

apparently been overlooked. The compound formed seems to have a very complex formula, being represented by  $C_{17}Cu_8H_4O_8$ . It is more explosive than the corresponding cuprous compound and, unlike it, on treatment with dilute acid yields very little acetylene. It gives, on the contrary, a humus-like substance of a formula of about  $C_{12}H_4O_8$ , which resembles both humic acid and the so-called graphite hydrate obtained from the graphite of cast iron. It would seem to be a unique case of the condensation of acetylene, at ordinary temperature under the influence of a copper salt, to a compound of high molecular complexity.

J. L. H.

#### ASTROPHYSICAL NOTES.

IN No. 367 of the Proceedings of the Royal Society is a note by Professor Oliver Lodge, read on February 11th, in which he calls attention to the notable discovery by Professor P. Zeeman, of Amsterdam, that lines in the spectrum of a flame may be broadened when a magnetic field is concentrated upon the flame.

Zeeman's paper appears in the *Philosophical Magazine* for March (Vol. 43, pp. 226-239). He alludes to the fact that similar experiments were the last researches of Faraday, in 1862. With the relatively slight dispersion then available, however, the effects could not have been observed.

Sodium and lithium were used by Zeeman, and the broadening effects were observed in both the emission and absorption spectra, which were obtained from a powerful concave grating.

The experiment was also tried on the band spectrum of absorbing iodine vapor, with negative results, which, however, confirmed the accuracy of the experiments with sodium. The widening of the sodium lines to both sides amounted to about  $\frac{1}{40}$  of the distance between  $D_1$  and  $D_2$  (that is, to about 0.15 tenth-meters). As the intensity

of the magnetic field was about  $10^4$  c.g.s. units, there would be a positive and negative magnetic change of  $\frac{1}{1000}$  of the period.

The theory of the motion of ions or electrons, whose vibrations are those of light, is discussed according to the views of Professor Lorentz, who pointed out to Zeeman that if the theory was true the edges of the widened lines ought to be circularly polarized in the direction along the lines of magnetic force, and plane polarized in directions normal to the lines of force. This was clearly shown by experiment to be the case, and it has been confirmed by Lodge, who also readily obtained the broadening effect in the sodium flame.

These researches are decidedly suggestive, and have an important astrophysical as well as physical application. The view is held by many that strong magnetic forces occur in the sun (and hence by analogy in the stars). Thus a new cause may perhaps be assigned for the wide range and variations in the breadth and intensity of spectral lines of celestial bodies.

E. B. F.

#### SCIENTIFIC NOTES AND NEWS.

##### LEGISLATION ON THE FOREST RESERVATIONS.

THE Senate, on May 6th, adopted Senator Pettegrew's amendment to the Sunday Civil Appropriation Bill, suspending President Cleveland's order of February 22d, setting aside some 20,000,000 acres of timber lands in the Northwest as forest reservations. The N. Y. *Evening Post* calls this action 'monstrous,' and it seems to be generally misunderstood. The Senators from the States concerned favor forest reservations, but President Cleveland's order, with the laudable purpose of adequately celebrating Washington's Birthday and securing to his administration the credit of this important movement, seems to have been premature. The letter from the Secretary of the Interior to the President of the National Academy of Sciences requested an official expression of the Academy upon the following points:

1. Is it desirable and practicable to preserve from fire and to maintain permanently as forested lands those portions of the public domain now bearing wood growth for the supply of timber?

2. How far does the influence of forest upon climate, soil and water conditions make desirable a policy of forest conservation in regions where the public domain is principally situated?

3. What specific legislation should be enacted to remedy the evils now confessedly existing?

It came within the province of the committee to recommend the setting aside of additional forestry reservations, but its primary object was to suggest an intelligent policy for the preservation of the reserves previously made. The Academy was especially asked for an opinion on the legislation recommended by the American Forestry Association and by the American Association for the Advancement of Science, in the hope that the weight of the Academy's influence would induce Congress to enact the needed legislation. Recommendations to this effect will doubtless be in the report now prepared by the committee of the Academy, and will guide the President and the Secretary of the Interior in the administration of the reserves in accordance with the powers given them by Senator Pettigrew's amendment.

