

layer such as is found investing the crown of the teeth of sharks, appears to have been a protection against the drilling power of the borers.

"Fossils excavated from the phosphate beds are of a ferruginous brown colour, but often much lighter or white upon the surface. Those which are obtained from the rivers contiguous to the beds are usually more or less black, with the enamel of teeth iron-gray, and they frequently exhibit the basal attachment of small barnacles, and occasionally the valve of an oyster.

"From the fossils consisting mainly of the harder and denser, and therefore heavier parts of skeletons and teeth, they are generally assumed to be petrified, but usually the change has not been more than a moderate loss of the ostein basis and the infiltration of iron oxyd.

"From the extraordinary variety and profusion of the fossil remains of the Ashley phosphate beds it may be inferred that these were the former rich feeding grounds for multitudes of marine and amphibious animals. At an early period during the formation of the tertiary marl here congregated great sharks, rays, squalodons, &c. At a later period their successors varied their diet with the carcasses of great land animals, as elephants, mastodons, &c., which floated down the broad and swollen rivers, as drowned herds of the bison are said to do in our day upon the Missouri River.

"Some of the remains of terrestrial animals, comparatively few in number, found as fossils in the Ashley phosphate beds, including even the softer or more spongey bones, exhibit no evidence of violent water action other than the signs of decay from the combined influence of moisture and air; neither do such fossils exhibit the marks of boring molluscs, nor the attachments of barnacles. Usually black and more or less friable, these fossils, such as the bones of mastodon, megatherium, deer, &c., are no doubt the remains of animals which became mired and sank into marshes of the Ashley phosphate beds after these had become elevated above the surface of the neighbouring sea. Of this nature, also, we may believe, are the remains of more recent animals, including also specimens of human bones, those of domestic animals, and stone implements, which are occasionally found in the Ashley phosphate beds."

SCIENTIFIC SERIALS

American Journal of Science and Arts, July.—Contributions to meteorology, by E. Loomis (eleventh paper).—Silurian formation in Central Virginia, by J. L. Campbell.—New form of spectrometer, and on the distribution of the intensity of light in the spectrum, by J. W. Draper.—Extinct volcanoes about Lake Mono, and their relation to the glacial drift, by J. Leconte, Mineral locality in Fairfield Co., Connecticut, by G. J. Brush and E. L. Dana (third paper).—Note on the progress of experiments for comparing a wave-length with a metre, by C. S. Peirce.—Recent additions to the marine fauna of the eastern coast of North America, by A. E. Verrill.—Position of the planets *Philomela* and *Adonia*, by C. H. F. Peters.—Method of preventing the too rapid combustion of the carbons in the electric lamp, by H. W. Wiley.—Bernardinite, a new mineral resin, by J. M. Stillman.—Notice of a new Jurassic mammal, by O. C. Marsh.—On the Hudson River age of the Taconic schists, by James D. Dana.—(Several of these papers are noticed by us elsewhere.)

Verhandlungen des naturhistorischen Vereins der preussischen Rheinlande und Westfalens (Bonn, vol. 35, parts i. and ii., 1878).—From these parts we note the following papers:—Section for Geography, Geology, Mineralogy, and Paleontology: Description of the Cotopaxi and its last eruption on June 26, 1877, by Th. Wolf (with plates).—On the eruptive rocks in the Saar and Moselle districts (with plates), by A. von Lasaulx.—Chemical examination of Westphalian and Rhenish rocks and minerals, by W. von der Marck.—New researches on the oldest Devonian formations of the Harz mountains, by C. Schlieter.—On some spiders and a myriapod from the brown coal of Rott (with plate), by Ph. Bertkau.—On some ferns from the coal-flora, by Dr. C. J. Andrä.—On some new Cephalopoda from the North German chalk deposits, by C. Schlieter.—On the geology of Italy, by Herr vom Rath.—On O. Volger's new theory of wells and sources, by Dr. Mohr.—On the depths and configurations of the sea-bottoms, by Herr Fischer.—On the crystallisation of cyanite, by Herr vom Rath.—On the natural conditions of Elberfeld, Barmen, and neighbourhood, by Herr Cornelius.—On

