

position, and that, indeed, of phytopaleontology, that Saporta has prepared a really noble volume. He first examines the conditions of the vegetable remains, their mode of preservation, the evidence of their vegetable nature compared with the impressions produced by animals or mechanical agency. On this subject he adds a note of Dr. Marion, who has followed the same line of research as Nathorst, in carefully studying the character of the cells produced by animal agency, and who points out the great difference between these tracks and vegetable impressions. The second part of Saporta's memoir contains a detailed examination of some types of fossil Algae. The species described are represented, as well as their living related types, with admirable care and precision. Some of the documents from which Saporta has derived valuable assistance are from the works or communications of American authors; *Harlania Hallii*, among others, is beautifully figured. With few exceptions, all the evidence adduced in the admirable work of Saporta is opposed to the opinions of Nathorst, and renders great service to phytopaleontology.

BOLTON'S QUANTITATIVE ANALYSIS.

The student's guide in quantitative analysis, intended as an aid to the study of Fresenius' system. By H. CARRINGTON BOLTON, Ph.D., Trinity college, Hartford, Conn. New York, John Wiley & Sons, 1882. 6+124 p. 8°.

THE above title is somewhat misleading; for the book, as stated in the preface, is a series of notes on a system of quantitative analysis, as developed and modified by the author, from a course of instruction originally organized in the School of mines, Columbia college, by Prof. C. F. Chandler. Viewing the book in this light, two things must be taken into consideration, —

first, whether the analyses given are typical ones, such as would enable the student, on the completion of the course, to work out by himself the common problems of quantitative analytical chemistry; second, whether the notes given under the various determinations are such as explain, not only the different steps of the process, but also the reasons that necessitate them. The first of these two questions we can answer decidedly in the affirmative. The only criticism that we might make is, that possibly too much attention has been paid to alloys, and not quite enough to complex mineral determinations. The first analysis given is baric chloride, then magnesian sulphate, and other simple salts where no process of separation is necessary. The book then takes up, in well-chosen order, almost all the common alloys and minerals, gives the simpler problems of volumetric work, the determination of carbon, hydrogen, and nitrogen in organic compounds, and many of the most striking commercial tests; such as the examination of sugar, milk, mineral-water, coal, and petroleum. The notes, however, under these different analyses, we cannot consider as perfectly satisfactory. They consist of a short account of the process, with references to Fresenius or the original article, and sometimes a tabulated plan; but no explanation of the various steps is given. If, after each analysis, the reasons why the different reagents had been added, and other numerous details, had been explained, the value of the book would have been much greater; for it is the want of such elucidations in Fresenius that makes his system seem confused and difficult to the young student. As a whole, however, when studied, as intended by the author, in connection with Johnson's translation of Fresenius, or when supplemented by a thorough series of lectures, we can recommend the book as giving a valuable course in quantitative work.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

ASTRONOMY.

Encke's comet, and a resisting medium in space. — Dr. O. Backlund, in a paper entitled *Kurzer bericht ueber meine untersuchungen ueber die hypothese eines widerstehenden mittels* (*Mélanges math. et astron.*, vi.), makes the following statement of the results of his researches on Encke's comet: "The investigations hitherto made of the theory of Encke's comet really prove nothing as to the existence of a resisting medium in space. Even if we

should succeed by such a hypothesis to explain sufficiently the increase of the mean motion and the decrease of the eccentricity during the period 1819-48, a simple hypothesis like this will not at the same time suffice for the motion of the comet after 1865, as the variation of the mean motion after that time has most probably become different. Not until the period 1865-81, and its connection with the earlier one, have been fully discussed, will it perhaps become possible to find indications of the nature of the unknown forces which act on the comet." — (*Copernicus*, Feb.) D. P. T. [531]

Selective absorption of solar energy.—Professor Langley publishes an extended, elaborate, and exceedingly important paper on the selective absorption of solar energy, as determined by observations with the spectro-bolometer at Allegheny observatory, and upon the summit of Mount Whitney. It consists mainly of a statement of results, with comparatively little detail, — perhaps in some cases not quite so much as would be desirable in order to enable the reader to judge how far the numerical conclusions are to be trusted, since probable errors are seldom given. Further papers are promised, however, in which these matters are to be more fully treated.

Prof. Langley's observations cover all the spectrum from about wave-length 0.635 in the ultra-violet to 3.00 in the infra-red, — far below the limit reached by any other investigator.

The principal results are the following: 1. The maximum of energy in the diffraction spectrum is near the luminous maximum between the red and yellow, though varying with the sun's altitude. 2. Our atmosphere produces an enormous systematic absorption, increasing continually from the infra-red extremity of the spectrum, where it is comparatively slight, to the ultra-violet, where it is very great. This, however, is not to be taken as denying the existence of remarkable absorption-bands in the infra-red. The observations, in fact, show *four* such bands at wave-lengths 0.694 , 1.14 , 1.37 , and 1.83 , each of them quite as remarkable as the great line A, near the lower extremity of the visible spectrum. 3. The character and color of the sunlight is markedly changed by the atmospheric absorption; so that, to the naked eye placed outside our air, the sun would appear decidedly bluish. 4. The solar constant indicated by the observations is even higher than Forbes's value: it rises to 2.84 , and seems not unlikely to reach 3.00 . (The units in which the solar constant is here expressed are not *calories* per square *metre* per *minute*, but ten-thousandths of a calory per square centimetre per minute.) 5. The apparatus used was so delicate that all the principal Fraunhofer lines of the visible spectrum showed themselves in the galvanometer readings. 6. The ratio of the luminous to the dark heat is greatly changed by the atmospheric absorption, being much greater outside our atmosphere than within it. The writer adds, "It is probable, however, that the solar spectrum before absorption, though probably weak below the red, *yet extended very much farther into the infra-red than our charts indicate*. We may even regard it as probable that some agent of the atmosphere acts as an almost complete barrier to the entrance or departure of rays below the point charted."

The salient features of the investigation are the exquisitely sensitive apparatus devised for its prosecution, and the new method of deducing the solar constant from pyrheliometer observations at the earth's surface by means of separate co-efficients of transmission determined for radiations of different wave-lengths.

An interesting question arises, also, as to the way in which our atmosphere acts to retain the sun's heat on the earth, in view of the observed fact, that, contrary to all previous suppositions, the air is more transparent to the red and infra-red rays than to those in the upper part of the spectrum. It would seem, as the author suggests, that the air must be almost opaque to rays of wave-lengths below some limit; that limit, however, being below the extreme point reached by his measures. — (*Amer. Journ. Sc.*, March.) C. A. Y. [532]

MATHEMATICS.

Algebraical curves. — M. Noether seeks to establish a thoroughly rigorous foundation for the general theory of algebraical curves in space, and, to this end, proposes to investigate all of the fundamental properties of such curves as can be derived from the general theory of algebraical functions. References are given to the most important papers which have already appeared on this subject; and the author remarks that but two processes have been employed in these earlier papers. The first, developed principally by Cayley, depends upon the representation of these curves by a cone and a 'monoid'; the second seeks to apply the theory of algebraical functions directly to groups of points on the space-curve. The author uses both of these processes; founding them, however, upon firmly established and constantly valid theorems concerning algebraical functions, and shows that the first method, although leading to very general results, is not sufficient for a rigorous establishment of the entire theory. The limits of applicability of the second method are also indicated. The curves treated are without multiple points; and, since they are regarded as general intersections of surfaces, these surfaces can have no multiple points, nor can they have contact along a curve. The first part of the memoir treats of special cases of intersections of surfaces; and the second part, of the intersections of surfaces in general, these surfaces being conditioned only by the fact that they must contain the space-curve under consideration, be destitute of multiple-lines, etc. This general theory has inversely its most general application in the development of the geometry of special surfaces. A brief section is devoted to this latter subject, which the author proposes more fully to develop in a forthcoming paper. The present paper is undoubtedly a most important addition to the existing literature of algebraical space-curves. — (*Journ. reine und angew. math.*, xciii.) T. C. [533]

Orthogonal surfaces. — M. Bianchi announces a theorem concerning certain triple systems of orthogonal surfaces; viz., all surfaces of constant negative curvature, $-\frac{1}{R^2}$, give rise to a triple system of orthogonal surfaces, of which one system is formed of surfaces having the same constant negative curvature, and the other two of surfaces which have circles of radius, R , as one of the systems of their lines of curvature. An application is given to the surface formed by the revolution of the tractrix; the Cartesian co-ordinates, x, y, z , of a point in the corresponding triply orthogonal surfaces, are given in terms of three parameters, u, v, w ; and the method of generation of these surfaces is described. — (*Atti della r. acad. dei lincei*, vii.) T. C. [534]

On Fuchsians. — M. Poincaré, in a series of memoirs presented to the French academy, has treated certain new functions, which he calls 'Fuchsians,' 'Kleinians,' 'theta-Fuchsians,' and 'zeta-Fuchsians.' These functions have a certain analogy to the elliptic and Abelian functions; viz., while these latter functions afford integrals of certain algebraic differentials, the new functions afford means of integrating linear differential equations with algebraic co-efficients. In the present paper the author merely introduces the subject by studying certain properties of Fuchsian groups (*groupes Fuchsienues*), and expresses the intention of returning later to the study of their consequences from the point of view of the theory of functions. A fuller account of M. Poincaré's paper will be given later, the present brief notice being taken

from the *Probeheft* of the new mathematical journal edited by G. Mittag-Zeffer in Stockholm. — (*Acta math.*, i.) T. C. [535]

Definite integrals.—M. Davidoff obtains two very general formulae, depending upon an arbitrary function $F(x)$ of the n th degree in x . He claims, by aid of these, to be able to obtain nearly all of the known theorems concerning definite integrals, by making n infinite, and properly choosing the form of $F(x)$. Several applications are made, based upon the assumption of particular forms for $F(x)$. — (*Journ. de math.*, 1882.) T. C. [536]

PHYSICS.

New method of determining specific gravity of solids.—Professor Munroe, having occasion to ascertain on shipboard the specific gravities of samples of coal, and being prevented by the motion of the vessel from using the balance, devised a procedure which not merely served his purpose, but is susceptible of wide application. Placing a block of coal in a liquid so dense as to float it, he gradually reduced the density by the admixture of a lighter liquid, until the coal floated immersed. The homogeneity of the mixture being maintained by stirring, this equilibrium was, of course, reached only when the specific gravity of the liquid became equal to that of the immersed solid. He then measured the specific gravity of the liquid with a common hydrometer. For the flotation of the lighter coals, he used a thick solution of cane-sugar; for anthracite, strong sulphuric acid.

As a test of the accuracy of the results, he afterward repeated the determinations with Jolly's balance, obtaining, —

	By Jolly's Balance.	By Mixture.	Difference.
Anthracite	1.5640	1.560	— .004
Bituminous coal	1.3008	1.310	+ .009
“ “	1.3000	1.300	.000
“ “	1.2790	1.285	+ .006
Cannel coal	1.1550	1.155	.000
“ “	1.1292	1.120	— .009
Lignite	1.0909	1.090	— .001
Mean	. .	. .	± .004

(*Phil. soc. Wash.*; meeting March 24.) [537]

Heat.

Domestic thermometry.—M. Gaston Tissandier considers the errors that are likely to be made in determining the temperature of a room by the usual method of a thermometer hung on the wall. He found that the apparent temperature of a closed room varied from 16° to 21.75° , according to the position of the thermometer. The air in the upper part of the room was much warmer than that near the floor, and the window had a very marked effect on the temperature of the air in its vicinity.

These observations were made with tested thermometers. The errors made with the ordinary domestic thermometer are, of course, much greater.

In order accurately to obtain the temperature of a room, M. Tissandier advises the thermometer to be held at the height of a man for about two minutes at several different points, and the mean of these observations to be taken. — (*La Nature*, No. 508.) C. B. P. [538]

Electricity.

Determination of resistance-unit.—Lord Rayleigh recently read a paper before the Royal society,

describing experiments conducted by him on the value of the B. A. unit of resistance. Three series of observations were taken, — two by Lorentz's method, and a third, in which the induction coils were separated from the disk so far that the result was practically independent of the radius of the coils. The mean value obtained was

$$1 \text{ B. A. unit} = .98677 \times 10^9 \text{ (c. g. s.)}.$$

The standard of time was a tuning-fork, whose absolute pitch was determined by a new method. — (*Electrician*, Feb. 10.) J. T. [539]

Pressure and resistance in carbon.—S. Bidwell read a paper before the Royal society, giving the results of experiments on carbon cylinders making contact at right angles with each other. He proves that changes in pressure produce the greatest proportional effect when the pressure and strength of current is comparatively low; on the removal of the pressure, the resistance returns to about its original value. The passage of a current the strength of which does not exceed a certain limit causes a permanent diminution of the resistance. Similarly, the lessening of resistance due to pressure is magnified by the action of the current. — J. T. [540]

ENGINEERING.

The Antwerp water-works.—Mr. William Anderson recently read a paper at the Institution of civil engineers in London, which contains some interesting facts in regard to the purification of water for domestic purposes. Antwerp has 200,000 inhabitants, and until recently its water was derived from shallow wells and from open canals. The well-water, though clear to look at, was for the most part dangerously contaminated by the sewage. The new works take the water from the Nèthe at a point eleven miles from Antwerp. This water was very impure, even after ordinary filtration through sand, as the river flowed through a highly cultivated country, carrying up the drainage of Malines on the flood-tide, and bringing down that of the villages on its upper waters on the ebb. The time during which water could be taken was thus limited to about three-quarters of an hour in each tide. Prof. Bischoff, Dr. Frankland, and Mr. Hatton had shown that finely divided metallic iron had the power of destroying organic impurities, removing color, separating finely suspended matter, and, above all, destroying the germs of putrefaction, of bacteria, and probably those of epidemic diseases. To confirm the laboratory evidence, a pair of filters with a total area of 680 square feet was made at Waelhem; the first filter being placed upon a higher level than the second, and filled with a bed of spongy iron and gravel, mixed in the proportion of one to three, covered with a layer of ordinary filter-sand. In this filter the water would become charged with iron, to eliminate which it was to be exposed to the air, and passed through a second or common sand-filter, in which the red oxide would be deposited. Three months of trial proved so satisfactory that three filters of the same kind were made, having an aggregate area of 31,000 feet, with three sand-filters of the same area. Eighteen months' work has shown that the water remains clear and bright, while the spongy iron showed no signs of deterioration. Dr. Frankland reports favorably upon the chemical condition of the water, and also upon the complete destruction of bacteria and their germs. — (*Van Nostrand's mag.*, March, 1883.) G. L. V. [541]

Seasoning wood for musical instruments.—Mr. C. René of Stettin has devised a process for the drying of wood, intended especially for the prepara-

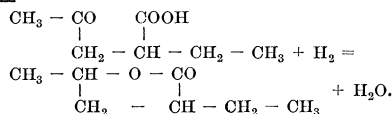
tion of wood for musical instruments, but perhaps otherwise useful. It is described as follows:—

The wooden boards are so arranged in a large iron kettle that gases may freely circulate over their entire surface, and exposed, in the first place, for twelve hours, to the drying effects of hot air. After this the kettle is closed, reheated by the apparatus below, and the air exhausted, when the kettle is filled with oxygen ozonized by electrical sparks passing continually between two points of platina, forming the end-poles of two wires conducted through tubes of glass into the kettle. The ozone is said to act so energetically upon the heated wood, that it consumes the destroying resinous, oily, or other parts in from twelve to twenty-four hours. — (*Engineers' club, Philad.; meeting March 3.*) [542]

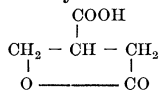
CHEMISTRY.

(Organic.)

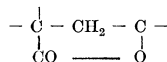
Investigations on the unsaturated acids.—For the purpose of defining the lactone formation with greater precision, a series of investigations has been undertaken in Fittig's laboratory, which, although not completed, have yielded valuable results in this direction. By reduction of β -aceto- and β -aceto-isobutyric acids, Gottstein prepared two new caprolactones. A heptolactone was obtained by Young from the reduction of ethylacetopropionic acid, —



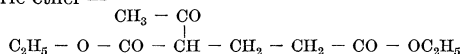
An octolactone resulted from the reduction of methyl-ethylacetosuccinic ether. Lactones were derived by Hjelt from allylmalonic, diallylmalonic, and diallylacetic acids. From the formation of paraconic acid from itabrompyrotartaric, it was shown by Beer to be a carboxylic acid of butyrolactone, —



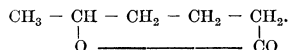
Other lactones of an interesting nature were prepared by Jayne and Penfield. Of special interest is a delta-lactone obtained by Wolff. In lactones hitherto examined the general structure has been, —



or reduction has taken place between the carboxyl group and a hydroxyl group attached to the third carbon atom from the carboxyl. Starting with sodium-acet-acetic-ether and β -iodopropionic acid, acetoglutaric ether —

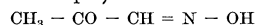


— was first prepared. By treatment with hydrochloric acid this substance was converted into γ -aceto-butyric acid ($\text{CH}_3 - \text{CO} - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$), which, by the action of nascent hydrogen in alkaline solution, gave the delta-lactone of normal capronic acid, —

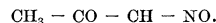


Results obtained by Ebert in the study of cumarine, by Fittig and Ebert on cumarilic acid, and by Erdmann on the action of sulphuric acid upon cinnamic acid, were also described. — (*Ann. chem.*, ccxvi. 26.) C. F. M. [543]

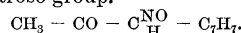
Constitution of the nitroso-bodies.—The nitrosoketones discovered by V. Meyer in 1877 are now regarded by him and M. Ceresole as containing an oximido-group ($=\text{N} - \text{OH}$) instead of the group $-\text{N} = \text{O}$; for example, —



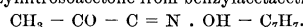
instead of



Several facts are mentioned in support of the first form; and, as an experimental proof, the benzyl ether of nitrosoacetone was made and compared with the benzylnitrosoacetone obtained by the action of nitrous acid on benzylacetacetic ether. Since the isomerism of these bodies was established by differences in their physical and chemical properties, the first cannot contain a nitroso-group.



Benzylnitrosoacetone from benzylacetacetic ether.



Benzylnitrosoacetone from nitrosoacetone.

Whether nitrosoacetone contains the group

$\text{C} = \text{N} - \text{OH}$ or the group $\text{C} \begin{array}{c} \text{NH} \\ | \\ \text{O} \end{array}$ remains to be de-

termined. The authors conclude that true nitroso-bodies are probably produced by nitrous acid when it acts on the group $\equiv \text{CH}$; when acting upon the group $=\text{CH}_2$, isonitroso-bodies containing the group $-\text{C} = \text{N} \cdot \text{OH}$ result. — (*Berichte deutsch. chem. gesellsch.*, xv. 3067.) C. F. M. [544]

GEOLOGY.

Geology of the vicinity of Havana.—Pedro Salterain y Legarra has published a geological map which shows along the Cuban shore, in the jurisdiction of Havana and Guanabacoa, a narrow strip of modern rocks; then a band twice as wide, which he refers to the miocene. Next to this is a band of about the same width, colored as eocene. The rest is represented as cretaceous, with narrow tongues of eruptive rocks running through it in a general east and west direction, the largest of which begins at Regla. Guanabacoa is situated on it, and it extends eastward to the limit of the jurisdiction. To the south-west, along the Rio Marianao, the cretaceous becomes very narrow; and south of and including Pedros, the eocene again appears. The first part of the accompanying memoir consists of a brief orographic and hydrographic description of the districts, together with a number of analyses of the water of the Rio Almendares and of various mineral-springs.

Great difficulty was experienced, in studying the geology, from the heavy mantle of vegetable earth, and the consequent distance between outcrops. His classification of the formations is as follows: 1°. The quaternary or recent, containing the reef-formations of corals and zoophytes, detrital, and alluvial deposits. 2°. Post-pliocene, the relations of which to the quaternary or to the upper tertiary pliocene are uncertain. It generally consists of a sandy, whitish-yellow limestone, with many fossils generally identical with living species. In Matanzas a molar of a hippopotamus was found in a similar deposit. 3°. The miocene, which is placed between the overlying madreporic or quaternary and the eocene band. It extends along the northern slope of the first range of hills, and consists of a rock of generally identical character in all parts, a somewhat argillaceous white limestone, generally very fossiliferous, coarse, porous, and rough to the touch. Most of the fossils are casts. Zoophytes are abundant, as in the post-pliocene; but the relative

proportion of mollusks, principally lamellibranchiates, is larger. Echinoderms are also of more frequent occurrence. 4°. The eocene, the most important formation in the island, which serves as a point of departure of comparisons between the formations. It lies at the base of the miocene, and rests unconformably on the very inclined and dislocated beds of an older system, probably cretaceous. It contributes chiefly to the formation of the first range of hills parallel to the coast. The upper part consists of fossiliferous limestones dipping 10°–12° N.W.; and below are various beds of clay and limestone. A cephalopod (*Aturia zigzag* Sow.) occurs, with a large number of gasteropods, lamellibranchiates, some echinoderms and corals, and many *Orbitoides* Mantelli. 5°. The cretaceous, in which no fossils are found. It underlies the tertiary and overlies the western group of mountains, which some geologists have considered jurassic. The general strike of its beds is east and west, and their dip about 50° S. or S.S.E. In this formation occur the numerous deposits of asphalt, which appear to be contemporaneous with certain igneous eruptions, none of which have affected the tertiary.

The eruptive rocks have been called 'Serpentinica formacion,' because serpentine is the prevailing rock in them. The characters of the rock are very variable. The serpentine is frequently associated with diallage, and yellowish-green olivine often abounds in the darker and more compact rock; there is also much oxide of iron and some oligist iron. The centre and highest part of the eruption is often occupied by diorite, then the olivine and diallage serpentine, and outside a talcose serpentine of brilliant lustre.

Lists of the fossils found in the miocene and eocene are given with the localities in which they occur.

M. Fernandez de Castro, in a lecture on the paleontological proofs that the island of Cuba was united to the American continent, says he believes that all the great geological divisions are represented in the island; but he adduces almost no evidence in support of this assertion. Those interested in the subject will find a bibliography of works relating to the geology of Cuba in vol. iii., p. 62. — (*Bol. com. mapa geol. España*, vii.) J. B. M. [545]

METEOROLOGY.

Spectrum of the aurora.—Professor S. Lemström, chief of the Finnish meteorologic observatory at Loden Kylä (lat. 67° 24' N., long. 26° 36' E.), has tried a novel experiment for determining practically the nature of the aurora. He placed a galvanic battery with conductors, covering an arc of 900 square metres (98 feet square), on the hill Oratunturi. He calls the arrangement a streaming apparatus. The conductors were constructed of uncovered copper wires, provided at each half-metre with fine erected points. The wire was led in slings to the top of the hill, and reposed on the usual telegraph-insulators. From one end of this wire a covered copper wire was conducted, on insulators, to the foot of the hill (600 feet high), and there joined a plate of zinc interred in the earth. In this circuit was put a galvanometer. Professor Lemström found the hilltop to be generally surrounded by a halo yellow-white in color, which faintly but perfectly yielded the auroral spectrum. This, he states, furnishes a direct proof of the electrical nature of the aurora, and opens a new field in the study of the physical condition of the earth. Further experiments in Enare, near Kullala, on the hill Pietarintunturi, confirm the above results. On Dec. 29, 1882, a straight beam of aurora was seen over the galvanic apparatus. — (*Nature*, Feb. 1.) H. A. H. [546]

Meteorologic council of England.—There will be published soon, by the English meteorologic council, 'Contributions to our knowledge of the meteorology of the arctic regions.' These will consist of observations, taken almost entirely by British ships, from 1819 to 1873.

The council has also resolved upon obtaining data for synchronous weather-maps for the Atlantic Ocean for the thirteen months, August, 1882, to September, 1883, inclusive. [Charts for October, during the West-India hurricane season, would be an important addition.] The council publishes 78 per cent of its forecasts of wind and weather as verified. It has also instituted an investigation of the cause and character of London fogs, the best form of thermometer-screen, Stevenson's or Prof. Wild's metallic screen, the best manner of determining moisture in the air, and the motion of the upper air-currents. All these are still in progress. The latter experiments have been tried by firing six-pound shells with fuses of fourteen seconds. The vertical height reached before the explosion was 2,896m. (9,500 feet). The smoke cloud was clearly visible under a blue sky, and remained so for a considerable time.

The council has made inspections of all the first and second class stations. A noteworthy fact has been brought out by the inspector of the stations in England: namely, that at some stations the abnormal deviations of the wind-direction from local causes is very great; e.g., at Shields, the vane points 22° to the right of the true direction for all except southwest winds. — (*Rep. meteor. council Royal soc.*, 1882.) H. A. H. [547]

PHYSICAL GEOGRAPHY.

The Gleisen valley, near Munich.—A recent study, by Chr. Gruber, of this dry valley in the Bavarian plain, shows its connection with the period of glacial extension from the Alps, down the valley of the Isar, to the line of morainal hills, when the overflow-streams from the melting ice cut out channels now abandoned. — (*Ausland*, 1883, 76, 87.) W. M. D. [548]

Ice-caves.—Professor Fugger read an entertaining paper on ice-caves at the fourth international alpine congress at Salzburg last summer, in which he showed that the common idea of the summer growth and winter melting of the cave-ice is incorrect, although supported by high authority, as the elder Picet, Murchison, Herschel, and others, and generally accepted in text-books. This error is doubtless based on the coolness of the caves in comparison with summer air, and their apparent warmth in the colder months, as well as on insufficient observations. Equally wrong is the view sometimes suggested, that the ice of caves survives from the glacial period. The grotto of La Baume, near Besançon, was known to contain ice in 1592; but in 1727 it was completely emptied by the duke of Lévi, to supply his army, encamped near by; yet in 1743 the bottom was covered again with ice, and a dozen ice-columns two metres high were formed. It is found by direct measure that the summer temperature of ice-caves is a little above freezing; but in winter it is several degrees below, the cold being derived from air that sinks in from the surface. Water trickles in at the temperature of the enclosing rocks, but is then soon frozen; and, if enough ice accumulates, it will last over the following summer season of melting. This is a simple and sufficient explanation. Summer evaporation has no effective share in producing cold, as the cavern air is very damp. Fifty-six ice-caves are known in the Alps, eight in the Jura and the Carpathians, four in middle Germany, and many more elsewhere.

None are known where the winter, or at least the January temperature, does not average below the freezing-point. The most important previous studies are by Thury, *Sur les glaciers naturelles* (*Bibl. univ. Genève*, 1861), and by Browne, *Ice-caves of France and Switzerland* (1865). — (*Peterm. mitth.*, 1883, 12.) W. M. D. [549]

GEOGRAPHY.

(Arctic.)

Notes from the north.—The Russian authorities have established meteorological stations at Mesen and Bereosoff in west Siberia. — The international station at the mouth of the Lena reached its destination in August, and erected its dwelling on the island of Sagastir, with four observatories connected with it by covered pathways. — The Russian *savant* Eliséieff is pursuing ethnological studies in Russian Lapland, and reports that there are not in that area more than three hundred individuals of the Lapp race. — The 'Louise,' after unsuccessful attempts to carry a cargo to the Yenisei in 1881 and 1882, finally returned to Europe with the much-handled cargo, which had, part of the time, been stored at Hammerfest. For some time, at least, it is expected that the commerce of the Weser will flow preferably in any other direction than toward the Yenisei, if, indeed, these repeated failures do not put a quietus on trade by the Karagates. — The results of the hydrographic investigations carried on during the voyage of the schooner 'Willem Barentz' are exhibited in the December number of the *Annalen der hydrographie* for 1883, by Bogoslavski. — The 'Jeanette' survivors left Liverpool for New York on the 18th instant. — A chart of the 'north polar lands' by Berghaus, with special reference to the work of the international polar commission, is on the point of publication by Justus Perthes. The stations will be represented in red, and the limits will extend to latitude 60°. The waters eastward from the Taimyr peninsula have received the name of the Norden-skjöld Sea from the author of the map, which will, as a matter of course, represent the latest researches, and, moreover, will be sold for the inconsiderable sum of one dollar. — The Danish expedition in Greenland is to be commanded by Lieut. Holm, who will give two years to the work. — Dr. Boas proceeded to the German station at Cumberland Inlet, with the meteorological party, in order to make a special study of the Innuits. — Poliakov, who went in the summer of 1881 to the island of Sakhalin to make collections and explorations for the St. Petersburg academy of sciences, passed most of the winter on the south-east coast, at Taranka, Patience Bay. Rich collections, and a part of his report, with maps, have already been received, and will soon be published. He will now proceed to the western shore of the Gulf of Tartary, and continue his investigations between Sakhalin and Vladivostok. — An account of Dr. Stejneger's journey and observations in Kamtchatka and the Commander Islands of Bering Sea appears in *Naturen*, — a popular scientific monthly of Christiania, Norway. — W. H. D. [550]

(Europe.)

Moors of Oldenburg.—The construction of canals through the moorlands of the duchy of Oldenburg has given much accurate information about them, which is summarized by chief inspector T. Schacht. Their area is 1,000 □ km. (about 400 □ miles) in a total surface of 5,376 □ km. The lower moors are perfectly level, and occupy depressions once filled with water. The upland moors are faintly

undulating or slightly convex, sometimes climbing fifty feet above sea-level, and only occupy ground that has free drainage even at its lowest point. They begin at some moist locality with the growth of sphagnum, which, by its power of absorbing and holding moisture, spreads over the surrounding surface, and drives out the pre-existing vegetation. The thickness of these deposits sometimes reaches thirty feet. Great quantities of peat are taken from the moors, and hardly any other fuel is used in this region. It serves in brickyards, and even in iron and steel works; one establishment at Augustfehn requiring five to seven tons daily. The moors still in growth are impassable, but the older are of firmer surface. Of the latter, 270 □ km. are under cultivation, and a small part of the remainder is sometimes burnt over for growing buckwheat, filling the air with a dark, penetrating smoke. The moors are underlaid by sand or sometimes clay; and not unfrequently the remains of old forests of fir, birch, alder, hazelnut, and, on the higher ground, of oak, are found beneath the peat. Birch stumps are sometimes found growing on a thin layer of turf, showing an alternation of forest and moor conditions before the latter took final possession of the surface. Roman coins and weapons and the remains of plank roads are found four or more metres below the surface, implying a growth of that amount in two thousand years. Similar moorlands are common throughout northern Germany. — (*Peterm. mitth.*, 1883, 5.) W. M. D. [551]

(Asia.)

North-eastern Borneo and Sulu islands.—W. B. Pryer, British north Borneo company's resident at Elopura, furnishes a general description of this region and its tribes. One of the chief features of north-eastern Borneo, or Sabah, is a low plain, some four thousand square miles in extent, enclosed by hills and mountains of sandstone and limestone on the north, west, and south. It has a heavy rainfall, and receives also the drainage of the high lands to the west in the form of numerous large rivers, along which there are many native villages in spite of the danger from fever. The higher land is thought probably suitable for European settlement. The forest fauna includes the elephant, rhinoceros, orang-outang, and some twenty kinds of monkeys, besides buffalo, deer, pigs, and bear, and many other animals. The largest orang-outang found measured four feet four inches in height; their appearance is deceptive, as they seem much taller. The adjoining islands of the Sulu archipelago are generally volcanic, though no volcanic rock is found on the part of Borneo visited. The islands are hilly, populous, generally cleared, and fairly well cultivated. They are surrounded by white coral strands, and, with their moderate temperature and pleasant, light breeze, are unusually attractive. The tribes of this region are very numerous. Some interesting details of their customs and condition are given. — (*Proc. roy. geogr. soc.*, 1883, 90.) W. M. D. [552]

(Pacific Ocean.)

Mindanao.—The account of Dr. J. Montano's ethnographic exploration of this island of the Philippine group includes a few notes on its physical appearance. Its rocks are generally eruptive, partly covered with deposits of coral rock, implying a modern upheaval. Similar coral reefs fringe the shore. Near the northern end of the island is the circular Lake Mainit, about five miles in diameter, apparently situated in an ancient crater with steeply sloping borders. Earthquakes are frequent and violent in its vicinity. The surrounding mountains contain warm springs, and, especially when the atmospheric press-

ure is low, are covered with vapors from these warm waters. Rain is heavy on the eastern coast (winter months), and the rivers are frequently in flood. — (*Bull. soc. géogr. Paris*, 1882, 593; map.) W. M. D. [553]

BOTANY.

(General and physiological.)

Effect of electric light on vegetation. — From experiments conducted at the Palais d'industrie during the electric exhibition of August, 1881, P. P. Déhéraïn concludes that the electric arc emits some rays injurious to vegetation, which are, for the most part at least, arrested by colorless glass. The light is sufficient to maintain mature plants in vegetation for two months and a half, and is decidedly beneficial to plants which obtain only diffuse daylight, but cannot effect the ripening or germination of seeds. — (*Electrician*, Feb. 10.) J. T. [554]

Nettles as artillery-plants. — L. H. Bailey, jun., finds, that, under favorable circumstances, *Urtica gracilis* exhibits an elastic erection of stamens, coupled with dehiscence of their anthers, which scatters the liberated pollen in puffs. The same phenomenon is recorded for this and other genera of *Urticaceae* by a number of writers. — (*Bot. gazette*, Feb.) W. T. [555]

Fertilization of *Catalpa speciosa*. — According to the observation of one of Prof. Beal's students, only large bumblebees brush anthers and stigma, and so pollinate the flowers while gathering their nectar. The stigma is sensitive, its lobes closing after being touched. The mode of fertilization of this species is similar to that of the common southern species with which it was long confounded. — (*Bot. gazette*, Feb.) W. T. [556]

The formation of starch out of sugar. — It is not yet known with certainty what is the first product of assimilative activity in a vegetable cell containing chlorophyll. Among the views most widely held may be cited those of Sachs and of Boehm. The former regards it as highly probable that the first and direct product is starch, while the latter holds that it is one or more of the sugars. As is well known, starch-grains are found in chlorophyll-granules after exposure to light. But Boehm thinks that the presence of starch in the granules of chlorophyll is no proof that this is the first product of assimilation, since it might have been formed there by the changes in other and simpler carbohydrates. That such changes may take place is rendered more than possible by his discovery that starch can be made in chlorophyll-granules out of sugar *artificially* furnished the plant. Nor does it, according to him, make much, if any, difference which of the sugars is used for the experiment. His method of experiment appears to be open to criticism, but is simple and ingenious. In the main, it consists in supplying to cut surfaces of herbaceous parts a dilute solution of sugar, being careful to avoid too great concentration of the liquid. The result of this administration of elaborated food is immediate. Starch-grains appear at once in the chlorophyll-granules, and the leafy shoots keep fresh and active for six weeks. — (*Bot. zeit.*, Jan. 19 and 26, 1883.) G. L. G. [557]

(Systematic.)

A new *Oxytheca*. — An *Oxytheca* from the Mohave region, California, described by Dr. Parry, is the eighth of that genus, which is now quite polymorphous in its character. This species is especially distinguished by the spreading, several-flowered involucre, which is cleft nearly to the base; the segments

closely resembling the bracts. — (*Bull. Torr. bot. club*, Feb., 1883.) S. W. [558]

New species of *Agrostis*. — Two small sub-alpine species of *Agrostis* are described by Dr. Vasey, — one from the San Bernardino Mountains, California; the other, from Mount Adams, in Washington Territory. The author does not recognize Mount Adams and Mount Paddo as only different names for the same peak. — (*Bull. Torr. bot. club*, Feb., 1883.) S. W. [559]

New *Passifloreae*. — Dr. Masters proposes a new genus (*Mitostemma*), remarkable for its peculiar corona, consisting of numerous thick thread-like processes arranged in a triple series at the throat of the very short flower-tube, and having the hypogynous stamens separate from the gynophore. Two species are described, from Brazil and British Guiana; also a new species of *Tacsonia*, and five of *Passiflora*, one of the latter from Mexico, the rest from tropical South America. — (*Journ. bot.*, