

Atome; p. 113, for present, prevent (the passage from Bentham in which this mistake occurs was evidently taken from Eisler's 'Wörterbuch,' where the same mistake is made); p. 126, for Preyer, Preger; p. 143, for Appendix B, Appendix II.; p. 194, for Fonsgrève, Fonsegrive; p. 269, for Kirchener, Kirchner; p. 270, for 1894, 1874; p. 273, for Appuleius, Apuleius; p. 292, for Herbert, Herbart; p. 456, for fühlen, Fühlen; p. 500, for Natur und Grenzen der Naturwissenschaft, Über die Grenzen des Naturerkennens; p. 533, for Gibert, Gilbert; p. 601, for Pufendorf, Pufendorf; p. 668, for stata, states; p. 823, for Nietsche, Nietzsche. The reference on page 421 to Müller's translation of the 'Kritik' (p. 320-326) should, I suppose, be to pages 300 ff.

The Greek, Latin, German, French and Italian indices which are found at the end of the second volume are useful.

FRANK THILLY.

UNIVERSITY OF MISSOURI.

SCIENTIFIC JOURNALS AND ARTICLES.

The Popular Science Monthly for January contains an excellent account of 'The Missouri Botanical Garden,' by William Trelease, telling of its origin, arrangement and plans for future growth. Alfred C. Haddon makes a plea for 'The Saving of Vanishing Data,' mainly zoological, and A. J. McLaughlin combats 'America's Distrust of the Immigrant' with the aid of various tables showing his various deficiencies. 'Variation in Man and Woman,' by Havelock Ellis, is largely a reply to former criticism by Professor Pearson and tends to show that variation is greatest in man. J. C. Sutherland considers 'The Engineering Mind,' and A. L. Benedict makes a plea for 'Post-graduate Degrees in Absentia.' Frederick Adams Woods presents the sixth of his papers on 'Mental and Moral Heredity in Royalty,' the present being devoted to the Bourbons in Spain, and W. J. Spillman discusses 'Mendel's Law.'

In *The American Naturalist* for December A. W. Grabau presents some 'Studies of Gastropoda' and W. M. Wheeler describes 'The Occurrence of *Formica cinerea* Mayr and

Formica rudibarbis Fabricius in America.' The twelfth part of 'Synopsis of North American Invertebrates' is by H. S. Pratt, and continues the treatment of the Trematodes, embracing the digenetic forms. This is a long and fully illustrated paper. The number contains the index to Volume XXXVI.

The American Museum Journal for January gives notes on the second Cope collection of fossil vertebrates, on the Eskimo collection from Hudson Bay and on the skeleton of the finback whale recently acquired by the museum. The supplement is a substantial 'leaflet' of thirty pages, fully illustrated, devoted to an account, by W. D. Matthew, of the 'Evolution of the Horse.' This pamphlet should be in demand, as it summarizes our knowledge of this subject in a most admirable manner and brings it down to date.

THE leading article of *The Museums Journal* of Great Britain for December is on 'Technical Museums,' by John MacLauchlan, and is a sketch of the technical museum of Dundee, showing how its collections were brought together at comparatively little cost. Not every museum, however, is so favorably located for acquiring material. The bulk of the number is occupied by reviews of museum reports and with notes. From these last we learn that the collections made by Sven Hedin are now in the Stockholm university college, where they are being arranged and studied.

F. A. LUCAS.

SOCIETIES AND ACADEMIES.

OHIO STATE ACADEMY OF SCIENCE.

THE twelfth annual meeting was held at Columbus, November 28 and 29, with about thirty-five members in attendance. The committee on topographic survey reported that the legislature had granted \$50,000 to continue the work in cooperation with the United States Geological Survey in 1902 and 1903. Lynds Jones, of Oberlin, gave an account of work done with aid from the Emerson McMillin research fund to secure data for a catalogue of the birds of Ohio to be published by the Academy. C. Judson Herrick was elected president for the ensuing year; J. A. Bownocker and Miss L. C. Riddle, vice-presi-

dents; Herbert Osborn, treasurer; E. L. Moseley, secretary; F. L. Landacre and T. A. Bonser, members of the executive committee; J. H. Schaffner, trustee and member of the publication committee. Hon. Joseph Outhwaite, president of the newly organized Society for the Prevention of Tuberculosis, addressed the academy on the work of that society.