the development and importance of coal mining in the Rhineland and Westphalia.—On the geographical conditions of the Oster Wood near Elberfeld, by Herr Buff.—On the mining operations in the Eifel from a historical point of view, by Herr Voss.—On some fossil bones from the Unkelstein, by Herr Schwarze.—On the perception of the earthquake of August 26, 1878, in the Rhenish mines, by Herr Fabricius.—On a fossil elephant's tusk from Hennef in the Sieg Valley, by Herr Buff.—On a lōss-like formation in the diluvium of the Weser district, by R. Wagener.—Botanical Section: Further researches on the fertilisation of flowers by insects, by H. Müller.—On *Limodorum abortivum*, Sw., and *Epipogium gmelini*, Rich., by G. Becker.—On *Ophrys arachnites* and *O. apifera*, by the same.—On some rare specimens from the Rhenish flora, by the same.—On the persistence of flowers and fruits in their position with regard to the horizon, by Herr von Hanstein.—Anatomical and physiological researches on the nectaries of flowers, by Herr Behrens.—On the change of colour in leaves, by Herr Lindemuth.—Section for Anthropology, Zoology, and Anatomy: Herpetological drawings made by Rösel von Rosenhof (from his posthumous papers), discussed by F. Leydig.—On some parasitical hymenoptera, by A. Förster.—On the mollusk fauna of Westphalia, by P. Hesse.—On the clothes of man compared to the natural coats of animals, by Prof. Troschel.—On the whales occurring on the coasts of Japan, by Herr Mohnike.—On the spermatogenesis of mammals, by Prof. von la Valette St. George.—On the differences between *Atypus piecus*, Sulz., and *A. affinis*, Eichw., in the female sex, by Herr Bertkan.—On the bats of the Rhineland and Westphalia. On thirty-six species of fish caught in the Rhine near Linz, by Herr Melsheimer.—Section for Chemistry, Technology, Physics, and Astronomy: On the action of prussic acid, by Herr Wallach.—On normal weights made of rock crystal, by Herr Stein.—On a metallurgical work published in Japan in the seventeenth century, by Dr. Gurlt.—On celluloid, by Dr. Köster.—On the nature of the force of attraction, by Prof. Mohr.—On the decomposition of salicylate of soda by carbonic acid, by Herr Binz.—On Prof. Newcomb's researches on the motion of the moon, by Herr Schönfeld.—On the Rott tunnel near Barmen, by Herr Hövel.—On a universal hand-boring machine for hard rocks, by Herr Faber.

Journal of the Franklin Institute, July.—Power-transmitting mechanism; on the strength of the teeth of wheels, by Mr. Cooper.—Harmonic and basic lines and tendencies, by Dr. Chase.—Committee report on Olsen's testing machine.—Machines for measuring, by Mr. Richards.—The electric arc, its resistance and illuminating power, by Professors Thomson and Houston.—Effects of atmospheric changes on textile bands, by Mr. Woodbury.—Phosphorus in bituminous and anthracite coals, by Mr. Roney.

THE quarterly *Revue des Sciences naturelles* (2nd series, vol. i., No. 1).—On the aphides inhabiting *Pistacia terebinthus* and *P. lentiscus*, by L. Courchet.—Morphological researches on the family of Graminaceæ, by D. A. Godron.—On some plants gathered in the neighbourhood of Montpellier in 1877, by M. Duval Jouve.—Catalogue of the land- and river-molluscs of the Hérault department, by E. Dubreuil.—On the employment of collodion for obtaining microscopical sections, by M. Duval.—Note on the discovery of a layer of limnacidæ-marlstone (shell-marl) at Celfeneuve, near Montpellier, by F. Fontannes.—On the reason of the occasional simultaneous occurrence of limestone plants and silica plants, by Ch. Contejean.

