

AMERICAN SCIENCE

THE chief signal officer of the U.S. army has been urging that physical observations of the sun be made, as of sun-spots, facule, protuberances, &c., in reference to their supposed influence upon terrestrial meteorology, and has offered to publish the results monthly, or such of them as may be considered desirable by the observer, in the *Monthly Weather Review*. The United States Naval Observatory at Washington has already accepted this proposition, and it is considered very desirable that some other observatories in the east, and at least one on the western coast, co-operate in this undertaking.

Dr. C. A. White, palæontologist to the United States Geological and Geographical Survey of the Territories, has spent the past season making a critical study of the mesozoic and Cainozoic strata of the great Rocky Mountain Region, and the results have tended to confirm in a remarkably clear manner the statement so often expressed by Dr. Hayden in his annual reports, that the entire series of deposits are consecutive from the Dakota group of cretaceous age below, to the Bridger group of tertiary age above. The sedimentation was evidently continuous through all the changes, from marine to brackish, and from brackish to fresh waters, that successively took place in that great region, although those changes in aqueous conditions produced corresponding changes in the then prevailing forms of invertebrate life.

The annual report of the Board of Regents of the Smithsonian Institution for 1876 has been published, and, as usual, contains a great deal of matter interesting to men of science. The portions of the volume detailing the operations of the institution for 1876 is more especially occupied with an account of what was done in connection with the International Exhibition of 1876, at Philadelphia, and especially of the very extensive and valuable presents made to the United States by the various foreign commissions, and taken charge of by the institution, in accordance with the law of Congress. Reference is made to an application for an appropriation to erect an additional building to accommodate these objects, for which it is estimated that a floor space of 80,000 square feet will be required. Until this is done the collections in question must remain in their original packages, more than 4,000 in number, which are stored on four floors of a separate building, 50 by 100 feet, and filling them completely from floor to ceiling. As usual, the funds of the institution are reported as being in a favourable condition, the income not being exceeded by the expenditure, and an available balance even remaining in hand at the end of the fiscal year. The second part of the volume embraces biographical notices of Dom Pedro II., and also of Gay-Lussac, articles on the kinetic theories of gravitation, the revolutions of the crust of the earth, the asteroids between Mars and Jupiter, and a number of papers on ethnology and archæology. Of these the most important is by Prof. Mason on the Latimer collection of antiquities from Porto Rico, in which the more interesting objects of this unique series are figured. Other papers on ancient mines and mounds, implements of various kinds, &c., are also contained in the volume.

We have to record the death of Mr. Timothy Abbott Conrad, one of the oldest and most accomplished palæontologists of the United States. Mr. Conrad was born in 1803, and commenced his investigations early in the century, beginning with the tertiary and cretaceous formations of the United States. In 1832 he commenced an illustrated work on the "Fossil Shells of the Tertiary Formations of the United States," which was, however, preceded in 1831 by his "American Marine Conchology." Most of his papers appeared in the *American Journal of Science and Arts*, and in the *Proceedings and Memoirs of the Academy of Natural Sciences*, Philadelphia. He also contributed largely to the reports of the various government exploring expeditions.

The *Nation* announces the death of Mr. John G. Anthony, for many years a devoted coadjutor of Agassiz in the Museum of Comparative Zoology at Cambridge, where he had charge of the conchological department. Long residence and extensive travel in the Ohio Valley had made him the first authority in the United States on fresh-water shells. He accompanied the Thayer expedition to Brazil, but sickness prevented him from taking part in it after its arrival. In addition to his special work Mr. Anthony always maintained an interest in Botany and horticulture. He was a native of Rhode Island, and was in the seventy-fourth year of his age.

Prof. Marsh makes the announcement of the interesting dis-

covery of the remains of two species of fossil bison in the lower pliocene of Nebraska and Kansas. They were much larger than the existing bison, with more powerful horns.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The Vice-Chancellor, Dr. Atkinson, on resigning his office on November 3 (he has been re-elected) spoke of the progress of scientific teaching in the University. The efficiency of the University as a school of natural science has been greatly promoted, Dr. Atkinson stated, during the past year by the erection of the new buildings for the department of comparative anatomy and physiology. Although the whole building is not yet completed, many of the rooms are already in use, and the accommodation which is thus provided for both teachers and students will be of the greatest advantage. In connection with this subject Dr. Atkinson referred to Prof. Clerk Maxwell's announcement that His Grace the Chancellor has now completely equipped the Cavendish Laboratory with all the apparatus and instruments which the professor considers that a first-class institution of this kind ought to possess. This singular munificence, continued so steadily and ungrudgingly for such a number of years, is but one of the many proofs which His Grace is constantly giving of his unwearied care and concern for the welfare of the University.

