking over my diary the following item met my eye and I copy it here as I am desirous of information on the subject, as I have never yet met anyone who could assist me or give a reasonable explanation.

"Friday June 27, 1873. There was the queerest phenomenon last night that I ever beheld. At 9:15 p. m. as we were sitting on the piazza at home we noticed something up in the heavens. A broad belt of light (there is no use of saying how broad, as is the same with the moon when we see it, perhaps as large as a dime or a big green cheese.) It stretched across the heavens, touching the horizon as far as we could see for the houses and trees, and running west. Now west by west and in a straight line. It seemed to be moving, and surely so in one spot. It was composed of something like smoke of a very light color, although it obscurred the stars as it was a very clear night. Sometimes it looked quite near, but of course could not tell how far off it was. Could distinctly see black spots in the western end of it, and these spots apparently moved along with the rest of it.

We watched it from first to last and finally saw the last disappear a little north of west after having been in view about half an hour

Today a man living three miles north of us said he saw the same thing in the same relative position, and a farmer living six miles southwest of our place observed the same condition as I judge it must have been a long distance away."

Can anyone tell what this peculiar light was? Undoubtedly the condition was described in the papers at that time, but I did not read the papers regularly then. However the phenomenon left a peculiar impression upon me, and I am anxious to learn of it.

MORRIS GIBBS,
Kalamazoo, Mich.

On January 9th of the present year a farmer living south of town shot a large Bald Eagle. After some clubbing he killed it. The measurement from tip to tip of wings was six feet, nine inches. This makes the second one of this species killed in this vicinity within the last two years.

CHAS. S. HODGSON.
Albion, Ills.

A curious gift has been made to the Natural History Museum at Soletta. This gift consists ot a bird's nest constructed entirely of steel. There are a great many watchmakers at Soletta, and in the vicinity of the workshops there are always the remains of the springs of watches which have been cast aside. Last summer (says the *Daily News*) a watchmaker discovered this curious bird's nest, which had been built in a tree in his courtyard by a pair of water-wagtails. It measures 10 centimetres in circumference, and is made solely of watch-springs. When the birds had fledged their brood the watchmakers secured their unique nest as an interesting proof of the intelligence of birds in adapting anything which comes within their reach.

The Mosaic Account of Creation Versus Science.*

The articles in the last two numbers of the MUSEUM, on the above subject, have tempted me to reply from the reverse side the writer seems to favor.

About the year 1885, Albert Reville, D. D., first professor of religion at the College of France, gave to the world a noted book called "Protegomines de l' Historie des Religeous," with an introduction by Prof. Max Muller. The volume attracted considerable attention in England, in fact throughout the civilized world.

The Right Hon. W. E. Gladstone, ex-prime minister of England, attacked the book in the columns of the Quarterly Review, and if a search was made throughout the whole world, it's quite possible a more suitable man could not be found to champion the cause of the Bible against Science. His vast fund of information, his great knowledge of the dead languages, his strong theological opinions, and his well known literary power, all conduced to make him the most suitable champion for the cause of the Bible.

In the volume mentioned, Dr. Beville states his unbelief in the Mosaic account of the creation, and Mr. Gladstone attempts to prove that Geneses and science agree. The several articles bearing on the subject, in the Quarterly Review, have been published in book form,* and are by the Right Hon. W. E. Gladstone. Prof. T. H. Huxley, F. R. S,, Prof. Max Muller, Dr. Reville, Mr. Lynton and Mr. Gladstone is strong on the Pentateuch, and Prof. Huxley is stronger on science. The writer of the two articles in the MUSEUM would do well to get this book, also Prof. Tyndal's "Beginning of Things," and Prof. Huxley's "Lectures on evolution" in New York, by the same publishers, and by the time he has got through with these, it's quite possible he may realize that he had not quite so strong a case as he imagined.

It's a well known fact that the majority of the great leaders of science do not recognize the creation of Genesis. It's true, Prof. Drummond, of Glasgow, came over here to Lowell, to lecture, and tried to make black, white. An English scientific journal spoke of it in this style: "If Prof. Drummond did make any influence on the American intellects, as Reconcilers, it would not be much compliment to them."

Facts are stubborn things, and these exist in the evidence of the rocks, against a most perplexing assortment of errors in the Genesis. A Divine book should be free from either errors of translation or anything else; but what do we find? Authorities out of number, differing on nearly all points. It seems only as yesterday that Bishop Colenso was cut adrift, because he could not (like De Reville) swallow the Pentateuch, and recently I read that

*The editor of the MUSEUM wishes to say to its readers that he does not consider the views set forth in any article appearing in its pages as necessarily representing his own views on any subject, or that in the publication of articles he is setting out to the world his own personal convictions, (and especially in regard to the article above he finds much not harmonizing with his own opinions.)

In this connection too, he wishes to say that while any article will be open to criticism in a fair and candid way and without personality it is not designed, nor will be allowed to open its pages widely to argumentation and therefore all criticism must in the future study brevity or be rejected; and with a reply if deserved by the original writer of the article also as concise as possible the subject must rest.

* Order of Creation, 75 cents, cloth; Investigator office, Appleton street, Boston, Mass.

the Rev. Edward Everett Hale, D.D., of Boston, says that ministers, to the proportion of five out of six, do not believe what they preach. It may be well to mention a little incident which went the rounds of the papers some years ago. The late Dean Hook was with a coterie of Fellows of the Royal Society, England, and the conversation ran on the cosmogony of Genesis versus Science. Prof. Tyndal cornered the Dean so close that in desperation, he said: "Well never mind, the majority had rather swallow than tackle it." When the Dean saw what a dangerous statement he had made he tried to draw it back, but it fell on good ground and got out into the world.

But I am digressing. Mr. Whiting says the Bible and geology agree; if so why does he not quote at least one good scientific authority to that end. But what do we find? Every authority he quotes proves quite the other way, viz: Lord Kelvin, the president of the Royal Society of London, gives the age of the world from eleven to 400,000,000 of years, and De Clarence King, of America, 24,000,000 years. Prof. John Perry, F. R. S., of London, he says, increases Lord Kelvin's estimate by over a hundred million. Then he quotes Newcomb and Humboldt's theory as to the age of the sun, and all of these authors our reconciler mentions, state facts directly opposed to the account of the Mosaic creation.

According to Genesis, the world is 6,000 years old, viz: 4004 B. C. and A. D. 1896 makes near enough the 6,000. So that how Mr. Whiting claims his case proved, I cannot tell. His only loophole seems to me to be the very stale one, viz: That the day then was a thousand, or it may be a million years in duration. If so, how does it come in when the words run, "and the evening and the morning were the first day," and these same words were used several times in the same chapter, after the toil of world making on the days depicted. Again, if the days of Genesis were so accommodatingly long for the reconcilers, how does it work in the wording of the fourth commandment, in the words "Remember that thou keep holy the Sabbath day," etc. Then the Mosaic writer goes on to say "for in six days the Lord made Heaven and earth, and rested on the seventh," etc. Or, again, when Joshua told the sun to stand still while he beat his enemies; of course Joshua did not know that it was the earth and not the sun that moved, but the point answers all the same for my purpose. Old Methusalah, too, must be an old man anyway, to live, according to the Bible, 999 years; but I will not stay to reckon up what his age would be if our friend's long days were in fashion then.

What does Prof. Huxley say about the Mosaic account of creation in the book I previously referred to? He says; "My belief is, and long has been that the Pentateuchal story of the creation is simply a myth. I suppose it to be a hypothesis respecting the origin of the universe which some ancient thinker found himself able to reconcile with his knowledge, or what he thought was knowledge, of the nature of things and therefore assumed it to be true."*

Again Prof. Huxley says: "It may seem superfluous to add to the evidence, that Mr. Gladstone has been misled, in supposing that his interpre-

* Order of Creation. See page 147.

tation of Genesis received any support from natural science. But it is as well to do one's work thoroughly while one is about it, and I think it may be advisable to point out that the facts, as they are at present known, not only refute Mr. Gladstone's interpretations of Genesis in detail, but are opposed to the central idea on which it is based."†

It has often been urged, and not without good ground of support, that those few leaders in Genesis who recognize the Mosaic account of creation, are not so in their hearts. The same has frequently been said of Mr. Gladstone, for with the facts at command it seems certainly difficult to understand how any enlightened person can do so; and yet we find that Dr. Dana, and also Dr. Guyot, both Americans, and both posing as reconcilers, according to an English authority.

And Mr. Whiting will find that if he will get the "Inquirer's Text-book," (by the same publishers before mentioned) a whole list of men, great in science and theology, who only echo Prof. Huxley's words. And for every well read man, who has the courage to let his opinions be known, we may rest assured that there is quite a dozen, who, from various causes, think it best to keep their individual opinions close.

To show how this feeling works, let anyone make a close scrutiny of many large booksellers stores and he will find that books bearing on Agnosticism are kept out of sight, or in the background. A bookseller once told me that if some of his customers knew he kept certain books they would not come near his place again, and this is the way truth is stifled.

† Same book. Page 56.

There is no doubt but what the deeper the research and knowledge of geology is extended, the deeper the chasm is between Genesis and science. For instance, at the time Prof. Huxley wrote his articles in the Quarterly Review he based part of his argument on the discovery of a solitary insect's wing in the Silurian rocks. In January, of this year, was found in a limestone quarry at Maguoketa, Iowa, a very er fect insect; antenna, wings, legs, etc., just as perfect as when it alighted on the ooze, millions of years ago, in the Silurian period.

It's comparatively easy to get a manual of Geology, and quote a lot of facts which belong to that science, but with Mr. Whiting, he seems to make "the wish the father to the thought," so fully, that he loses sight of his goal and only disproves what he started out to prove, and evidently wishes to prove.

I well remember my own feelings. I, at one time, fully believed in the cosmogony of Genesis, and wished to attend a lecture on geology, by Prof. Morley, of Birmingham, Eng., and he well knowing my religious opinions, advised me not to go to the lecture, for he says the two won't mix anyway. But I went to the lecture, and there I got my first idea of the Ice Age in Quarternary Times.

Our friend seems so serious that I am somewhat sorry to break in on his religious convictions, and his dreams of satisfaction, on the junction of the two unmixable parts of our ideas, as I well remember my own feelings, and certainly do not condemn him or any one else for thinking as he does, but my hearty advice is, search for the truth, with a mind quite free from the

tint of religious partiality and with a strong desire to get the truth at all hazards, and it will come in the end. Study the pros and the cons and not the pros only. The great thing is to start in unbiased, as we must remember, that we have taken in our idea of the Bible and Christianity with our mother's milk, and the feeling is naturally strong, to think as our ancestors thought for eighteen hundred years, against, comparatively speaking, a new idea, for geology is quite new compared with Christianity, or rather the earlier part of Christianity that is depicted in the Genesis.

Geology has nothing to do with the Bible, so far as I know, other than with the Pentateuchal account of the creation, and as time goes on the breach between these two will be greater and greater, for every discovery in the field of geology is met by a weakening of the Mosaic account.

I can not do better than close my paper with a short extract from Prof. Darwin's "Origin of Species,"‡ Dr. Darwin says, "He who can read Sir Charles Lyell's grand work on the "Principles of Geology," which the future historian will recognize as having produced a revolution in natural science, and yet does not admit how vast have been the past periods of time, may at once close this volume."

WILLIAM COOPER,
Milo, Maine.

Science Gleanings.

If life on our earth could not originate from lifeless inorganic matter, or from dead organic matter, then it is entirely alien to the idea of Abiogenesis, or spontaneous generation, as was attempted to be shown in a previous article. How unscientific must be the claim that it may possibly have originated from the development of germs, showered upon our earth from cosmic space, taking root and springing into living forms on earth. To the utmost bounds of space our finite powers have ever been able to penetrate, and illumitable beyond our conception to think of in distance, the very same laws are in operation. Gravitation, light and heat, sound and electricity are acting everywhere in the same way we see them acting around us. The spectroscope reveals the very same chemical elements in the sun and stellar worlds that form our own earth There is no new element certainly discovered in them, and if so many of these elements have not been discovered in these worlds as are known in our earth, we do well to remember that no one can rightly claim that all the chemical elements that really exist have yet been discovered on our earth. How unlikely then, that we have attained the limit of reality in our knowledge in this matter, in worlds so remote or that our knowledge of the constitution of them should surpass what we have so much better opportunity to discover on earth. But such is the tribute that infidelity brings as its offering to lay upon the altar of science, when it would reject a Living Creator to command forth life into our world, and would seek to induce us to believe the very same laws and power which are incapable of producing life on our earth, have been able to do so elsewhere in the regions of space, with no other material upon which to work. Geologists are fond of building the

‡ Origin of Species. 6th London edition.

whole earthly structure upon the foundation of an Azoic devoid of life. But it is surely not devoid of the evidences of life. In point of time, this is the fly-leaf in the book which we must first turn over before we can read what is recorded on its written pages. But if there is inscribed on it the name of the donor of the volume who presents it to us, so richly unfolding a true conception of nature in the past ages of the world, it ought to be the page most endeared to us, as revealing where we are to look for the very origin of material things. But if this Azoic age was devoid of life, the question may very properly be asked whence has come the vast amount of Graphite—which is almost pure carbon—that is found in the rocks of this age.

Upon the authority of Dawson and Logan, who have most thoroughly studied this age, it is scarcely an exageration to say the quality of carbon in it, is sometimes equal to that of a similar area in the coal or true carbon age. It is true carbon exists in considerable quantity in the atmosphere in carbonic acid combined with oxygen; and that it once existed in still greater quantity there, by an amount now represented by the limestones, and carbonate minerals, the beds of Coal, Graphite and Hydrocarbon products, as mineral oils etc, stored up in the earth, is very probable. But if there is any way in which this carbon can be taken from the atmosphere, liberated from its union with the oxygen and applied in the way of forming such products, it is not known to science; unless it is by and through the agency of the plant life, or of animal life secreting shell or coral (limestone) for a habitation, and nourished and fed by the plant—a small exception only being made for such limestones as may have been formed by chemical precipitation.

Whence came the Anthracite coal and bituminous matter, sometimes amounting to ten per cent, in the rock of this age; unless as the residue of plant and animal life. Whence the vast beds of iron oxide ores in the form of Hematite and Magnetite in the Lake Superior region, at Pilot Knob, Mo., and many other places.

These oxide products point to natural reduction; to which, outside of artificial reduction in our furnaces, we are strangers to the process; unless through the reducing effects of decomposing vegetable and animal matter. All this points to life, constant, continuous, uninterrupted, on our globe, from the beginning.

When was that? Some, who have not properly considered that they are striving to measure infinite problems by a finite measure; unmeasurable space and immensity in duration, with the yard stick of finite reason and shortness of human life, have cut the Gordon Knot in despair and declare matter and living germs to be eternal and uncreated. But of this much we may be absolutely certain, everything has had a beginning, and has had its origin and will have its end in time.

The proof of this is seen in the universal and constant change we see going on in everything and everywhere around us. For had existing forces been acting from eternity every change which they are capable of accomplishing would have been effected in the ages past, and we would now witness nothing but absolute rest and stagnation in the universe.

The absence of fossil remains in this age may be accounted for in two ways; either the animal life was made up of soft and perishable matter without shells or hard skeletal parts—as is most usually the case in lowest forms of life—or else by a change in the rock state in which they were deposited, caused by the joint action of pressure and heat, and known as metamorphism, every trace of the original form of life was lost, nothing left but a residue as explained above.

Tracing the geological record on after this Azoic age, the proofs of increasing life on earth becomes more evident.

It is not proposed in this article to enter into any detailed account of the particular kinds of animals and plants that successively occupied the earth as age after age passed away. The kind of life was always suited to the conditions of its existence, and these conditions ever varying reacted so as to change the forms of life. It amounts to this:—there has always been susceptibility in animals and plants to external influences, which renders them liable to continual change, to be in unison with the environments.

The outer configuration, and the inner composition of the earth has always been changing, and the summation of these changes, in both respects, causes modification in form, and increase in numbers in life corresponding to the changes. Each separate form affected, at the same time, conditioned many others reciprocally opposed in the struggle for existence, and every possibility of a new form became a reality. From the homogeneous, or oneness in structure, to the heterogeneous, or diversity in structure has been the law of development for the earth itself, and all that it contains. Great simplicity in structure was characteristic of the first forms of life, in the oldest geological ages. A tool invented to do almost any kind of work may be made of almost any shape, and hence there was great indefiniteness in shape, as every part of the body did almost every kind of work necessary for the creature's life. Sometimes there was no stomach to digest with. The food was simply enfolded in the jelly mess and absorbed into its being:—No heart to propel, or vessels to convey a circulation, but the nutrient fluid permeated the body by the physical law of transfusion:—No brain or special nerve center, but sensation to some impressions, and perception, was scattered intimately through every particle of the body. Then, as other conditions are to be met, life advanced in complexity to meet these new conditions.

If new enemies are to be met, shells for protection, or horns or some means of defense were forthcoming to meet the exigences of the case. This diversity in structure, has given rise to classification in science, and this implies degree in rank. But why are some animals reckoned higher in the scale of being than others?

A few points on this subject will be noted. First, under any circumstances water animals may be considered inferior to land animals. And, as in the early ages of the world, the ocean was much more extended and even universal, and the land much less in area, and even nothing, it follows of course that in the aggregate life was of inferior type. Want of symmetry is a mark of inferiority.

Some bivalve shell-fish close the valves of their shells by the aid of two muscles, and others by the aid of one. The former are a higher type, and the valves seem to be much more symmetrical in shape and they are also generally of later age in time. A multiplication in the number of parts, in the same organs, such as an increase in the number of vertebræ running out into the upper lobe of the tail fin in the old Ganoid fishes, or an excessive number of segments, beyond the typical number in some insects, shows inferiority. Species having the posterior part of the body prolonged, are the inferior ones of that type. Hence Lobsters are inferior in rank to Crabs. Animals that to arrive at full maturity pass successively through the fully developed form of other species, are higher in rank than the species passed. Thus the young frog (Tadpole) has a Salamander tail which is lost in the adult frog, hence the Salamander is inrerior to the Frog. Organs which in some animals are made use of to subserve the purpose of thought and intelligence, instead of ministering simply to bodily wants shows the superiority of their possessor. Thus in quadrupeds, all the four legs are used as organs of locomotion and are all placed to the ground. In the Squirrel and Cat, the two front legs and feet are used also to convey food to the mouth and are thus often removed from the ground and in some measure act the part of arms and hands and thus show the superior rank in this type, while in the human, they have become real arms and hands and are wholly removed from the ground and now aid entirely in the higher intellectual purposes of his nature. And this being the extreme length to which that distinction can be carried, shows his superiority in the highest degree in this respect.

A shortening of the jaws, and thus of the anterior extremity, and a concentration of the nerve force into a brain and spinal chord, to be the seat of thought and reason, and the controlling power of action, shows the highest mark of superiority, and is found only in perfection in man, which in unison with his erect and not horizontal position—another mark of superiority—which gives him the ability to look upward, and not entirely earthward like the beast, and with aspirations corresponding to his upward gaze, proves him to be the head piece of creation, towards which all life in the past ages has converged. The destiny of man is the problem that the future geological age is to unfold and with his moral nature freed from all that now affiliates him to the bestial creation he will yet so impress the age that it may indeed be called the "Age of Man."

GEO. M. CROFTS,
Keokuk, Iowa.

Turritella sanguinea, Red Sea.

Cypræa Madagascarensis. A neat little species from Madagascar. Has the appearance of being mammillated all over.

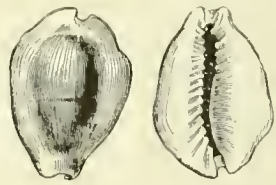
Hair-worms.

Anyone who will search carefully in the waters of a warm semi-stagnant pool may be rewarded by seeing an organism resembling a long black thread, so slender as to be almost invisible, moving slowly, and apparantly aimlessly about, and propelling itself by means of graceful convolutions of its body. To the ignorant the organism is a hair-worm; and by them it is believed to be a horse-hair, vivified by long immersion. To the naturalist it is a member of an interesting genera (*Gordius*) of articulates. The study of the life history of these animals is exceedingly difficult on account of the surprising metamorphoses which they undergo.

The adult hair-worm is about eighteen inches in length. It is a hermaphrodite and produces the remarkable number of eight million eggs which are all joined together and contained in a long belt. This is rolled into a compact ball about the size of a pea. The worm then winds itself around the ball, and, in the process ties itself into a series of intricate knots. It retains the ball of eggs in its coils until they are hatched and float away; when, its mission being ended it uncoils itself and soon dies.

The young worms, when they emerge from the parent egg, are minute transparent bodies shaped like an egg. One end is covered with sharp-pointed hooks and the other with short hair-like appendages called verbratile cilia by means of which it moves in a rotary direction, with considerable rapidity through the water. In this form the animals live, as nearly as can be ascertained, from twelve to eighteen days, at the expiration of which time, unless a grasshopper happens to jump into the water near them, they perish. If, however, an unfortunate grasshopper comes within their reach, they stretch themselves, by means of these hooks, to its legs. If the grasshopper succeeds in escaping a watery grave, the parasite escapes with it. Otherwise, they; too, perish.

Upon emerging from the water, still attached to the legs of the grasshopper they burrow into its intestines where they undergo their final transformation, emerging as perfect hair-worms. Upon dry land the hair-worms move slowly and with difficulty, but a slight rainfall enables it to reach a pool where it remains until the approach of cold weather when it is believed to burrow into the mud and lie dormant until spring when it emerges to re-produce itself. It is believed to feed upon the animalculæ, which with a powerful microscope may be seen in water. When we consider how few are the chances of the worm at birth for reaching maturity, we are not surprised at the immense number of eggs which each individual produces.



Cypræa moneta, Money Cowry, front and back view. A small oval species of yellowish-white color; mainly from the Indian Ocean. It is gathered largely by momen on the shore of the Maldivian Islands, three days after the full moon and before the new moon, being thence transported to Africa where it is used by the Natives for money.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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Single Subscription..... $1.00 per annum
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WALTER F. WEBB,
ALBION, ORLEANS CO., N. Y.

Entered at Albion post-office as second-class mail matter

NOTES.

Mr. Arthur Wright of Somers, N. Y. writes: "On the 20th of December last while looking for some mallard ducks I had shot in a small lake north of here a mile the day before, my brother shot a Cinnamon Guillemot or Murre. I could find nobody who had ever seen one here before. We also got a female Mallard. They are very uncommon here. On the 10th of March I took a set ½ of Barred Owl's eggs. They were in a nest that had been occupied the year before by a pair of Red-tailed Hawks. In October, I did not put down the day, I saw a large flock of snow buntings. I shot one and have his skin now. We had no cold weather up to that time and they very seldom come here only in the coldest winters.

George Pitman has purchased the collection of minerals and relics of the late Rev. J. B. Ludwig. He estimates that there are more than 15,000 specimens in the collection which is one of the finest in this part of the state. Mr. Ludwig spent years in gathering the specimens. Some of the gems in Indian and mound builders relics are very fine. Mr. Pitman takes great pride in his new acquistion.—*New Castle* (Ind.) *Democrat.*

Since the April number was mailed we have moved our entire establishment to another part of our village into new and commodious quarters, a building of our own fitted out wholly for the Natural History business. We are prepared to execute every want of the naturalist and collector.

May 10th we were treated with a pleasant call from Mr. Richard Mansill of Rock Island, Ills., one of the MUSEUM subscribers from the first. Mr. Mansill for the past 40 years has been a close student of geology and palæontology with a special leaning towards the latter. There is hardly a corner of the United States that he has not explored in quest of specimens.

Our new catalogue recently published contains a very neat list of shells and minerals. Write for it enclosing stamp to either Albion, N. Y. or Keokuk, Iowa which ever office is nearest your home.

On page 162 of April MUSEUM the name Wm. B. Carilk should be Wm. B. Caulk.

Just before going to press we were

pleased to welcome at our office Mr. Chas. K. Reed of Worcester, Mass. Doubtless most of our readers have heard of him, as he is a believer in printer's ink and has persistently used the columns of the MUSEUM and with unusual success. His specialty is taxidermy work in all its varied branches, although he at all times carries a very large stock of eggs, skins, shells, curios, minerals and naturalists supplies.

Visions of the Past.

I.

Many years ago, long 'ere the white man's aze had broken into the wilderness, imagine looking from a hill, upon the scene of a valley, quiet and picturesque in beauty.

From this point the eye takes in at a glance to the eastward and westward the broad and gentle windings of the beautifnl Mohawk River. A little way below is seen another gleam of water; it is where the Schoharie winds its way between the hills from the south and joins the Mohawk.

Stretching on beyond to the north, can be seen the blue line of the Adirondacks; and far away in the northeast the Green Mountains of Vermont.

Tall and graceful elms rise conspicuous in the valley, while the oak, rock-maple and the dark foliage of the evergreen mark the elevation of the surrounding hills.

The majestic pine under which we stand is sweetly fragrant; the wind sighs musically through the trees; while the ground is soft with fallen leaves, mosses and feathery ferns giving scarcely a sound to the wanderers footsteps.

There before you is the landscape in all its tranquil beauty—the valley, river and diftant hills—all bathed in the autumnal glory of fading sunshine.

This, where Nature spreads her feast, is the home of the Mohawks. No gilded court, nor palace; no cathedral is here. The woods their only home; the hills their shrine; God's azure skies their canopy.

"Their ancient haunts by wood and stream,
Are here before you like a dream."

From the lofty hill no sign of life is seen; not a single wigwam, canoe or the smoke of a fire, nor anything to show the existence of man. Is it deserted? Look! From among the trees near the river bank a thin line of smoke steals slowly up—and far down the river a canoe comes in sight, gliding rapidly along, propelled by vigorous strokes of the paddle.

With curiosity we descend the hill and cautiously steal our way among the trees towards the camp. In the slow advance we cross a path, which the eye instinctively follows—there beyond the trees is a garden or field of ripening maize, beans and yellow gourds, nearly ready for the squaws to harvest. A great noise arises from the nearby camp. Are they alarmed? No. It's the squaws and children greeting the hunters from the river bank, as they reiurn laden from the chase.

From our snug retreat we can see the camp among the trees. Several wigwams are ranged around a common fireplace. We see within the beds or mats of rushes and robes of skin, dried corn and smoked meat hang from the ridge poles; the mortar and pestle stand ready for pounding the corn; while little dishes of bark,

baskets and the symmetrical pottery vessels are here and there. Outside of the circle of huts sits an old man, famous in his tribe as a maker of arrow heads. As we watch him he takes a flake of flint from the basket at his side and skillfully chips the piece with the aid of a bone or horn implement into a keen and perfect arrowhead.

Now the whole camp comes noisily trooping back bearing the game, followed by the tired hunters, who after laying aside their bows, arrows and other weapons, stretch themselves upon the ground.

Soon all is activity and bustle among the women, with much ado they skin and dress the deer with their sharp flint knives and skinners.

We study the people who are before us. Tall and erect with high cheekbones—the dull red skin—the dark, flashing eyes and the long straight black hair are characteristic of their race. Their clothing is wholly made from skins. The hunters wear breech clouts, leggins and moccosins; while the squaws an upper garment or tunic, met at the waist by a petticoat reaching to the knees; below, the leggins and well fitting moccosins—the glory of the Mohawk belle.

The shadows lengthen. The flames from the fire dart up and light the faces of those nearest it. The day is fast waning. Soon the sombre forest grows in deepest shadows. You see the squaws prepare and cook the simple meal, which is quickly eaten. The men sit around and silently smoke their long pipes. The darkness of the night gradually closes over them and the stars come out. The fire blazes merrily away and the dancing flames throw out a pleasant glow and warmth.

Some wrapped in their blankets the dwellers prepare for sleep. The camp is quiet. The fire flickers and grows low. It is midnight, the hour of dreams—and dreams was the religion of the Mohawks.

ROB'T. M. HARTLEY.

Amsterdam, N. Y., Apr. 1, 1896.

Instructions for Collecting, Preparing and Shipping Fresh Water Shells.

Having lately received from one of our subscribers in Western New York a circular that contains some useful hints on above subject, we print it in part:

WHERE TO LOOK FOR THEM.

"They abound in almost every branch, stream, river, pond and lake. Each kind prefers certain surroundings—some drill holes in the hard clay banks or bottoms, others burrow in the muddy or sandy bottom with the tips of their shells just above the bottom. Sometimes they will be found lying on the surface of the bottom and generally in shallow water, at the seasons when the waters are low, they can be readily picked up. When it is desired to obtain the kinds that live in deeper waters a good dredge may be made of a common iron garden rake, by attaching a bag of wire mosquito netting on behind the head of the rake. Certain kinds will be found near enough to the mouths of rivers to be in salt or brackish water like the horned clam. (Unio Spinosa Lea.] which has been taken in the Altamaha River as far down as Darien, Ga."

WHAT TO LOOK FOR.

"There is something like 800 different kinds of fresh water mussels now

known in the United States, and fully two-thirds of them are peculiar to southern waters. Alabama was credited with 260 kinds in 1876. No one knows how many may be found in Georgia as no effort has been made to make a thorough search for them. These shells are of every possible shape, some long and slender, others wide, thick and thin, smooth and rough, warty, knobby, and even having horns on the sides like the very remarkable kind before mentioned, that lives in the Altamaha River. They are of all possible shades of color, both outside and inside, all the tints of the rainbow are shown in the pearly interior, and when cleaned the exterior is usually beautifully marked. Some species are very minute, growing no larger than the finger nail, while others get to be as large as a dinner plate. Some have heavy teeth by the hinge, others with very light teeth or none at all."

HOW TO PREPARE THEM.

"Place the live shells in boiling water until they open, when the animals may be easily removed, and then tie the two valves together with thread. Do not bother to clean the dirt from those sent to me—I can do that myself. If you desire to prepare some for your own collection give them a bath in warm water, to which has been added one part of Muriatic Acid to three parts of water. Or if the surface deposit be of *iron* and very black, use a weak solution of Oxalic Acid. Do not let them remain in but a moment, unless very heavily coated, for the acid will soon blister the epidermis, and spoil its beauty. After the acid bath allow them to dry in the sun—then rinse in water, using a stiff scrubbing brush—then dry again, rub them well outside and inside with a cotton rag, moistened in a light finishing oil, to bring out the colors and brighten them up, and their great beauty will astonish you."

"Never send a dead shell, that is one that was found without the animal in it, unless it has so recently died that the shell is still perfect and bright, and the two sides (valves) connected by the hinge or ligament."

"☞Look out for PEARLS when taking the animals out. Many valuable finds have been made in this way. A lady in Louisiana wrote me a few days ago of one that was found by a colored man, who sold it for $90. In New Jersey a fisherman took a mussel for bait, and when adjusting the fleshy part upon the hook, felt something hard; it proved to be a pearl of rare beauty and size and was sold for $2,000. Gently pass each animal between the thumb and finger, as it is taken out, and if pearls are there, they will be felt. Sometimes valuable ones are found loosely attached to the shell though the best ones are in the fleshy mantles of the animal."