The following papers were read:

HERBERT OSBORN: 'Opportunities for Faunal Studies at the Lake Laboratory at Sandusky.'

F. L. LANDACRE: 'A List of Protozoa Observed during the Summer of 1902.'

MAX MORSE: 'Ohio Batrachians and Reptiles.'

C. JUDSON HERRICK: 'A Note on the Significance of the Size of Nerve Fibers in Fishes.'

W. F. MERCER: 'Report on the Development of the Bones in the Legs of our Domestic Animals.'

JAS. S. HINE: 'The Tabanidae of Ohio.'

JAS. S. HINE: 'A List of Ohio Syrphidae.'

HERBERT OSBORN: 'Remarks on the Occurrence of Periodical Cicada in Ohio in 1902.'

HERBERT OSBORN: 'Note on the Occurrence of the Cigarette Beetle in Columbus.'

MAX MORSE: 'Unusual Abundance of a Myriopod.'

WILLIAM R. LAZENBY: President's Address—'The Dietetic Value of Fruit.'

ROBERT F. GRIGGS: 'New Heliconias from Guatemala and Elsewhere.'

OTTO E. JENNINGS: 'Further Notes on Smut Experiments.'

W. A. KELLERMAN: 'The Life History Problem of the Heteroecious Rusts.'

H. HERZER: 'Eleven New Species of Fossil Plants.'

LUMINA C. RIDDLE: 'Some Algæ from Sandusky Bay.'

W. A. KELLERMAN: 'The Three Forms of Prickly Lettuce in Ohio.'

W. A. KELLERMAN: 'Annual Report on the State Herbarium and Plants New to the State List.'

E. L. MOSELEY: 'Additions and Corrections to the Sandusky Flora.'

JOHN H. SCHAFFNER: 'The Flora of Chicken Island.'

JOHN H. SCHAFFNER: 'Ohio Station for Myriostoma.'

WM. C. MILLS: 'New Discoveries at the Baum Prehistoric Village Site, Ross County, Ohio.'

WM. C. MILLS: 'The Gartner Mound.'

W. A. KELLERMAN: 'Two Botanizing Trips in the Mountains of West Virginia.'

H. HERZER: 'Two Fishes from the Upper Helderberg Group.'

WM. C. MILLS: 'The Darnell Mastodon.'

OTTO E. JENNINGS: 'General Climatic Conditions of Ohio.'

THOS. BONSER: 'Some Problems in Montana Forestry.'

ROBERT F. GRIGGS: 'Three Interesting Tropical Plants.'

W. A. KELLERMAN: 'An Ecological Study of West Mansfield Swamp,' preliminary report.

THOS. BONSER: 'Final Report on Big Spring Prairie.'

LUMINA C. RIDDLE: 'Microscopic Life Forms in Brush Lake.'

JOHN H. SCHAFFNER: 'Preliminary Report on the Plant Ecology of Brush Lake.'

WM. C. MILLS: 'Identification of Flint from the Prehistoric Flint Quarries of Licking County, Ohio.'

E. L. MOSELEY: 'Currents in Sandusky Bay.'

W. A. KELLERMAN and J. G. SANDERS: 'The Ohio Erysiphaceæ—Keys and Distribution.'

LESLIE D. STAIR: 'Additions to the Cuyahoga County Flora.'

LESLIE D. STAIR: 'Additions to the State Flora.'

OTTO E. JENNINGS: 'Trees and Shrubs on the Ohio State University Campus, with Dendrological Notes.'