THE *Sitzungsberichte der naturwissenschaftlichen Gesellschaft Isis zu Dresden* (1878, part ii., July—December) contain the following papers of interest:—On the earthquake observed at Nolhac on July 24, 1878, by J. von Boxberg.—On the tertiary basin of Bilin, by Herr Deichmüller.—On the cones of *Glyptostrobus europeus*, Brongn., by Herr Engelhardt.—On the bed of the River Priessnitz, near Dresden, by the same.—On J. H. Schmick's work: the sun and moon as constructors of the earth's shell, by Clemens König. The reviewer condemns Herr Schmick's theory completely, and draws attention to its numerous weak points.—On the mineralogy and geology of the St. Gotthardt, by Herr Roscher.—On some abnormal cone formations in pines, by Dr. Nobbe.—On some Swedish plants, by Herr von Biedermann.—On some new results in prehistoric research, by Dr. Geinitz, sen.—On a light machine, by Dr. Töpler.—On an elementary derivation of the law of gravitation from Kepler's laws, by Herr Helm.—On an expedition to the Arctic Ocean and the White Sea, by Herr Baldauf.—On silicified

roots and other wooden objects found at Oberan, Tessen, and Okrylla, by Dr. H. Conwentz.—On the silicified woods from the diluvium of Kamenz, Saxony, by Dr. E. Geinitz.—On the general conception of space and its applicability in natural research, by Dr. A. Harnack.—On the electrometric appliances of the present day, by Dr. Töpler.

Journal de Physique, July.—On the optical figures of polychroic crystals, by M. Bertin.—On the figures presented by crystals having one optical axis, by M. Bertrand.—Noës' thermoelectric piles, by M. Niaudet.—Colours, the chromometer, and photography of colours, by M. Cros.

Gazetta Chimica Italiana, fasc. iv. and v.—On nicotine, by S. Andreoni.

SOCIETIES AND ACADEMIES

GENEVA

Society of Physics and Natural History, February 6.—M. L. Lossier explained a special method which he has introduced for assays of gold.—M. Albert Rilliet gave an account of a research made by him and M. E. Ador on the hydrocarbons obtained by the action of the chloride of methyl on benzine in presence of chloride of aluminium.

February 20.—M. H. de Saussure described an apterous insect of Gaboon, whose mode of life is unknown, and which has been described under the name of *Hemimerus*. It has the remarkable characteristic of possessing a second lower lip provided with palpi, and several other characteristics make it an insect of an altogether special nature, difficult to classify in any of the known orders.

March 6.—M. Casimir de Candolle has studied the anatomy of the leaves of some cotyledons, and particularly the internal conformation of their petiole, or the principal nervure. This petiole shows in its centre a woody bundle presenting very varied forms—sometimes that of an arc, sometimes that of a complete ring. Besides this complete ring, there are frequently observed woody bundles placed outside the ring, and which M. de Candolle calls cortical; at other times bundles inside the ring, and which M. de Candolle calls intra-medullary.—M. Ph. Plantamour observed during the cyclone of February 20 a notable depression of level of the Lake of Geneva. The wind produced this effect of depression notwithstanding the diminution of atmospheric pressure indicated by the barometer, and which would tend to raise the level of the water. When the wind assumes the form of a whirlwind, it produces an aspiration instead of a depression. The rate of the cyclone referred to appears to have reached at least 24 metres per second.

March 20.—Prof. E. Plantamour presented a quarto volume entitled "Telegraphic delineation of the difference of longitude between Geneva and Strasburg," published by himself and M. M. Löw. This operation, executed in 1876, resulted in a difference of 6m. 27'934s.—M. D. Colladon, on the occasion of very remarkable cases of *verglas* observed in Paris on January 20 and 23, recalled former cases described by him and others (see *Comptes Rendus*, t. lxxx. viii., March 31, 1879).