HOW TO PACK THEM FOR MAILING.

"Wrap each specimen in thin paper, slender ones can be placed inside of stronger ones, and little ones in larger ones, with cotton or moss to separate them and prevent breaking. Use plenty of cotton in the angles and a layer in the bottom and top of the box and stuff it in the angles and between the shells. Use old cigar boxes or tin cans. Number two specimens of each kind you have and keep one. I can then name them for you by the num-

bers, and can also tell you how many of each kind I want and agree upon the terms of exchange or sale, as some kinds are worth much more than others, because of their scarcity. The size of a shell is no criterion of its value. Enclose the box with stout paper and tie securely. Use no paste, as that will subject it to letter postage; insert no writing except the number on the shell for the same reason."

"The postage will be 1 cent an ounce."

"To any person who desires to form a collection or cabinet of these or any other kind of shells, fossils or plants, I will freely give all the aid possible. I will name without charge all the specmens submitted, exchanging other named specimens for those that are common to you, or that you can collect with little trouble or expense."

"I hope many of the youth, especially, will embark in this most fascinating study instead of wasting their time and energies upon stamps, autographs, brands and other fads—things which teach no lessons—lead us to no higher conception of the power, wisdom and goodness of the Creator of the Universe, and do not aid in forming valuable habits of observation and thought. Besides, a well arranged collection of Natural History objects, especially of shells, is a thing of wondrous beauty; something you will always be proud to show your friends and be a solace and comfort to you in times of trouble and give zest and pleasure of richest character to old age."

[Any collectors who desire to know the author of above circular, drop us a line and we will send same promptly. He is especially anxious to secure Southern Unios.]

"The Village Bird-stuffer."

"So you be a bird-stuffer be ye?"

"Say you ought to have the bird I see this morning. It was as big as a robin and his back was the color of a 'patrige' and he had a blue head and a yellow tail. Do you know what kind of a bird it was?"

"A new species likely." (ironically)

"Do you know the names of all the birds when you see 'em?" Ike Smith killed a funny bird the other day; Dick Jones stuffed it for him. There's a fellow you ought to know. He stuffs birds out of sight. Just picked it up too. He never had no one learn him. He has a whole lot of birds. Say, did you ever get a crane? Dick Jones has one that high. What's that bird you got slung over your back? Oh, a henhawk! I saw one the other day five times as big as that. There's a fish eagle down around the 'crick.' His wings are near that far accross." (Indicating somewhere between twelve to fifteen feet.)

"What do you stuff your birds with? "Tow," "What's that? That yeller frizzely stuff like what's in our best parlor chairs? You have to take all the meat out, don't ye? That must be a hard job. How do you keep 'em from rotten? Arsenic; that aint what Dick uses. Come on over and see Jones, he has a whole lot of stuffed things."

We proceed over a hill to that white house with them green blinds." As we neared the gate we were received by a liver and white rabbit hound that came bounding and barking at us until recalled by a voice behind the wood pile.

"Come 'ere Jack, gol darn ye."

"That's Dick now," said my hayseed friend, and as Dick emerges from the

wood pile, I am introduced to him as "another bird-stuffer."

"I thought I would bring him around to see your birds, Dick," apologised my escort.

We go into the house and my two acquaintances stand respectfully aside until I recover from my delight. (?)

Enthusiasm! Ye gods! they are 'stuffed.' Weep! Oh! shades of Audubon, that such things can be.

"How do ye like 'em?"

"They are very well DONE;" and to use the vernacular they are 'done' and no mistake.

"I've got a lot more birds in the closet here. Here's a hawk owl; I know it because I saw a picture of it in *Forest & Stream.*"

And he hands out a short eared owl.

"This un here is a jacana; I saw a picture of it in a newspaper."

This time it turns out to be an immature purple gallinule.

"I got a funny bird up stairs; His back is like a sparres and his bill like a woodpecker and his feet are like a ducks. Want to see it?"

On my offering my desire to see this ornithological wonder, Dick goes up stairs and returns with an immature double crested cormorant; then going up to a large case, lined with highly flowered wall paper, he says:

"Ever see a young snipe? There's one." (A least sand piper.) "And there's a sapsucker and a young un. (Hairy and Downy woodpeckers.) "And that un down in the corner is a skunk bird."

"What's that?" I say pointing to a female bobolink.

"Oh that's a plain sparrow."

And so it goes until I weary of hearing the pet science of Wilson and Audubon dragged through the mire, and depart meditating on the world, and some of its people.

P. A. TAVERNIER,
Guelph, Ont.

VOL. II. NO. 8.

JUNE 1896

THE MUSEUM

A Journal Devoted to Research in

Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

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All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

WANTED.—To buy old U. S., U. S. Revenue, any good Foreign, which catalogue 10c or over, and entire collections of stamps. If you have any of the above to sell send them on with your price. W. H. COLBURN, Dealer in U. S. and Foreign Stamps,, Box 696, Lowell, Mass.

FOR EXCHANGE.—A taxidermist 20 gauge breech loading shot gun, Sharp's action, self-ejecter, in first-class condition, and loading kit. Cost $15. Will exchange for a Smith & Wesson revolver, 32 or 38 cal. Must be in good order. Address, FRANK WOOD, 134 S. Burdick St., Kalamazoo, Mich.

PRINTING PRESS WANTED.—Will pay cash or good exchange in books, eggs, tools, U. S. stamps, or watch. I have new type for sale or exchange, for anything used by a printer. Job type wanted. EMMET D. AUSTIN, Randolph, O.

FOR SALE OR EXCHAGE.—Lovell Diamond Bicycle, in good condition, 30 in. front, 28 in. rear; steel rims, spring seat, for $25 cash. Have 2000 varieties stamps for sale. Eggs to exchange for same with data. C. B. HODGE, Sterling, Kan.

SALTON SEA:—5,000 minute shells from a point 260 feet below sea level in the Desert of Southern California, postpaid for 25 cents. Will send by express at your expense a pair of horned toads or a pair of "Desert Chipmunks" for 50 cents. Address D. O. BAILIFF, Banning, Calif. 4t A-96

TO EXCHANGE.—An American solid gold watch, brand new, value $75, for a collection of stamps not less than 2500 varieties; or will exchange for good single stamps or in quantities. All letters answered. Address, W. H.COLBURN, Box 696, Lowell, Mass.

FOR SALE.—Somebody will get a big bargain in the following relics if sold soon. 150 Indian arrow heads; 125 North Carolina arrow heads; one large ax (grooved); nine fine celts; one hammer stone; one fine stone ball. All the above are good to very fine specimens and will be sold as a lot together for only $10 cash. Also 36 varieties of birds eggs in fine condition. Many scarce in the lot. Single eggs taken in Boone County, Indiana. Also 40 duplicates. The entire lot of eggs for only $3 cash. The 36 are in a fine case. C. E. TRIBBETT, Thornton, Indiana.

WANTED.—Young deer and red and gray foxes. Information where these can be procured will be rewarded. If you know of any in captivity drop me a postal. J. R TABER, Canfield, Ohio.

FOR SALE.—Buffalo Horns, polished or rough; Elk Horns, Deer Horns, Bones of Mastodon and other large animals. Infusorial earth. Wanted: Snap shot cameras. G. F. DEMERRITT La Salle, Ills.

POTTERS' CLAY, just what all taxidermists need for mounting Deer Heads, Fish Mammals, etc; in bricks of 6 and 12 lbs. each; 30c for a 6 lb. brick or 50c for a large size; must go by express or freight, $3.00 per hundred lbs. W. F. WEBB, Albion, N. Y. or Keokuk, Iowa.

FOR SALE.—Fine specimens of the Cal. Condor's egg with data; taken this year. Best cash offer accepted. Egg guaranteed genuine. WILLIS GRIFFITH, Santa Barbara, Calif.

WANTED FOR CASH:—Old *Youths Companions*: July 6, 1876; July 9, 1874 and all prior to 1869. Will exchange or pay cash. Address E. A. MELENDY, So. Londonderry, Vt. 4t A-96

WANTED.—Sets of 713, 40, 58, 65, 80, 74, 118, 140, 184, 196, 199, 200, 211, 219, 221, 230, 280, 305, 417, 420, 659. S. B. CRAYTON, Anderson, S. C.

TAME HORNED OWL, (*Bubo Virginianus*) two-thirds grown, fine; want Indian relics, Bird Skins, Books, Ornithology and Archæology or cash. GEO. W. GEHMAN, 1041 Windsor St., Reading, Pa.

SAM CRAYTON of Anderson, S. C., has been collecting and has sets of 428n-2, 610, 452, 461n-3, 624, and lots of others for exchange.

BOUND VOLUMES of the MUSEUM. Any of our subscribers who wish to return us the first 12 numbers of the MUSEUM prepaid we will send them twelve numbers of like date neatly bound in cloth, for 50c and 10c additional for postage. Or bound in full leather, law book style for 90c prepaid to you. We will send Vol. I, 12 numbers, being a book of nearly 400 pages, handsomely illustrated prepaid for 1.50. W F. WEBB, Albion, N. Y.

W. F. Webb, Albion, N. Y.

The MUSEUM is all one could require of such a publication, and surely more than we could expect at so low a price. I was afraid it was a shaky undertaking at the beginning of the year but surely it has survived; survived to improve, survived on its own intristic goodness I am led to believe. I have only good wishes to it and success to its editor. Faithfully yours, E. W. VICKERS, Ellsworth, Ohio.

Walter F. Webb.

Dear Sir:—The shells arrived this morning and I hasten to send money as per bill, which please find enclosed. The entire order was filled to my utmost satisfaction in fact was surprised to get such magnificent specimens for such little money, therefore I ordered yesterday the entire shell collection. Yours, ALEX H. NOEL, Principal Laclede Schoool, St. Louis, Mo.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., JUNE 15, 1896. No. 8

Notes from the Mohawk's Country.

P. M. VAN EPPS.

(VI)

AT THE HELDERBERGS.

Those who have not experimented or looked into the subject would hardly believe it possible that a sliver of flint could have such a keen sharp edge that comparison with a sharp razor or fine-edged surgical knife would not be far fetched, yet such is the case as I found to my annoyance when after cracking open some cubes of a solid black flint I realized that I had sliced the end of a finger nearly to the bone. So fearfully keen was the edge of the sliver that the cutting was not felt, and not until a stinging sensation was experienced followed by a copious flow of blood, did I realize that I had unwittingly experimented with a second-cousin of the sacred sacrificial knife of the ancient Aztecs. It is customary to class certain chipped flint implements that are in shape thicker and heavier than arrow or spear-heads, as knives. Some of these in outline have a shape very suggestive of a knife blade, and perhaps they were used as such, but what would they cut? These implements all have an edge produced by secondary or even tertiary chipping, and some of them are quite sharp, but compared with the sharpness of a sliver produced by one blow their edge is as the edge of a hoe. It is true that these slivers would make very fragile and short-lived knives, but the material was plentiful and the art and labor of manufacture very simple, and I have no doubt but that many such were used. If so, this would account for the numerous flint chips of indubitable aboriginal placing which are found scattered over territory which is not only remote from any natural supply of the material, but which was used only as hunting grounds by the Indians. I have found numbers of such and indeed the whole region abounds with them. What would be easier for the red hunter than to carry a small supply of these sliver knives or a core of flint from which they could be struck with ease by aid of a pebble from the stream or soil. Mr. Evans in speaking of flint flakes occurring in England says, "Each flake, when dexterously made, has on either side a cutting edge, so sharp that it almost might, like the obsidian flakes of Mexico, be used to shave with. As long as this edge is used merely for cutting soft substances it may remain for sometime comparitively uninjured, and even if slightly jagged its cutting power is not impaired."

It is said of the obsidian flakes used by the ancient people of Mexico, that their edge was as keen as if they had been forged in iron, ground on a stone,

and finished on a hone; also that the Mexican barbers threw away their obsidian flakes as soon as they were dull, and made use of new ones Clavigero relates, that so skilful were the Mexicans in the manufacture of obsidian knives, a single workman could produce a hundred per hour.

* * *

At our visit this year we found the rocky floor of the great tunnel (Haile's Cavern) covered with a muddy deposit left by the rush of waters in the spring, This slimy deposit made any attempt at exploration very disagreable. Last year the floor of the cavern was perfectly dry, yet the level of the pool of standing water was the same then as now. The Clarksville cave we found to be dry save for the regular water-courses; the tinkling stream, and the dark body of water lying remote in the cavern which Mr. Verplanck Colvin calls The Styx. Far in the depths of this cavern we noticed a couple of little plants growing alone in the darkness. Probably grown from seeds washed in by the torrents that course through these gloomy halls during the season of the melting snows, when the mountain water-courses and ravines are all flooded.

The growth was perfectly white as is the case in a darkened cellar, and probably when the tiny plant has exhausted whatever of nourishment is contained in store in the seed from which it germinated it will perish.

* * *

By the roadside at the foot of the mountain slope we noticed a few ripe strawberries. For this vicinity and this date (May 26th) this is very early.

* * *

The next time Frank gets up in the night to put a smudge of green leaves on the camp fire, he will take care that he does not stumble onto a growth of Rhus tox., its qualities as a smoke produder are no doubt as good as any other green plant, but it leaves a very tangible remembrance of contact. About every third person one meets will claim for himself complete immunity from the poisonous effects of ivy, no matter how much they may dabble amongst it, yet if these persons would consent to perform the easy experiment of crushing a leaf or green stem of the plant, on the back of their hand, the proportion of those exempt from the virulence of the poison would likely be found but small.

Below the Helderberg precipices on the debris covered slopes the three-leafed ivy finds a congenial home, especially in such places where by reason of some great rock-fall or slide, the forest has been destroyed.

PAT ROONEY'S KNIFE.

(IN ONE ACT.)

Dramatis Personæ.

AGRITAN, the antiquary.
GERMANICUS, a mower by the roadside.
SCENE—The Great Kayaderosseras Patent.
TIME—Aug. 20, 1895, 8 a. m.

AGRITAN—"Good morning sir. A good mower carries a sharp scythe. From the stub of your swath I take it that you are no slouch with the bill-hook."

GERMANICUS—"Guten morgen; wie gaites."

AGRI.—"By the way; when at work in the fields do you find many flint arrow-heads or other stone objects such as the Indians used?"

GER.—"Yes, I finds him, a lot of flints down here."

AGRI.—"Well did you ever notice anything else besides the arrow-heads? Did you ever find; or do you know of anyone who has any stone pipes or axes?"

GER.—"Pat Rooney up here, he finds a knife; it was a beauty; he vas so long." Measuring on his arm. "But he was rusty all over, zo he puts him over night in te shwill-barrel, and in te morning he takes him out and goes at him mit emery-stones und kerosene-oil and makes him shine yust like zilber so bright. Und now he vouldent take anytings for him."

Glenville, N. Y., May 1, 1896.

DON'T.

Notes taken from Bulletin No. 6 of the Department of Agriculture of Pennsylvania.

When you go into the country on a collecting trip, hunt for specimens but don't hunt for trouble, which you can easily avoid by the exercise of a little common sense and gentlemanly behavior.

Remember that the holding of a Prothonotary's certificate gives you no right to trespass on the premises of any land owner or tenant. It is, perhaps, true that the majority of farmers and other land holders are decidedly opposed to hunters running over their premises, and yet the presence of a "trespass notice" on an estate should not be taken as conclusive proof that the owner or occupant of the property is "mean."

According to my observations, the majority of farmers and other people who forbid trespassing, are forced to take the position they do, because of annoyances and injuries sustained from visits of thoughtless, reckless, uncivil and unscrupulous hunters and fishermen, who, in some instances, have shot or otherwise injured cattle, destroyed poultry, broken fences, or torn down stone walls, and even, at times, mutilated small out-buildings, when in pursuit of rabbits or other game. The writer has often wondered, in view of the mischief done by tresspassers in some parts of the state, that farmers, and other residents of the rural districts are as liberal as they are in the way of allowing hunters, gunners and fishermen the freedom of their grounds. As a rule the men and boys who destroy property and misbehave in other ways, when on hunting, fishing or other trips in the country, should be vigorously prosecuted and speedily punished for their misdeeds. They not only greviously annoy, and sometimes occasion considerable money loss to farmers and others, but their conduct also tends to reflect on every true sportsman, fisherman, or naturalist who is seen in the agricultural districts with a gun, fishing-rod, botanical box or other collecting outfit in his possession.

Every naturalist, every manly and true lover of field sports should use his best efforts to aid in arresting and convicting these evil doers. I never knew a true naturalist to wilfully do any damage when engaged in field work, and no genuine sportsman, would, for moment, think of committing depredations in the lines thus indicated. Don't go upon any man's premises to hunt or fish without first getting his permission. This can generally be obtained if you approach the owner in a gentlemanly manner and make

known to him the true object of your visit.

Don't take a dog with you when on collecting trips for specimens, i e, for other than game birds.

Treat every man's property with the same considerate care you do your own. My advice is, don't go specimen hunting until you have learned to realize that carelessness, such as breaking down fences, leaving gates open, or bars down so that live stock can get out of enclosures and do mischief, may mean the loss of hard earned dollars, and sometimes a good many of them, to the farmer on whose possessions you go.

If you are considerate you will refrain from firing a gun near horses, either along the public highways or in the fields.

Don't shoot recklessly. Always make it a special point to know that no person, cow, horse, or fruit tree will get the charge of shot you intend for the bird or other game. It is infinitely better to lose a specimen than take any chances in this direction.

Don't shoot at or kill domestic pigeons when on collection tours. They are personal property and are raised, by many as a source of profit, with as much care and attention, as are poultry.

Don't tramp through grain or hay fields or in fact in any crops where by so doing you may possibly do harm.

Don't build camp fires in woods and then go off and leave them burning to possibly start a serious forest fire which may destroy thousands of dollars in timber, fences and other property. Last year from reports made to our eminent and efficient Forestry Commissioner, Dr. J. T. Rothrock, the farmers of this state spent not less than $45,000 in cash to aid in checking devastating forest fires, many of which originated, it is asserted, through carelessness of hunters and fishermen.

In this connection it is further learned from Dr. Rothrock's "Preliminary Report on Forest Fires," that there were about 225,000 acres of woodland burned over in the year 1895, causing a loss to timber of a million dollars. Many fences were destroyed and about 5,000 men were engaged in a total of about 250 days in extinguishing the fires. Twenty-five buildings were destroyed, among which were several sawmills; five horses and cattle and two men lost their lives. Much cut and sawed timber was also burned.

The counties in which the most extensive fires occurred are Centre, Forest, Pike and Potter, although Bedford, Fulton, Huntington and Warren counties also suffered great losses. These counties contain some of the best shooting grounds for ruffed grouse in the state. Forest fires, particularly in the spring, destroy the nests and young of large numbers of these noble game birds as well as other species, especially those which nest on or near the ground.

Don't shoot birds simply for the sake of killing, and never kill more than you can take care of properly.

When you learn to skin and mount a bird don't apply your skill in the preparation of one to grace a lady's hat, but use your persuasive powers to induce her sex to not wear such ornaments. "Fine clothes do not make a gentleman," nor do showy feathers on a pretty, rosy-cheeked girl's head add to her attractions. Remember that.

Nesting of the Red-tailed Hawk.

Many of our birds have been well represented in the pages of the MUSEUM, but as yet I have searched its columns nearly in vain for observations on the Red-tailed Hawk (*Buteo borealis.*) This is a common species to be sure, but many of our common birds are quite as interesting as the rare ones.

Timbered bottom-lands or wooded hill-sides near a stream, are the nesting places of the Red-tail. For the birds have discoved that a diet of frogs and mice is excellent for the growth and development of young Buteos, and their nests are usually placed where there is an abundance of these creatures to be found.

A large bulky nest of sticks is constructed in a crotch of some large tree. Every nest of this species, that I have examined, was lined with inner bark, and with one exception contained corn husks. A little grass or moss and a few feathers usually help to make up the lining.

Of nine nests, three were in basswood trees, two in oaks, two in elms and two in maples; the lowest was forty and the highest ninety feet from the ground.

The eggs are usually deposited during the first week of April, though, if the season be early, fresh eggs may be found in March.

This hawk will make use of the same nest year after year, adding another layer of sticks each time.

I know of two instances where the trees have been of such size as to baffle all attempts of oologists to reach the eggs. One of these, a huge elm has been the nesting site of a pair of Red-tails for six years, to my knowledge, and I think for some years longer. They may continue to rear their young in safety, if some enterprising oologist does not introduce the use of flying machines in collecting eggs.

On the afternoon of April 25, 1891, while out collecting eggs with my brother, we were pleased to see a Red-tailed hawk sail off from a nest, sixty feet up in an oak.

My companion ascended the tree while the birds attempted to frighten him away. I have never seen Hawks so bold as this pair were. They would repeatedly swoop down, uttering harsh screams until within a few feet of him, when they would swerve to one side and pass by, to again renew the attack.

On reaching the nest, he found one egg, two young hawks, and three field mice.

The little hawks were queer looking objects, covered with white down. They were about a day old.

The egg was infertile; it measured 2.45 by 1.70 inches.

A few days later I obtained three young ones, which showed a regular graduation in size. I attempted to raise them and the task was not a light one for their appetites and capacity for food were unlimited.

Contrary to the adage that "Little birds in their nests agree," they divided their time about equally between fighting and crying for food.

One day two of them were found calmly feasting on the remains of the smallest one. One of these met a like fate the next day.

It is not surprising that the remaining little cannibal came to a bad end before he was a week older.

On April 14, 1894, a neighbor brought me a male Red-tailed Hawk

which he had caught in a trap, and stated that the birds had a nest in his woods.

The next day I set out to find the nest and soon located it on the top of a bass-wood stub. The female hawk was seen near, but the nest contained only broken egg-shells; half of one shell was found on the ground. They appeared to be fresh and I think had been eaten by crows while Madam Red-tail was away.

The nest measured: Diameter, outside, 36 inches; inside, 12 inches; depth, outside, 18 inches, inside 6 inches. This nest was occupied again in 1895, but I did not disturb it.

While collecting botanical specimens, April 21, 1894, I espied a nest of Buteo borealis in a maple grove.

It was in triple-forked crotch of a sugar-maple, fifty feet up and contained two eggs, for advanced in incubation, one slightly more than the other.

The old hawks circled overhead but did not come very near.

On March 23, 1895, while hunting for Great Horned Owl's eggs on Hemlock lake outlet, a Red-tailed Hawk was seen to alight on a nest in a tall bass-wood. An examination showed that the nest was not yet completed and a nest was found in a bass-wood about three rods from this one.

Waiting a few days I returned on April 6th and found Mrs. Red-tail sitting. She joined her mate at my approach and they gave vent to their displeasure by loud cries.

Fifteen minutes of hard climbing brought me to the nest, which was ninety feet from the ground. The sticks projected so far as to cause me some difficulty in getting past them.

On a bed of corn husks and inner bark, rested three eggs, real beauties; two were of a creamy tint, blotched and splashed with reddish-brown; the other had a bluish tinge and was almost free from markings. When blown, one proved to be fresh and two slightly incubated.

Fragments of another egg were found on the ground under the nest, it might have been rolled out by accident. I removed the eggs and substituted two specimens of "hen fruit" which I had previously colored for that purpose. Happening to pass the nest a few hours later, the hawk again flew off, unaware that she had been sitting on hens' eggs and the birds continued to sit for six weeks before they left them.

This nest was appropriated this year (1896) by a pair of Great Horned Owls, who lined it with owl-down and feathers.

The Red-tailed Hawk, though he goes by the title "Hen-hawk," is not so much a vagabond as was supposed. Dr. Fisher classed it among our beneficial species. Of ten stomachs, from this locality, which I have examined, only one contained the remains of poultry.

I once found a Snapping Turtle (*Chelydra serpentine*) in the stomach of an immature bird of this species. The turtle had been swollowed whole and was of such a size that it has always been a wonder to me how the hawk managed to swallow it.

N. Raymond Reed,
Raymond Mills, Ont. Co., N. Y.

Quartz Rock in Clay Slate.

BY C. M. ORMSBEE, MONTPELIER, VT.

In an article entitled "Clay Slate of Vermont" which appeared in the March

number of the MUSEUM, I made a brief allusion to certain beds of milky quartz which are found interstratified with the clay slate. In that article I had not space, even had I wished to do so, to enter upon a study of the quartz. Yet to fully understand the clay slate formation some description of the quartz rock contained in it seems to be necessary.

Quartz, when pure, consists of silicon combined with oxygen. It is found in various combinations and in almost every species of rock, and is said to form about one-half of the solid crust of the earth. Even when existing nearly pure, as oxide of silicon, it is found in so many conditions and forms that its study is exceedingly difficult. Thus in some localities it is found merely as fine sand. Again it is cemented into sandstone. Often it seems to be formed merely by the melting of sand or sandstone. In this form it is often found in the crevices of other rocks, especially in granite, into which it seems to have been forced, when in a melted state, although a heat sufficient to melt the quartz would much more than melt the granite. In other places it seems to be a sedimentary rock. And still again it appears to have been formed by disposition—that is water containing quartz in solution has dissolved and carried away some body already deposited and left quartz in its place. This process is really petrefaction.

These are but a few of the many forms of quartz which puzzle the brains of the geologist. In the clay slate of Vermont it exists in still another form.

The previous article hinted that the quartz in question was really but a metamorphic form of the silicous limestone which is also interstratified with the slate. Yet the hint may have given rise to some erroneous impressions. Metamorphism, when used in geology, implies a change produced wholly by heat. It may, however, be properly used to signify any change, either in the form or composition of a rock. It was in this sense that I used the term.

Quartz rock, as it exists in the slate region, is of a milk-white color. It has crystaline structure, is rather brittle, and breaks into irregular fragments. It is exceedingly hard and no drill will penetrate it. There are two varieties, milky and crystal, but they pass into each other by insensible gradations, and the same general descriptions apply to both. It occurs in about the same relative places that we should naturally expect to find a strata of limestone; but, as a general thing the strata are not so thick. I know of one extensive strata that is less than half an inch and another that is about ten feet in thickness, and between these extremes there is an endless variety. Its strike and dip correspond, of course, to that of the clay slate surrounding it. I know of no place where it is found, *in situ*, in connection with limestone, but limestone boulders are sometimes found with a thin scale of quartz upon one side. It is never cemented to the slate.

At first thought it seems incredible that a rock differing so widely from the original should have been formed from limestone. But a little reflection shows that such a result is by no means improbable. This variety of limestone, although it contains traces of other substances, consists almost

wholly of silica and carbonate of lime; the proportion of each is nearly equal. Now, supposing the limestone to have been deposited under water, as sediment, or as the solid remains of marine life, as I suggested in the previous paper, it is easy to conceive that the water above might have become charged with carbonic acid. In this case the water would permeate the deposit and the carbonic acid would wash out every trace of lime leaving the silica in the form of a very porous quartz rock. If this process took place while the deposit was in a plastic condition, and, while in that condition, a sufficient pressure was applied, a compact, granular quartz rock would result, which, by the application of sufficient head and possibly by pressure alone would be changed to crystal quartz. This I believe to be the true origin of quartz rock as it exists in the clay slate of this locality.

I am gradually arriving at an understanding of most of the geological phenomenon of the clay slate belt. Until recently I have been troubled to account for the alternate strata of slate and limestone, but I am beginning to see my way clear, and in a future number of the MUSEUM I hope to present a satisfactory solution of the problem.

The Oologists' Association.

There was organized about one year ago an association for advanced oologists and as it will be of interest to many of the readers of THE MUSEUM. I will go into particulars in describing the organization.

The objects of the Oologists' Association are the encouragement of the scientific study of North American Oology, the publication of the results of such study and the protection of its members in exchanging specimens etc., etc.

Any oologist who is over eighteen years of age and who has a collection of eggs of North American birds numbering over 200 specimens is eligible to membership and can apply to any officer or member.

A membership fee of fifty cents is charged and dues are fifty cents per year.

Some of the best known oologists in the county are members and beyond a question this organization will before long be to the oologists what the A. O. U. is to the ornithologists.

Isador S. Trostler, Omaha, Neb., President; Harry W. Kerr, River Sioux, Ia., Vice-president; Will E. Snyder, Beaver Dam, Wis., Secretary; Dr. Morris Gibbs, Kalamazoo, Mich., Treasurer; Jos. A. Dickinson, Gresham, Neb., Executive Committeeman. Among the prominent oologists who are members may be named. Ed. Van Winkle, Van's Harbor, Mich.; John H. Bowles, Ponkapog, Mass.; Dr. C. C. Purdum, Balitmore, M. D.; R. W. Williams, Jr., Tallahassee, Fla.; G. W. Dixon, Watertown, S. Dak.; Walter E. McLain, New Vineyard, Me.

Any of the above will be glad to give inquirers any desired information regarding this organization.

ISADOR S. TROSTLER,
Omaha, Neb.

Queries and Suggestions.

HIBERNATION.

Those who collect and hatch Cecropia, Polyphemus and Promethia cocoons, have noticed that the period for the emerging of the moths may be

greatly varied by the treatment the cocoons receive at the hands of the collectors.

One season, 1872, some of my cocoons were exposed to constant warmth from October first, into, and through the cold months, and some of the moths emerged during the holidays, and many of them a little later.

Since then it has occurred to me to attempt to prevent the hatching of cocoons until the second season; that is delay the emerging of the moths twelve months beyond the natural and usual time. With this object in view a lot of cocoons were secured in winter and placed in an ice house at the time when the ice was harvested. Unfortunately the stock of ice for family use gave out in September and my experiment proved nothing. Still it demonstrated that progress in development may be held in abeyance, as one of the cocooons hatched in the warm days of October and quite four months later than the usual time.

The following season the experiment was repeated and with a larger number of cocoons, and greater care was used in placing them. But again my efforts were for naught, as the ice-house was old and caved in about the middle of summer, and the cocoons were either ground to pieces, scattered or exposed to the heat of summer. What is more, I do not think that an ice-house is a good place for the experiment, as during the warmer months there is sure to be some moisture in the atmosphere and this humidity I believe affects the pupæ disastrously.

It would be interesting to learn if active life would be held in abeyance for two seasons instead of one, and if healthy moths could be brought out after this enforced abeyance.

The metamorphosis of insects, when occurring in the warmer months, is a constant change, so far as I am able to discover, and this change, or series of changes, is continuous from the time the caterpillar splits its skin and appears as a pupa, to the emerging of the imago. There are no halts so long as the weather continues warm; and the change goes on continuously from the sixteen-legged caterpillar through the chrysalis to the six-legged winged butterfly. In the case of the Cabbage butterfly I have known the period to be but eight days from pupation to the emerging of the white butterfly.

However, when the larger species of caterpillars, which are one-brooded, enter the pupa state, they remain, practically in the same condition until the warm weather. This is literally a period of hibernation, and as much as with the snakes and other reptiles. Now can this period be lengthened, an extra season, and the creature still live? I believe so, if the conditions are correct, and I have little doubt that turtles and other reptiles may be kept in the condition of hibernation for two, and perhaps more consecutive seasons, if the conditions are favorable.

The conditions of hibernation are always a natural one and if only brought on by cold weather, and if the conditions are favorable to summer activity, then the animals will continue in an active state through the winter. This has been verified in the cases of tortoises, as well as with Woodchucks, *Arctomis monax*, warm-blooded as well as cold-blooded animals. The condition has been proven in the case

of the silk-worm also, as this spinner has been known to thrive and breed when housed during cold weather, and has been repeatedly kept in the active state under glass; that is, in extensive winter gardens.

Any of my readers may keep a series of cocoons and regulate the time for their hatching by exposing them to the sun and warmth of summer, or keeping them in a cool spot and thus retard the completion.

It is suggested that students attempt to keep over some of our larger common cocoons, and see if activity can be prevented for an extra twelve-month. This can be tried by placing some cocoons deep down in an ice-nouse, or better still in a cold storage house. The cocoons should be secured in a tightly closed tin box to prevent moisture from affecting the live pupæ.

Let us hear of your success, or lack of it, through these columns. Experiments with turtles and snakes in the same direction will also be of great interest.

MORRIS GIBBS,
Kalamazoo, Mich.

Some Crystallized Micas of North Carolina.

BY E. H. HARN.

Among the many minerals of interest to the collector and student found from time to time in the older metamorphic rocks of the Western counties of North Carolina, there are none more unique, and few indeed that are really handsomer than recent discoveries in the mica group.

Perfect tabular hexagonal crystals with all the prism planes full, clear-cut and brilliant have been found lately in some quantity. The most abundant form of these specimens are groups of crystals of all sizes, with one to three planes fully developed, and planted in every conceivable angle of penetration, so that specimens as taken from the vein matted and not crumbled, have a more or less globular appearance and a general radiation from a common center.

But while this is the rule for its occurrence as far as exploited, there was one notable exception. This was a single pocket or vein opened in the Western part of Lincoln County, and all of the material taken out was in peefect six-sided single crystals. If there was any grouping, it was made up by the penetration of one or more crystals into and through another, and all showed the full number of planes.

In this vein the penetrations which were common in all other deposits observed, were very rare. Here, however, the mica was much decomposed, and but a few crystals out of the many hundreds obtained were in any degree clear.

The color most common is green of some shade, from deep emerald clear and transparent in all positions, to dark bottle green and lighter to oil green and nearly yellow.

In one case all of the mica obtained from a pocket of clear and amethystine quartzes was a clear reddish brown. The crystals were all penetrations one-half to three-quarter inches in diameter, showing two to four planes and very brilliant. The amount secured here was very insignificant. a few ounces.

In my operations no vein carrying mica crystals has been worked lower than ten feet, but they show every indication of being true fissure veins. When abandoned they still continue to

sink. It is a little remarkable, though, that the crystals cease at about six feet. Below this the mica is in a schistose state and fine scales without regular form.

The associated minerals are quartz, dark brown tourmaline, rutile, hematite, magnetite, wad and pyrites in a pseudomorphic state. Occasionally small clear and greenish crystals of zircons and monazite are found.

From a study of these minerals and their positions in the vein as shown by the order of penetration, I am led to believe they were laid down at different periods, and as follows: first, rutile which penetrates all of the others; then come the tourmaline and the ores of the metals; after these the mica was formed, and last its quartzes both massive and crystallized, but at different levels. I mean by levels that just so far from the surface, governed, possibly, at the time of deposition by the influence of the atmosphere—certain minerals, or certain forms of the same mineral are to be met with.

As stated above, when the mica in crystal form ceases, fine scales set in, and the same is true of the quartzes.

Where the crystals cease an amorphous condition sets. No good crystals of either the micas or the quartz have been found by me lower than six feet. All of the rest extend in their usual way much lower.

In over a year's work I have found but one vein of mica that can be called fine, and the entire yield would not exceed ten pounds. This is not owing to the rarity of the mineral here, but to the fact that the rocks are so old that the contents of veins are found to be rotten and crumbles to dust in the hands.

The region is very interesting and gives promise of better results with a more persistent search.

The localities, so far as observed by me for these minerals, are at Stony Point, Alexander County, and near the line in both Lincoln and Catawba Counties, at the western extremities. —*Mineral Collector.*

Discoveries Near Mayslick, Ky.

BY ANNIE L. HUDSON.

During the month of July last, some discoveries were made near Mayslick, Mason County, Ky., which will doubtless prove interesting to archæologists. For many years the people of that vicinity had been anxious to open the old mounds on the farm of William Fox. At last the work was begun, and the day the writer visited the scene many hands were busy unearthing the relics of a by-gone race and age.

While nothing more was found in these mounds than have been found in hundreds of others which have been opened during the past few years in the Ohio and Mississippi valley, still the facts in the case are both interesting and valuable to those who are fond of the study of antiquities.

There were twenty-eight skeletons exhumed, and one of the peculiarities noticed was that the bodies had all been buried with their faces to the West. The skulls were perfectly preserved, and had exactly the same appearance as those of Indians.

The fields near the mounds had long been called the Bony Fields, for in plowing there had often been found the bones of both men and animals. It seems that there can be no means

of knowing jnst how long these bodies have lain there. Some persons think the Indians and mound builders were buried in a common receptacle, the latter taking their places first, but this theory is not accepted by the best authorities on the subject.

Many pieces of beads, shells, etc., were found. No doubt these people used them for ornaments, and they were deposited in the graves with them, just as the favorite dog was buried in the grave of the red man of the forest at a later day.

There were several pipes found, one of which had the face of an idol carved on it. This show of whatever race these people were they were undoubtedly worshippers of idols. Near the mounds there are the remains of an old fort—at least, it is supposed to be such—where these people gathered for defense against their foes.

It will probably always remain a mystery just who these people were, but just as long will the question be full of interest.—*Popular Science.*

The Tiger Swallow-Tail.

The smooth caterpillar, of a greenish color, characterized by a continuous black transverse band bordered with yellow across the fourth segment dorsally and by having a pair of small eye-like spots, one on each side of the second segment, sent by Mr. H. S. Burroughs, of Silver Bay, Lake George, is the larva of one of our prettiest swallow-tail butterflies (*Papilio turnus*). It is known as the tiger swallor-tail, because the color of the butterfly in its commonest form is yellow, with black transverse bands. This larva feeds on a number of different plants and particularly on plum, cherry, liriodendron or tulip tree, birch, poplar, magnolia, linden, pear, ash, catalpa, hop, beech, alder, hickory, willow, lilac, etc. The lilac is given as its favorite food in the North by Mr. S. H. Scudder, who is one of our best authorities on the New England butterflies. The eggs are globular and yellow and laid on the under side of the leaf. The chrysalis is pale yellowish gray, inclining to brown, and is characterized, as are most of the chrysalides of the genus, by a mediodorsal prominence on the thorax and by two ear-like projections on the head. It is attached by the tip of the body to a little bundle of silk and suspended around the waist, so to speak, by a thread of silk.

An interesting fact in connection with this butterfly is that in the Southern States, more particularly, but reaching as far north as New York and Wisconsin, a dimorphic form occurs in which the yellow of the wings is replaced by a dull black, this variety being known as glaucus Linn., and confined to the female sex. The caterpillar rarely occurs in sufficient numbers to be injurious.—*C. V. R.*

Alligators grow slowly. At 15 years of age they are only two feet long. A 12-footer may be supposed to be 75 years old. It is believed that they grow as long as they live, and probably live longer than any other animal.

A heavenly census is now being taken by the Paris Observatory. To count the stars the heavens are photographed in sections. Some of these sections show only a dozen stars, while others of the same dimensions show over 1,500.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r
Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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NOTES.

"Taxidermy; How to Collect, Skin, Preserve and Mount Birds; The Game and Fish Laws of Pennsylvania," is the name of a pamphlet published by the Divisions of Economic Zoology of the Department of Agriculture of Pennsylvania, which is under the direction of Prof. B. H. Warren, State Zoologist. It contains a number of illustrations, including "Instruments," "First steps in skinning," "Skin properly made," "Method of wiring," "Game panels," "Screens" &c. The Introduction contains some "Donts" that we consider are of special interest at this season and we include in this number. The work is well written and will commend itself to all active naturalists.

During the past two months collectors have witnessed two Natural Science papers gently pass along where the woodbine twineth. The *North American Naturalist* published one number (April) which promised good things, and we had hoped to see it continue, but it died young. It was advertised in the MUSEUM early in the year and if *any* of our subscribers sent money to the Naturalist Pub. Co., Newark, N. J. or Richard F. Jolley who passed as manager and it has not been returned to them please notify the MUSEUM at once. This firm, through Richard F. Jolley, contracted for quite a lot of advertising in the MUSEUM. Our contracts read "bills payable monthly." First month bill was paid O. K. Next month in reply to our bill Mr. Jolley sends an ad. for the ensuing month and says to send bill for all and I will remit. We held the ad. to ascertain if he intended to stand by his contract and not receiving any reply we waste-basketed it. Now comes the climax. Mr. Jolley says that he can't pay our bill at all, that the Co. has busted, that it has returned all subscriptions to subscribers, etc., that he was only acting as manager for the Co. and is not holding for any Co. debts, etc. As to the character, honesty and integrity of Mr. Jolley we have not been informed, and he does not want to enlighten us. It looks very much as if Mr. Jolley was the sum and substance of the Naturalist Pub. Co. and that the Co. was simply an underhanded game to defraud the public. We have no hesitancy in announcing his actions as crooked and if we find that our subscribers have sent him money which he has not returned, we shall be tempted to give him the full force of

the law. We would thank any of our subscribers who personally know Mr. Jolley to give us their opinion of the man, or any information about the Naturalist Pub. Co. of Newark, N. J. If naturalists' papers continue to pop up every month we shall be forced to refuse their ads. unless they are willing to execute a bond guaranteeing good faith, financial backing, etc.

The weekly NATURAL SCIENCE NEWS has been sold out to the POPULAR SCIENCE NEWS of New York.

We have received from Mr. F. C. Willard of Galesburg, Ill., prospectus of a new ornithological publication to be called *The Osprey* and which will be published soon. We are not so narrow minded as to believe but that there is room for several more good natural history publications. Look at England, with a neat little journal for every few counties. Yes there is lots of room and a good paying support can be worked up, but let it be in a fair square, competition. If *The Osprey* has enough financial backing it will succeed but the proprietors want to be prepared to drop one or two thousand dollars before they will even see a fair subscription list.

The New York legislature has recommended that Dr. James Hall of Albany, notwithstanding his old age be placed in exclusive charge of the State Geological Survey.

Mr. W. T. Hornaday, the author of "Taxidermy and Zoological Collecting," "Two Years in the Jungle" and other works, has been appointed director of the new zoological park at New York. Mr. Hornaday has had large experience with animals in their native haunts and in all branches of taxidermy and was connected for some time with the National Zoo at Washington, D. C. so that "no better man could have been selected to guide and direct the mammoth enterprise." One of the first questions he has been called upon to decide was "Where is the park to be placed." It is needless to say Mr. Hornaday is a reader of the MUSEUM and pays $1.00 annually for same.

Mr. Chas. L. Edwards of Cincinnati, who is in charge of the Bahama Biological Station, has decided to locate the labratory for this season at Biscayne Bay, Fla., which place is favored with clear water and a subtropical fauna and flora. The course which begins June 22d, consists of lectures, practical work in the labratory and observatory and observations of the organisms in their natural surroundings. He will also collect some for outside collectors and institutions.

The American Museum of Natural History at New York, has been appropriated $500,000 for adding a third wing to the building.

The Iowa Geological Survey at Des Moines, have established a museum in connection with their office, devoted mainly to economic geology of the state. Samples of the mineral building stones, clays, etc., of the state have been gathered together. A large number of interesting geological photos have been made and are offered to schools and colleges throughout the state at cheap rates.

An appropriation of $10,000 has been made in Maryland to establish a geological Survey. The new state geologist is Prof. W. Clark.

Prof. A. Agassiz has chartered a special steamer in Australia for the purpose of exploring the great barrier reefs.

The University of Minnesota has sent Mr. Roy M. Squires to Venzuela in the interest of botany. His main field of labor will be in the mountainous districts southeast of Barancas. He will be absent 6 months and as the district is practically unexplored from a botanical standpoint new and rare finds will doubtless be made.

Notes and Illustrations on Showy Sea Shells.

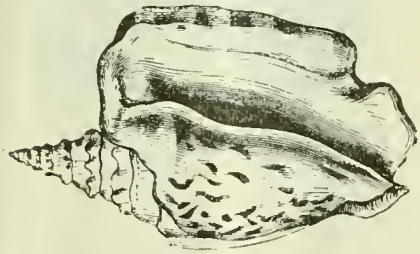


Fig. 1.

Strombus thersites, a very light colored species from the Pacific.

Fig. 2.

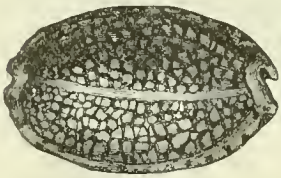
Strombus cancellatus, a small ribbed species from the Atlantic.

Fig. 3.

Strumbus luhuanus is a species from the Indian and Pacific ocean. Common at Singapore and we received a fine lot from Japan in our last shipment. It is a fawn colored species marked with white. The inside is purple and black, with the external right edge red and striped.

Fig. 8.

Cpraea mappa is quite common at the Phillipines. It is oval shaped, the outside being a violet color, having 36 teeth on one side and 42 on the other. It is beautifully ornamented throughout with bright spots, the inside being of a yellowish color. Nearly all true Cypraea have a beautiful natural polish, and are rightly considered one of the most showy families.



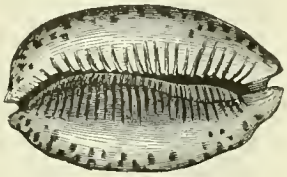


FIG. 9 and 10.

Cypraea histrio (front and back view) sometimes called the Harlequin Cowrie, is found on the shores of Madagascar. It is finely ornamented with dark spots regularly arranged.

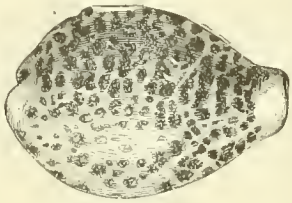


FIG. 11.

Cpraea tigris found all through the Indian and Pacific oceans from Madagascar to Australia. It is imported at regular intervals to the United States in large quantities. We have had as high as 6000 fine large shells of this species on hand at one time. The top is frequently eaten off with acid and then it is sold as the "Blued Cowry" and after being eat off to the blued state, the Lord's Prayer and other mottoes are embossed on same.

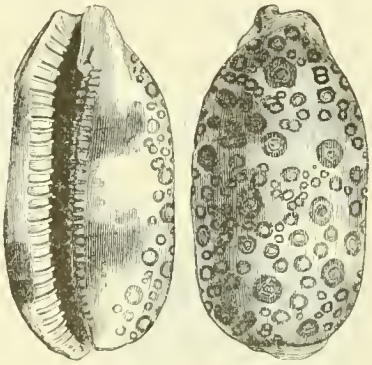


FIG. 12 and 13.

Cypraea argus is from the Southern Pacific. It was named "Eyed Cowry" by Linnaeus, who was fond of Grecian mythology, referring to the many eyed monster which Juno stationed to guard her hapless paramour.

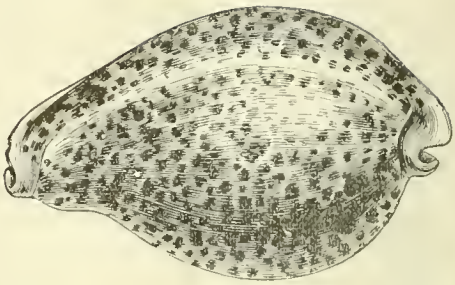


FIG. 20.

Cypraea pantherina, sometimes called the Panther Cowry is so closely allied to Cypraea tigris that in looking over a large series of the latter one could nearly trace the two together. It is a south Pacific species.

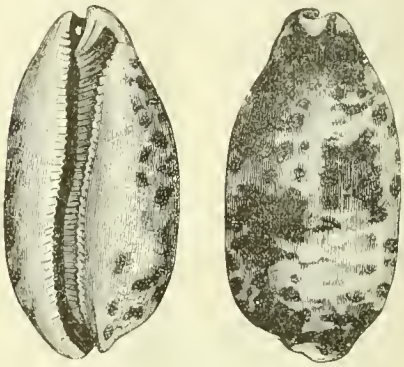


FIG. 21.

Cypraea testudinaria is a large dark colored species from the Indian Ocean. The spots are nearly black and good sized specimens measure 4 in long.

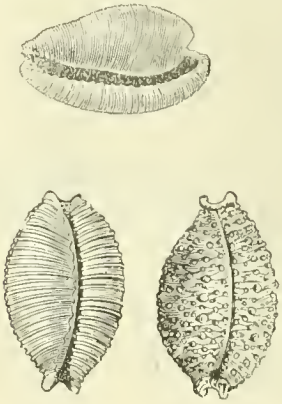


FIG. 24 and 25.

Cypraea Madagascariensis of which front and back view is shown is frequently mentioned as the Madagascar Cowry, It is a handsome species and has the general appearance of being mammallated all over.

FIG. 25.

Cypraea capensis, is another species from same locality.

FIG. 14.

Turritella replicata from the Atlantic is typical of the genus. All of the family represent a spiral shape ending in a sharp point. Many species are elegantly marked.

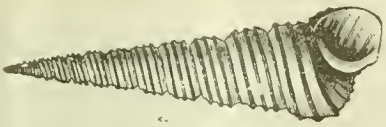


FIG. 15.

Turritella angulata from Tropical Atlantic.

FIG. 19.

Turbo undulatus, sometimes called the Navy Turbo also as the Australian Serpent Skin. It is white covered with lines of spots of green running longitudinally.

FIG. 18.

Turritella telebellata from the Indian Ocean.

FIG. 20.

Turbo marmoratus found in the North Sea passes under a variety of names as Marbled Turbo, Green Snail, Spotted Snail, Banded Snail, Pearl Snail, etc., etc. Coming from the water the animal is furnished with a large operculum and the shell covered with a thick coat of vermetus and lime remains of insects. In fact some we received from the North Pacific (Japan) were so covered with lime material no shell was recognizable except at the mouth.

But it is in the cleaned state the public know this species best. Well cleaned and it shows a beautiful shade of green. By cutting through the green we come to a beautiful pearl, and we have the "Banded Snail" and "Spotted Snail" and removing all the green we have the "Pearl Snail" one of the handsomest pearl shells possible to secure. Where it picked up the name "Snail" we never determined, as it very wrongly confuses it with the Helix.

Leading Natural Science Articles of the Month Among our Exchanges.

The Nautilus for June contains: 1. Notes on Neritina showalteri Lea, by Wm. H. Doll. 2. THE GOOSE FAIR BROOK, by Rev. Henry W. Winkley. 3. Some New and Rare Species of Marine Mollusca Recently Found in British Columbia, by C. F. Newcombe. 4. Descriptions of new Pisidia, by Dr. V. Sterki. 5. New Variety of Punctum, by H. A. Pilsbry.

Kansas University Qurterly Vol. IV No. 4 contains: 1. On the Skull of Ornithostoma, S. W. Williston. 2. Bibliography of N. A. Diptera, S. W. Williston. 3. Involutoric Collineation in the Plane and in Space, Arnold Emch. 4. Study of the Type of the Greek Epitaphias, with special reference to the oration in Thucydides, D. H. Holmes. 5. A new Species of Dinictis from the White River Mocene of Wyoming E. S. Riggs. 6. Continuous Groups of Projective Transformations Treated Synthetically.

Popular Science for June: 1. Marine Nobodies Johann Schleimer. 2. Stories of a Celestial Wanderer, Mary Proctor. 3. Effect of Continuous Darkness on Animals, James Weir. 4. Can we Mitigate the Locust Pest? Lawrence Irwell. 5. Wild Parsnip and Wild Carrot, C. L. Lochman. 6. Acetylene Gas. J. M. Crafts. 7. The Parthenon Inscription Deciphered. 8. Camp Cayadutta, Robert M. Hartley. 9. Jewelry 4000 years old. 10. Study of Plants and Fowers, Lyle Mertan. 11. Uses of Manganese, E. A. Matthews. Interesting notes on various subjects.

The Reliquary and Illustrated Archaeologist, Quarterly London, Apr. '96: 1. The Cup and Ring Sculptures of Ilkley. 2 The "Dwarfie Stone" of Hoy, Orkney. 3. Notes on Archaeology and Kindred Subjects.

Natural Science, London, June '96: 1. Notes and Comments. 2. Casual Thoughts on Museums. 3. The Teeth of Fishes, 4. The Midwife Toad. 5. The meaning of Metamorphosis. 6. Verworus "General Physiology."

The Iowa Ornithologist, Quarterly, Apr. '96: 1. Notes on Traill's Flycatcher in Pottawattomie Co., E. E. Irons. 2. The American Crow, H. Heaton. 3. Warblers of Iowa, M. E. Peck. 4. The Red-tailed Hawk, Carl F. Hening. 5. The Sparrow Hawk. 6. Of Historical Interest, A. Johnson. 7. Urinator arcticus in Jackson Co., Ia., J. Giddings. 8. A Reverie, J. R. Bonwell.

The Botanical Gazette, May '95: 1. Filices Mexicanae, Geo. E. Davenport. 2. Flowers and Insects, Chas. Robertson 3. Aster tardiflorus and its forms, M. L. Fernald. 4. Root Tubers of Isophyrum occidentale, D. F. MacDougal. 5. Albert Nelson Prentiss, Geo. F. Atkinson. 6. Noteworthy Anatomical and Physiological researches.

The Naturalist, Leeds, Eng., June '96. 1. Bibliography Birds, 1892. 2. Couchs Whiting at Whitby. 3. Some Diptera of the Alford District. 4. A Critical Catalogue of Lincolnshire Plants. 5 Yorkshire Naturalists at Hackfall and Tanfield. 6. Note, Masses. 7. Notes, Ornithology. 8. Notes, Mollusca.

A more complete line of reviews next month.

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VOL. II. NO. 9.

JULY, 1896

THE MUSEUM

A Journal Devoted to Research in

Natural Science.

RATES: $1.00 per year to all countries, in advance. Single numbers, 10 cts.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., JUYL 15, 1896. No. 9

Notes from the Mohawk's Country.

P. M. VAN EPPS.

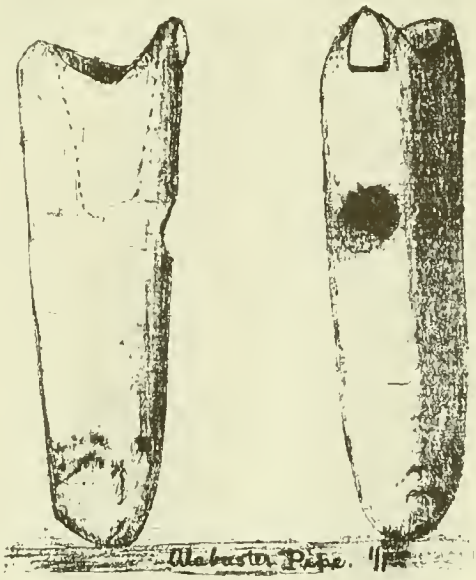
(VII.)

ALABASTER.

A few years ago I came in possession of a beautiful example of the not over common doubly-perforated, boat or shuttle-shaped form of what for want of a better name are commonly termed gorgets. This specimen, one of a number of objects dlscovered at the accidental opening of a grave, in the eastern Mohawk Valley, was long rather a puzzle as to the material from which fashioned, some thinking it to be of marble, which it somewhat resembles, while others have suggested that it was bcne, somewhat changed and mineralized by long burial.

Not being familiar with objects of alabaster, this gorget was not recognized as such, until after reading Mr. Hovey's valuable paper relating to the prehistoric quarries of alabaster, discovered by him in Wyandot Cave, Indiana. * Mr. Hovey says, "Quite probably the place was resorted to by successive generations for material to be made into amulets, ornaments, discs and images. According to J. Jones M. D. such articles of alabaster have been repeatedly exhumed in the Southern States, and I learn from Prof. S. F. Baird, that similar specimens of manufactured alabaster have been found in tumuli in Illinois."

On close examination and comparison with some samples of alabaster from the ancient quarry at the base of The Pillar of the Constitution in Wyandot Cave, and with other specimens from New York caverns it appears certain that the material from which the gorget in question is fashioned is alabaster, and which might easily have been derived by barter from the ancient Wyandot quarrymen. During September 1894 an alabaster pipe of a very curious and uncommon form, was found at Camp Cayadutta in Fulton Co., N. Y., by Mr. Robert Hartley, who has kindly furnished a draw-



* Amer. Antiquarian, Oct. 1880.

ing to accompany this paper. This pipe, if pipe it be, as its use as such has been questioned, † is $3\frac{1}{8}$ inches in greatest length with a diameter of 1 inch at the edge of the bowl, of which the perforation is $\frac{7}{8}$ of an inch in depth; is finely finished, and has but one attempt at ornamentation, a small boss or shield in relief, as can be seen in the illustration.

It is possible that these objects of alabaster were fashioned from material derived from sources nearer at hand than Wyandot Cave, but to my knowledge, no deposits of alabaster showing traces of ancient quarry work have as yet been reported from this vicinity, or from any section of New York state. It is possible that some such quarries may yet be found. A large cavern only partially explored and comparatively unknown (not Howes) located in Schoharie County, has been described as containing "vast slabs of alabaster" and in the future perhaps some evidences of ancient search for the material may be discovered in this, or in some one of the numerous half-explored caverns which abound in the Helderberg limestones of Albany and Schoharie Counties, N. Y.

Lying directly west from the city of Albany is the picturesque Helderberg plateau with its percipitous cliff edge leading for miles in sinuous curves and bays, resembling on a somewhat smaller scale that mysterious region of caverns, The Causses in southern France, now famous through the subterranean researches of Messrs. Martel, Pons and associates.

Here in this rough limestone region of the Helderbergs, must certainly exist large caverns, perhaps inaccessible, but still there, as is evidenced by the arched outlets of subterranean torrents and by the numerous sink-holes (avens) which are to be met with on the surface of the plateau.

The gorget of alabaster spoken of in this paper was found in immediate association with a fine axe of native copper, and other implements, and the grave from which these objects were recovered was situated on the higher portion of a naturally dry, gravel bank or ridge. ‡ For this reason this gorget might easily have escaped the liability of decay, spoken of by Mr. Hovey as a characteristic of alabaster. Mr. Hovey also suggests this,—the perishable nature of the material when exposed to the elements,—as a reason why so few objects manufactured from it have been found. Judging from an outgrowth of stalagmitic alabaster, partly healing as covering the incision made by the ancient Wyandot workers in the enormous columns of alabaster, known as the Pillar of the Constitution. Mr. Hovey argues very justly for a long abandonment of this subterranean quarry. The finding in eastern New York of the two examples of worked alabaster, of which I have spoken, prove nothing against the antiquity of this quarry even could it be shown that they had been derived from this source, as they both were found under conditions pointing to a

† It has been suggested that the object might have been fashioned for use as a whistle as it bears in its outlines and disposal of perforations some resemblance to certain objects of bone, discovered at the same camp site by Mr. Louis Albrand, which are supposed to be whistles; but as yet all manipulations have been without avail in extracting from it a musical note.

‡ Amer. Antiquarian, March, 1894. Description of this find in article, The Mutilation of Archæologic Finds.

considerable age. The camp-site in Fulton Co., N. Y., at which the alabaster pipe was found, although plainly Iroquoian as indicated by the ornamentation of the pottery, and apparently a camp of long continued occupancy, judging from the innumerable fragments of pottery, bones and teeth of wild animals preserved intact in the ash-beds; still had certainly been abandoned before the coming of the very earliest settler in either the Mohawk or Hudson Valleys. This is plainly shown by the entire absence of anything showing contact with Europeans, in noticeable contradistinction with certain other camp and village sites in the vicinity, at which many objects of European manufacture are found commingled wtth the Iroquoian implements of bone, horn and stone, such as bits and shreds of metal, steel, brass or copper, bullets, hand-hammered nails, beads, old coins, mostly English half-pence of the Georges, etc.

Thet the Indians were quick to procure and use implements and ornaments, from the early settlers and travelers has been often shown. Quoting from Dr. Rau: "Simultaneously with the settlement of the eastern parts of North America by the whites, there arose a traffic between them and the Indians in their neighborhood, which provided the latter with implements and utensils so far superior to their own, that they soon ceased to manufacture and use them."

Glenville, N. Y., 1st July, 1896.

A Visit to Some Maine Heroneries.

What has become of the immense colonies of Herons which used to nest annually in various suitable localities throughout this state, writes O. W. Knight in the *Maine Sportsman*? With a view to answering the above question I have sought information of all possible sources, and have myself visited three colonies of these birds which I know of.

On June 2nd, '95, I visited the nesting place of about 50 pairs of Great Blue Herons. The nests were all placed in huge maple and birch trees at the extremities of large limbs, and in many cases there were four or five nests in a single tree. At this time the nests all contained young birds which in some cases were nearly a third grown. I should say that there were at least 175 birds in the nests at the time of my visit, and this would be a very low estimate of their numbers allowing that there were from three to five young in each nest.

May 9th, '96, I visited this same colony, which is situated near the shores of a pond about 25 miles from Bangor. I found the number of birds sadly decreased, there being only about 35 nests which seem to be occupied, but owing to their inaccessible situations, we were able to examine only two of them, which contained five eggs each.

A number of trees which had contained nests the previous year had been cut down the previous summer, as was evident by the dried leaves adhering to the fallen trees. Whether or not the young birds had left the nests before the trees were felled I was unable to determine.

One fact was very evident and this was that for some reason or other the colony of birds had been diminished by nearly one-third of the numbers which were nesting the previous year, and

this without taking into consideration the young birds of the previous year, which should have greatly increased the number of birds in the colony,

At the present rate of decrease in numbers this colony of birds is doomed to extinction within five years at the outside, and sooner or later this will be the fate of every Heron within this state.

At Hudson, Me., a colony of a hundred or more pairs of birds has been utterly broken up within the last five years, owing to the cutting down of the trees in which they had nested, but of course these birds have sought another and probably safer locality for nesting.

The worst destruction of all has been wrought among the colonies which formerly nested on the islands of Penobscot Bay. Plume hunters have killed hundreds of birds, and where formerly hundreds of birds nested, there are now only tens and twenties.

With the desire of making a study of their habits I left Bangor on May 15th for a flying visit to Fickering's Island, where ten years ago the Great Blue and Black-crowned Night Herons nested in countless numbers. Leaving Bangor at 1 p. m. I proceeded by train to Bucksport and here met my friend, Mr. Dorr, who was to accompany me on the trip. We embarked in a small rowboat, and being fortunate enough to meet with a small steamer which was going our way, and with whose captain my companion was acquainted, we were able to get towed a distance of 15 miles on our journey. Being cast loose at Castine, where the steamer left us, we were obliged to take to our oars and make a desperate pull against a head wind and tide. In the face of these difficulties it was after 10 p. m. when we reached our destination. As we landed an Osprey uttered its shrill whistle of alarm, and several Herons joined in with discordant squawks.