E. L. MOSELEY: 'The Meteor of September 15.'

JOHN H. SCHAFFNER: 'Report of Progress on the Plant Ecology of Ohio.'

W. A. KELLERMAN: 'Variation in *Carex lurida*.'

E. L. MOSELEY,

Secretary.

NORTH CAROLINA ACADEMY OF SCIENCE.

THE North Carolina Academy of Science held its first annual meeting at Trinity College, Durham, N. C., on November 28 and 29, 1902. Between thirty and forty persons attended the various sessions, most of whom identified themselves with the organization. Retiring President W. L. Poteat, of Wake Forest, gave an admirable address upon the subject 'Science and Life,' after which the Academy was tendered an informal reception by the faculty and ladies of Trinity College. About fifteen papers were presented in full and briefs of several others given, while still others were presented only by title. A resolution was passed authorizing the publication

of the proceedings of the meeting, to include also the constitution and by-laws. The officers for the ensuing year were selected as follows: *President*, C. M. Edwards, Trinity College, Durham; *Vice-President*, C. E. Brewer, Wake Forest College; *Secretary-Treasurer*, Franklin Sherman, Raleigh; *Executive Committee*, Messrs. C. M. Edwards, Franklin Sherman, F. L. Stevens, W. G. Sackett, H. H. Brimley, C. B. Williams, W. L. Poteat, Chas. Baskerville, Collier Cobb.

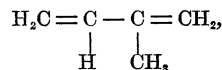
F. S.

AMERICAN CHEMICAL SOCIETY. NORTHEASTERN SECTION.

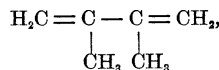
THE fortieth regular meeting of the section was held at the 'Tech Union,' Garrison St., Boston, Friday, December 19, at 8:00 P.M., President A. H. Gill in the chair. About 150 members were present. Dr. Carl Otto Weber, of Manchester, England, gave a very interesting talk on 'India Rubber, its Chemical and Technical Problems,' in which he first described the preparation of the gum from the milk as it exudes from the trees when they are tapped, and showed that the coagulation of the milk is influenced by the albuminous matters which are always present. If these substances are allowed to coagulate with the rubber, it is impossible to remove them afterwards, and they become the source of the injurious fermentation which often occurs in crude rubber. Pure rubber free from albuminous matter, even if shipped wet, will not ferment at the extreme heat to which it is often subjected in the holds of vessels, and arrives at its destination in perfect condition. It is thus of the greatest importance to use a process of curing in which the albumen is removed before coagulation.

Dr. Weber then took up the question of the chemical composition of rubber, showing that rubber, freed from albuminous and resinous substances, no matter from what source the rubber is derived, consists of two substances; one, amounting to four per cent. or less of the total, insoluble in all solvents, contains oxygen, and has the empirical formula, $C_{30}H_{68}O_{10}$; the remainder is a hydrocarbon $(C_{10}H_{16})_n$. As to the constitution of this

hydrocarbon, it is undoubtedly a polymer with a very high molecular weight. On dry distillation it gives C_5H_8 , isoprene, $C_{10}H_{16}$, inactive limonene, and $C_{15}H_{24}$, the so-called heveëne. The last two compounds are cyclo-terpenes, but isoprene is an open chain compound, with two double bonds, and has the formula,



or 2-methyl-1, 3-butadiene. Isoprene, on standing, polymerizes into rubber, or polyisoprene as it has been called on this account. There is evidence to show that isoprene is the main primary product of the dry distillation of rubber, and that limonene and heveëne are secondary products derived from the isoprene. Rubber forms addition products with chlorine, bromine, etc.; also extremely interesting compounds have lately been discovered, which are formed by the action of oxides of nitrogen on rubber. These compounds, $(C_{10}H_{16}N_2O_3)_2$ and $(C_{10}H_{16}N_2O_4)_2$, are produced quantitatively from all varieties of rubber, and are soluble in many solvents. They, therefore, furnish valuable aid in the analysis of rubber, and open up a very promising road for the further investigation of its constitution. The fact that rubber is a highly polymerized unsaturated hydrocarbon with an open chain, and probably three double bonds for $C_{10}H_{16}$, shows why all attempts to make rubber by polymerizing those terpenes, $C_{10}H_{16}$, which are known to be cyclo-compounds with only two double bonds have not led to success. Attention was also called to the recent work of Kondakoff, who has obtained a compound,