The following gentlemen have been elected to fellowships at St. John's College:—Arthur Milnes Marshall, B.A., Senior in Natural Science Tripos, 1874, and Donald M'Alister, B.A., Senior Wrangler and First Smith's Prizeman, 1877.

OXFORD.—At a special meeting of the Town Council held at Oxford on Monday it was resolved to establish a first-class grammar school, the Corporation granting a site in the centre of the city of nearly an acre in extent, 4,000*l.* towards the building, and 100*l.* per annum towards its maintenance. There are to be fifty free scholarships tenable for three years, thirty of which are to be filled up from the public elementary schools.

LONDON.—The Council of University College, London, have appointed the Rev. T. G. Bonney, B.D., of St. John's College, Cambridge, Professor of Geology and Mineralogy for five years.

ST. ANDREWS.—Mr. George Chrystal, B.A., Fellow and Lecturer of Corpus Christi College, Cambridge, has been appointed to succeed Prof. Fischer in the chair of mathematics.

Among the names likely to be brought forward by the students for the honorary and honourable post of rector of the University, that of Prof. Tyndall is mentioned.

SCIENTIFIC SERIALS

Morphologisches Jahrbuch, vol. iii. Part 3.—R. Bonnet, on the structure of, and circulation in, the gills of Acephala, pp. 45, three plates.—C. Hasse, fossil vertebræ (the Squatina), two plates.—R. Wiedersheim, the skull of Urodeles, pp. 97, five plates; a most valuable memoir on Menobranchus, Siren, Proteus, Amphiuma, Cryptobranchus, Menopoma, Salamandrina, Triton, Axolotl, Plethodon, Spelerpes, Ellipsoglossa, Amblystoma.—M. Fürbringer, on the cephalic skeleton of Cephalopods.

Annalen der Physik und Chemie, No. 9.—On discontinuous liquid motions, by M. Oberbeck.—Explanation of Dufour's and Merget's experiments on the diffusion of vapours, by M. Kundt.—On the diffusion of liquids, by M. Johannisganz.—On the internal friction of solid bodies, by M. Schmidt.—On the photo-electricity of fluorspar, by M. Hankel.—On the resistance of flames to the galvanic current, by M. Hoppe.—On the electrochemical process at an aluminium anode, by M. Beetz.—Further experiments on galvanic expansion, by M. Exner.—Reply to Zöllner's objections against my electro-dynamic views, by M. Clausius.—On a mode of inference employed by Prof. Tait in the mechanical theory of heat, by M. Clausius.—On the sounding of air in pipes, by M. Ciamician.—The spectrum of nitrous and hyponitric acid, by M. Moser.—On optical illusion, by M. Trappe.

Beiblätter zu den Annalen, &c., No. 8.—On the equilibrium of a drop between two horizontal plates, by M. Bosscha.—On cylindrical sound-waves, by M. Grünwis.—Application of the galvanic current to investigation of the spheroidal state of some liquids, by M. Hechus.—On the tenacity of copper and steel, by MM. Pisani and Saporita Ricca.—On the polymorphism of crystals, by M. Moutier.—The heat of solution of chlorine, bromine, and iodine compounds, by M. Thomsen.—New

saccharimeter, by M. Laurent.—Lecture experiment on the colour-change of certain double iodides, by M. Boettger.

No. 9.—On physical isomerism, by M. Lehmann.—On the elasticity of gypsum and mica, by M. Coromilas.—On the influence of pressure on the temperature at which water shows a maximum density, by M. Van der Waals.—Apparatus for measurement of the expansion of rigid bodies by heat, by M. Reusch.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, November 1.—Dr. Gladstone in the chair.—The following papers were read:—On some hydrocarbons obtained from the homologues of cinnamic acid, by W. H. Perkin. These hydrocarbons were prepared either by heating the acids or by treating the hydrobromo acids with bases. The following acids were prepared and examined:—Hydrobromocinnenylic, hydrobromocinnenylcrotonic, hydrobromocinnenylangelic. The following hydrocarbons were obtained:—Isopropylvinylbenzene, isopropylallylbenzene, isopropylbutenylbenzene, allylbenzene, and butenylbenzene; the dibromides of these bodies were also prepared and examined.—On anethol and its homologues, by W. H. Perkin. By heating methylparoxyphenylacrylic acid, vinylic anethol was obtained, similarly allylic or ordinary anethol and butenylic anethol were prepared. In conclusion the author discusses the formation of the hydrocarbons from the hydrobromo acids, and concludes that they are formed simply by the separation of hydrobromic acid and carbonic anhydride.—On two new methods for estimating bismuth volumetrically, by M. M. P. Muir. To a solution of bismuth in nitric acid an excess of sodium acetate is added, and then a measured volume of standard sodium phosphate solution also in excess; the bismuth is precipitated, the precipitate filtered off, and the excess of phosphoric acid determined in the filtrate by uranium acetate. The other method given does not yield such accurate results.—On the oxidation of ditolyl, by T. Carnelly. By the oxidation of solid ditolyl the author obtained diparatolylphenylcarbonic acid and diparadiphenyldicarbonic acid; liquid ditolyl yielded orthoparatolylphenylcarbonic acid, orthoparadiphenylcarbonic acid, and finally terephthalic acid.—On a new manganese reaction, by J. B. Hannay. If a solution of a manganese salt in strong nitric acid is warmed in the presence of an iron salt with some crystals of potassic chlorate, the iron and manganese are precipitated as a double manganate of iron and manganese. The author proposes this reaction for separating iron from aluminium, &c.

PARIS

Academy of Sciences, October 29.—M. Peligot in the chair.—The following papers were read:—*Résumé* of a history of matter (second article), by M. Chevreul.—On the solar photospheric system, by M. Janssen.—The telephone of Mr. Graham Bell, by M. Breguet.—On the determination of the quantity of mud contained in current water, by M. Bouquet de la Grye. He uses an instrument named a pelometer ($\pi\lambda\lambda\omicron\varsigma$, mud), consisting of a V-shaped vessel whose rectangular faces, inclined one-tenth, are of thin glass, while its sides are of copper or white iron. One glass face has a centimetre scale commencing from the angle. The pelometer is filled and held vertical; it then presents a succession of vertical layers of increasing thickness upwards, and by comparison with glass-ended tubes containing muddy water of various known densities, the proportion of mud may be ascertained. Other methods are given. Experiments made at Rochelle show that the quantity of mud per litre varies from one to ten times according to the depth. He considers regular measurements of the kind on watercourses desirable for agriculture, &c.—On an American vine-stock not attacked by phylloxera, by M. Fabre. This vine belongs to the species *Riparia*. Among other merits (besides its immunity) it gives cuttings readily, receives grafts from French species better than any other American variety, thrives in most arid soils, compact clays, and soils long exhausted by vine cultivation, and grows very rapidly.—On treatment of phylloxerised vines with sulphocarbonate of potassium applied with the distributing pail, in 1876-77, by M. Gueyraud.—Observations of the planet (175) Palisa, made at the Paris Observatory, with the west equatorial of the Garden, by MM. Paul and Prosper Henry.—Stellar systems of 36 Ophiuchus and 40 Eridan, by M. Flammarion.—General form of coefficients of certain developments, by M. André.—New mode of plane representation of classes of graduated surfaces, by M. Mannheim.—Experiments on the disruptive discharge made with the chloride of silver battery by MM. Warren de la Rue and H. W.