#### THE BEQUESTS OF THE LATE PROFESSOR COPE.

THE will of Edward D. Cope, signed October 1, 1895, in accord with the guiding principles of his life, leaves, after making ample provision for his family, his collections for the benefit of science. His scientific books, his osteological collection, and his collection of fresh-water mollusca are given to the School of Biology of the University of Pennsylvania, and his collection of minerals to the University. Duplicates of the collection of fresh-water mollusca are to go to the Cincinnati Society of Natural History and to the American Museum of Natural History. The collections preserved as wet preparations and the skins of animals are given to the Philadelphia Academy of Natural Sciences. The paleological collections are divided into three parts: *First*. The North American collection. *Second*. The South American, *i. e.*, the Pampean collection which was purchased of the Buenos Ayrean exhibitors at the Paris Exposition of 1878, and small collections from

the West Indies and Mexico. *Third*. European collections chiefly from the Neocene of Alber of France. It is directed that these collections be sold, and after the payment of private bequests, including \$2,500 to each of his assistants, Mr. Jacob Geismar and Miss Anna M. Brown, that the balance, estimated at \$40,000, be given to the Academy of Natural Sciences at Philadelphia, as an endowment for a professorship or curatorship of vertebrate paleontology. The incumbent must be an original investigator elected by the Council of the Academy and approved by the National Academy of Sciences, \$400 of the income of this endowment to be used for the procurement, either by collection or purchase, of vertebrate fossils. The executors of the will are Mr. John B. Garrett and Professor Henry F. Osborn.

#### GENERAL.

A MEMORIAL meeting in honor of the late Professor Sylvester was held under the auspices of the Johns Hopkins University on May 1st. Addresses were made by Dr. Fabian Franklin and others.

THE Flower Astronomical Observatory of the University of Pennsylvania was dedicated on the afternoon of May 12th. An address was made by Professor Simon Newcomb.

PRINCE LUIGI with a large party will shortly arrive in this country, with a view to making explorations in Alaska and ascending to the summit of Mt. St. Elias. Professor I. C. Russell has made thorough explorations of the mountain, attaining a height of 12,000 feet, but the summit, some 18,000 feet in height, has never been reached.

THE Literary and Philosophical Society of Sheffield proposes to have painted for the Society a picture of Dr. H. C. Sorley in celebration of the fiftieth anniversary of the beginning of his scientific work.

THE degree of LL.D. has been conferred by the University of Edinburgh on Professor James Dewar and Dr. John Willie.

THE Royal Geographical Society has elected the following as honorary corresponding members: Professor G. Della Vedova, Baron Toll and Captain Otto Irminger.

DR. NANSEN'S proposed lecture before the Geographical Society at Rome has been abandoned because the Society was unable to pay the terms demanded.

THE Board of Estimate and Apportionment of New York City have authorized the issue of bonds to the amount of \$500,000, the money to be used for the erection of a further wing for the American Museum of Natural History. Plans for the wing prepared by the architects, Messrs. Kodeberg and See, were submitted and approved.

THE class of 1897 of Yale University has presented to the Peabody Museum a meteorite, weighing 65 lbs., which was found three years since in Kansas.

A PROPOSITION in the Massachusetts House of Representatives to amend the bill appropriating \$150,000 for the work of exterminating the gypsy moth, by making the amount \$200,000, was voted down, but the bill itself was ordered to a third reading.

IT is reported that the authorities of the elevated railways of New York City have examined Mr. Keely's motor with a view to its introduction. It is probable that the nature of motor was not made clear to them and that it will not be used in New York. Scientifically inclined people are not likely to believe that Mr. Keely's motor can make something out of nothing, but this will not be the opinion of those who have invested money in the scheme.

AT the monthly general meeting of the Zoological Society of London, held on April 22d, it was reported that the additions to the Society's menagerie during the month of March were 152 in number. Special notice was directed to three examples of the Indian pygmy goose (*Nettopus Coromandelianus*), presented by Mr. Frank Finn. It was stated that many attempts had previously been made to introduce this bird into Europe, but without success, and that these were the first specimens which had reached the Society's gardens alive.

ANOTHER great Auk's egg has been sold at auction in London—this time to Mr. G. T. Middlebrook for 280 guineas.

THE appearance of two new serials is noted

in *Natural Science: The Aeronautical Journal*, published by the resuscitated Aeronautical Society, and *East Asia*, a quarterly, which will include the natural history, etc., of the region.

DR. C. DU BOIS-REYMOND, son of the late Emil Du Bois-Reymond, expects to edit, from the notes of students, the courses of lectures given by Du Bois-Reymond, at the University of Berlin, on the Results of Modern Science and Physical Anthropology.

IT gives us regret to announce the death of Martin L. Linell, Aid in the Department of Insects of the U. S. National Museum for the past nine years. Mr. Linell was 47 years of age, a Swede by birth and a former student in the University at Lund. He came to America in 1879, and was at first Curator of the Brooklyn Entomological Society, accepting the position in the National Museum in 1888. He was one of the most learned coleopterists in the country, and his high scientific attainments, as well as his thorough acquaintance with the great collection of insects at Washington, will render it very difficult to fill his place.

THE *American Naturalist* for May contains a short appreciation of the late Professor Cope, by Dr. Persifor Frazer, who takes *pro tem.* Cope's place as senior managing editor of the journal, and an article on Cope by Professor J. S. Kingsley, who for many years was associated with Cope in the editorship of the journal. The number also contains six portraits of Cope. Four of these are from photographs taken respectively in 1879, 1884, 1887 and 1892. These show an evident gain in force of expression, which appears not to be unusual with men of great achievement. The frontispiece of the number is from an oil painting by Mr. George W. Pettit, in the possession of the American Philosophical Society, and a second full-page plate is from a bust by Mr. Eugène Costello.