or 2, 3-dimethyl-1, 3-butadiene, which is seen to be a methylisoprene. This substance, on standing, was converted quantitatively into a white spongy mass, tasteless, odorless and insoluble in all solvents, which is probably a methyl derivative of rubber, or methylpolyisoprene. Thus a very important step has been taken in the synthesis of rubber.

The lecturer also discussed the subject of vulcanization, pointing out that it consists simply in the addition of sulphur, no hydrogen sulphide being formed if pure rubber is used. The result of vulcanization not only depends upon the amount of sulphur, the heat and the time, but also on the state of the rubber at the moment of vulcanization. The amount of sulphur may vary from that necessary to form a compound, $C_{100}H_{100}S$, to that for $C_{100}H_{100}S_{20}$. The state of the rubber can be greatly changed before vulcanization, as for instance by manipulation between rollers, whereupon it becomes more plastic and loses in elasticity. This is due to the breaking down of the molecules, $(C_{10}H_{16})_n$, into molecules of lower molecular weight, that is where (n), which may be 100 or more in crude rubber, becomes a smaller number. This is shown by the fact that the rubber becomes more easily attacked by oxidizing agents, and is in many ways more reactive, as is to be expected from a highly unsaturated compound, where the higher the molecular weight the less easily is the molecule attacked by reagents.

Dr. Weber showed how many of the technical problems that continually occur in the rubber industry can be solved by the application of theoretical considerations, and closed with an appeal for workers on this very interesting but comparatively little investigated field of organic chemistry.

ARTHUR M. COMEY,
Secretary.

TORREY BOTANICAL CLUB.

At the meeting of Wednesday, November 26, 1902, Dr. W. MacDougal spoke on some examples of propagation by bulbils. Two kinds of bulbils were spoken of, namely, those which morphologically are stems, and those that morphologically are roots. He exhibited specimens of *Dioscorea villosa* which bore in the axils of the leaves large bodies described as bulbils of the first sort, and *Ranunculus Ficaria* and *Globba Schomburgkii* which had similarly placed bodies, much smaller, however, which were morphologically roots. In any case the bulbils reproduce the plant by

germinating after falling to the ground. Drawings of *Lysimachia terrestris* were shown that represented the changes effected in the habit of the plant brought about by being grown in water.

A specimen of the so-called 'wood-rose' of Guatemala was also presented by Dr. MacDougal. This curious malformation is a hypertrophy of a branch of some species of the Leguminosæ and is caused by an unknown species of *Loranthus*.

Dr. N. L. Britton made remarks on the plant conditions and the general plant formations of the island of St. Kitts, British West Indies. The meeting then adjourned to the conservatories, where the members of the club, under Dr. Britton's guidance, examined some of the plants that have recently been brought to the Botanical Garden from St. Kitts.

W. A. CANNON,
Secretary pro tem.

At the meeting of December 9, 1902, the first paper was by Professor A. P. Selby, on 'Culture of the Grape-rot Fungus,' with exhibition of culture-tubes containing its fully developed spore-sacs and spores, derived from pycnosporos upon the grape leaf. This fungus has menaced the industry in Ohio, producing rotting of both fruit and leaf.