Müller.—Rheostatic machine, by M. Planté. He combines a number of condensers (made of mica and tin), so as to be easily charged, from a secondary battery, in quantity and discharged in tension. The commutator is a long cylinder of hardened caoutchouc, having longitudinal metallic bands, and traversed by bent copper wire (for the two objects named). Metallic springs are connected with the two armatures of each condenser, and fixed on an ebonite plate on each side of the cylinder, which is rotated. A series of sparks can be got between the branches of the exciter in this arrangement, quite like those from electric machines with condensers. The discharges are always in the same direction, and the loss of force is less than in induction apparatus. A great many discharges can be had without the secondary battery being perceptibly weakened, as each discharge removes only a very small quantity of electricity.—On semi-diurnal barometric variations, by M. de Parville. The tropical hours may present, at a few days' interval, divergences amounting, during the great period, to forty-five minutes. The barometric variations in the tropical hours are not uniform; the maximum of descent of the mercury column occurs about three o'clock. Equality between the periods of day and night has never occurred. The amplitude of the variation is greater by day than by night, and during the dry season than during the wet.—On the action of anhydrous acids on anhydrous bases, by M. Bechamp. They are capable of uniting wholly.—On the determination of reducing sugar contained in commercial products, by M. Girard.—On the reducing sugar of commercial products in its relations to saccharimetry, by M. Morin. He shows the optical inactivity of this sugar.—On the production of racemic acid in the manufacture of tartaric acid, by M. Jungfleisch.—On some physical properties of *quercite*, by M. Prunier.—Action of solar light with variable degrees of intensity on the vine, by M. Macagno. Diminution of intensity hinders the production of glucose; the other elements (produced or assimilated) are in direct ratio of the luminous intensity. A portion only of potash is in inverse ratio of the luminous intensity: the contrary occurs in the case of potash combined with tartaric acid.—On the Orthopectida, a new class of animal parasites of Echinoderms and Turbellaria, by M. Giard.—On the calcareous algae belonging to the group of verticillate Siphonae (*Dasycladaceae, Harv.*), and confounded with the Foraminifera, by M. Munier Chalmas.—Effects of faradisation in a case of hydrophobia in man, by M. Menesson. Considerable sedative effects were obtained; the patient, however, died after two days through a sudden stoppage of the heart's contractions.

CONTENTS

	PAGE
EXPLOSIONS IN MINES. By W. GALLOWAY	21
THE SUN'S PHOTOSPHERE By J. NORMAN LOCKYER	22
FOWNES' "MANUAL OF CHEMISTRY"	24
OUR BOOK SHELF:—	
Bryce's "Transcaucasia and Ararat; being Notes of a Vacation Tour in the Autumn of 1876"	25
Wormell's "Thermodynamics"	25
"Simple Lessons for Home Use"	25
LETTERS TO THE EDITOR:—	
Appunn and Koenig.—Beats in Confined Air.—ALEXANDER J. ELLIS, F.R.S.	26
The Radiometer and its Lessons.—Dr. W. B. CARPENTER, F.R.S.; Prof. OSBORNE REYNOLDS, F.R.S.	26
Potential Energy.—G. M. MINCHIN	27
Effects of Urticating Organs of <i>Millepora</i> on the Tongue.—L. F. POURTALES	27
Drowned by a Devil Fish.—H. N. MOSELEY, F.R.S.	27
The Earthworm in Relation to the Fertility of the Soil.—Rev. HENRY COOPER KEY; A. STEPHEN WILSON	28
M. Alluard's Condensing Hygrometer.—G. J. SYMONS (<i>With Illustration</i>)	28
Optical Spectroscopy of the Red End of the Solar Spectrum.— J. B. N. HENNESSEY, F.R.S.	23
Singing Mice.—JOSEPH SIDEBOTHAM; GEORGE J. ROMANES	29
Meteor.—RALPH COPELAND	29
INTERNATIONAL POLAR EXPEDITIONS. By E. J. REED, C.B., M.P., F.R.S.	29
THE NORWEGIAN DEEP-SEA EXPEDITION. By Dr. H. MOHN (<i>With Map</i>)	30
ON THE DIFFUSION OF MATTER IN RELATION TO THE SECOND LAW OF THERMODYNAMICS. By S. TOLVER PRESTON	31
MUSIC A SCIENCE OF NUMBERS. By W. CHAPPELL, F.S.A.	32
ROBERT SWINHOE, F.R.S.	35
DOUGLAS A. SPALDING	35
OUR ASTRONOMICAL COLUMN:—	
The Solar Eclipse of 1788, February 2	36
The Minor Planet Euphrosyne	36
Comets of Short Period in 1878	36
NOTES	37
AMERICAN SCIENCE	39
UNIVERSITY AND EDUCATIONAL INTELLIGENCE	39
SCIENTIFIC SERIALS	39
SOCIETIES AND ACADEMIES	40