THE opening article of the May number of the *American Journal of Science* is an admirable memoir of Hubert Anson Newton, by Professor J. Willard Gibbs. The frontispiece of the number is a portrait of Professor Newton in his library, taken by a member of his family in the spring of 1894. The appended bibliography contains 69 titles.

FROM a note in the current number of the *American Journal of Science* we take the following facts regarding the late Matthew Carey Lea, who died on the 15th of March. He was born in 1823, and was the eldest son of Isaac Lea, the publisher, well known as a geologist and a mineralogist, but especially as a conchologist in connection with his investigations on the genus *Unio*. His early associations giving him a special interest in scientific matters, he entered the laboratory of Professor James C. Booth and there acquired great proficiency in chemistry. To this science he devoted his life, his chemical researches being numerous and important. He was elected to membership in the National Academy of Sciences in 1892, and the list of his more important papers then published contained fifty-four titles. These investigations for the most part related to the chemistry of photography, and especially to the action of light and other forms of energy upon silver salts. He described photo-bromide and photo-iodide of silver, and in 1887 published a paper on the 'Identity of the photo-salts of silver with the material of the latent photographic image.' His most remarkable discovery, made in 1889, was that silver is capable of existing in three allotropic states.

ON the catalogues of Muscineæ by Mitten, in Godman's Natural History of the Azores, which recognized 47 species from the archipelago, and the recent collections of Trelease, Brown, Carreiro, Machado, Blanchy, Richard and Minelle, M. Cardot in the last report of the Missouri Botanical Garden bases a catalogue of 88 Azorean species and 14 varieties or forms, of which 9 species and 3 varieties are considered as new to science. He also describes one new species and indicates one other as probably undescribed, from a small collection of 19 species made on Madeira last year by Trelease. Eleven plates illustrate, in habit and detail, the novelties.

A LETTER from Professor Th. Tschernychew to Dr. Persifor Frazer in reference to the approaching International Geological Congress is translated and published in the current number of the *American Naturalist*. It states "that from this time on the number of persons who have in-

scribed themselves is so great—nearly 700—that it will be absolutely impossible to enable them all to take part in the excursions." It is not clear from this whether those already registered may be excluded from the excursion or whether this applies only to new applicants, but those who are attracted to the Congress by these excursions will do well to make enquiry.

THE issue of SCIENCE for February 12th contained an article by Professor A. B. Macallum on the arrangements for the Toronto meeting of the British Association. We are now able to give the preliminary daily programme, which is as follows :

*Wednesday, August 18th.* Reception Room open, 8 a. m. to 6 p. m.; Meeting of Council at 10 a. m.; Meeting of General Committee at 3 p. m.; Address of the President, Sir John Evans, in Massey Hall, at 8 p. m.

*Thursday, August 19th.* Sectional Meetings in most cases, 10 a. m. to 3 p. m.; Garden Party, 3.30 to 6 p. m.; Conversazione in the Legislative Buildings, 8.30 to 11.30 p. m.

*Friday, August 20th.* Sectional Meetings in most cases, 11 a. m. to 3 p. m.; Garden Party, 3.30 to 6 p. m.; Lecture by Professor W. C. Roberts-Austen, C.B., F.R.S., in Massey Hall at 8.30 p. m.

*Saturday August 21st.* Sectional Meetings, 10 a. m. to 1 p. m.; Excursion of Members of Section G. (Mechanical Science) to Niagara, 9 a. m. to 6 p. m.; Excursions to Hamilton and neighborhood, Niagara Falls and Muskoka Lake Region, returning on Monday morning. Lecture to Workingmen. Lecture and subject to be announced.

*Monday, August 23d.* Sectional Meetings in most cases, 10 a. m. to 4 p. m.; Excursion of Members of Section C (Geology) to Scarboro' Heights, 1 to 6 p. m.; Garden Parties; Lecture by Professor J. Milne, F.R.S., on Earthquakes, in Massey Hall, at 8.30 p. m.

*Tuesday, August 24th.* Sectional Meetings in most cases, 10 a. m. to 3 p. m.; Garden Party at Trinity College, 4 to 6 p. m.; Conversazione in the University Building, 8.30 to 11.30 p. m.

*Wednesday, August 25th.* Some Sectional Meetings, 10 a. m. to 1 p. m.; Concluding General Meeting, 2.30 p. m.; Garden Parties, 3.30 to 6 p. m.; Banquet in honor of Lord Kelvin, Lord Lister and Sir John Evans, 8 p. m.

*Thursday, August 26th.* Excursions to Niagara Peninsula, Thousand Islands, Ottawa, Montreal, Upper Lakes and to Manitoba and British Columbia. (See Excursion Guide.)