The second paper, by Dr. H. H. Rusby, was on 'The Flora of the Orinoco Delta,' a delta extending about 200 miles along the sea, and as far inland, if we include the region of rocky islands and deep rocky river-channels in addition to the area of silt-deposits. It is doubtful if the part visited by Dr. Rusby had been botanically explored before his visit. Its characteristic features are:

1. A hill flora which covers islands never submerged, and rocky banks of the river toward the interior; trees and Bignoniaceous vines characterize it. Mounted sheets exhibited (from Dr. Rusby's collecting) included *Spondias*, the hog-plum, *Anona*, the custard-apple, palms of the genus *Bactris*, and representatives of the many large trees (reaching often 100 feet high) as a *Vitex* of the Verbenaceae family and an *Alibertia* of the Rubiaceae.

family; also a *Paullinia*, a woody vine; a *Cupania*, of the Sapindaceæ, etc.

2. A river flora, including a marginal flora on periodically submerged banks and a submerged flora upon islands; chiefly a mass of tangled vines. River-bank trees, of which specimens were shown, included a *Cecropia* of the Fig family; and *Inga*, a relative of the acacia, a tree which becomes a mass of flowers frequented by hundreds of humming-birds. Another tree, *Hecastophyllum*, has its hollow stems always inhabited by myriads of formidable ants with a sting hot as fire. Shrubs of the marginal flora include many with a milky juice, as *Tabernæmontana*, and many gorgeous-blooming species of *Solanum*. Woody vines were largely of the Bignoniaceæ; drinkable water was obtained from one which climbed perhaps 100 feet. Marginal river herbs shown included a *Spigelia*, source of a valuable drug, especially important now that the *Spigelia* of the southern United States is disappearing. A *Cuphea* with orange flowers made a magnificent display. A *Heliconia* (*H. pendula*) of the Zingiberaceæ, resembles a drooping orchid. *Sphenoclea*, an introduced member of the Lobelia family from India, covered low places. Island trees include several large drupe-bearing species of *Moquilea* and *Licania*, related to our plum, and producing a wood valued there for charcoal-making.

3. Along the setbacks of high-water periods, lakes remain as the water recedes, alternating with partly dried exposed levels, which produce peculiarly dense and terrible swamps. The lakes become covered with vegetation which resembles a meadow at a distance. This swamp flora includes floating and herbaceous aquatics and shrubby thickets like chaparral. Trees occur with roots nearly exposed during the dry season. The swamp flora includes many trees of the Rubia family, with valuable wood; a profusion of shrubby *Lantana* and *Eupatorium*; various vines, as the *Securidaca* of the Polygala family; herbs, as *Jussiaea* of the Onagraceæ, etc.

4. A tidal flora extends some forty miles in breadth along the coast, where the villages are built on piles. The littoral flora at the

ocean edge is soon replaced by an inland tidal flora, chiefly of stout fan-leaved palms of different species, from the short spiny palms of the river-margins to the tall smooth palms of the hills.

Dr. Rusby found but few orchids; two exhibited were a beautiful *Ionopsis* and a *Habenaria* of curious floating habit, growing where the water beneath was fifteen feet deep. One of the palms occurring there is remarkable for its elevated base, raised about four feet by means of spiny outward stilts (roots?); its smooth trunk rises upward about forty feet.

In answer to inquiries, Dr. Rusby said that his collections were made during six weeks, beginning in April; that though he found many flowers, he concluded that flowering and seed production at any time is comparatively the exception in the tropics, nature relying chiefly on the continuance of plants by vegetative processes. Much of the country visited was uninhabited; the Imataca Mountains, about twenty-five miles distant, had never, it would seem, been visited even by the Indians of the region. Dr. Rusby attempted to penetrate through the twenty-five miles of swamp in vain, making but nine miles in three weeks, and then turning back exhausted with forcing his way over the swamp water. Two of his men, with boards fastened to the feet somewhat in the manner of snowshoes, afterwards crossed the swamps to these mountains, and were rewarded by the discovery of a 'lace-work fall' hundreds of feet in height, but from inaccessible cliffs.

The evening's program closed with the exhibition by Dr. Underwood of a sterile mycelium of a fungus of the nature of a *Polyporus*, growing recently beneath the new North German Lloyd docks.