We partook of a belated supper and pitched our tent for the night. At daybreak we awoke and started on our tour of inspection. Alas! What had become of the birds that formerly made the island their home? What had become of the 50 pairs of birds that my companion found nesting there when he visited the place in May, 1895? All but a meager remnant had been slaughtered or had left the place. We found fresh traces of the plume hunter, in observing thr recently killed carcases of three or four birds. Only about five pairs of living birds remained in the colony and but four nests contained eggs, three containing four eggs each, while the other contained three eggs. These all belonged to the Great Blue Herons and my companion informed me that the Night Herons had not nested on the island since 1890. With the best of luck this colony can only rear fifteen young birds this present season and probably will not do that well.

We now left for another island where my friend thought the Night Herons still nested; while en route we passed an Osprey's nest placed on a ledge of rock about three feet above high tide level. The nest was a huge, bulky affair, three or four bushels of sticks and other rubbish being used in its construction. As the nests are generally placed in trees, this was something unusual to find a nest on the ground, but later on we found another

Fish Hawk's nest in a similar situation. In localities where they are protected, the Ospreys often place their nests in such situations.

As we approached the island where the Herons were said to nest both species of these birds rose and flew about but the Night Herons greatly predominated in point of numbers, there being perhaps a hundred pairs of them to about twenty pairs of the Great Blues. On landing we found nearly every tree contained from one to five nests of the Night Herons, the nests being very slight affairs of sticks, about a foot in diameter and containing only a slight hol ow for the eggs. We were astonished to notice two or three broken eggs under each of these nests, each of these eggs being emptied of its contents through a rough hole in the side or end. For a time we were puzzled to account for this phenomenon, but the mystery was finally solved. A pair of Northern Ravens had a nest on the island, and undoubtedly they had sucked the Herons' eggs in order to obtain food for their young. So complete a destruction had they wrought that only one nest of the Night Heron contained an egg, hundreds of broken eggs being found on the ground all over the island.

The Great Blue Herons had better success in caring for their treasures as, owing to their larger size and greater courage, they were able to fight off the depredading Ravens. The nests of the "Blues" were huge affairs about two or three feet across, being very flat and composed entirely of sticks, which were well white-washed by the excrement of the birds. Except in three cases, the nests contained three eggs each, the exceptions being two sets of five eggs and one of three. One nest was found containing newly hatched young. The nests were placed near the tops of small spruce trees and averaged about twenty feet from the ground. If fortunate the Great Blues may rear about 60 to 80 young this year to increase the numbers of their colony.

The Ravens' nest, which we found later on, was composed of sticks and very warmly lined with lambs' wool. It contained five nearly fledged young, and was situated on the limb of a spruce tree about 25 feet from the ground. The parent birds kept up a loud angry croaking or cawing and flew excitedly about during the time we remained on the island, while the young kept up a constant squalling for something to eat.

If the Ravens continue to reside on the island through the summer, it will be manifestly impossible for the Night Herons to rear any young this season, as they are too cowardly to make a determined fight for their eggs against the black robbers.

Having taken all the observations that I desired to, we now started on the homeward journey, and arrived there safely in due time well satisfied with the knowledge gained on the trip.

The Netsuke.

There are, perhaps, few curios of oriental origin that possess greater charms for the collector than the Netsuke, one of the most popular of Japanese curiosities.

A considerable degree of ignorance exists with regard to the use of the Netsuke; its derivation and the innumerable forms in which it is made are also points about which there is a gen-

eral misconception. To trace the Netsuke to its birth would be a difficult undertaking for even a Japanese connoisseur. It will, perhaps, be the easiest task if we start backward, in true Japanese fashion, for then our foundation will be an assured one.

The Netsuke of today is a Netsuke in no sense of the word. It and its fellows date no farther back than thirty years, and the material employed is almost invariably ivory. Oftentimes it is not even allowed to retain its original color, but is stained with tea and other substances to enhance its value by a spurious appearance of age The interval between 1860 and the commencement of the century is noticable for considerable elaboration, especially in the detail, and the progress of the popular school is seen in the frequent treatment of subjects taken the life of the people.

Around 1800 and somewhat earlier, we have many masters reproducing these studies from life with marvelous fidelity, especially Masanao, Minko and Fakatashi.

The last half of the eighteenth century differs only in greater simplicity in treatment and a narrower range of subject.

Lacquered and colored Netsukes have apparently been made from the very early times, especially those coated with red lacquer. In 1614 an edict was issued by Hitdetada that every house should contain an image of a Buddhist Diety. This edict brought into the ranks of the ordinary carpenters of that day a considerable infusion of men of a more artistic nature who would occupy themselves not only with the larger temple idols but the smaller personations It was about this time that Netsukes first began to be artistically decorated.

Concerning the evolution of Netsukes—both they and the "iuro" have been considered to be essentially Japanese. The Netsuke has been one of the articles to which Japanese origin has never been assigned, but researches strengthen the opinion that they are not peculiar to Japan. Examination of a large number evidences that the subjects and dress are Chinese.

Because we of the west see the Netsuke attached to the "iuro," we regard it as particularly designed as an adjunct to that article; but this was but one, and that a minor office. Its main one seems to have been as a sort of button to hold the tobacco pouch in the girdle. In Japan everyone smokes, but everyone does not carry a medicine or seal case. It may then be defined as a toggle to hold in the "obi" or girdle either the tobacco pouch, pipe or brush case, purse, snuff or water bottle, medicine or seal case.

About every condition of man wear the Netsuke. From the noble down to the coolie it is found to be in universal use. On occasions both tobacco pouch and "iuro" would be slung from Netsukes, the former on the left side, the latter behind the body under the right shoulder.

The shape of the Netsuke varies considerably. The accompanying illustrations show representative pieces —the circular or rounded form is the most usual Of these there are two that are defined: one is termed "manju" because it assumes the similitude of a rice cake. The other "kagamibuta" because the metal center enclosed in ivory resembles a mirror—"pagami." One example shown in cut rep-

resents a masque, one of the many tiny reproductions of those which were made for the "No" dances. The other cuts represent a figure and two perfectly carved leaves with gourd.

My collection consists of Netsukes in wood, ivory and metal.

LEE ROY J. TAPPAN.

July 3, 1896.

Field Columbian Museum Expedition in Africa.

Recent dispatches from Washington concerning the African expedition in charge of Professor Daniel G. Elliot of the Field Columbian Museum, are corroborated by communications received from the professor by Director Skiff. These letters are replete, with interesting details and signity that the enterprise recommended by Mr. Skiff although one of vast magnitude and certaintly a decided innovation, will prove to be a splendid success. The eyes of the world's naturalists are turned toward the Field Museum in ashtonishment, for it required both brains and nerve to undertake an expedition of this character into the heart of the dark continent in quest of material that usually is not collected in thirty or forty years by older museums. An infant in the history of museums, the Field Columbian, after two years of life, inaugurates, equips and starts a thorough organization upon a mission that calls for much the same kind of spirit that characterized the work of Livington and Stanley.

Into the wilds of Africa Professor Elliott accompanied by Messrs. Akeley and Dodson and five score of natives, went without counting upon anything but success. That the ambition of the museum directory will be realized, and that, too, in a brief time, is indicated by the voluminous correspondence now in possession of Director Skiff. The professor decided upon his route before leaving London, and this will be followed with but few deviations.

Starting from Berbera on the Gulf of Aden, the expedition was to cross

the desert plains called the Hands, requiring a five days' journey without water, reaching Tug Turfa, where game of various kinds exists in abundance. This route never yet has been traversed by human beings, and the professor was conservative enough to say that he might have to abandon it for another. At all events, Tug Turfa was the objective point, and there he anticipated the addition of valuable specimens. From there the expedition would go south to the River Shebegli, crossing in the neighborhood of Irne, about 6 degrees north latitude, with a view to entering the unexplored country in the angles between the Juba and Dan rivers. This territory has never been disturbed and is a sort of no man's land between rival tribes. Many rare animals are supposed to roam unmolested there, and no doubt some new specimens will be secured. The route from there was problematical.

Probably the party's return to Berbera will not be recorded until September or October, as the professor's purpose is to stop wherever he discovers the animals. One of his chief desires is to penetrate the Shebegli for zebra and across the Juba for giraffes, elephants and other large animals.

* * *

Writing from Aden, at a later date, the professor expresses gratification at the progress made, as well as upon the selection of the district for operations. The warlike demonstrations in other portions of Africa caused the party to pursue the course mapped out.

"A few years more," writes the leader of the expedition, "the game is liable to be wiped out of existence, and, had we delayed another twelve months in getting started, I fear it would have been too late. I have been received most courteously by the authorities of this military post, and every assistance has been afforded me, while I have received full authority to collect specimens even on the reservation—so called—a tract of land eighty miles wide near the coast in the British protectorate. The Indian war office established and maintains this reservation as a sort of preserve for British officers. The expedition is designed to serve a double purpose from this time on—the original one, with which the world is acquainted, and the thought that I may send reports of the probable extinction of the game which will enable them to enact and enforce stringent laws wherever British authority in Africa extends. To augment this laudable object shall be my aim."

The writer advises that he has slightly changed his programme, and intends going to the wild ass country, a short distance down the coast, this being practically the only locality where this animal can be found, after which he will follow the route near the Juba and Dan rivers. This change was made because it was his desire to hunt elephants, rhinoceros, giraffes and other large animals while his men and camels were fresh. Besides, this programme would not compel him to carry heavy loads of specimens into the interior and pack them back to the coast country. Like the good hunter that the professor is he will endeavor to reach the fartherest point and then begin to load up for the return trip. The specimens he obtains near Berbera will be left there for his return or shipped to the museum if opportunity offers.

About the only regret expressed in any of the letters relates to the scarcity and hence the high price of camels. This beast of burden, absolutely essential upon an expedition into Africa, doubled in price in a short time, caused by the Italian government purchasing several thousand for its corps of new soldiers sent into Africa against the Abyssinians. However, the professor finally secured a herd of sufficient dimensiohs and began his trip into the interior.

* * *

The last communication, dated April 27, gives a humorous account of the professor's men breaking camels.

"You can imagine," it reads, that there's a circus around here while the instruction is going on. When the untamed camels arrived I heard a tremendous growling in front of the door, and on going out I saw one of these amiable beasts being led by his keeper, but walking along with every expression of disgust, both in his countenance and voice. The man stopped (ditto camel) and attempted to tie the beast's forelegs together, when it reared and striking out with its fore feet, landed on the keeper's stomach and head, sending him flying through space as if shot out of a cannon. The man picked himself out of a ditch with a hand on each bruised part, and the camel which had never ceased roaring, was taken in charge by two other and more robust natives and led to the tents, or rather induced to go by the energetic assistance of a very sharp iron rod, applied in a most vigorous and miscellaneous manner. Similar exhibitions are being conducted daily, and we are now ready to lead the recently broken camels. Within three or four days they are said to become tractable. I formed my opinion of a camel forty years ago when I rode across the Arabian deserts, and I see no reason to alter it in any way. The creature has so many talents and so many ways of exhibiting them. And, to begin with, it can kick harder, higher, swifter and oftener than a Virginia mule, and can use all four feet at one time in a kicking match. Then it can bite worse than a vicious horse and buck in a way to make a broncho blush with absolute shame. No cowboy ever lived who can stay on that perch seven feet from the ground during a camel's exhibition of gymnastics Then he can run away whenever he feels like it, and he is often seized with a desire to slope. Upon an occasion of this kind his rider experiences a sensation between being blown up with dynamite or struggling against the throes of an earthquake until all his joints are dislocated, and he drops, a limp, inert mass, to the ground.

"Then this sweet creature has a way of evincing his displeasure that is at least effective and convincing. He twists his snake like neck into a circle and, poking his ugly nose into the face of the rider, opens his cavernous mouth and lets out a roar of disgust in such a fetid breath that the elevated human victim is fairly blown into the middle of the coming month (a week being too short a distance). And yet, with all these high recommendations, which some people might consider objectionabl , these are the dear animals I am yearning for I enclose proof of a photograph of my official headquarters in an old Egyptian bungalow, taken by a hunter. You will notice that I am in full dress with all my flags around me,"

The museum officials expect no further advises by mail about the expedition until about June 20, when a report of the success in the wild ass country may be anticipated.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r

Albion, N. Y.

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NOTES.

We are in receipt of a neat little pamphlet entitled "Birds of Franklin Co., Iowa," from the pen of Frank H. Shoemaker of Hampton. 151 species are recorded.

Mr. H. Chamberlain of Canton, Ohio, under date of June 24th, writes: "I noticed in the May number of the MUSEUM an article on Hair Worms. I have given some attention to them and can it be that I am altogether mistaken? I have supposed they were in some way, either an offspring or parasite of the *cricket* as I have seen them emerging from the cricket at different lengths varying from an inch to ten or twelve inches, in pools of water and on the grasses about them. As you know the cricket is a very much better swimmer than the grasshopper and quite fond of being near the water. May I not be right in my theory that it is a parasite of the cricket?"

We shall be pleased to hear from some of our subscribers as to their views on the subject.

We call the attention of our readers to the large advertisement of Mr. Robert Burnham in this issue. Mr. B. carries a very fine line of gems and minerals, especially in opals. We have seen some of his fine Australian and Hungarian opals and they would be hard to beat at the low prices charged. Write him at once, mentioning the MUSEUM.

Mr. Tappans article in this issue on the Netsuke will doubtless interest many. A great number of our subscribers that we are personally acquainted with have had the advantage of foreign and home travel and could give us very interesting notes. Put your thoughts on paper and send them to ye editor of THE MUSEUM.

"Geology and Microscopy" is the title of a valuable work by Richard Mansill, author of various works pertaining to geology and astronomy. It is richly illustrated with several hundred fine cuts of fossils just the kinds one would be apt to get and not know the names of. The illustrations are arranged to show the remains found in every group and formation, and at a glance show in unmistakable evidence the gradual development of creation. Part 1 of the work is devoted to Astronomy; Part 2 to Geolo-

gy, treating "composition of the Earth," "Rocks and Strata," "The Commencement of Life," "Low Forms of Life," "The Forces," "Animal Types," "Paleontology and Microscopy," "The Animal Kingdom" and all through the various geological periods, giving minute explanations and reasons, in language that any student or naturalist can understand. We have not space to outline even one quarter of the chapters of this valuable work. It consists of 250 pages bound in flexible cloth. Will be sent prepaid for $1.50. Orders may be sent direct to the author, Mr. Richard Mansill, Rock Island, Ills. We commend the work very highly to all and as previously stated the illustrations are worth many times the price of the volume.

A Baby Hippopotamus.

NEW YORK, April, 1896.

There is quite a stir in fashionable circles of hippopotimi in Central Park. A few days ago Mrs. Fatima gave birth to a youngster and the father—Caliph— felt very proud, like all good husbands ought to. Caliph grunts occasionally and allows he would like to know whether his child is a boy or a girl, and Miss Murphy, with a true grandmother's solicitude, now and then asks her daughter how the young one is getting along.

Mrs. Fatima eats beans and carrots at frequent intervals with a little hay "on the side," and the baby has shown that he is something of an eater too, but no one has seen him eat yet, as he insists on taking all his meals under water. The superintendent says if all goes well the cub will be able to sit up and notice things in a few days, and then the public can see him.

Another baby hippopotamus is expected shortly. Miss Murphy will be the mother. This will make the present baby have an aunt or uncle younger than itself, but a thing like this is not considered out of the way in the best circles of hippopotimi.

The hippopotamus is one of the most interesting animals, and it is one of the largest of existing quadrupeds. The bulk of its body is little inferior to that of the elephant, and its legs are so short that its belly almost touches the ground; its height is not much above five feet.

The hippopotamus is extremely aquatic in its habits, living mostly in lakes or rivers, often in tidal estuaries, where the salt of the water compels it to resort to springs for the purpose of drinking, and sometimes even in the sea, although it never proceeds to any considerable distance from the shore.

Its skin is very thick—on the back and sides, more than two inches; it is dark brown, destitute of hair, and exudes in great abundance from its numerous pores, a thickish, oily fluid, by which it is kept constantly lubricated. The tail is short. The feet have each four toes, nearly equal in size and hoofed. The neck is short and thick. The head is very large, with small ears and small eyes placed high so that they are easily raised above water, without much of the animal being exposed to view. It is said that John B. Winters, an ex-circus agent, rode several rods on the back of a hippopotamus in one of the branches of the Nile. The muzzle is very large, rounded and turned with large nostrils.

and great lips concealing the great front teeth.

The hippopotamus cuts grass or corn as though it were done with a scythe, or bites with its strong teeth a stem of considerable thickness neatly through.

The skull, while it is distinguishable by remarkable peculiarities, corresponds in the most important characteristics with that of the hog. The brain is not large, but "there are others"—in Washington—who would not show up much better.

The respiration of the hippopotamus is slow, and thus it is enabled to spend much of its time under water, only coming to the surface at intervals to breathe. It swims and dives with great ease and often walks along the bottom completely under water.

Its food consists chiefly of the plants which grow in shallow waters and about the margins of lakes and rivers. The hippopotamus is lively and playful in its native waters; soon learns to avoid man, and when it cannot retire among reeds for concealment, it dives and remains long under water, raising only its nose to the surface when another breath becomes necessary.

The female hippopotamus may sometimes be seen swimming with her young one on her back. The animal is generally inoffensive, but is occasionally roused to fits of rage, in which it becomes extremely dangerous, particularly to those who pursue it in boats. Its voice is loud and harsh, and it is likened by Burckhardt to the creaking and groaning of a large wooden door.

The circus is now abroad in the land, and a visit to the red cage of the hippopotamus is always interesting.

T. B. D.

Visions of the Past.

II.

Years pass by. Once more we stand beneath that lofty pine. The nood-day sun shines down upon the brilliant green of summer; the atmosphere is hot, but in harmony with the visible aspects of nature. Again we see the distant mountains, the valley and the river. But we see a change—No longer does the smoke curl from the fires in front of the wigwams down along the river; no longer we hear the voices welcoming the hunters. No, the brave and hardy settiers have made their way into the beautiful and fertile valley. Their keen axes have laid low those tall and graceful elms. Dotted here and there we see little clearings in the once boundless forest. Log cabins and barns stand amid charred and blackened stumps, where once stood the wigwams among the trees. Yellow grain and tassled corn are growing where grew the dogwood and witch-hazel, and the crowing of a cock and the noisy clang of a cowbell greets the ear. What a change!

We see it all and a sadness creeps over us at the sight.

Here for years and years—no man can tell how long—this spot of sunshine and of shade was the red man's home, his possession, life and enjoyment.

Here for generation to generation they lived in their wild, unsettled haditS of savage life, with little speculation of the future. Alas!

"The rightful lords of yore
Are the rightful lords no more."

At first the white men were received and respected as Superior Beings sent by the Great Spirit, and the red men gave them lands. The settlers soon set them examples of violence by burning their villages and laying waste their slender means of subsistence; yet they wondered that the savages did not show moderation and magnaminity towards those who had left them nothing but mere existence and wretchedness.

Sensible of the fact that the white men were fast becoming the usurpers of their ancient domains, and smarting with increasing injuries, they began to manifest a hostile spirit.

Their council fires were lighted, and soon we hear the fearful war whoops echoing through the forest.

The lonely cabins were watched by prowling bands of savages. Woe to him who was not always on the alert and the rifle near at hand.

The homes of the settlers blazed at midnight and the tomahawk and scalping knife were red with blood. All the unimaginable horrors of barbaric warfare desolated the defenseless frontier, and conflagration, torture, blood and woe held high carnival.

Many a midnight tragedy was enacted in the solitude of the forest, as prowling Indians with whoop and yell applied the torch to the settlers' cabins. The shriek of the tortured father, and the dying wail of the mother and maiden faded away in the silence of the wilderness. Age and infancy were alide the victims.

With fire-brands and scalping-knife they swept with whirlwind ferosity over the land, and made themselves merry with death and woe.

We see men, women and children flee wildly to the forest for safety, hoping to reach by long detours the distant and larger settlements of Schenectada and Albany. Behind them are the savages; before them a desolate wilderness, scarcely broken by a single habitation. Few have time to furnish themselves with provisions in their hasty flight. We see them blindly plunging through the forest, fording streams, wet, tired, hungry and half clad, slowly and painfully making their way along, and at last—more dead than alive—reach the friendly shelter of the block-houses in the settlements.

We also see the captives hurried along on the weary march to the distant Indian villages. Happy indeed are those who met death on the spot, for a fate more terrible than death awaits those whose lives are spared for a time.

With appetites whetted for blood the savages enter upon the tortures with which they are wont to avenge their slain comrades.

Some of the captives are compelled to run the gaunlet—slashed and beaten every step by knives and clubs in the hands of the women, until they are literally hacked to pieces. Others are bound to the stake and roasted before a slow fire; still others suffer sharp thorns thrust into their bodies; eyes gouged out; fingers and toes pulled off; hot coals heaped upon their bare flesh, and many other means of torture which their develish and fertile brains devise.

As we watch the horrible spectacle we see the gloom of night light up with the glow of the fires by which the captives are slowly consumed, and our nostrils are filled with the stench of

burning bodies. So we turn away from the awful sight of barbarous mutitation, torture and death, where

"Nothing but lamentable sounds is heard
Nor aught is seen but ghastly views of death;
Infectious horror ran from face to face
And pale despair."— * * *

Through the valley the night closes gloomily. Scarcely a cabin is left standing. All tells a tale of murder and death, fire and smoke, pillage and devastation. ROBT. M. HARTLEY.

Amsterdam, N. Y., July 1, 1896.

Don't hunt in fields or meadows where cattle are grazing; go on the general principle that in every herd of cows or steers there is a keen-eyed vicious bull which is always on the alert to defend the interests of his owner. Aside, however, from danger to yourselves a field or meadow where cows, steers, sheep or horses are feeding is no place to discharge a fire arm and if the bellicose lord of the pasture proceeds to drive you out, regard him as in the light of only doing what a farmer should do to protect his property. Even if you do not shoot the live stock you can thus frighten them and thereby oftentimes do much damage.

Leading Natural Science Articles of the Month Among our Exchanges.

The Reliquary and Illustrated Archæologist, London; quarterly. July, '96. 1. Some Forms of Greek Idolatry. 2. The Old Stone Crosses of Somersetshire. 3. Churchyard Games in Wales. 4. Notes on Archæology and Kindred Subjects.

The Mineral Collector, N. Y.; July, '96. 1. Concerning Quartz, Part II. 2. Rambles in Moreland. 3. History of Clay Stones. 4. Gem Fields of the World.

Natural Science, London; July, '96. 1. How and Why Scorpions Hiss. 2. An introduction to the Study of Antropoid Apes; the Gorilla. 3. The Lobster in Commerce and Science; Its Name and Nature. 4. The Duo Decimo Classification and the International Catalogue of Science.

The Microscope, Washington; June, '96. 1. Objects Seen Under the Microscope. 2. Use of Ordinary Binocular for Dissecting. 3. Practical Suggestions. 4. Science Gossip.

Popular Science, July, '96. 1. The Tiniest of Birds. 2. To the North Pole in a Balloon. 3. The Prairie Rattlesnake. 4. The Coming Eclipses of the Sun. 5. Truth About Microbes. 6. Poison Hemlock and Sweet Cicely. 7. Wonder Works of the Sioux. 8. Mound Explorations in Ohio.

The Nautilus, July, '96. 1. On the American Species of Ervilia. 2. Notes on Mollusks of Florida. 3. A Word About Sphæria. 4. The Mussel Scars of Unios. 5. Description of two New Species of Achatinellidæ from the Hawaiian Islands. 6. Isaac Lea Department. 7 An Interrogation Regarding the Fossil Shells of San Pedro Bay.

The Linnæan Fern Bulletin, quarterly; July, '96. 1. The Relation Between the Sterile and Fertile Leaves of Dimorphic Ferns. 2. How I found Dryopteris Simulata. 3. A Coiling Frond. 4. Dryopteris Simulata in Maryland. 5. Woodwardia areolata. 6. The Polypodys Relatives.

Meehan's Monthly, July, '96. 1. Aspidium Goldianum (colored plate.) 2. Wild Flowers and Nature. 3. General Gardening. 4. New and Rare Plants. 5. Biography and Literature.

The Nidiologist, Calif., May, '96. (Last number out at this date) 1. Albinos. 2. Michigan Notes. 3. Florida Gallinule. 4. Unusual Nesting Sites 5. The Photo Fiend. 6. Nesting of the White-throated Swift. 7. Periods of Deposition of Eggs. 7. Whip poor-will Courtship.

The Naturalist, Leeds, England; July, '96. 1. Yorkshire Naturalists at Hackfall and Tanfield. 2. The Constituents of the No. Lancashire Flora 3. Work for Lincolnshire Geologists. 4. Bibliography; Lepidoptera. 5. Notes, Ornithology, Coleoptera, Mass, etc.

The Fishing Gazette, July 4. Beautiful Sea Anenomes.

Scientific American, June 27. 1 Florida Tree Palm. 2. A Destroying Vacuum. 3. Curious Locomotive Explosions in Peru.—July 4, 1896. 1. The Geological Societies of America. 2. A Government Biological Survey. 3. A Gigantic Turtle. 4. The Vegetation of Lower Calif. July 11, 1896. 1. A Homeric Flight at Sea. 2. The Damascus of today. 3. Recovery of Silver and Gold from Photographic Residues. 4. Testing the Parts of a Modern Bicycle

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Bowenite, R. I	10	1 50
Brookite, Ark	10	1 50
Brown Spar, R. I	10	50
Brucite, Pa	25	75
Buhrstone, France	10	30
Cairgorm Stone, Brazil, Col	10	10 00
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Calacereous Spar, Wis., R. I., Greenland	05	3 00
Calcereous Tufa, N. Y	10	1 00
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Chlorite, R. I., Mass., Pa	10	50
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Chromic Iron (Chromite), Pa	05	50
Chrysocolla, Pa., Cal	10	1 00
Chrysotile, Canada, Mass., N. J.	10	1 00
Cinnabar, Cal	10	2 00
Cinnamon Stone, Me., N. H	10	50
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Cryolite, Greenland	10	75
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Cyanite, Conn., Penn., Me	05	1 00
Damonrite, Conn	15	50
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Dog-tooth Spar, R. I., Wis., Eng.	10	2 00
Dolomite, R. I., N. Y	10	1 50
Doubly Refract' Spar, Iceland	15	3 00
Elaeolite, Ark	25	75
Emery, Mass	10	50
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Feldspar, Pa., Mass., Europe	05	4 00
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Fuchsite, Me	25	75
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Ilmenite, Mass., Conn, etc.	15	1 50
Indicolite, Mass	10	
Iolite, Conn	25	2 00
Iron Pyrite, Mass., Pa., Col., Eng.	05	2 50
Jasper, R. I., Pa., Col., Brazil	05	1 00
Jeffersite, Pa	25	75
Kyanite, Conn., Pa., Me	05	1 00
Labradorite, N. Y., Lab., etc	15	2 50
Lava, Sandwich Is	05	1 00
Leopardite, N. C	30	1 00
Lepidolite, Ct., Moravia	10	1 50
Limonite, Ill, Pa, Me	10	2 50
Lintonite, Wis	10	20
Lodestone, Ark	20	3 00
Macle, Mass	10	2 00
Magnesite, Canada, Mass	10	50
Magnetite, R. I., Pa., Ark, etc	10	1 50
Malachite, Siberia, Ct., etc	25	4 00
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Marble (ruin), Italy	1 00	3 00
Marble (landscape)	50	3 00
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Marble (Sienna)	25	1 00
Marble (Verd-antique)	25	1 00
Margarite, Mass	10	1 50
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Masonite, R. I.	10	4 00
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Mica, Mass.	05	2 00
Mocha Stone, (Moss Agate), Col., Brazil, W. T.	10	1 00
Molybdenite R. I., Me., Aust.	10	2 00
Moonstone, Pa., N. Y.	25	3 00
Muscovite, Mass.	05	2 00
Nacrite, R. I.	25	50
Nailhead Spar, R. I., Eng.	15	5 00
Novaculite, Ark.	05	30
Obsidian, Cal.	10	1 50
Oligoclase, Ct., Pa.	25	1 00
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Oolite, Eng., Mo.	05	1 00
Opal, Mex., Hun., etc.	15	15 00
Opalized Wood, Cal., Col.	10	1 50
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Orthoclose, Col., Mass.	10	3 00
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Phylite, R. I.	10	1 00
Plumbago, R. I., N. Y., Minn.	10	75
Porphyry, Mass., Italy	10	2 00
Prehnite, Scotland, N. J.	25	2 00
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Pyrolusite, Canada	10	1 50
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Pyrrhotite, Canada, N. Y.	15	50
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Sagenite, Mass., Pa., N. C., etc.	10	2 50
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VOL. II NO. 10.

AUGUST 1896

THE MUSEUM

A Journal Devoted to Research in Natural Science.

RATES:—$1.00 per year to all countries, in advance. Single numbers, 10 cts.

Published the Fifteenth of Each Month by

WALTER F. WEBB, ALBION, N. Y.

THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one-half (½) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

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TO EXCHANGE.—Beautiful specimens of Mexican Onyx, for all kinds of minerals, fossils, shells, Indian relics and curiosities. All colors, polished and unpolished. Send list of what you have to exchange and its value, and receive reply by return mail. EDDY N. SMITH, New Britain, Conn.

WANTED for cash.—Microscope, entomological check list, literature on Conchologo and Entomology, back volumes of *The Observer* and *The Nautilus* Will sell copy of Studer's Birds of North America, for best offer. O. B. MONTGOMERY, Lock Box 181, Allentown, Pa.

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U. S. Postage and Revenue Stamps wanted for cash or good exchange. Can also use good foreign in exchange. It will pay you to correspond with us if you have any stamps to sell or exchange. Have a 16-shot Marlin safety repeating rifle, 32 cal. in fine condition; several parts of Nehrlings Birds of North America; Animate Creation, in 16 parts, something fine, rare eggs in sets, water-color paints. If you have any stamps drop us a line. MEEKER & LUCAS, Box 296, Bridgeport, Conn.

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MILO CENTRE, N. Y.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., AUGUST 15, 1896. No. 10

Notes from the Mohawk's Country.

P. M. VAN EPPS.

(VIII.)

RAMBLES IN AN ARROW-HEAD AND OTHER TOPICS.

Now before me I have the base of an unnotched pentagonal arrow-head picked up on the flats of the Mohawk. This arrow-head fashioned from yellow jasper is of a very rare form with its five corners; it had five corners when perfect but minute veins of quartz running through the jasper have given it an opportunity of breaking, about two-thirds of its length remaining. The breakage has happily disclosed a small geode lined with minute quartz crystals. This minature grotto is located about midway on the line of fracture and when examined with a glass of low power becomes a veritable Alladin's cave with its intricate passages lined and studded with knobs and bosses of glittering crystals. With long and close examination one can easily imagine himself of lilliputian size traversing and wandering through these diminutive halls whose sparkling corriders appear endless. Only Ruskin or Jules Verne could properly describe this illusion.

Such veins of quartz and other minerals occuring in the material from which arrow-heads and other primitive objects were made have been responsible for many unfortunate breakages and it sometimes happens that an inclosed fossil or cast of former life has occasioned the same damage, for it must not be forgotten that most of our so-called flint consists of limestone silicified or changed, having often the form of its contained fossils yet intact. I have a shapely arrow-head with regular outline of gray-blue flint measuring 2½ inches in length but broken in two parts and from this very cause, an inclosed organism, in this case a section of an encrinal column piercing the flint of the arrow-head in its longer direction, hence the breakage at that particular place was partly due to the want of cohesion between the sections or joints of the silicified encrinite stem. To judge from the diameter of the inclosed encrinal column, the arrow-head was made from flint occuring in limestone of the Trenton period, which abounds in the vicinity. Flint chips and implements perfect and broken showing imprints or containing silicified shells, corals and the like are frequently found on our ancient camp-sites and work-shops. I might also mention an implement of red flint—probably a knife or skinner—found in central Missouri which shows beautifully, numerous encrinal joints. This specimen would adorn equally well the cabinet of the paleontologist or antiquarian.

A very curious fact in connection

with the finding of the broken arrow-head containing the encrinal column is this, that the base I found one year on the Mohawk river flats and the point I picked up another season. Probably both parts lay near together, but of this I am not sure; at any rate they perfectly correspond forming when joined a shapely specimen. How many collectors can record such an instance? And how many persons upon finding a beautifully modeled hunting point of flint or mayhap of chalcedony or quartz, have stopped to think that possibly the arrow-head found may be at a point miles from where discharged from the bow?

I imagine that many an arrow-head has been carried back into the wilderness far from the usual hunting grounds of the aborigine by wounded animals. The arrow or spear-head becoming detached from the shaft might easily be retained in the body of the wounded deer or bison until its death, be it sooner or later.

Thus might the particular and unique examples of the art of the arrow-smith of one tribe be easily distributed over the territory occupied almost exclusively by other tribes. Possibly many an exotic,—some rare form or material plainly the work of a distant people, is noticed with a wondering thought—"how did this strange example get in this region." However, barter and warfare are responsible for some of these instances.

As exotics we sometimes find here in the Mohawk Valley examples of the white quartz points used by the nations living more to the south.

Glenville, N. Y., Aug. 1, 1896.

The Antarctic Continent.

BY C. O. ORMSBEE.

At the present time much interest is centered upon the Antarctic continent. Anything descriptive of this unknown land is eagerly read by the multitude. As yet very few travelers have ever seen this land. No exploration into its interior has ever been attempted; and, although two expeditions are being fitted out, and several more are under serious consideration, all designed for antarctic exploration, it is not probable that the present generation will do much more than to outline its coast. At first thought this statemant seems to cast some reflection on the ability of our explorers, but, when we consider the lapse of time since Arctic explorations first began, and note the little progress that has been made in the exploration of the interior of Greenland during the past three hundred years, and compare the incentives for Arctic with those for Antarctic explorations, we shall see that the statement is not too conservative.

Yet, notwithstanding the fact that the Antarctic continent is wholly unexplored it does not follow that its physical features are wholly unknown. When sufficient data are given, we may, by a system of comparisons and deductions, ascertain innumerable hidden features. As the mathematician may, from a few simple elements, solve an abstract problem, or as the anatomist may, from a single bone, construct the model of an unknown animal, so may the geographer, from a few known facts—by reasoning from cause to effect, and inversely from effect to cause—calculate the physical features of a continent. This has

been done to a much greater extent than most people are aware. We have maps of Asia and Africa and Australia in which the topography of these countries is clearly described, yet actual survey of these countries has done little except to corroborate theories already advanced, and to furnish data for the making of more minute calculations.

Travelers' tales are not always accurate and are often wholly unreliable, even when there is no intention to exaggerate or misrepresent. Such reports form the basis of geography, and when incorrect reports are accepted as being correct, then it follows that our geography is incorrect, and likewise the deductions which we have made and based upon incorrect statements must also be incorrect. Errors, the result of incorrect or incomplete or exaggerated information, do occasionally occur; but such errors, when detected, only serve to add to our information and to make us more careful in the future.

Thus, in the present paper in which I have endeavored to describe the configuration of the Antarctic continent, although I have been obliged to be guided by the statements of a few travelers, I have accepted only those which I believe to be trustworthy and reliable. If they are so my description will be found to be correct. If I have been imposed upon my description may be incorrect to the extent of the imposture.

Meteorologists, all over the world, have for years been recording the temperature of various places on the earth's surface. So numerous have been the observations of this nature that at the present time there is hardly a town of any size in the world of which there is not a record of its daily temperature, extending over a period of from one to fifty or more years. By a simple mathematical calculation the average temperature may be found, and this, for any given locality, varies but little from one year to another. Not only this but every ship that sails upon the ocean carries a thermometer, which is used in connection with its barometer, and several hours each day the temperature is accurately recorded, together with the latitude and longitude of the place of observation. By the comparison of records of thousands of voyages we are able to construct a tolerably accurate chart of the mean annual temperature of the ocean. Next we connect, by lines drawn upon the chart, all places having the same mean annual temperature. These lines are called isotherms; and, for convenience, each one is numbered according to the temperature of the places which it connects. Thus, the isotherm which connects the places having a mean annual temperature of forty degrees is called the fortieth isotherm. Now it will be noticed, from the numbers of the isotherms, that the temperature constantly decreases, with something like regularity, as we go from the equator towards the poles; and the statement that the Antarctic continent possesses an intensely cold climate will need no further demonstration.

But the isotherms tell us much more. It will be noticed, in studying an isothermal chart, that, when they are not deflected by local influences, the isotherms encircle the globe, lying parallel with, and co-incircling with the parallels of latitude. It will also

be noticed that the land masses, by their unequal radiation, form an important agent in the deflection of the isotherms. In the northern hemisphere, where the land masses greatly predominate, the parallel system can hardly be traced; but south of the equator, the system is more noticeable, and, as we pass beyond the limit of continental influence, there is very little deviation from the direct course. Thus the fiftieth, fortieth and the thirtieth isotherms very nicely co-incircle, throughout their entire length, with the fortieth, fiftieth and sixtieth parallels of latitude respectively. Now this indicates that the Antarctic continent must be of a circular form; and that it must be situated around the South Pole, which is, necessarily, very nearly in the exact geographical center of the continent. This theory is strongly corroborated by other circumstances which will be noticed in their proper places.

Now a general law of continental relief is, that an independent land mass of this form consists of an undulating plain, of a low elevation, surrounded by a range of low mountains situated near the coast, to which it is parallel. There is no reason for believing that the Antarctic continent is any exception to the general rule; and hence we are justified in assuming that these are the general features of the country. In fact Sir James Ross, who discovered the continent noticed and described such a range of mountains, which, in memory of another distinguished navigator, he called Parry mountains. He also described two volcanoes, Mt. Erebus with an altitude of 12,400 feet, and Mt. Terror, 10,900 feet in height. From these altitudes (assuming the measurements to have been correct) we might be justified in supposing the range itself to have a greater elevation than it really possesses. But the position of these volcanoes, so far from the volcanic zone, shows them to be but isolated volcanoes; and, as one distinguished writer has said, "Isolated volcanoes are but accidents in the relief of a continent," and do not affect the general laws of relief. Their height, together with their steep, precipitous sides, show, however, that they belong to that class of volcanoes which emit ashes and stones instead of melted lava.

It may well be stated, in this connection, that a land mass of this form possesses few good harbors, and it is worthy of note that Ross, who sailed along the coast of this continent for a distance of four hundred and fifty miles without finding a single safe harbor. The encircling ring of mountains generally presents an inseperable barrier to the perfect drainage of the interior of a land mass of this kind. At each extremity of the longer axis of such a land mass the mountains have a less elevation, often being nothing but hills through which the few rivers, which have their sources in the interior break their way to the ocean. This is the case with the Antarctic continent. The climate is too severe to admit of the existence of a stream of flowing water. But the topography of the continent is such, that, did rivers exist in its interior, the main streams would reach the ocean not far from the meridian of Greenwich and that of one hundred and eighty. Considering the temperature, I incline to the opinion that the interior plain is filled with

snow to a height equaling the tops of the surrounding mountains.

It has been noticed that icebergs in the Antarctic continent, are almost invariably, huge masses of ice, with steep precipitous sides, and surmounted by a flat plateau. Now very few of the sources of the icebergs of the Antarctic continent have been discovered; but Arctic icebergs have been studied very carefully, and it is known that they have their origin in glaciers which push their way towards and into the ocean. The progressive motion is continued until the glacier has projected itself into the ocean so far that the buoyant power of the water is sufficient to lift and break off the end of the glacier, which then floats off, and is afterwards known as an iceberg. Whenever the glacier pushes its way over a precipice, it produces a corresponding inequality in its own surface. Inequality of surface is a characteristic feature of the Arctic icebergs, but it is wanting in those of the Antarctic ocean. Hence the inference that the valleys in which the Antarctic glaciers are formed are broad and level Such valleys are formed in two ways:—first by erosion and secondly by the erection of that class of mountains which are produced by folding. There are no indications that the Antarctic continent ever possessed a soil in which erosion could take place, or a climate sufficiently mild for it, as erosion is caused only by the action of running water, consequently we are forced to the conclusion that these valleys are merely mountain valleys, and that the mountains are of the class already named.

Mountains of this class are those which were elevated while the material of which they were composed was in a plastic condition. The strata are bent instead of being abruptly broken. They present the appearance of undulating elevations, while the transverse valleys are broad, and smooth, with a regular descent to the plain below. Now if this conclusion, regarding these valleys be correct, the assertion already made, that a range of low mountains surrounds the interior of the continent, receives an important corroboration. In fact the two theories are corroborative of each other.

But the icebergs tell us more. Icebergs do not break off from the parent glacier until it has projected itself so far into the ocean that the buoyant force of the water overcomes the cohesion of the particles forming the glacier. This can never be done so long as the glacier rests upon the bed of the ocean There can be no strain until a portion of the glacier is lifted clear from the bed and suspended in the water. Then a leverage is created and the tension is greatest at the point where the glacier enters the water. Now the icebergs of the Antarctic ocean are immense cakes of ice, many times as large as those of the Arctic ocean. This shows that the glaciers entered the ocean upon a gently inclining plane, instead of over an abrupt precipice as is the case in the Arctic region. It proves that the ocean, near the Antarctic continent is shallow, and that the beach of that continent extends far out to sea.

Now we naturally expect just such a beach to a land mass of a circular form. The Antarctic continent is circular in form. We expect to find such beaches where folding mountains occur near and parallel to the shore. I have shown that such mountains are

found in the Antartic continent at a comparatively short distance from the coast. Moreover, as has been stated, if occular demonstration be needed to establish this point, Sir James Ross saw and described such a range of mountains. Again, no oceanic current, properly speaking, is to be found in the Antarctic ocean. That is, there is, in the Antarctic ocean, no counterpart of the Gulf Stream of the Atlantic, or, of the Japanese current of the Pacific ocean. Instead there is a regular and constant movement of the entire body of water, from the east towards the west caused by the axial motion of the earth. Now, were the Antarctic continent of any other shape than circular, or were its coasts line very irregular, the water would be diverted, some point, towards the north, and a return current of warm water would come from the equatorial regions. No such currents have been noticed, and this, therefore, directly corroborates the theory of a circular continent; and, indirectly the same fact corroborates all other theories which I have advanced respecting the Antarctic continent.

A brief description of the meteorolgy of this continent is yet to be given. It is a well-known fact that most of the meteorological phenomena with which we are acquainted are caused, more or less directly, by the influence of the sun's rays. The sun, by shining upon a particular portion of the earth's surface, raises the temperature of that portion. This surplus heat is radiated back into the atmosphere and combined with the heat which the atmosphere itself receives directly from the sun, it produces an elevation in temperature, and a consequent expansion in bulk of the atmosphere over that particular locality. To maintain an equilibrium, colder and heavier air rushes into the partial venum and over the heated portion of the earth's surface. As each particle of air moves forward it leaves a vacumn behind which is filled by other particles from behind and above. This process is repeated again and again, the lower particles acting with less and less force, until the upper particles, moving perpendicularly have gained a complete mastery. At this point the wind ceases upon the surface; but the descent of the upper particles of air has likewise created a vacumn into which a voleme of air from a still higher region immediately pours. This air comes from the heated portions, and thus, by continual wind currents an equilibrium is maintained.

Now these conditions prevail in the Antarctic zone, as well as elsewhere. The sun warms a portion of the earth's surface, we will say near the Antarctic circle. The air above is rarefied and a partial vacuum is created. Into this vacuum colder air rushes from the south. We have seen that the isothums of this region extend around the earth in a direction perpendicular to its axis, and hence the increase of heat must have considerable regularity. This indicates that there is constant wind, varying only in intensity, continually blowing from the South Pole towards the equator. The region of the greatest intensity of this wind would seem to be just off the coast of the Antarctic continent. And it may be well to remark that every navigator who has ventured near the shores of this continent has complained of severe head-winds at this latitude. The greater intensity, it will readily be

seen is caused by the perpendicular current of air combining with tne horizontal current which rolls along over the elevated surface of the continent.

I have intimated that the general course of the wind is from the South Pole towards the equator. This implies that its general direction is due north, and this would be its course were the earth at rest; but the diurnal motion of the earth, from the west towards, the east, gives to the wind a northwesterly course. This wind blowing as it does, across a frozen continent can contain but little moisture. It must of necessity be dry and cold, But the counter current, rising, as it does, from a warm ocean, and returning to the continent. in the higher regions of the atmosphere, carries with it a large amount of moisture. This moisture is congealed and falls upon the continent in the form of snow. Thus, are fed, the glaciers which are constantly returning the moisture to the ocean, condensed and congealed into ice or icebergs. Thus the equilibrium is maintained.

Physical geography embraces that science which treats of the distribution of the flora and fauea over the surface of the globe; and this article, although already produced to a greater length than was at first intended, would be incomplete were this subject to be omitted. There is, however, very little to be said upon this subject. A continent wholly covered with snow to a depth of many hundred feet, with a temperature seldom, if ever, rising to zero, clouded in darkness of night during half the year, and with the sun continually above the horizon during the other half, does not present conditions that are favorable to the development of any of the types of either animal or vegetable life with which we are acquainted. Moreover, its isolation from other land masses, surrounded as it is by miles of drift ice, with a constant wind blowing furiously from its coast, and no current (except in the upper regions of the atmospher) drifting towards it, presents serious difficulties to the migration of either animal or vegetable life. No doubt various species of the seal family find their homes on its inhospital shores. Birds related to the petrels and penguins, may visit the continent for the purpose of rearing their young. Fish of various species, may abound in the ocean near the shore but beyond these few instances, no life is to be found upon the continent unless it be of a type differing from anything with which we are acquainted.

Chipmunk and How He Excavated His Burrow.

The little striped squirrel or as he is sometimes called the ground squirrel is a common pest in this vicinity and it has seemed to me the present spring that I had never known them so abundant in any former year. One can scarcely enter orchard or woodland without hearing every where their incessant "*chick chick chick*" bird-like calls repeated as regularly as the ticking of a clock and so mingled in the spring with the songs and chirping of woodland birds as to be scarcely distinguishable except upon near approach when with a startling "*chick-a-re-re-re*" he dives into the little round hole in the ground beside which he was located and vanishes from sight and sound.

Everything seems to fill some place in the economy of nature and the most

important one of this little quadruped has always appeared to be to provide food for the carnivora of the woods, but natures balance this year seems to have been disarranged, in that no hawks of any species appears to have made our forests their summer camping ground, and the little squirrel has ranged with immunity far and wide and everywhere, varying his diet of fern fronds, mushrooms and swamp apples, as the boys call the fungus growth on the wild azaleas, with eggs and young of the little birds of the wildwoods. Many a rare bird's nest have I been led to by the scolding of the owner over an intruding chipmunk. I well remember the only worm-eating warbler's nest I have ever found here was discovered by being led to the lonely spot in that manner.

I was much interested in a curious find which I discovered last year, it was an egg partially imbedded in the ground, proving on removal to be the egg of a Ruffed Grouse, fitting into the mouth of a small squirrel's hole in the ground like a cork in the neck of a bottle pointed end downward. The egg contained a nearly full developed young bird and must have been extracted from its nest at a late stage of incubation, from how far I know not as the location of the nest was not discovered.

Black snakes and weasles find in the little squirrel's body a diet greatly to their taste and the woods, a preserve ready for any demand of their appetites and I have been often entertained with a race for a dinner on the one part and for life on the other between them in my rambles, anything but an entertainment to the panting victim filling his part unwillingly in nature's economy.

A small oak grove near my place furnishes a paradise for these squirrels and thence they sally forth in troublesome raids on my garden. They enter my strawberry patch as soon as a berry begins to gather bloom and not content with eating to repletion they strew the ground with berries severed from the stems, nor can they be banished except by being destroyed. As the raspberries begin to color they meet the same fate and a watch would soon disclose the lively little squirrel, making for the grove with distended cheeks filled with the stolen fruit and so goes every thing edible that his taste may fancy in the garden or even the cellar where a family made their home last year and were with great difficulty dislodged. One cunning little rogue took possession of my greenhouse last spring finding a secure retreat in the wall and the climate to his taste. One ofhis amusements was to dig up every bulb that I planted apparently in fun and wontonness as he rarely even nibbled them. If reset he would dig them right out the very next night.

Several years ago I noticed in a corner of my yard a little round hole in the ground, grass growing to its very edge as if it had been made by a crowbar, into which one could look by sunlight some fifteen inches and see nothing but darkness. This I soon discovered to be an entrance to the home of a striped squirrel, and often have I been startled by his sudden "*chick-a re re re*" as he vanished into the ground when I happened that way. One could never get so accustomed to that cry as not to be startled by it. Thither I have often seen him skurrying along on the fences with cheeks distended to their utmost capacity

with loads of hazel nuts, smilax se ds, chestnuts or apple seeds in their respective seasons, laying up a winter store of provisions in his underground storehouse with only the one inconspicuous entrance, upon which I often looked and was reminded of the newspaper story of some years ago.

It seems that there was a social club among whose rules were these two: If any member asked a question no one could answer they should pay him a forfeit. If he asked a question he could not answer himself he should pay the forfeit. The question asked was, how the little ground squirrel dug his hole so deep in the ground without throwing out any dirt at the entrance. One ingenious member escaped the penalty with the simple if not lucid explanation that the squirrel begun digging at the other end and threw the dirt behind him. The interlocutor thought he saw a weak point in the answer and immediately asked, "But how did he get at the other end to begin?" "That," said the respondent, "is your own question, answer it yourself or pay the penalty for asking one you cannot yourself answer."

I had thought of those questions and been puzzled over them as I looked upon the little bare entrance into the depths below, but one day in passing by I saw something going on unusual and the secret was a secret no longer. About five feet away from the entrance of the squirrel's storehouse I had often noticed a mound of fresh earth like a mole-hill. It was always there and it was always fresh. I had supposed it to be one of the little mounds of earth often seen thrown up by the moles from their underground passages, the uses of which I never quite understood, though a matter of common observation.

Passing by one day I saw the little squirrel emerge from his underground castle with distended cheeks evidently bringing out something, and I paused to see what was going on. The squirrel watched me for a few moments from the entrance of his fortress. as I stood passively observing him a short distance away and finally ran to the little mound of fresh earth before mentioned and immediately proceeded to empty upon it the contents of his cheeks and pouches which proved to be fresh yellow loam brought up from under the ground where his storehouse was evidhntly undergoing extension or repairs. He carefully removed all the bits of earth, very deftly using his paws, from his cheeks and mouth, leaving them upon the little mound of earth I had so often noticed before without guessing its source. And that was how the chipmunk excavated his hole in the ground without throwing up any earth at the entrance. He simply carried it out in his cheek pouches and deposited it in a heap a short distance away.

Notes on Nesting Habits of Some of our Feathered Friends on Vancouver Island, B. C.

As a few notes on the above mentioned subject, may interest the readers of your very interesting magazine, I begin with Parkman's Wren, which was noticed today, July 2, 1896, as having taken possession of the lately vacated nest of a Downy Woodpecker. This nest was discovered a few weeks ago when the Downy Woodpecker was busy feeding her young ones, and today the wrens were feeding theirs, so a very short period must have elapsed

when the second tenant came in.

I have known this wren to build in several strange places, viz: in an old accordian case, and also, in an old carpet sack, both thrown on a picket fence, also in a small model of an indian house, the interior of which about a foot square was nearly filled with twigs, etc. and in the branches of an old ivy plant, the nest in this case being built of twigs (as is usual) six or seven inches long with interior of finer material.

On several occasions I have found the nests of blue grouse with eggs of the California partridge or quail, also those of the English pheasant.

The last one I found was not disturbed and when the hen left with her family I found that she had hatched all her eggs, five, and also two pheasants, showing that they take about the same time to incubate. I am certain the grouse did the sitting as I often saw her on the nest and never off it.

Some years ago I saw an article in the *Oologist* stating that our western robin built only in apple and young fir trees. Such is not the case on this island, as they build in forest and orchard trees of all sizes and ages. I have even found it nesting on a beam in an open shed in a farm yard where people were passing to and fro all day. On one occasion I found it on a large fir and the bird had made use of two or three yards of string and part of a local daily paper. There is a peculiarity, about their eggs also. Sometimes we find them of a dark blue green and never more than three in a nest, average size 1.37x.31, and at other times three, four or five eggs of pale green not so pointed at one end, average size 1.25x.37. I believe the egg of the eastern bird is smaller.

I have never noticed much variation in robin's eggs in size when of one shade or the other. The darker ones are always the larger and never in my experience has a nest contained eggs of both sorts. Do eastern eggs vary in size and coloring in this way? I would be much obliged if some one through the MUSEUM would answer my questions.

J. W. T.,
British Columbia.

A Few Hints Upon the Marking of Eggs.

It has long been to me a surprising fact why *all* wide-awake oologists do not "catch on" and use for the marking, or rather the *re*-marking of their specimens, instead of the pencil, India ink. It is the desire of every *live* oologist, or at least, it should be, to mark his specimens in an intelligible manner; so that he can readily perceive at a glance, the number, set mark and date; so that after the wear of years, he can open his cabinet drawer, examine his "sets" or "singles," and yet find the markings thereon *nearly* as clear, distinct and perceptible as when first applied. This is a feat, substantiated by experience —the best of all teachers—that *cannot* be accomplished with a pencil, that is if the eggs are constantly handled, and such is invariably the case with the studious oologist.

The markings of the pencil, when subjected to handling will *blur*, moreover they will gradually fade under the influence of time While taking measurements of eggs, very often the markings are touched, and if of the pencil, will be very likely to be obsured *unconsciously*, thus oftentimes accounting for the disagreeable confusion of sets. There is but one alternative: mark your eggs with Indiaink. Up-

on eggs with immaculate shells such as those of the Columbidæ, Bubonidæ, Alcidinidæ, and especially the Picidæ, this ink has a most pleasing effect, as it forms a jet black gloss contrasted with the white ground color (?). Of course it requires patience and exactness to apply it properly, but the oologist without these qualities is a poor one indeed. In the field the use of the ink is impracticable, but when we reach "headquarters," where we have more convenience and more time to devote to our specimens, the temporary markings of the pencil can be easily washed off, and the ink substituted, or still better, during the winter, when the work of the oologist is comparatively limited would be a more appropriate season to devote to this work. I have found India ink to be more *durable*, equally as stainless and more *apparent* than the markings of the pencil; furthermore the markings of this ink are as *readily*, if not more readily washable than those of the pencil.

I trust the day will ultimately arrive when all live oologists will learn to appreciate the great superiority of this ink above the pencil. The greatest egg collection in the U. S. today—the the U. S. National Museum collection —has adopted this method, and why not follow its good example?

JOHN W. DANIEL, JR.,
Lynchburg, Va.

Is This a Common Occurrence?

Upon two occasions I have been an eye-witness to the death of a common Crow by a Hawk. The first time was about noon in the spring of the year. I was sitting on the front veranda of my dwelling when I heard the sounds of Crows after a Hawk. Upon looking up I saw the Hawk light very low in the branch of a scrubby tree distant about eighty yards. The Crows to the number of twelve or fifteen, were very noisy and unusually demonstrative. This continued for a few minutes, when suddenly the Hawk darted to the ground catching a crow either in the descent or upon the ground, and as suddenly flying off through the woods, followed by all except one, left fluttering upon the ground. I quickly walked to the spot, and found the Crow almost dead. An examination showed some wounds upon the body and on the neck near the head.

The second time I was riding horse back along the public highway, when I heard the unmistakable sounds of a lot of Crows after a Hawk. While looking at them the Crows darted and cawed, the Hawk swerving and trying to escape. The Hawk made a quick downward dart, caught a Crow in its taloons and carried it perhaps sixty yards directly across the road in front of me, and letting it go, when perhaps 200 feet high. The Crow made an attempted flight, falling obliquely about seventy-five yards distant. I dismounted and hastily tied my horse to the fence. On picking up the Crow it expired in my hands. I only found one hole in the head, apparently penetrating the brain—whether made by the talons or beak I can not say. I have not read extensively of Ornithological literature, but have never seen anything similar in print.

Is this a common or rare occurrence? The Hawk is known by the common name, "Squirrel Hawk," being the largest species in this section. Is it *Buteo latissimus?* M. CRABB.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Pub'r
Albion, N. Y.

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The Canons of Southern France.

The great canons of America are so well known that the very name canon has now an American flavour about it and people are apt to forget that it is a Spanish word applicable to many valleys in Spain and in Southern France, says *Natural Science*. Indeed, some remarkable examples occur in a part of France which it is now by no means difficult to reach, though it is only within the present century that Frenchmen themselves have become aware of the marvels to be found in a corner of their own country; and it is only by the recent extension of the Ligne du Midi, and by the conversion of ancient tracks into good roadways, that the "causses" and canons of Lozere have been made accessible to the ordinary traveler.

Bounded on the north by the granite hills of central France, on the east by the range of the Cevennes, and rising high above the lowlands that border the Gulf of Lyons, are the "causses" of Lot and Lozere; high-lying plains or plateaux, consisting of thick Jurassic limestones disposed in nearly horizontal beds, and resting on clays and marls of Triassic age, from beneath which, to the north and east, emerge the gneiss and granite of the Central Highlands. Southwestwards, the causses descend in a series of broad steps toward the valley of the Garonne.

All the water which falls on the surface of the limestones is absorbed by those rocks and sinks into the ground, finding its way by subterranean passages and caverns down to the level of the springs, which feed deep sunk rivers of the country. The causses themselves are dry, rocky, and barren plains, without soil and without trees. But Mr. Baring-Gould* tells us that before the Revolution they were covered with forests, and that the impoverishment or the entire limestone district is due to the ruthless denudation which followed on that event. The seigneurial forests were cut down, the soil was bared to the winter storms, and, no longer held together by roots of trees and shrubs, it was rapidly swept away and carried down into the depths of the valleys or into the swallow-holes, which gape like gigantic wells in the bare surface of the causses. "One hundred years has sufficed to sweep every particle of soil from the causses, which it took countless ages to accumulate, and land that once maintained a well-to-

* "The Deserts of Southern France." Methuen & Co., 1894.

do population is reduced to a desert."

"Swept by the cold winds of winter and parched by the heat of summer, only a Caussenard," says Reclus, "can love the causses, but every citizen of the world can admire the gorges of mighty depth that cleave it, and the precipices that form the walls of this gigantic acropolis. In decending by goat paths these bordering precipices, one is suddenly transported from parched wastes to pleasant pastures, from vast horizons, vague in outline and sad in tone, to smiling nooks of blended Heaven and earth . . . The startling contrasts between some of the canons and their causses from one of the most phenomenal beauties of beautiful France,"

But pleasant pastures are generally very small, and the smiling nooks are often perched on steep slopes or on a narrow ledge above the rushing river. One or two of these gorges are indeed wide enough to admit of river, and rails but most of them are in places so narrow that the river washes precipitous on each side.

It is these deep ravines or canons, with their vertical walls, rising sometimes in a single sheer, continuous cliff, sometimes in a series of steps, with mural scorps and faces, that are the distinctive feature of the causses country. The tableland is divided by them into a number of insolated masses, and it is impossible to pass from one causse to another without decending into the depths of the canon, and climbing again up the opposite cliff; there is no way round, for the river enters the canon between limestone walls, and completely traverses the limestone region.

The average depth of these chasms is from 1,300 to 1,500 feet, and their width at the bottom varies from 160 to 1,500 feet. Their rocky walls are carved by rain and frost into an infinite variety of buttresses and turrets, alcoves and recesses, which recall the fantastic conceptions of Gustave Dore. Still, there is nothing monotonous or sombre about the scenery of the canons, for though in places their precipitous sides close in till there is only just room for the river to pass, yet soon they widen out again and give space for fields and vineyards and orchards.

The finest canons is that of the Tarn. "The whole of its course," writes Mr. Baring-Gould, "from Ispagnac to Roziers, a distance of thirty miles, is one succession of marvels. At every turn comes a surprise. The forms of the rocks are not alone singular and beautiful, the colouring is rich as it is surprising. The dolomitic limestone, which rises in nakedness to the height of 600 feet and even 1,800 feet on each side of the water is tinged and splashed with colour. It is fawn or salmon colour, with patches of red ochre, here stained black, there it gleams white. Everywhere it is sprinkled with the green of the box of juniper clinging to the interstices. Overhead gleams down the azure sky and below flashes the foaming river"

Readers who wish for further particulars about this curious country will find excellent descriptions in the readable book by Mr. Baring-Gould; and so far as its physicial features are concerned, in E. A. Martel's marvellous-cheap and beautifully illustrated volume on the Cevennes.* My present

* Les "Cevennes," par E. A. Martel. Paris, 5th edition, 1894.

intention is to discuss a point on which both these writers seem to be behind the knowledge of the day—namely, the manner in which these wonderful ravines have been formed.

Mr. Martel argues, and Mr. Gould takes it for granted, that the canons were originally subterranean water-courses, and that the caverns formed by these underground waters became open valleys by the falling of their roofs. This idea has commended itself to other travelers, and is even shared by some who have a considerable knowledge of geological causes. It is a possible explanation, and looking to the canons alone, without considering the valleys beyond and below them, it might seem a reasonable way of accounting for their existence; but it is not the way in which the other gorges and canons have been formed, and there is no reason that I can learn why these should have been formed in so exceptional a manner.

A few decades ago it was generally supposed that such deep ravines were simply cracks in the earth's crust, and travellers described them as resulting from some "great convulsion of nature," laying stress on the fact that every concavity on one side was opposed by a convexity or promontory on the other, and taking it for granted that the two walls had originally fitted into one another and had simply gaped apart. Now we believe that a river is not there because of the valley, but the valley is there because of the river, which gradually cut and carved its way through the solid land, and has thus led to the formation of the valley.

Let us grant, therefore, that running water has made the canons of Lozere; but did the water begin its work below, or did it cut its way down from the surface? That is the question at issue. Limestone formations are always full of fissures, caves, and caverns, which have evidently been occupied and enlarged by subterranean streams. If the roof of such a cavern fell in, would it not present the features of a canon? It is quite possible that it would, in many respects; but it is exceedingly unlikely that the roof of a deep-seated cavern should fall in completely for any great distance.

(TO BE CONTINUED.)

Visions of tae Past.

(CONCLUSION.)

One hundred and fifty years have passed. We feel like strangers as we wander over the country—so changed. We see no guiding landmarks to aid us in finding the places once so familiar to our footsteps.

The hills, valley and streams are unfamiliar. The forest has fallen—the keen axe has laid it low, and fire and time—long ago—destroyed every vestige of the stumps. Peaceful fields and pastures extend as far as the eye can reach, only broken here and there by narrow strips of wood and brush along, and in some inaccessible rough or rocky gulch.

No longer we hear the music of splashing brooks, their beds are dry; and even the once deep-flowing river is shrunken to the center of its channel.

The inventions of the fertile brain of the white man—the steam cars—are continually moving up and down each side of the winding river with lightning speed, carrying safely each

day, thousands of souls and tons of freight. The waters of the artificial canal, like a great river, glimmer in the sun, and help in making the Mohawk valley the greatest thoroughfare of the whole world. Lines of telegraph and telephone wires are stretched through the valley, connecting one end of the country with the other.

We hear the rattle of the mowing machine and reaper, and the hum of the steam thrasher. Busy villages, towns and cities are standing where formerly stood the rude huts of the Redman.

Before the white man's march savage nature in man and forest have departed; the sound of the war-whoop has given place to the shout of the farmer; the laughing waters are made to turn the busy mills, and the Indian's trail is trod by the wheel of the untiring locomotive, which goes screeching and thundering through the valley. So the ravages of the axe, plow and time have nearly obliterated every trace to prove that this was the domain of the once proud and powerful Mohawk.

As they had no written language, poetry or music, history soon becomes lost. They have passed away from among us, scarcely leaving upon the land any memento of their greatness. Were it not for the occasional finding of their flint and other stone implements, there would scarcely be left a trace of their ever having existed.

We shudder as we look upon it, and can scarcely realize so vast a change. It is the law of God. The world must be occupied and subdued, and civilized man must occupy and subdue it.

Yet writers complain that "we have no antiquity, no mystery, no dim lights and deep shadows, where the imagination of the story teller may flower and bear fruit.'" It does not take the romantic dreams of the poet to picture in imagination the American Indian, his glades and groves, like the fauns and satyrs and sylvan dieties of antiquity.

But should we venture upon the dark story of their wrongs, tell how they were invaded, corrupted and despoiled, driven from their native abodes and graves of their fathers; hunted like wild beasts about the earth to the grave—posterity will either turn with horror and incredulity from the tale, or blush with indignation at the inhumanity of their forefathers.

They left no monuments behind them like the Mound Builders, whose works are scattered all over the central part of our country—high interrogation points of deep significance though they are—and subjects for sharp speculation.

* * * * * *

The visions of the Mohawk's eventful history are sad ones. We have but a few leaves torn from the great book of human fate; they flutter from us on the winds of time—growing fainter and fainter, and finally fade away like the closing day into the deeper shadows of night.

ROBT. M. HARTLEY,
Amsterdam, N. Y.

A Useful Weed.

Growing by the dusty roadside of any northern state, may be seen the common Chicory (*Cichorium Intybus L.*), a near relative of the Garden Endive or Succory. This plant though contemptuously dubbed a weed on ac-

count of its too evident inclination to appropriate the land of the farmer, is, nevertheless, very handsome, and produces its bright, opaque blue flowers in great profusion, affording a pleasing contrast to the Golden-rod which bears it company. The unbotanical may recognize Chicory by its strap-shaped corolla, beautifully notched at the apex and by its color, which once seen will always be remembered, for it is probably not matched exactly by any other plant.

This is one of the plants, which not indigenous in America, have come as tramps and made themselves at home with a freedom that is not always pleasing to the agriculturist; but it is not always to be regarded as a weed, for its cultivation is found profitable and promises to form a quite important element in the agriculture of some sections in the near future. The long top root is the part employed and has proved to be the best article for adulterating coffee which has been introduced. Immense quantities of the plant are raised annually in Yorkshire, England, but the climate of California has been found so well adapted to its cultivation that it is not improbable that it will form a leading industry within a few years.

The crop is harvested in late autumn, the roots washed and dried and the tops saved for fodder. When thoroughly dry, the roots are chopped fine and roasted, after which they are either powdered or granulated and mixed with coffee. The deleterious effects of Chicory on the system are greatly exaggerated and the general opinion of physicians seems to be now that it is less harmful than coffee and when mixed with the latter counteracts its evil effects.

One would expect that the greed of man would be satisfied when he had succeeded in adulterating coffee, but he must needs go one step further and adulterate the adulterant. Chicory is cheap but there are other substances that are cheaper and Yankee ingenuity has been called into account to find them. Following is a list of the most common substitutes for Chicory, and it is not to be doubted that some of them are less innocent in their effects than the real article: roasted beans, peas, wheat, rye, barley, acorns, parsnips, turnips, carrots, horse chestnuts and such other appetizing things as castaway biscuits, exhausted tar, logwood, oak-bark powder, mahogany dust and the livers obtainable from slaughter houses.

Aside from its drinking qualities, Chicory is very useful for forage, particularly in dry, sandy regions, for it is capable of withstanding considerable drought. Cattle relish it and in France the human as well as the bovine race esteems it and the leaves are extensively used for salads, while the roots are palatable when treated like salsify.

The flowers of Chicory are always turned towards the sun and in allusion to the fact the plant has the German name of Sonnenwendel. It was formerly believed to possess wonderful medical properties. In Lonicer's "Krauterbuch," published in 1768, we find it was esteemed of wonderful value in the cure of gout and all stomach, liver and heart troubles.

The Germans have a tradition to explain the origin of Chicory, which states that a beautiful, blue-eyed

maiden made an appointment to meet her lover at a certain spot in the country road. At the appointed hour she was there, but the faithless lover did not arrive and she waited from day to day in expectation of his appearance. But he never came and she finally died there; then Chicory sprang up and bloomed where she had fallen—an emblem of faithfulness, perhaps. X.

Nassau's Phosphorescent Lake.

Having in remembrance old Sampson Stamp, of Key West, the discoverer of the sea gardens at Nassau, we took a pilot and sailboat the following morning and sailed some four miles up the channel. There we embarked in a rowboat with a glass bottom, made by inserting therein plates of thick glass, through which the bottom of the sea spread out before us like dry land. A strange feeling crept over me and in imagination I fancied myself with Jules Verne on the voyage of Twenty Thousand Leagues Under the Sea. We could see all the little fishes, minnows one inch long and larger kinds one foot, two feet and three feet in length, some white and black and blue, besides many angel fish, all yellow like a canary, with bright blue fins and tail, swam by beneath us. As the ripe wheat fields in summer sway to the breeze, so there in the submarine currents waved great bunches of fan leaf coral, purple, yellow and white. The water was clear as air, and, pointing to some especially beautiful specimens of rock and fans, our little darkey dived over, and, like the fish, we could see him swimming down until at last, clutching the growth with two hands and feet firmly braced against the coral, he gave a tug and away he came to the top, fan in hand. Indeed, God hath wrought marvelous things in this world of His, but nothing of greater bewitching fancy than the sea gardens of Nassau.

When night came and before the moon was up a drive of two miles back on New Providence Island brought us to a most interesting work of nature. A lake some 1,000 feet long and 300 feet wide lay quiet and black as any other sheet of water at night might do. But once in a rowboat and shoved off from shore what a mighty change was wrought! Two small out-swimmers, the hue of the surrounding darkness, accompanied our boat of fire, for such it seemed. Like two human torches our darkies swam by our side as in a cloud of phosphorescent fire. At the slightest disturbance the whole surrounding water lit up like molten silver. Each boy's toes and fingers were as though the sun shone on them, and fish darted through the quiet water like skyrockets, leaving a glittering trail behind. The light was so vivid I could see the time by my watch, and when a wave was sent upward with the oar the falling drops were like blue tinted pearls. The movements of our boat made enough light to plainly show the bottom, for the water is from the ocean and as clear as all that which nature makes to flow about those lovely Bahamas. Enticed by the water's warmth and the hot night my friend and I went in swimming, but only for a few minutes. From this swim comes a story hard to believe, but as true as Gospel. That night, as was my custom before turning in, I went to the bathroom, which I could easily darken, to change some photo plates in my holders. When about to pull the slides I noticed the phosphorescence, which I had brought from the lake, shining from my bare feet and giving so much white light I had to cover them with a towel before I dared expose the plates to what a moment before had been intense darkness—*Forest and Stream.*

Leading Natural Science Articles of the Month Among our Exchanges.

The Mineral Collector, New York, Aug., '96. 1. Concerning Quartz. 2. A General Description of Cumberland County. 3. On the History of Claystones. 4. Pumice Stone. 5. On the Formation of Hematite on Staten Island, N. Y. 6. Hints on Testing Minerals. 7. Ode to Lake Superior Minerals. 8. Small Pyrite Crystals. 9. How Gems Change Color.

Natural Science, London; August, '96. 1. Notes and Comments. 2. Joseph Prestwick. 3. On English Amber and Amber Generally. 4. Two Views on Museums Generally. The Skeleton in the Museum and the Museum of the Future. 5. Sporozoa. 6. Lyell and Lamarckism, A Rejoinder. 7. Some New Books, Correspondence, &c.

The Microscope, Washington; July, '96. 1. Truth About Microbes. 2. Geological Distribution of the Faramenifera. 3. Note on an Optical Rule. 4. Editorial, Practical Suggestion and Science Gossip.

Popular Science, New York; August, '96. 1. Compound Animals. 2. A Plea for Forests. 3. Crabs. 4. Is the Pumpkin American. 5. Microscopical Organisms in Drinking Water. 6. Birds of Alaska 7. Putrefaction and Disinfection. 8. Archæology and Anthropology on the Old Continent. 9. Ancient Mohican Interments. 10. Correspondence, Notes, Inquiries, Recent inventions.

Meehan's Monthly, Philadelphia; August, '96. 1. Hypericum Kalmianum. 2. Wild Flowers and Nature, Notes. 3. Forestry. Notes. 4. General Gardening, Notes. 5. New and Rare Plants. 6. Biography and Literature.

The Nidiologist, California; June-July, '96. 1 Nidification of the White-necked Raven. 2. Orinthology in Norway. 3. Song Flight of the Prairie Horned Lark. 4. The Red-breasted Nuthatch. 5. Bird Notes from Montgomery Co., Pa. 6. Yellow-headed Blackbird in Wisconsin. 7. Wood Thrush. 8. The Florida Red-shouldered Hawk. 9. The American Bittern. 10. Raptorism Maryland. 11. The Hawk Diary. 12. Nesting of the Nashville Warbler. 13. The Photo Fiend. 14. Cahto Birds. 15. The Coloration of Eggs. 16. The Oven Bird. 17. Notes.

The Oologist, New York. No numbers published recently to our knowledge.

The Naturalist, England; August, '96. 1. Bibliography, Lepidoptera, 1892. 2. Natural Histoy Notes from Whitby. 3. Masses of South Lincolnshire. 4. A Critical Catalogue of Lincolnshire plants. 5. Gossip on Natural History. 6. Notes, Fungi. 7. Notes, Ornithology. 8. Notes, Hemiptera. 9. Notes, Geology and Botany.

The Oregon Naturalist, Oregon; July, '96. 1. A Birth and a Tragedy. 2. Amethyst. 3. Sea Urchins. 4. Flamingoes Seen Here. 5. Mexican Hieroglyphs. 6. Kadiak Island. 7. The Imported and Acclimated German Song Birds in Oregon. 8. Habits of the Chipping Sparrow.

Scientific American; July 18, '96. 1. The International Geological Congress at St. Petersburgh, Aug., '97. 2 Tattooing by the Maori Race. 3 Cave Exploration in the Eastern United States. 4. Excavations at Corinth. 5. A Living Fossil. 6. The Matabeles and Mashonas Aug. 1, '96. 1. Nest Building Fishes. 2. Recent Archælological News. Aug. 8, '96. 1. A Baby Kangaroo at the Zoological Gardens, London.

The Kansas University Quarterly, Lawrence; July, '96. 1. Projective Groups of Perspective Collineations in the Plane, Treated Synthetically. 2. Hoplophoneus Occidentalis. 3. One of of the Dermal Coverings of Hesperornis. 4. The Duty of the Scholar in Politics.

VOL. II. NO. 11.

SEPTEMBER 1896

THE MUSEUM

A Journal Devoted to Research in

Natural Science

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., SEPTEMBER 15, 1896. No. 11

Notes from the Mohawk's Country.

P. M. VAN EPPS.

(IX.)

TOU-AR-E-U-NA.

Dr. C. C. Abbott in his valuable work Primitive Industry speaks of a neighborhood in Salem Co., New Jersey, noted for the extraordinary number and beauty of the implements that have been left there by the aborigines. The same remarks could very justly be applied to a tract of hilly country lying a few miles west from Schenectady on the north side of the Mohawk. This slaty torrent-gullied upland, the ancient Touareuna of the Mohawks, must certainly have been a most choice hunting ground for the red-man a remarkable nnmber of extra large and choice arrow and spear-heads having been brought under my notice from the surface finds on the cultivated lauds of the region.

Now as the number of relics that have escaped attention is probably very great; many having been found in former years to be afterwards scattered and again lost, while doubtless very many more are yet concealed in the soil as large portions of the surface are still wooded, so it is evident that the proportion of implements known, to those scattered and yet hidden in this region, is likely very small.

Like elsewhere in this valley, so in this region the larger part of the relics found by the farmers are picked up in the spring months while cultivating and working over the fields plowed during a preceding fall. The snows of winter and the spring rains leaving all the stones and pebbles on the surface clean and free from dirt. Under such conditions any relics present are easily noticed. An even dozen of flint points procured this season from a small area of this tract presents examples ranging in length from $4\frac{3}{8}$ inches down to $1\frac{3}{8}$ inches. In shape this lot shows many types from the acutely pointed dagger shaped arrow-head to the triangular and oval forms with both notched and unnotched bases. A table of measurements of the lot is appended.

I should consider all of these chipped points as arrow-heads excepting the three first in the list which were probably used as spear-heads, although number two, notwithstanding its length ($3\frac{3}{4}$ inches) would have been none too heavy to be used as an arrow-head for striking game at short range weighing as it does but a trifle over an ounce.

I am well aware that some would not agree with me in this matter. Mr. Fowke in his paper Stone Art in the 13th Annual of the Bureau of American Ethnology, says:

"The largest stone arrow-point in the extensive collection of arrows in the Mohawk Museum measures two and five-eighths inches in length and is narrow and thin. An arrowpoint two inches in length is seldom seen."

NO	LENGTH IN INCHES.	GR'TEST B'DTH IN INCHES.	
1	4 3/8	1 5/8	Heavy implement with stout tang.
2	3 3/4	1 3/8	Dagger shaped, straight base.
3	3 3/4	1 3-16	Lanceolate, concave base. Quartzite.
4	3	27-32	Long slender point, dagger shaped base.
5	2 5/8	1	Oval outline, notched.
6	2 1/2	1 1/4	Obtusely pointed oval, outline, notched.
7	2 3/8	1 1/4	Obtusely pointed, notched.
8	2 1-16	1 1-16	Incurving edges, notched, straight base.
9	2 1-16	1 1/8*	Ordinary leaf-shaped but with very prominent shoulders.
10	1 3/4	7/8	Triangular with concave base, notched.
11	1 3/4	1 1/8	Triangular with concave base, unnotched.
12	1 3/8	3/4	Triangular outline with notched base.

*Approximate, implement being broken.

Probably many of the long and slender points which are so often found in this part of New York State and of which so many beautiful examples can be seen in private collections, were used as arrow-heads and for that purpose only.

Long, thin and slender, often from three to four inches in length, too slender and fragile to be used as knives, spear-heads or scrapers and with perfect points often of needle like sharpness showing no evidences of having been used as perforators these objects were certainly fashioned for arrow-heads.

With the long and powerful bow in use among the Five Nations, to effectively discharge an arrow tipped with a slender flint-head of from two to four inches in length would be an easy matter. Morgan tells us:

"The Indian bow is usually from three and a half to four and a half feet in length, and so difficult to spring, that an inexperienced person could scarcely bend it sufficiently to set the string. To draw the string back an arrow's length when set, could only be done by practice, superadded to the most powerful muscular strength. An arrow thus sent would strike its object with fearful velocity."

Touareuna! Mr. J. N. B. Hewitt informs me that the meaning of the term is; "Where we dwell together" and as the name was given by the Mohawks not only to the region under discussion but as well to the hill lying directly opposite on the sonth side of the river in the present town of Rotterdsm, so it is entirely possible that the appellation has direct reference to the juxtaposition of these two prominent landmarks which stand like sentinels at the ending of the hilly portion of the Mohawk valley, for below to the meeting with the Hudson are no summits of any considerable heighth.

From the northern Touareuna a grand outlook can be had in every direction except to a small section of the horizon to the southwest where the more distinct view is cut off by the fellow summit in Rotterdam which is a trifle higher. To the south the rugged Helderburg plateau, whose Siluvian and Devonian ledges conceal so many underground wonders, lies directly before us while above and far beyond tower the dim blue peaks of the Cat-

skills. To the west the low heights along the Mohawk are visible for miles, and to the northwest we have the Mayfield Mountains in Fulton and Hamilton Counties. Northward we look directly ot the Kayaderosseras Range and Mount McGregor while over and beyond lies a jumble of black forested peaks almost countless in number. These immense masses of hypersthene the oldest known rock-strata of the globe, form the south-eastern part of the Adirondack wilderness. But to the east the most magnificent view is had. Far out over the Saratoga Plains are seen the historic heights on the west bank of the Hudson,—the Saratoga battle-field where Burgoyne and his Hessian hirelings met their fate, while next in order across the Hudson rise the Washington County range of hills with the rounded dome of Willard's Mountain as its principal elevation while far beyond as a background against the sky stand the serrated summits of the mountain ranges of Vermont and Massachusetts. These are plainly visible in an actual extent from north to south of over one hundred miles; an apparently continuous mountain range whose peaks fade from sight in the dim distance both to the north and south. Dropping the eye again from the Vermont elevations to the Saratoga Plains we will see—if our point of view be judiciously chosen—Saratoga Lake with its waters showing blue between shores which from this distance appear continuously wooded. From our outlook the distance in an air-line across the plain to the lake is about seventeen miles. Is it not possible that the Mohawks may have resorted to certain favorable points on this uplift to signal, by means of fires, to their brethren at the fishing resorts on the lake where the Mohawks annually went?

It would have been entirely practicable and I have in mind a certain spot on the northern crown of the hill which would have been an ideal situation for this purpose, the ground here falling nbruptly away to the north, and curiously, right here on the very verge of the hill an unusual number of flint implements have been picked up; also spalls and chippings of flint, and an odd find of flint chips. A number of polished celts and other implements of stone have been found on different portions of Touareuna.

Whether stone implements have been found on the twin summit to the south of the Mohawk I am unable to say.

Glenville, N. Y., 1st Sep., 1896.

Science Gleanings.

The last article gave a few points, briefly, in regard to rank in the animal creation. But rank is a basis of classification which will be the theme of this paper.

Classification in science is intended to be an aid to memory. By association, some characters common to a number of objects, are brought to be reviewed by one effort of the mind, and the result to the memory is much like the increased strength of the bound bundle of rods in our hand. The historical facts the very name itself is designed to carry with it, if the classification is correct, adds its power to the value of the association. Whether a whale is to be classed as a mammal or a fish would seem to be a matter of not much importance to mankind; and if scientists had been

agreed to class it as a fish, instead of a mammal, what would the world have been the worse off for such an agreement? About the most that could be said would be, here is a term generally agreed on, which, by the use of language, means a creature that brings forth its young alive and for some time suckles it; and as we know whales do this and fish do not, it had been improperly left out of its right place in classifying. But it may yet be found that other animals that pass current as fish do the same and may for the same reason have to submit to a like removal.

Thus, it seems perfect and complete classification in science can only result from a perfect and complete knowledge of nature, and this will never be attainable. This ought not to destroy or even very greatly lessen our estimation of the value and importance to the world of the labor of those who zealously are aiming to map off nature as correctly as the geographer is striving to show the correct location of places and the features of all parts of the earth's surface on his map. Many places must of necessity be excluded and some not precisely located as to their relative position with other objects and places, yet the traveler and mariner can confidently go forward with his map and chart in hand, with an abiding confidence of a safe arrival at the destined spot.

Classification is as old as the race. Every beast of the field, and every fowl of the air was brought unto Adam "To see what he would call them; and whatsoever Adam called every living creature, that was the name thereof." (Gen. II:19.) No doubt he was divinly assisted in giving names corresponding to their appearance and habits, though these may have been partly or wholly unknown to him, as we infer from his naming Eve. No doubt the classification was satisfactory to himself and met with no objectors or adverse criticism, and such a one would pass current in any age of the world. From that to the present day it has been continually undergoing change.

There must in very early ages have been some things noticed in common to groups of living things, while individuals in these groups may have differed in many other particulars. No doubt external resemblance in form, voice, gait and habits would be most readily noticed by the unlearned, and would furnish a basis for grouping together and for separation; for both separation, which implies a difference from another, and grouping together, which implies uniformity with others, must enter into the idea of scientific classification.

Structural characters would be noticed by those who did not give it deeper study. The straight bill, flat back and stiff tail of the woodpecker tribe, among birds; the flat, long snout and slender, nearly cylindrical body of the pickerel tribe, among fish; the bark and howl of the whole dog, wolf and fox tribe; the miau of the whole cat, lion, tiger and panther tribe; the neigh of the whole horse, donkey and ass tribe; the low of the whole cow, buffalo and musk ox tribe; the web foot, quack and waddling gait of the goose and duck tribe; the cawing of the crow tribe; the hooked beak and talons and soaring of the whole tribe of birds of prey; would be common traits and peculiarities not apt to go

unnoticed, even by crude and unobserving people.

The forms of plant growth that affect the physiognomy of the earth, by impressing a peculiar aspect upon the landscape, are not many and they are peculiarly striking; so as, in some measure to dominate and rule out of the mind other forms less impressive. Humboldt has included them in sixteen forms. Among the most striking of these, is the palm form, with their lofty, slender ringed and sometimes prickly stems, terminating in shining, fan-like or pinnated foliage, inhabiting the tropics; the cactus form, with their leafless, leathery, flattened spherical or polygonal stems, flourishing in the sandy waste only of the New World; the casurina form, including the pines and cypresses, with their leafless or economized needle-like leaves, most at home in northern latitudes; the gramineæ form, giving an expression of cheerful and airy grace and lightness by their long, narrow, alternate leaves and tall, smooth, bending stem and social habits, partial to the north temperate zone, but to a great extent the companion and support of man everywhere; the willow form, with its sameness of foliage, in all parts and the most varied climates and ages of the world, from the creteceous or chalk age to the present time.

A classification of all plants into herbs, shrubs and trees was the only one in vogue originally, and in fact has never been entirely given up in our common talk and literature. But it was not until science begun to develop, through a desire to know more of nature; to understand better the silent, secret working that is constantly going on everywhere, to produce and vary the world of life about us; and to grapple those unseen laws that regulate and control by a mysterious power every part of nature, that a strict classification in the sciences began.

When such a desire seized mens' hearts there was not wanting means to aid its accomplishment. And chief among these was the binomial nomenclature or system of naming first advanced by Linnaeus, by which all animals and plants receive a double name; the first intending to tell the genus, and the last the specie of the object named; thus corresponding with the names of persons, who have a family or surname and a christian or given name, only with the order reversed, as we often see it in alphabetical lists of names: the family name being the generic, and the christian name the specific equivalent in science.

This system has been a vast advantage and its application has been extended not only to recent but also to fossil animals and plants as well. And even in the case of the Mollusca it is made to apply in naming the shell in common with its animal. Thus a wide range of the natural sciences—Zoology, Botany, Palaeontology, Conchology and lately Chemistry, have been placed on a uniform basis of systematic naming. It has never been extended to Mineralogy but it has every right, and in the interests of science ought to be extended to it and Petrology also.

The classical terms used in naming ought to express the peculiar characteristic of the species and genus in hand and it may sometimes do this by a classical name indicative of its color or form or habit if these are entirely characteristic—or by giving it the

name of the locality or country where it is found, or the name of the person who has discovered or described it. This may apply to either genus or species name, only remembering that the genus name ought to be a noun, while the species name is more generally an adjective or often a noun used adjectively and the same genus and species name may not be repeated in the same branch of science, but properly enough in a different branch. Classification does not stop with giving each object a genus and species name Genera have been grouped together into families, families into orders, orders into classes, classes into branches or sub-kingdoms, and ffnally an undivided kingdom; and under classes and orders are sometimes placed sub-classes and sub-orders. As we ascend in species the peculiarities in common keep dropping out, but those that remain and hold good in common for the larger groups are more contrasting. In other words the further we proceed in gronping, the more uniformity in the individuals making up the group; for it leaves the structural parts and descends into characters capable of change by accidental circumstances, until when such change ceases to be capable of uniformity, invariable and permanent continuance by propogation or pass the verge of species into the realm of mere variety.

Naturalists do not agree entirely in their systems of classification and perhaps never will. But this fact ought not to discourage us. Good and correct grammar in any language, is that use of it, in accordance with its usage by the best speakers and writers of the language; and correct classification is that set forth above according to the views of the best living naturalists. There may be different objects in arrangement. If we undertake to arrange a library we may do it in several ways. We may arrange the volumes on the shelves in respect to size or style of binding or we may place the volumes of history on one shelf, biography on another, and poetry or fiction on another. There may be some old manuscript volumes with the stain of years upon them that we removed to a particular shelf. The books might be arranged according to the price paid for them or as to the time at which they came into our possession. If two persons were to set about the work and attempt to combine and illustrate all these ideas in the arrangement of the books it is not likely they would entirely agree. Here might be a volume in Hebrew poetry, which one would thoroughly understand but the other not as well, so that he would hardly know whether rightly to place it on the poetical or historical or biographical shelf.

It is felt specific differences are the hardest to deal with. Species is the giant that every day goes forth to defy the scientific camp. What is a species and how has it originated are questions that have yielded more scientific literature and criticism in the past fifty years than any other subject in science; and yet these questions remain undecided. It is not possible for any species to consist of a single individual, unless it is on the very verge of extinction.

In the higher animals and plants every individual implies the previous existence of a pair of ancestors and can be continued no further without at least a pair of progeny. All individ-

uals so nearly alike in character that they may be supposed to have descended from a pair having like character with themselves and capable of perpetuating their kind, is perhaps the usual idea of what constitutes a species. And this seems to rest upon the two notions of resemblance and heredity. Both these notions, however, are true only within certain limits. The amount or kind of resemblance that rightly constitutes individuals into a species is not a fixed, precise or measurable quantity. Any difference, however small, between two individuals, provided the difference is constant and continuously reappears in the offspring will make the two individuals of different species. Because the insensibly graded links in the chain of certainty, if there be such links at all, are not constant within assignable limits, and the very application of the terms inconstant and variable makes them varieties. Specific differences must exist apart from, and without any influence exerted by, man's aid or care. While by selection and care we may make almost any variety of plant transmissible by seed and cause it to become a strongly marked variety—a race—yet races cannot be said to exist independently of man; and he really does not produce them. Such peculiarities occasionally originate from unknown causes and are preserved and more fully developed by the cultivation and skill of man; and without this dwindle and perish, or resort to the original form of the species. (Gray.)

The Harp shells, usually reckoned as consisting of twelve species, are by some good naturalists considered as only one; although the difference is considerable in resemblance. It is hard to find two shells of Columbella fulgurans, or of Nerita peleronta and many other species that pass as well-defined and undoubted species, that have the same color markings. The same is true of Purpura crispata, both in regard to color and external markings; and many others might be mentioned presenting as great or greater diversity.

We are therefore led to believe that in species there is room for variation within certain limits that are never over-stepped; and that the descendant is liable at any time to resort to the original type, and will do so sooner or later. In this there is great analogy to the revolutions of the heavenly bodies in their orbits. The planets are continually varying their position as they course around the sun, yet there is that powerful, controlling influence of gravitation, that brings them back again to their starting place. The comet may shoot off into space seemingly never to return, but the same law brings it back. May there not be an unknown law controlling the living world, that even in these forms, that like the comet, seem to be going off by variability from all ancestral relationship never to return, just as surely brings them back, as the comet was forced to return by the law of gravitation? As we know there is a great space between the planets of our system, and a still greater distance before the next system of worlds is reached, so there is an assignable and time space in kind between species, and a yet greater when we attempt to pass from one genus—which is only another name for a grouped system of species—to another.

Variation is most marked in domes-

tic animals. We can see a very good reason for this. They have been particularly designed for man's use and benefit; and they have accordingly been endowed with susceptibilities to reciprocate man's treatment as a rational being, fitting them in a good degree to go with him into every climate, and claim his protection for the service they render him. By his reason, and it is a shame to say by his avarice, often unguided by reason, he seeks to make the most of them. And yet man has never created a single species. Domestication cannot be appealed to as having produced a single species, nothing higher than varieties, which soon return to the original types when left to themselves. We do, however, regard it as a proof of the very highest kind in support of the origin of species by an intelligent Being working in nature and by inexplainable laws as man works with his domestic animals to produce his varieties; but working untrameled with infinite resources of knowledge and power at command, and so able to overstep varieties and carry the work into specific difference, and even much further if we see fit to claim it. Darwin was right in claiming varieties to be only incipient species, and the distinction to be only one of degree. But the transformation of variety into species is one which baffles our skill to effect, eludes our capacities to understand and thwarts our evidence conclusively to prove. We have no experience of our species being transmitted into another and we do not see it taking place before our eyes.

In the mineral kingdom there are nearly seventy fixed mineral species; and these have bid defiance to our power to change one into the other. It would seem the gulf is just as impassible between the vertebrate and invertebrate. At no stage of its development is the radiate animal like a mollusc; and so of all the five great types that constitute the whole animal world as advocated by Agassiz. Dana assures us since man appeared geology does not disclose a single new species of plant or animal. That would perhaps be very hard to prove. It certainly would not be derogatory to Scripture to think several may have appeared. Only negative proof can be advanced which may or may not be true. So far as the completion of creation is concerned it was a finished work with man s creation. Revelation was given only for his benefit. The fact of his being the object of it proves him to be the finished work, in the sense of being most exalted, with a moral nature that becoming debased made a revelation necessary, with dominion over all created things, either completed or contemplated, for with the Creator contemplation is actual execution of the plan. But no higher creation, so far as our earth is concerned, was ever to enter into the account, either in the contemplation or execution of the plan. Never will any creature henceforth appear on earth to be honored with a divine revelation or so unfortunate as to need one.

Man then stands as one species which will never so change as to pass beyond the pale of revelation; one to which we can point with certainty as never having originated from, or destined to pass into any other. It seems to be conclusively proved that since the human race has existed, and even during historical times of a rather re-

cent date, species have become extinct; and we can see some from our own observation, fast looking that way. This, to my mind, is one of the strongest arguments, though not a conclusive proof, that new species are from time to time being introduced.

For "Nature abhors a vacuum" in the mineral world also. Though no one can positively point to an instance as proof of this, we must remember it is much easier to trace the extinction of a species than to show the undoubted origin of one. Whoever has his eye fixed npon some object that is vanishing out of sight may see the last glimpse of it and be able to tell exactly when and where it disappeared. But how different is it to say some new object has appeared on the landscape while we are uncertain as to what point of the horizon to look for its advent or whether it may not have appeared at some point of the earth where proper observation has been wanting or while we slumbered—The tares so came among the wheat and yet by appointed means, and natural causes. (Matt. XIII:25.) If it be true, as indeed it is, that species do become extinct, if the earth is not replenished with new ones it only becomes a question of time how soon the earth will become entirely destitute of living things. This would depend upon the rate at which species are vanishing. But it would not require any infinite duration of time and it might go on with accumulated speed because of the intimate relation that exists through all the world of life. Some parasitic species must perish with their hosts and go down with them in the ruin; and some are so intimately dependent upon others for food that the destruction of one is the destruction of both, though one may not be parasitic in its habits. Upon the principle of commensalism, species might so affect each other that both wonld perish together.

If it be not true that new species are being introduced it would seem to be an unavoidable conclusion that the world has already entered upon a downward career that is leading to the extinctioff of life. But can that be believed when we see the recent living species of many genera exceed in numbers the same genus in all previous ages of the world combined, since the genus first begun?

GEO. M. CROFTS,
Keokuk, Iowa.

Porcelains and Ceramics.

BY LEE ROY J. TAPPAN.

Supremacy of mind over matter is best illustrated by that which the Japanese artisan has done toward exalting inanimate mother earth to the form and position of that which is suggestive, if not possessive, of an inert vitality. Few nationalities live nearer to nature's heart than the inhabitants of Japan. An almost intuitive instinct to reproduce life's glorious realities in tangible form is most remarkable in their porcelain and pottery creations, all of which are nothing more or less than a representation of this very life which they have always lived. The secret of an undimmed success in all undertakings is dependent in great measure upon one's seriousness of conception as to what the outcome should be.

The Japanese artisan could never dispense with his ideal of perfection, and it is perhaps this sympathetic and

one might say almost filial love for art, that has won such laurels for his efforts. In striving to attain that which alone proceeds from "art for art's sake," the Japanese have given us truly marvelous representations of what the human hand can do toward lending to mere clay the beauty of nature and the tones of the sky. Every article which they are instrumental in producing in porcelain and pottery is distinguished for a scientific exactness and an almost marvelous completeness —no crude or partially formed artistic conception is ever permitted to pass from their hands. The infinite variety of designs and shapes which this special branch of art assumes is remarkable, when its thoroughness and real beauty is considered.

As to the decoration of their wares if would seem that the Japanese have a positive aversion to repetition of designs, for rarely, if ever, is the same detail and method of execution pursued. This alone is strongly indicative of their freedom from a merely formal compliance with the demands of art and conventional patterns. No true artist will countenance routine—the Japanese certainly do not. The same skill that is exhibited in the formation of the object is shown in its surface ornamentation, floral subjects, figures, and not infrequently, reproductions of dieties constitute the greater part of the decorations used.

As to the wares of Japanese ceramics and porcelains—these are as varied and diversified as as their shapes, colorings and decorations. There are, of course, the finer and less common wares as well as the more ordinary specimens. Of the former may be mentioned the fine Satsuma, which is notable for its rare beauty and exquisite combinations of the lighter colorings. Many of Satsuma pieces are rendered remarkable by reason of a certain delicate tracery of gold, which in connection with its flower or figure design, creates a most pleasing effect. The craquele wares, so designated because of an actual and very apparent cracked surface effect, have long been regarded as extremely valuable. The process of securing this effect must have been more or less of a difficulty, attended by many losses, for good specimens are not common. The exposure of the heated object while yet in the oven to a sudden draft of chilled air is one way of giving the network appearance to porcelains not liable to shrink while baking—the natural shrinkage of some wares, however, often precludes the use of artificial means.

Other interesting and really remarkable productions in porcelains and potteries there are without number. Fine old curios and choice modern bits as well may safely mingle one with the other in the most "proper" drawing-room or interior. The one great feature of the Japanese porcelains and ceramics which commends itself to every lover of Oriental art is their comparative inexpensiveness.

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Newark Valley, Tioga Co., N. Y.,

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Walter F. Webb, Editor and Manager

Albion, N. Y.

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A Carrion Route.

Doubtless the above title sounds queer, but as will be seen it applies in every way to the subject to be treated.

Early in May a friend, whom we will call H., and myself conceived the idea of establishing what we called a carrion route in order that we might fill vacancies in several families in our insect cabinets.

Any Coleopterist who has collected around carrion at all knows the abundance of beetles to be found there at the right season of the year. Having observed this fact from occasional visits to deceased dogs and cats H. and myself procured two canines and one cat, the only ones to be found.

Another idea furnished more bait. We took several baking powder cans and punched small holes through the bottoms so that they would not hold water; then cut in the cover a circular hole, an inch or more in diameter. The covers we painted black and before the paint was dry sprinkled on dirt so as to give them a dirt appearance.

Here then was a real beetle trap for when these cans were baited and buried in the ground level with the surface, the beetles, attracted by the smell of the bait, dropped in but were unable to drop out. Nor could they crawl out for most of the carrion beetles are rather clumsy walkers and but few of them would be able to fly out. These cans were baited with bird meat. This was the easiest to procure, since I at this season of the year (spring) had many skinned bodies from my work in Taxidermy. The beetles seemed very fond of this fare, which I consider the very best bait for them. The bait should be changed at least once in five days as it loses most of its smell in that time and therefore ceases to attract the beetles.

These cans, and with one exception the dogs and cat were distributed in likely places in the woods. We left one of the canines on a dry spot in the middle of a small swamp, which proved to be a good location.

Either H. or myself tried to visit the different places on this "route" every day. With the cans it was only necessary to take off the cover and turn the can upside down when beetles and bait would roll out together. Then after putting the beetles in the killing bottle the bait was replaced.

With the dogs and cat the method of collecting was necessarily different. First we looked carefully to see whether any beetles were on top and around

the edges of the "scent raiser." Then with our hands or a stick we would roll him over, shake him, and in some cases beat him with a switch, and the beetles inside, in the fur or anywhere about him would hurry out to see what was the matter.

It is a good plan to place some bagging or cloth of some kind on or near the bodies as these will sometimes afford hiding places for beetles which would not stay on the animal itself.

We collected many specimens of *Frox unistriatus* from a piece of bagging which had been over the cat long after all of the feline except the bones had disappeared.

A few small stones placed near the bodies will often be an aid also. Many small *Nitidulidæ* will be found hiding under these.

We obtained the best results from carrion placed in quite open woods "in spots where man seldom trod," although in different localities this may not be the rule. During the latter part of May and through June the beetles were most abundant.

The *Silphidæ* were the most common, especially *S. noveloracensis* and *S. inaequalis*. Many *Staphylinidæ* and *Nitidulidæ* were found as well as some *Necrophori*, *Histeridæ* and *Dermestidæ*.

I would advise every Coleopterist to try this method of collecting, which I think yields more good coleoptera than any other I ever tried, although it is not quite as pleasant work.

F. P. DROWNE.

Edward Drinker Cope

BY MARCUS BENJAMIN, PH. D.

American science honors its representatives by an election to the National Academy of Sciences or by an election to the presidency of the American Association for the Advancement of Science. This year the last named organization is fortunate in having as its presiding officer a scientist who is also a member of the National Academy, for it was at its Springfield meeting last summer that Prof. Edward Drinker Cope, who ranks among the foremost of American paleontologists, was chosen to preside over its forthcoming Buffalo meeting.

Prof. Cope was born in Philadelphia., Pa., on July 28, 1840, of distinguished American ancestry. His great-grandfather was Caleb Cope, a Quaker of Lancaster, Pa., who protected the ill-fated Major Andre from a mob in 1775. His son, Thomas Pym Cope, whose line of ships made regular trips across the ocean, founded the great linen house in Philadelphia, which on his retirement passed into the hands of his sons Henry and Alfred, who then formed the well known firm of Cope Brothers. Prof. Cope is the son of the younger of these two brothers.

His academic education was acquired at Westtown Academy and at the University of Pennsylvania, but he did not graduate and turned his attention to science. He studied comparative anatomy in the Academy of Sciences, in Philadelphia, and in 1859 he joined the gronp of young naturalists who were associated together in the Smithsonian Institution under Prof. Baird. Their names are best recalled by the following stanza, improvised by one of their number, after a hotly contested argument on some disputed point in natural history:

Into this well of learning dip with spoon of
Wood or Horn,
For students Meek and holy silver spoons
should treat with scorn

If Gabb should have the gift of Gill
(As Gill has gift of Gabb),
'Twould show a want of judgment still
To try to Cope with Meek.

Then he went abroad and spent the years 1863-64 in study in the universities of Europe, returning in 1864 to accept the chair of natural sciences in Haverford College, which he resigned three years later. Meanwhile he became paleontologist to the government geological surveys, serving at first under Hayden, on the survey of the Territories, and then under Wheeler on the survey west of the 100th meridan. His work in this connection has resulted in the discovery of more than one thousand new species of extinct and as many recent vertebrata. There is not space here to consider these in detail, or, indeed, to even mention them, but as has been well said the titles of his papers, some four hundred in number, "form a systematic record of the development of paleontology in the United States." Of his larger works on this branch of science, most of which are contained in government reports, the following are the more important:

"Systematic Arrangement of the Lacertilla and Ophidia" (1864); "Primary Groups of the Batrachia Anura" (185); "History of the Cetacea of the Eastern North American Coast" (1866); "Synopsis of the Extinct Cetacea of the United States" (1867-68); "Systematic Arrangement of the Extinct Batrachia, Reptilla and Aves of North America" (1869-70); "Systematic Relations of the Fishes" (1871); "Systematic Relations of the Tailed Batrachia" (1872): "Extinct Vertebrata of the Eocene Formations of Wyoming" (1873); "Cretaceous Vertebrata of the West" (1877); Tertiary Vertebrata" (1885); "Catalogue of the Batrachians and Reptiles of Central America and Mexico" (1887); "The Batrachia of North America" (1889); and he has just completed for the press "The Snakes and Lizards of North America," which will be issued by the Smithsonian Institution during the coming year.

Philadelphia has for many years been the home of Prof. Cope and, on the death of Prof. Leidy, in 1889, Prof. Cope was called to the vacant chair of geology in the University of Pennsylvania, which post he still fills. Besides the duties of his chair he has long been the senior editor of the American Naturalist.

Prof. Cope is also well known as the graceful writer of nnmerous popular contributions in book form to the literatnre in favor of the now generally accepted doctrine of evolution. These include:

"On the Origin of Genera" (1868); "Hypothesis of Evolution, Physical and Metaphysical" (1870); "Method of Creation of Organic Types" (1871); "Evolution and its Consequences" (1872); "Consequences in Evolution" (1875); "Relation of Man to Tertiary Mammalia" (1875); "On the Theory of Evolntion" (1876); "The Origin of Will" (1877); "The Relation of Animal Motion to Animal Evolution' (1878); "A Review of the Modern Doctrine of Evolution" (1879); "Origin of Man and Other Vertebrates" (1885); "The Energy of Life Evolution and how it has Acted" (1885); "The Origin of the Fittest" (1886); and "The

Primary Factors of Organic Evolution" (1896).

He is a formidable antagonist and his strong pen was wielded relentlessly until the victory was won.

Honors have come to him. The Bigsby gold medal was conferred on him by the Geological Survey of Great Britain in 1879, and his name is on the rolls of many of the scientific societies in this country and abroad, including our own National Academy of Sciences, to which he was admitted in 1872.

He joined the American Association in 1868, and in 1875 was advanced to the grade of fellow. The section on biology made him its presiding officer in 1884, and in the following year he addressed the society on "Catagenesis." His name has frequently been urged upon the association for its highest office, but it was not until last year that the well merited honor came to him.

Leading Natural Science Articles of the Month Among our Exchanges.

The Mineral Collector, Sept. '96. 1. Concerning Quartz. 2. Observations with Oolites. 3. Our Limestone Caves. 4. The Tricks of Miners 5. A Curious Letter. 6. Remains of a Prehistoric Amphitheatre. 7. News and Comments.

Popular Science, Sept. '96. 1. A Queer Partnership. 2. The Vicissitudes of Animal Life. 3. The Flight of Insects. 4. Filteration of Drinking Water. 5. Ferns of the Wisconsin Dells. 6. Glaciers. 7. Archæology of Plainfield, N. J. 8 The Land of the Cliff Dwellers. 9. How to Save Fossil Bones. 10. A Fish that Lives Out of Water. 11. An Electric Scorer for Fencing. 12. Distilling Water. 13. The Equinoxes and History. 14 Brain Building in Idiots. 15. Positions that Affect Sleep. 16. Microscopic Minerals.

The Microscope, August, '96. 1. Objects Seen Under the Microscope—Chrysanthemum. 2. Notes on Calcareous Algea from Michigan. 3. Odontophores and their Preparation.

Meehan's Monthly, Sept. '96. 1. Cirsium Discolor or Two-colored Leaved Thistle, with colored plate. 2. Wild Flowers and Nature. 3. General Gardening 4 New or Rare Plants.

The Oregon Naturalist, Sept. '96. 1. A New Industry. 2. Mexican Hieroglyphs. 3. The Basket of the Klickitat. 4. Some North Carolina Minerals. 5 A Vacation Trip to the White Mountains of New Hampshire. 6 Beach Collecting. 7. The Flour Beetles.

Scientific American, Aug 22, '96. 1. Artificial Flight. 2 Hints to Beginners in Photography. 3. Biography of E. D. Cope. 4. Nansen's Polar Expedition. Aug. 29. 1. The Colossal Caverns of Kentucky. 2. Tesla says Roentgen Rays are streams of very small missles. 3. Lamson's Kite—Trial of a Kite Carrying 150 lbs. Sept. 5 1. Proceedings of the American Association at Buffalo, N. Y. 3. The Eclipse of the Sun. 3. Dr. Nansen. 4. The American Chemical Society. Sept. 12. Notes on the American Association Meeting. 2. Recent Archæological News. 4. in the September Sky. 5. Iron Pierced by Hailstones. 5 Proposed Polar Explorations. Sept. 21. 1. The Columbia River Salmon Fisheries. 2. The Calumet and Hecla Copper Mines.

Natural Science, Sept. '96. 1. Notes and Comments 2. On English Amber and Amber Generally. 3. A Geologist in Tierra del Fuego. 4. What Shall we do with our Local Societies? 5. Casual Thoughts on Museums. 6. The Structure of Graptolites 7 Zoology since Darwin.

The Naturalist, Eng., Sept. '96. 1. Specialization of Leaping Legs of Locust. 2. Natural History Notes from the Skepton Churchwarden's Accounts. Review; An Angler's Paradise. 4. Review; British Aculeate Hymenoptera. 5. Lincolnshire Naturalists at Grantham. 6. On the Hepaticea and Musci of Westmoreland. 7. Notes—Lepidoptera, Botany, Worms, Ornithology.

The Asa Gray Bulletin, Sept. '96. 1. Aquatic Plants 2. Botanical Field Work in Northern Michigan 3. Iris Cristata. 4. Autumn Studies and Collections. 5. Concerning Solonum. 6. The Struggle in a Pasture. 7. Orchids of Grand Rapids 8 Orchids of New London, Conn. 9. Orchids found about Alma, Mich.

The review of some of our September exchanges is unavoidably left out. Will doubtless appear next month.

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A Monthly Magazine Devoted to Research in Natural Science.

VOL. II. ALBION, N. Y., OCTOBER 15, 1896. No. 12

Notes on Arctic Work for 1896.

The present year will long be remembered as a most remarkable one for active Arctic research, and one that has been crowned with great success. Doubtless most every one has read the accounts of Nansen's return, and that he has made remarkable discoveries.

Dr. Gregory, one of Nansen's associates, in October *Natural Science*, outlines some of the results of the expedition, which we reproduce herewith.

"Nansen left Europe in 1893 in order to reach the Pole by floating with the ice pack from the north of Siberia to the Greenland Sea. It was well known that off the Arctic coast of eastern Siberia the water drifts northward; also that currents drift southward from the Pole down each side of Greenland and along the eastern coast of Spitzbergen. Nansen thought it probable that these movements were all part of one great current, which flowed right across the Pole. Support was given to this idea by two considerations; firstly, the marine fauna of the Greenland coasts is remarkably similar to that of Siberia; secondly, in 1881 the steamer "Jeannette" was crushed by ice to the northwest of the New Siberia Islands and some years later various articles supposed to be the relics of the "Jeannette" were found off Cape Farewell, at the southern end of Greenland. Accepting these two arguments as rendering the existence of the polar current most probable, Nansen proposed to get frozen into the pack near the point where the "Jeannette" was nipped, and then float along the same course into the Greenland sea. The "Fram" was accordingly designed with especial reference to the capability of withstanding ice pressure, and supplied with stores for six years. Nansen left Norway early in 1893 and the last news from him was sent from Jugor Strait, the southwestern entrance to the Ara Sea, in August of the same year. It had been arranged that he should pick up a further supply of dogs from the Olenek river, but owing to some delays in rounding Cape Chelyuskin, it was not until September 15 that the "Fram" reached the estuary of the river. It was then too late to risk an approach to the island, so the ship's head was turned northeastward for the New Siberia Islands, which were passed on September 18th. Here the packed ice compelled the course to be changed to the Nortwest, and thus the "Fram" was finally frozen into the ice pack, in 78 degrees and 50 minutes north, 138 degree, 37 minutes east, or about 20 degrees too much to the west."

"Thence the expedition floated to the northwest, although the course was apparently irregular, changing with the winds. Up to the point where the "Fram" was beset by the floes, the depth of the sea was only 90 fathoms; but north of this it deepened rapidly, and the depth varied from 160 to 220 fathoms, until the "Fram" approached shallower water north of Spitzbergen. All through the winter of 1893 and the spring of 1894, the resultant course of the "Fram" was northwestward; in the summer the direction was reversed, as the prevailing winds, following the arctic rule, were from the north. In the winter of 1894-5 the "Fram" again went northward crossing the highest

previous record of 83 degrees and 24 minutes (attained by Lockwood, during the Greely expedition) on Christmas eve. In the following month she run her greatest risk from ice pressure. She had been designed so that if the lateral ice pressure, exceeded a certain amount, the ship would be squeezed upward out of the ice; Mr. Colin Archer's calculations were found to be reliable, and the ship rose above the ice as her skilled designer had expected. On March 3, 1895 the latitude of 84 degrees and 4 minutes was reached, and the "Fram" again drifted southward. Expecting that this would be the highest altitude reached, Nansen and one companion, Lieut. Johansen, left the ship on a sledging expedition towards the Pole. They took three sledges, two kayaks, 28 dogs and provisions for themselves for 100 days. The two explorers started on March 14th from 83 degrees and 59 minutes and 12 degree and 27 minutes east. The ice was almost stationary, and good progress was made to the north. In eight days they advanced one degree and 11 minutes northward; after this, progress was slower, as the ice moved southward, the average up to April 4th being a little over three miles a day. Three days later at altitude 86 degrees and 14 minutes, after only another eleven miles had been gained, it was deemed advisable to return.

The explorers, however, had traveled 2 degrees and 15 minutes northward in three weeks. On April 18th the return journey towards Franz Josef land began. On June 4th at altitude 82-18 the ice began to drift northward and by June 15th they had been carried 8 degrees further north. A week later they found the first proximity to land, as they shot a seal (*Phoca barbata*) and afterwards at the same place got three bears. As the snow was in bad condition and they now had plenty of food Nansen stayed there for a month. They started again on July 22d and two days later sighted land; this, however, they could not reach until August 6th. August 12th they came to the first large island of the Franz Josef Archipelago, and on August 26th went into winter quarters. They lived in Eskimo fashion, in a hut of skins, stones, earth and snow; used blubber for fuel and fed on blubber and bear meat. On May, 1896 they started for Spitzbergen, keeping southwest down a broad, frozen sound, to the open water and small islands to the south of the archipelago. On June 16 they thought they heard dogs barking, and next day heard a shot fired. Johansen stayed with the kayaks while Nansen went off in search, and found Jackson's party in their winter quarters; the Norwegian explorers subsequently returned with the "Windward" to Varfio.

"While Nansen and Johansen were making this daring march, the "Fram" had again turned northward, and slowly drifting, reached the latitude of 85-57. This was the furthest point north at which an observation was possible, for clouds prevented the exact distance further from being determined, though it has been estimated on the "Fram" at as much as 30 minutes north of the 85-57 point. The ship then drifted to the southwest until, in February, 1896, it reached a point 84-9 and 15 east. There it remained stationary until released by the break-up of the pack in July. After that the vessel steamed southward through the leads, until she reached open water to the north of Spitzbergen on August 12th."

"It is as yet too early to discuss the value of the fresh information brought back by the "Fram" expedition; we may, however, briefly refer to the chief results. In the first place there is no doubt that the area around the North Pole is a deep ocean basin. In a remarkable lecture delivered to the Geographical Society in 1894, Professor Lapworth predicted, from geological considerations, that his would be found to be the case. As the ortho-

dox view represented the Arctic ocean as a shallow-water area studded with islands and archapelagoes, the correction of this error is of great importance in geography, meteorology and geology. The depths proved by the "Fram" show that the great depression west of Spitzbergen is not a basin surrounded by a shallow sea, butis widely open to the north, where it spreads over the polar area. The depth of this ocean renders it improbable that many islands will be found in it. It has been confidently asserted that there must be land to the north of Spitzbergen, as birds are seen flying northward from it. The voyage of the "Fram" has, however, shown that there is no land in the position expected, and once again we are taught that birds make mistakes as well as other animals. Another bogey from which Nansen has relieved us, is that the whole of the central arctic sea is full of ice of immense thickness and great age. He found that, except for local heaps and hummocks, it is only about thirty feet thick and thus the great "palæocrystic ice" and floe-bergs of northwestern Greenland are proved to be exceptional. After this discovery geology will no longer be burdened with the incubus of a recent Polar ice-cap. Another interesting geological contribution is Nansen's collection of Jurassic fossils in Northern Franz Josef land.

In spite of the poverty of the Arctic Sea, and Nansens short journey on land, naturalists will await with impatience the detailed account of the results of the expedition. These will no doubt be found to repay the magnificent patience and courage of Dr. Nansen and his colleagues. His march with Johansen must certainly be reckoned as one of the most daring feats in the annals of Arctic travel; but its courage was far exceeded by the reckless hardihood with which, instead of returning to the "Fram" (as the explorers could no doubt have done had they arranged to do so) they set off for Spitzbergen, a journey of ten times the length. Such a feat was only possible to men skillful with kayak and ski, who knew how to live on the feeble resources of an Arctic island. For daring and neatness of execution, the Nansen expedition is probably unrivalled in Arctic history, while, to find a parallel for the extent of new area traversed and richness in results, we have to go back to the days of Franklin and Parry."

Gems of Quartz Origin.

By George F. Kunz.

Rock crystal is the purest form of quartz, transparent, colorless, and exhibits most perfectly the properties of the mineral. It is widely distributed, but is brought chiefly from Brazil, Madagascar, Japan, and North Carolina. It is wrought, especially by the Japanese, into polished crystal balls and other articles of elegant ornament. The Romans made much use of it to incise their intaglios, and it has been worked into vases and caskets from the time of Nero to the present, but especially during the fifteenth and sixteenth centuries. Remarkable crystal objects are to be seen in the Louvre, the Green Vaults of Dresden, the Schatz-kammer at Vienna, and at Madrid.

Spheres of rock crystal were used as show stones and for devination from the thirteenth to the eighteenth centuries. The engraving and cutting of some of these was so elaborate as to cost years of work and thousands of dollars. Spheres have been cut up to eight inches in diameter, and valued at from $1000 to $20,000. Nearly the latter price was paid by the late Gov. Ames, for the magnificent crystal ball bequeated to the Boston Fine Arts Museum. This ball measures 185 mm., or 7¼ inches. It was found in 1876. The crystal from which it was cut was 18 inches high, 14½ inches wide, and 12 inches thick. It was found on the Ortake-muko-Yuma, province of Kohi, Japan, originally the

property of Naito Arimari, and purchased from Naito Tsukuba for 18,000 yen—about $18,000. It was cut by an old workman, who had devoted his entire life to cutting crystal balls. This one was started in June, 1891, and finished in December, 1894. The ball weighs nineteen pounds. The famous Dresden ball weighs 16½ lbs, but is quite imperfect. A five-inch ball cut from material found in Ashe county, North Carolina, and another nearly six inches in diameter, from the summit of Mount Antero, Colorado, are now in the Field Columbian Museum in Chicago. Though not entirely perfect, they are quite equal to the balls of the eighteenth century.

At Hot Springs, Ark., clear, rolled pebbles found on the banks of the Ouachita are often sold. These are more highly prized than the quartz crystals, as the fancy prevails that they cut clearer gems. The scarcity of these, and the demand for them has led to the artificial production, by putting the crystals into a box which is kept revolving for a few days by water power. Any expert, however, can discern the difference, since the artificial ones have a little whiter surface.

Many places in Colorado furnish fine specimens, and along the New Jersey coast and Long Branch, Atlantic City, Cape May, and other places, transparent pebbles are found in the sand, and sought after by the visitors, who often have them cut as souvenirs. At such places the local lapidaries have been known to substitute for pebbles from the beach foreign-cut quartz, cairngorm, topaz, crocidolite, Ceylon moonstone, and even glass, obtaining twice the value of the foreign gem for the supposed cutting. Sometimes even the stones found by the visitors are exchanged for cut ones from Bohemia, Oldenburg, and the Jura. Cutting is done abroad on so large a scale and by labor so poorly paid, that the cut stones can be delivered in this country at one-tenth of the price of cutting here, because the rock crystal itself has but little value.

Amethyst is a transparent puple variety of quartz, its color being due to oxide of mangnese. It is a very beautiful stone, much used by the ancients to engrave on, but certain varieties are now but little valued, because not rare enough to be costly. It is found in Brazil, Ceylon, India, and the Ural Mountains. In the latter region, near Mursinka, are found superb deep purple gems, changing to red by artificial light, some of which have sold for $500 each. For intensity and perfection of color, and, one might say, majestic beauty, these rival almost any other gem. Smaller but equally fine amethysts occur in Delaware county, Pennsylvania, Maine and North Carolina. Oriental amethyst is a purple variety of sapphire, far more rare and valuable than the ordinary amethyst.

Agates are usually formed by the deposit of silica, with more or less of coloring oxides, in the cavities of igneous rocks. When the rock disintegrates, they fall out as hard nodules, and are then found on the surface, or frequently strewn along shores, beaches, and the beds of streams. These agate pebbles are abundant on the shore of Lake Superior and on the beach at Pescardo, Cal., and are gathered as souvenirs, and to some extent cut for local jewelry. They are made into seals, rings, pencils, handles for swords, knives and forks, mortars for grinding chemicals, bearings for fine balances, beads, studs, ear rings, trinkets, match boxes, and many other objects.

A peculiar feature of all these agates and chalcedonies is their power of absorbing coloring matters under certain conditions, and by this means all manner of highly colored varieties are artificially produced by skillful treatment of the stone. Most of the deep red carnelians and sards are thus prepared by burning from pale or dull colored chalcadony, and all the black agate, which has now quite replaced jet in

mourning jewelry, is so prepared. In the banded varieties, some of the bands are more absorbent than others, and thus the highly colored black and white onyx and red and white sardonyx are produced, and most of the richly tinted variegated agates used for ornamental work. Picture agate is the name given to quaint markings resembling human forms or like objects. The famous Madonna agate in the Vienna collection has thousands of peasant visitors annully.

Moss agate has been much less used during the past twenty years than formerly, the annual sales not exceeding $1,000. Since the recent use in cheap jewelry of the Chinese natural green and artificially colored red and yellow moss agate, the sale of the American has greatly fallen off. At Hartville, Wyo., large masses of moss agate, weighing from forty to fifty pounds each, were recently found in limestone rock. When cut into translucent slabs, they show the magnificent black dendritic or moss-like markings in a most striking manner. Some table tops of this elegant material were exhibited in the Wyoming section of the Mining building at the World's Columbian Exposition. The finest instructive collection of agate known is the wonderful series presented to the Harvard mineralogical cabinet by Dr. W. S. Bigelow of Boston. Ruskin wrote upon and presented a fine series of agates to the British Museum.

If chalcedony is boiled in a solution of molasses and water, blood and water, or sugar and water, until it has absorbed a quantity of the solution, and is then again boiled in sulphuric acid, the transparent hydro-carbon is changed to a charcoal substance, and black onyx is produced. When white bands alternate with the chalcedony, they are impenetrable to the coloring, and appear clearer and brighter. Black onyx has now almost entirely superseded jet.

The yellow variety is made by first putting the stones in a honey solution, then in a solution of chromate of lead for several days. Placed for a few weeks in hydrochloric acid at a moderate heat, a beautiful cleat yellow glow is given to the streaks that were before a dirty brown. This is also erroneously called golden opal. Stones of a reddish hue are greatly improved in brilliancy of color by first thoroughly drying them for weeks in ovens, then dipping them in sulphuric acid, heating to full red hhat, and afterward slowly cooling them. The changes that take place in both these processes are upon the oxide of iron, which is the coloring matter.

Modern chemistry has wrought great changes in agate coloring, as in other arts, a secret process having be en discovered by which chalcedony of any single color can be made to assume any two or more colors, so that an onyx of any shade or variety of colors can be made. If a sunken centre of another color is required it can be made so that the figure wnen cut out remains in a hollow, forming a cameo intaglio. In this manner the fine cutting of the cameo is protected. A white figure may be made in a black stone, a red figure in a brown stone, or a white one in a red stone. By this process the entire stone is first changed to the color desired for the outer layer, then a cavity is cut in the top and a solution put into it, which alters it to the desired color. It is this discovery that has made a formerly valuable onyx worth now only a nominal sum.

Agates are thus made to assume the onyx character, which is desired by the lapidary, for the production of cameos and intaglios in imitation of the antique sculptural gems. In cameos the figures are in relief and of a different color from the ground. Intaglios are usually all of one color. In Persia inscriptions or devices are written on beads of carnelian and other forms of agate with carbonate of soda and other chemicals; they are then burnt, and the inscription ap-

pears white in contrast to the other color.

The principal supply of agates for the last hundred years has come from Brazil and other South American countries, where the stone is mostly found by Germans who leave Oldenburg for that purpose, and who persevere until they find it. Thence it is sent to Germany for cutting, chiefly to Oberstein and Idar. Every fortnight from five to ten tons of the rough material is sold in Idar at public auction, usually in assorted lots of 100 or 200 pounds. The industry yields to the district an annual net profit of half a million dollars, and good agate workmen are among the best paid laborers in Germany.—*The Mineral Collector.*

Some Notes on the Collection of Shells in the Museums of Paris, Berlin and Amsterdam.

The collection of shells in the Museum of Zoology, Jardin des Plantes, Paris, says C. W. Johnson in October *Nautilus*, is one often referred to as being the only collection in which you can see the recent and fossil species side by side. One, therefore, naturally imagines what such a collection *should be*, and under the circumstances, one is somewhat disappointed. The collection is described as follows: Around the entire outer portion or railing of the first gallery, in a case about two feet in width, are arranged the Pelecypoda, while on the second gallery around the entire wall, in a wide, slanting case or shelf (with corals above and a series of eight drawers beneath) are arranged the Gastropoda. This necessarily scatters the collection to a great extent, and makes it very inconvenient. A collection of the recent and fossil species arranged together is very interesting and instructive, but it should be a special collection of such forms as can be readily traced back through geological time, and which anyone would consider to be the prototypes of the recent species; in other words, the primary object of such a collection should be to show the evolution of species and genera. The study of recent and fossil mollusca is now divided into well defined specialties; no one person can cover with success more than a few closely related groups, faunæ or formations; so it seems to us that a large collection should be arranged accordingly. The paleontologist must be a geologist, also; he cannot ignore stratigraphy; therefore the collection most convenient to him is arranged geologically; again he is making a special study of the tertiary mollusca, and has, for instance, a collection of Paris Basin fossils, he would not want to travel two or three hundred linear feet, on two or three different galleries to determine his material. Neither would the collector of recent shells want to delve among the overwhelming mass of fossils to name his collection. I think that we can therefore lay aside this plan (which is advocated by many) as being entirely inconsistent with our present system of investigation. The specimens in the Museum are mounted on tablets, the recent on white and the fossil on yellow, the label being pasted on the lower edge of the tablet.

The collection of Mollusca in the Museum of Natural History of Berlin, presents many features of interest. It occupies one-half of a large room, that is divided into small alcoves by tall, upright cases. All of the alcoves open into a passage-way, along the side of the room, leaving three sides for the display of specimens. Each alcove is about 20x30 feet, and in the center of each is a long horizontal case, with drawers beneath, containing an exhibit of the land and fresh water shells of Germany, and the mollusca of the North and Mediterranean Seas. The latter are arranged longitudinally in a series, the one above the other. The condition of the two seas being so different, the two collections form a very interesting comparison. The general collection is arranged in the upright cases in cardboard trays, above which the printed label is held by a small card holder. In the upper part of the

cases are a series of enlarged drawings of the animals, radulæ, jaws, darts, etc. On top of the cases is a light iron framework, on which are hung excellent charts of the "Weichthiere," showing the anatomical features of the leading groups. Throughout the entire museum great emphasis is placed on geographical distribution. At the entrance to the rooms is a large chart of the world, each faunal region having a different color. Under each chart is a series of the labels used in the museum, the labels having a wide colored border to indicate the different faunæ. Small charts are also placed among the specimens, the areas inhabited by certain species being colored.

In the Zoological Garden at Amsterdam, are two museums of natural history. The one devoted to the fauna of the Netherlands contains a very good collection of the shells of Holland. The other occupies the second floor of a long building, extending each side from a central hall. Around the walls of these two rooms are arranged the birds and mammals, while in the center in two longitudinal rows of table cases is a splendid collection of shells, a collection that any museum should be proud of. One can get an idea of the space occupied by the following figures: Each case was about 2½x4 feet, and of these there are 144. In hastily going over this collection, certain families and genera were represented by magnificent specimens, and seemed almost complete, the most noticeable being the Pectinidæ, Veneridæ, Cardiidæ, Crassatellidæ, etc. Among the Volutidæ and Conidæ were many of the rarer species, while the Cypraea were graced by the presence of *C. princeps* and *C. guttata*. Very interesting in showing color variation was the very large suite of *Nanina citrina*. But my time was too limited to do justice to these grand collections, and, at the time of my visit, the curators were either on vacation or absent for the day. Our readers will therefore please pardon the incompleteness of these brief descriptions.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

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Entered at Albion post-office as second-class mail matter

NOTES.

With this number we close Vol. II of the MUSEUM—started two years ago November with no circulation whatever, it has steadily grown each issue. Its advertising columns have been well patronized and subscriptions in most cases paid promptly. And yet, notwithstanding the fact that we are passing through the hardest times of past 25 years, we can make no promise for the future, more than that we shall publish the Journal regularly once every month (no doubling up of numbers as in the case of other publications in our line) and will endeavor to give our readers double their money's worth.

Our exchange columns will still be a prominent feature. Every subscriber should send in notices when they have anything to exchange. Some of the largest collections have been made wholly by exchanging. We shall illustrate some during the winter, probably giving at least 100 views of Natural Science objects during '97.

With this number several hundred subscriptions expire. Send in your renewal promptly. Fifty cents for one full year or send $1 and select any of the 100 premiums in our advertising pages. A large number send $1 bill folded in a letter and it invariably comes safely.

We would, above all, prefer to have you get one *new* sebscriber at 50 cents and remit $1 for the two. Free exchange coupons will be sent to all.

Did you look over our advertisement of books in last issue? We have a number of them left yet. Write us for prices on anything in the book line.

We take pleasure in acknowledging to the U. S. National Museum the receipt of Vol. II of *The Histories of North American Birds*, by Capt. Chas. Bendire, Hon. Curator of the Department of Oology. This volume commences with the Paroquets No. 382 A. O. U. and covers all species to No. 513: Boat-tail Grackle. It is illustrated by seven full page plates, figuring 111 kinds of eggs and in many cases showing three to five illustrations of the same species, covering range of size and coloration. Like all government publications the topographical work is unsurpassed. The colored plates true to nature. One can, with this work get an accurate knewledge of the sizes and colors of eggs. We were specially interested in the illustrations of some species that are very rare in collections, as Carolina Paroquet, Derby and Grauds Flycatcher, Poor-will, Vaux Swift, Sulphur-bellied Flycatcher, Nutting Flycatcher, Olive-sided and Coues' Flycatcher, Labrador and Pinon Jay, Clarke's Nutcracker, Northern Raven, the rarer Horned Larks, Scott's Oriole, Rusty Blackbird, etc. The last species has been abundantly abused in collections; very few being able to boast of genuine eggs. All the sets we have ever seen are distinct from any Grackle or Blackbird. While looking at a large collection recently, numbering 17,000 eggs and nearly 600 species, we noticed several clutches of other birds eggs doing duty for Rusty's. While we have not had time to peruse the text of this volume, from a hasty review we can say it is the most complete work up to date. It is really the "Life History" of every specie treated. We remember with pleasure a visit of several days, two years ago, with the Captain, when he showed us through every one of the drawers which held the 35,000 eggs of the U. S. N. M. They had at that time received part of the beautiful Ralph collection of Utica, N. Y. We say "beautiful," for every set was a "thing of beauty," so finely prepared—eggs from size of a Hummer to a Robin blown through a hole no larger than if made with the point of a pin. Large eggs with holes about the size we usually see in Sparrows and so on. We also remember perusing some of the finest English, French and German colored works on eggs, none of which were to be compared with our own already famous "Life Histories." We were shown proof-sheets of some of the plates of Vol. I, eighteen impressions being necessary to produce some of the fine coloring on the Hawk, Grouse and Ptarmigan eggs.

We close with the hope that Vol. II may be a source of as much honor to the painstaking work of Capt. Bendire as Vol. I has been, and that he may be spared many years among us.

Among the Rockies.

M. J. ELROD.

VI.

The wonders of Yellowstone National Park cannot be told in words. Pictures cannot express the beauties of its scenery. There is so much reduction, the colors are lost, the clear atmosphere is not felt, nor does the soft murmur of pines or gurgle of geyser

A View in Yellowstone National Park.

streams greet the ear. Words and pictures are but a faint echo from this wonderland, the most varied in scenery and natural curiosities in the world.

For a dozen miles we toiled up the mountain side, a continuous up hill, as hard a tug as any team can make with even a small load. Several miles more across the summit of the plateau, and we began the descent of several hundred feet to the Lower Geyser Basin. Eagerly we craned our necks to catch the first faint glimpse of geyser steam, about which we had heard and read so much. We turned a sharp corner, when, lo! before us was spread out as grand a panorama as man can see. It was a cloudy, gloomy day, and the white geyser steam was spread out in white clouds against the dark background of pines. Before us was a white floored basin with a silvery thread, (No. 4) Firehole river running through it. Across the river the Fountain Hotel (No. 3) stands but a short distance from the Fountain Geyser (No. 1), while three miles to the right or south is a larger steam cloud than the others, from the famous Excelsior Geyser (No. 2).

This basin covers an area of about 40 square miles, and includes, according to Dr. Hayden's report, 693 hot springs and 17 geysers. The central portion is some seven miles wide, comparatively level, partially timbered, covered with spring deposit or marsh. The altitude of the basin is about 7250 feet. To the sightseer there are two features of particular interest in this basin, the Fountain Geyser and Mammoth Paint Pots.

The Fountain being the first geyser we saw naturally had great attractions for us. As can be seen from the illustration it is on an elevation several feet above the plain around it. The fountain from the geyser covers several acres, and after each eruption is flooded by the overflow of water. The crater is an opening about 30 feet in

diameter, with little elevation, the most being an elevation of geyserite some 3 or 4 feet on the south side.

Opposite this, on the north side, is a large pool which receives the overflow from the crater preceding an eruption. Eruptions occur when the crater and pool fill with water, when the entire mass is suddenly thrown to a height of about 20 feet, while jets may be thrown to a height of 60 feet. After eruption the water in the crater falls from 12 to 18 inches, gradually rising until the crater and lake are again full. The temperature of the water in the crater gradually rises, attaining a maximum at eruption. A half hour before eruption I took the temperature with a sensitive thermometer graduated in half degrees. It registered 86.5° C, and gradually rose to 92.5° C, a few seconds before eruption, 188.7° and 198.5° F. The eruptions last from 15 minutes to an hour, generally about 15 minutes.

The crater of the Fountain Geyser is much similar to what it was in 1878, when visited by Dr. Hayden, as shown by the figure of it in his report.

From the Fountain to the Mammoth Paint Pot is but a few hundred feet eastward, A few pines are between them, and the pot is several feet higher than the geyser. This remarkable mud caldron lies in a basin about 50 feet in diameter, with mud rim four or five feet high all around save toward the north. In this basin a fine pink-white mass, in constant agitation, is constantly bubbling. It resembles a huge bed of mortar boiling, and the sound of the bubbles as they explode makes a continuous "plop, plop, plop." The bubbles rise in hemispheres, cones, rings and jets, and as they collopse frequently throw the finely powdered silicious clay out on the bank. Needless to say it is scalding hot, as one of our drivers can testify.

Near the Paint Pots is the Great Fountain, situated in a somewhat dangerous locality, where are numerous springs. In one of these may be seen the whitened skeleton of a buffalo. Our guide book remarks that "No king or saint was ever more magnificently entombed than this monarch of the hills in his sepulchre in the wilderness."

The traveler in the Park with his own outfit must exercise some caution if he wishes to escape without mishap. In many places the crust is a thin shell, and by thumping with the heel there is given out a sound which leaves no doubt as to the character of the support. Many cases are recorded of horses breaking through while turned out to graze, or even while driving, oftentimes into such hot, sticky slush as to scald the leg above the fetlocks, and in some instances requiring the animal to be shot. There is no danger, however, if one camps away from the geysers and their basins, that the animals may not wander off into dangerous places. There are thousands of horses taken through the Park, and those who exercise reasonable care experience no difficulty whatever.

From the Fountain to Upper Basin is about ten miles, with an up hill pull of 150 feet. About half way is a basin termed Midway, containing the crater of the famous Excelsior Geyser, Turquoise and Prismatic Lakes and other points of interest. Excelsior is merely a huge pit of irregular outline 400 feet by 200 feet, on the west bank of Firehole river. The water is some 15 or 20 feet below the top of the walls, is of a deep blue color, is in a continual state of agitation and sends off great volumes of steam. This region was formerly called "Hell's Half Acre," until Col. W. P. Morris discovered it was a geyser and called it Excelsior. It is the greatest of all the geysers, the others as compared with it being insignificant. When it erupts most of the others cease. Its first observed eruption was in 1881, after the close of the tourist season, when thirty eruptions were observed, varying in interval from one to four hours, and in

height from seventy-five to three hundred and fifty feet. It then remained inactive until the spring of 1888, when eruptions again began, continuing through the entire season and the succeeding winter. At this time the intervals of eruption were at first every hour and fifteen minutes, increasing to two hours There is no way of determining the time of an eruption save by the increased flow. "Immediately preceding an eruption a violent upheaval occurs, raising the entire volume of water in the crater nearly 50 feet, when instantly one or two, and sometimes three, terrific explosions occur, followed closely by the shooting upwards of water, and oftentimes masses of rocky formation, to a height of 200 to 250 feet. Tons of rock have in this way been hurled into Firehole river, some pieces fully 500 feet from the crater.

Near Excelsior Crater is Turquoise Lake, in whose waters are seen some of the most delicate and varied colors, far more beautiful than can be imagined by even the most imaginative. A little further away is Prismatic Lake, of much greater expanse, the water displaying another variety of colors.

Such sights are too much, such scenes too grand, to take in for too long a time. We must have time to muse over and think about them. We had observed in the lakes and in the outlet to the crater numerous dead dragon flies. They had met a sad fate and had come to an untimely death by too close proximity to these hot steam vents. Now these were what we were after, though we had as yet taken none in the Park. There is no law against catching insects or digging plants, so we prepared for action, We soon struck a warm stream along which hundreds of beautiful large red-winged *Libillula saturata* were sporting themselves, and mixed among them were many smaller blue-colored *Mesothemis simplicicollis var. collocata.* All the boys took a turn, and that ravine was well swept. The insects were frequently seen depositing eggs in water that was hot to the touch.

Digressing for a time from the natural wonders of the Park, the geysers, we may devote a little space to the insects

Dragon flies in the Rockies are quite abundant in numbers and in species, are interesting to study and have received some little attention from entomologists. Most conspicuous of all the dragon flies on account of its large size and brilliant red color is *Libellula saturata* Uhler. This beautiful specimen has in the male a beautiful red body and abdomen, with wings reddish brown from the triangle to or beyond the nodus. The female is far less common than the male, has much less color on the wings and body, as usual in most Odonata, and was sought for eagerly, though comparatively few were taken. *Saturata* has been collected from various parts of Mexico, from Guatemala, Colombia (?), California, Arizona, Montana and the Yellowstone National Park. What was formerly a separate species described by Hagen as *croccipennis* has been determined by Calvert to gradually merge into *Saturata* (Proc. Cal. Acad. Sci., Ser. 2, Vol. IV, P. 517) and the two species are made into one by him.

The next most noticeable dragon fly to *L. saturata* is *Mesothemis simplicicollis* var. *collocata* Say. It was found in the Park quite abundantly, generally with *L. saturata.* On account of their staying in close proximity to small warm pools and running streams they are not difficult to catch. One could generally straddle the stream and sweep from either side as they went past, or secure a favorable position near a pool, and sweep them while a second party would keep them on the wing. They fly low in the Park, do not take long flights, and by their bright blue bodies are quite conspicuous, though not as much so as *L. saturata.* Quite a number were captured by throwing hats over them, though

by such means failures were the rule and captures the exception. Hundreds of these were seen in various pools where the water was too hot for the insects. In some cases they were cooked, and were so soft and unsightly as to be useless as specimens. At first it would appear difficult to account for their presence in these hot pools. From the fact that many males are among the dead it cannot be from an attempt at depositing eggs in water too hot to endure. They undoubtedly are overcome by the escaping steam, smothered and boiled. *Simplicicollis* has an extensive distribution, being found in the United States generally west of the Rocky Mountains, in Mexico, West Indies and the Bahamas. The variety *collocata* is found in Texas, Yellowstone National Park, California, and Baja, California. Calvert is of the opinion that the varietal differences are very slight and it is doubtful if the variety should be considered. (Proc. Calif. Acad. Sci., Ser. 2, Vol. IV, P. 553.)

The dragon flies of the Park are not very numerous in species, but are very interesting, and are deserving of more extensive study.

Leading Natural Science Articles of the Month Among Our Exchanges.

The Mineral Collector, Oct. '96. 1. Topaz and Other Western Minerals. 2. "Tit for Tat." 3. Near by Curiosities. 4. Gems of Quartz Origin. 5. The Colossal Caverns of Kentucky. 6. Legends of the Diamond. 7. Famous Gems in Russian Crown. 8. Boring in a Coral Reef. 9. The Fate of a Relic Hunter.

Popular Science, Oct. '96. 1. Some Shells that Build Nests. 2. Color in Nature. 3. The Discovery of Dark Stars. 4. Oscillation of Thought. 5. Oddities of Animal Organs. 6. The Ant Lion. 7. Changing Silver Into Gold. 8. Total Eclipse of the Sun. 9. How Crawfish Fish. 10. Poison Oak and Sumach. 11. The Return of Nansen. 12. A Flying Machine Martyr. 13. Edible Crabs. 14. Positions that Affect Sleep. 15. The Will as a Brain Builder. 16. Birds that Use Incubators. 17. Origin of Decorative Art. 18. Mounds About Vincennes.

The Microscope, Sept. '96. 1. Objects Seen Under the Microscope—Chrysanthemum 2. Biology of Bacteria. 3. Diagnosing Typhoid Bacilli. 4 Editorial, Practical Suggestion, Science Gossip.

The Nautilus, Oct., '96. 1. Some Notes on the Collectors of Shells in the Museums of Paris, Berlin and Amsterdam, by C. W. Johnson 2 Influence of Environment Upon the Form and Color of Helix Alternata, by C. C. Ormsbee. 3. Two New Pisidia, by Dr. V. Sterki. 4 Isaac Lea Department. 5. Notes on Some Shells of Puget Sound, by Mrs. M. Drake. 6 Notes and News. 7. New Publications Received. 8 Obituary—B. Schmacker

The Osprey, October, '96 1. Notes on the Nesting of the House Wren. 2. Rambles About Quiver Lake. 3. Nesting Habits of the Nashville Warbler. 4. A Tern Study. 5. Albinism, Melanism and Hybredism. 6. Prize Photographs. 7. Warbling Vireo. 8 New Farralone Petrel. 9 Notes.

The Naturalist, England, England, October, '96. 1. Section in the Lower Oolites of Scarborough. 2 Lincolnshire Naturalists at Bourne. 3. Review, Prof. Williamson's Autobiography. 4. Detours of Sleaford District. 5. A Critical Catalogue of Lincolnshire Plants 6. Review Manitoban Flowers. 7. Notes, Mosses, Worms, Mammals, Ornithology, Ferns, Fishes, Botany, &c

Natural Science, London, October, '96. 1. Notes and Comments. 2. The Arctic Work of 1896. 3. The Structure of the Graptolites, Part II. 4. An Introduction to the Study of Anthropoid Apes. II,—The Chimpanzee. 5. The Organization of Local Science, by Geo. Abbott, M. R C. S 6. Some New Books. 7. Obituary.

Autumn List of Birds Eggs and Skins.

The following list of eggs and skins are all in stock at time of printing this number of the MUSEUM. We have put the price lower than ever before. Compare with any list you may have access to. We guarantee specimens to be first-class. No discounts are given off these prices. All will be sent prepaid, except large skins which must go at purchaser's expense, and orders of $1 or under must contain from 10 to 20 cents postage, according as they order large or small specimens. Look the list over carefully and select your order at once. Get your friends to order with you, and have all come together. We cannot agree to furnish at these prices after thirty days. If you can name a few substitutes do so, so that if we are out of any you desire, when your order order arrives we may be sure to fill it complete.

	SKINS.	EGGS.
Western Grebe.	$	$ 15
Horned Grebe		15
American-eared Grebe		06
St. Domingo Grebe		16
Pied-bill Grebe		04
Loon	1 50	
Puffin		08
Cassin's Auklet		50
Black Gullilemot		10
Murre		10
Calif. Murre		10
Razor-bill Auk		10
Great Auk (cast)		60
Kittiwake		15
Iceland Gull		40
Western Gull		10
American Herring Gull	80	10
California Gull		10
Ring-bill Gull		10
Laughing Gull		09
Caspian Tern		15
Royal Tern		15
Common Tern	40	04
Arctic Tern		05
Least Tern	50	
Sooty Tern		10
Black Skimmer	40	
Bridled Tern		40
Black Tern	35	04
Noddy Tern		15
Fulmar		25
Leaches' Petrel		08
Heermann's Gull	1 75	
Gannet		15
Anhinga	2 00	

	SKINS.	EGGS.
Cormorant		10
Double-crest Cormorant		10
Farralone Cormorant		15
American White Pelican		12
American Merganser	70	
Red-breast Merganser	70	12
Mallard	60	
Black Duck	70	
Florida Duck	95	
Gadwell		25
Widgeon		12
Baldpate	60	
Green-wing Teal	60	
Blue-wing Teal	50	08
Shoveler	70	20
Pintail	90	15
Wood Duck	1 00	
Redhead	1 00	15
Lesser Scaup	75	
American Goldeneye	90	
Bufflehead	60	
Old Squaw	75	
Amer. Eider	1 50	12
Ruddy Duck	65	15
Canada Goose		50
Fulv. Tree Duck	85	
White Ibis		12
White-face Glossy Ibis	1 50	
Wood Ibis	2 00	
Amer. Bittern	40	25
Least Bittern	40	09
Gt. Blue Heron	1 00	
Amer. Egret	1 00	12
Snowy Heron		08
Louisiana Heron	50	05
Little Blue Heron	50	05

	SKINS.	EGGS.
Green Heron	30	05
B. C. N. Heron	70	03
Yel. Cr. N. Heron	1 00	
Sandhill Crane, beauties	3 00	
King Rail		10
Clapper Rail		05
Virginia Rail		08
Sora Rail	18	04
Fla. Gallinule	60	08
European Coot		06
Amer. Coot	35	03
Wilson's Phalarope	30	
Amer. Avocet	50	16
Amer. Woodcock	60	40
Wilson's Snipe	35	65
Long-bill Dowitcher	60	
Knot	40	
Least Sandpiper	15	
Sanderling	25	
Great Yellow-legs	35	
Yellow-legs	25	
Solitary Sandpiper	25	
Spotted Sandpiper	16	06
Whimbrel		20
Lapwing		06
Golden Plover	65	
Killdeer	17	08
Ring Plover	35	08
Snowy Plover	65	
Bobwhite	40	04
Fla. Bobwhite	50	05
Calif. Quail	50	05
Sooty Grouse		30
Ruffed Grouse	50	
Willow Ptarmigan	1 25	45
Sage Grouse	1 25	

Continued on next page.

Autumn List Continued.

Chacalaca		25
Red bill Pigeon	40	
Mourning Dove	15	02
White-wing Dove		07
Ground Dove		10
Mexican Ground Dove		16
Inca Dove		25
Turkey Vulture		25
Marsh Hawk		12
Sharp-shin Hawk	30	
Cooper's Hawk		10
Harris' Hawk		20
Red-tail Hawk	60	20
Western Redtail		20
Red-shouldered Hawk	75	12
Fla. Red-shouldered H'k	65	
Golden Eagle	3 50	
Duck Hawk, N. Y. State		2 00
Des Sparrow Hawk		25
Audubon's Caracara	75	40
American Osprey	1 25	25
Barn Owl	1 25	
Long-ear Owl	45	
Short-ear Owl	40	
Barred Owl		40
Fla. Barred Owl	65	
Screech Owl	40	16
Great Horned Owl	1 25	40
Burrow Owl	40	08
Fla. Burrow Owl	1 50	50
Road-runner		09
Y. B. Cuckoo	25	05
Belted Kingfisher	20	08
Hairy Woodpecker	20	20
Downy Woodpecker	15	08
Gardner's Woodpecker	20	15
Baird's Woodpecker		40
Nuttall's Woodpecker	60	30
White-head Woodpecker	70	
Yellow-bel. Sapsucker	14	15
Red-breast Sapsucker	40	
Red-head Woodpecker	16	03
Calif. Woodpecker	20	15
Red-bellied Woodpecker		09
Gold-front Woodpecker		15
Flicker		15
Red-shaft Flicker	20	04
Northwestern Flicker		10
Chuck-wills-widow		65
Whip-poor-will		70
Merrill's Paraque	90	
Nighthawk	30	15
Western Nighthawk		15
Fla. Nightbawk		30
Texan Nighthawk		17
Chimney Swift		05
Vaux Swift	85	
Ruby-throated Hummer	40	25
Anna's Hummer		25
Scissor-tail Flycatcher		04
Kingbird		02
Arkansas Kingbird		03
Cassin's Kingbird		10
Derby Flycatcher		60
Crested Flycatcher		05
Mex. Crested Flycatcher		15
Ash-throated Flycatcher	16	10
Phœbe	15	02
Say's Phœbe		05
Black Phœbe		05
Wood Pewee	15	05
Western Wood Pewee		06
Western Flycatcher		10
Acadian Flycatcher		07
Little Flycatcher		08
Least Flycatcher		06
Pallid Horned Lark	20	20
Prairie Horned Lark	20	20
Mexican Horned Lark	20	25
Ruddy Horned Lark	20	15
Amer. Magpie		07
Yellow-billed Magpie	40	15
Blue Jay	15	02
Stellar's Jay	60	
Long-crest Jay	30	
Calif. Jay	20	08
Green Jay		50
American Crow	35	04
Florida Crow	40	15
Northwest Crow		15
Fish Crow		15
Starling		03
Bobolink		08
Cowbird	15	01
Dwarf Cowbird		04
Bronzed Cowbird		15
Yellow-head Blackbird		02
Red-wing Blackbird	12	01
Bi-colored Blackbird		04
Tricolored Blackbird		06
Meadowlark	20	04
West Meadowlark	20	05
Hooded Oriole		15
Orchard Oriole		03
Baltimore Oriole	18	03
Bullock's Oriole	20	04
Rusty Blackbird	15	
Brewer's Blackbird	15	03
Purple Grackle	15	02
Bronzed Grackle	20	02
Great-tail Grackle		08
Boat-tail Grackle		07
Evening Grosbeak	40	
Pine Grosbeak	40	
Purple Finch	12	
House Finch	15	02
Redpoll	15	
American Goldfinch	15	02
Arkansas Goldfinch	15	03
Lawrence Goldfinch		08
Snowflake	15	
Lapland Longspur	20	
Chestnut-col. Longspur		15
Vesper Sparrow	15	02
West Vesper Sparrow		03
Savanna Sparrow	15	
W. Savanda Sparrow	15	
Grasshopper Sparrow		08
Sharp-tail Sparrow		12
Lark Sparrow		02
W. Lark Sparrow		05
Intermediate Sparrow	18	
Gambel's Sparrow	18	
Gold-crested Sparrow	20	
White-throa.ed Sparrow	15	15
Tree Sparrow	15	
Chipping Sparrow	15	01
W. Chipping Sparrow	15	03
Field Sparrow		02
Slate-colored Junco		07
Oregon Junco	20	
Black-throated Sparrow		12
Rufous Crown Sparrow	50	
Song Sparrow	12	01
Herr. Song Sparrow	15	04
Swamp Sparrow		05
Fox Sparrow	12	
Texas Sparrow	20	
Towhee	15	05
Spurred Towhee	15	09
California Towhee	15	05
Abert's Towhee		25
Cardinal		02
Gray-tail Cardinal		20
Texas Cardinal		15
Rose-breasted Grosbeak	20	05
Black-head Grosbeak	20	06
Indigo Bunting	15	04
Lazuli Bunting		09
Painted Bunting		05
Sharpe's Seedeater		25
Dickcissel		03
Louisiana Tanager	40	30
Summer Tanager		10
Scarlet Tanager		09
Purple Martin		05
Cliff Swallow		05
Barn Swallow		02
Bank Swallow		04
Tree Swallow	15	05
Bohemian Waxwing	50	
Cedar Waxwing	15	03
Phainopepla	35	15
White-rump Shrike		04
Red eye Vireo	15	05
Yellow-throated Vireo	15	08
White-eye Vireo		06
Hutton's Vireo	25	
Bell's Vireo		06
Least Vireo		25
Black and White Warb'r	20	
Prothonotary Warbler	30	15
Nashville Warbler	15	
Orange-crown Warbler	20	
Lutescent Warbler	30	35
Parula Warbler	15	
Cape May Warbler	60	
Yellow Warbler	15	02
Black-th. Blue Warbler	18	
Myrtle Warbler		12
Magnolia Warbler	15	
Audubon's Warbler	15	
Cerulean Warbler	35	
Chestnut-sided Warbler	15	09
Black-poll Warbler	15	
Black-th. Gray Warbler	45	
" Green "	17	
Hermit Warbler	1 00	
Townsend's Warbler	90	
Pine Warbler	15	
Ovenbird	15	
MacGillivray's Warbler	35	
Mary. Yel. tht. "	15	
Western Yellow-throat	20	
Yellow-breasted Chat		04
Long-tail Chat	18	06
Pileolated Warbler	25	
Amer. Redstart	15	06
Meadow Pipit		04
Sage Thrasher	25	
Mockingbird		02
Catbird	15	02
Brown Thrasher		01
Sennett's Thrasher		06
Curve-bill Thrasher		07
Bendire's Thrasher		25
Calif. Thrasher	25	10
Cactus Wren		06
Rock Wren		25
Carolina Wren		05
Lomita Wren		25
Bewick's Wren		09
Baird's Wren		08
House Wren		02
West. House Wren		05
Parkman's Wren		05
Winter Wren	20	
L. B. Marsh Wren		02
Brown Creeper		15
Slender-bill Nuthatch	20	
White-breast Nuthatch		12
Brown-hd. Nuthatch		[illegible]
Pygmy Nuthatch		[illegible]
Tufted Titmouse		15
Plain Tit	25	25
Chickadee	15	06
Wren Tit	20	
California Bush Tit	15	10
Verdin		25
Golden-crested Kinglet	20	
Blue-gray Gnatcatcher		10
Wood Thrush	15	03
Wilson's Thrush		05
Russet-back Thrush	18	06
Olive back Thrush	15	15
Dwarf Hermit Thrush	20	
Hermit Thrush	15	10
American Robin	15	02
Bluebird		01
Mt. Bluebird	25	05
Western Robin	20	04
Western Bluebird	15	06

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