April 3.—M. Raoul Picet communicated the continuation of his researches on the theory of heat. He admits that the amplitude of the oscillations of molecules around their position of equilibrium may be taken as a measure of heat, or as corresponding to the temperature. He explains by this definition the properties of fusibility of metals and the anomalies of Mariotte's law.—Prof. Brun described a curious case of poisoning in a child of two years, resulting from eating a combination of cabbage and figs. The cabbage must have produced a great abundance of lactic acid, which in presence of the glucose of the figs had produced butyric acid in sufficient abundance to cause the death of the child.

April 17.—Prof. Alph. Favre has found iron in the state of particles attractable by the magnet in all the earths and rocks of the country around Geneva which he has examined. This iron, in grains, not being soluble, cannot be considered in the analysis of arable soils, as profitable to vegetation. Hence erroneous conclusions resulting from these analyses, which suppose more iron than there is possible for vegetation. The origin of this iron is attributed in part to the *débris* of meteorites.

PARIS

Academy of Sciences, July 28.—M. Daubrée in the chair.—The following papers were read:—Researches on the refrac-

tion of obscure heat (continuation), by M. Desains.—Note on the hydrate of chloral, by M. Wurtz.—Observations on the memoir of MM. Noble and Abel on explosive substances, by M. Berthelot.—On the theory of hail, according to MM. Oltramare and Colladon, by M. Faye. M. Boussingault also made some observations on the subject.—On the effect of electrical excitations applied to the muscular tissue of the heart, by M. Marey.—Memoir on the temperature of the air at the surface of the ground and of the earth to 36 m. depth, as also on the temperature of two soils, one exposed, the other covered with grass, during the year 1878, by MM. Ed. and H. Becquerel.—Researches on samarium, radicle of a new earth extracted from samarskite, by M. Lecoq de Boisbaudran.—MM. Georges Pouchet and S. Jourdain were then nominated candidates for the chair of Comparative Anatomy at the Natural History Museum, vacant through the death of M. Paul Gervais.—M. Daubrée then reported on the experimental researches of M. Stanislas Meunier, relating to the meteoric nickel-iron and native carburetted iron of Greenland.—Two memoirs were presented to the Academy, one by M. David, on the development of algebraic functions, the other by M. Poincaré, on the effect produced by the inhalation of nitrobenzole vapour.—On some observations of planets (198) and (200), made at the Marseilles Observatory, by M. Stephan.—On an application of rational mechanics to the theory of equations, by M. F. Lucas.—On the action of light on electric piles, by M. H. Pellat.—On the refrigerating action of air at high pressure, by M. A. Witz.—On the distillation of a heterogeneous liquid, by L. Troost.—On the quantities of organic matter in mineral waters, by G. Lechartier.—Thermo-chemical researches on the soluble alkaline sulphides, by M. Sabatier.—On the decomposition of sulphide of ammonium, by MM. R. Engel and A. Moitessier.—On the calcination of turnip-molasses, by M. C. Vincent.—On the influence of sugar injected into veins upon the secretion of urine, by MM. Ch. Richet and R. Moutard-Martin.—On the irritability of a muscle during the different periods of its contraction, by M. Richet.—On the discovery of medicaments and poisons in saliva, by M. Gabriel Pouchet.—Comparison of the influence of intravenous injections of chloral, chloroform, and ether, by M. Arloing.—On the lympho-glandular organs and the pancreas of vertebrates, by M. Renaut.—On some multi-nuclear animal and vegetable proto-organisms, by E. Manpas.—On the two great phases of the annual circulation of the atmosphere, by L. Brauet.—Experiments on milk-production, by M. Lami.—On the formations of the so-called "Dombes," by M. Nivet.—On the palm-wine of Laghouat, by M. Balland.

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