EDWARD S. BURGESS,
Secretary.

COLUMBIA UNIVERSITY GEOLOGICAL JOURNAL CLUB.

November 21.—Professor J. F. Kemp reviewed 'Etude sur le Point de fusion des minéraux et sur les conséquences pétrographiques,' par A. Brun. He then reviewed an unpublished paper by Professor W. C.

Knight and himself on the 'Leucite Hills of Wyoming.' This joint paper was given at the Washington meeting of the Geological Society of America.

December 12.—Dr. Julien reviewed a paper in a late number of the *Bulletin de la Société Belge de Géologie* on the origin of the curious granite enclosed in the arkose of the St. Etienne coal basin.

Professor Grabau presented a very interesting paper on the origin of limestones. This was presented at the Washington meeting of the Geological Society of America.

H. W. SHIMER.

DISCUSSION AND CORRESPONDENCE.

FIRST RECORD OF THE POLLACK WHALE (*BALÆNOPTERA BOREALIS*) IN THE WESTERN NORTH ATLANTIC.

TO THE EDITOR OF SCIENCE: I am in receipt of reliable information that during the season of 1902 four finback whales of a species corresponding to, or identical with, *Balænoptera borealis* Lesson were taken at the whaling station at Rose-au-Rue, Placentia Bay, Newfoundland. This is the first authentic record of this form of finback in the western North Atlantic. The species is called 'Sejhval' (pollack whale) by the Norwegian whalers. Whether the species taken at Newfoundland is really identical with the European species can of course only be determined by examination of specimens.

The species named *B. tuberosa* by Cope, on the basis of a specimen killed in Mobjack Bay, Virginia, may be the same as the Newfoundland pollack whale, but the description of that species is inadequate for a positive determination, and the whereabouts of the type is at present uncertain. It is quite as probable that the Mobjack Bay whale represented *B. physalus* L.

The Newfoundland whale fishery, which was established in 1898, has grown to large proportions. The kinds of whales taken are the humpback (*Megaptera nodosa*) and three species of finbacks, namely, the common finback (*Balænoptera physalus* L.), the sulphur-bottom (*B. musculus* L.) and, as just noted,

the pollack whale (*B. borealis*, or an American representative of that species).

According to the figures kindly placed in my hands by Dr. L. Rissmuller, more than 450 whales were taken at the Newfoundland stations during the season of 1902. The number of each kind taken at four of the stations was as follows:

Station.	Sulphur-bottoms.	Common Finbacks	Pollack Whales.	Humpbacks.	Total.
Snook's Arm Station*		79		21	100
Balena Station†.....	65	31		11	107
Chaleur Station†.....	60	11		6	77
Rose-au-Rue Station†..	5	70	4	9	88
Total.....	130	191	4	47	372

The fifth station, at Aquaforte, took about 100 whales, mostly humpbacks.

The existence and importance of this fishery are as yet not widely known in the United States. Thus, in the latest number of the *American Museum Journal* (January, 1903, p. 10), in a notice of a probable sulphur-bottom, it is stated that "whalers know this species as the 'finner' or 'finback' (*B. musculus*) and do not prize it, on account of the small amount of blubber and the small size of the whalebone it carries." When it is considered that a sulphur-bottom whale is worth about \$1,000 it becomes evident that this statement is hardly warranted.

FREDERICK W. TRUE.

U. S. NATIONAL MUSEUM,
January 6, 1903.

A SECOND BISHOP'S RING AROUND THE SUN AND THE RECENT UNUSUAL TWILIGHT GLOWS.

TO THE EDITOR OF SCIENCE: A glare around the sun merging into a faint smoky red or purple ring 5° to 10° wide, with the maximum color about 30° from the sun, has been observed here during the past two weeks. Mr. Rotch noticed a smoky ring around the sun on one day in August but no further unusual glare or color was noticed around the sun

* East coast.

† South coast.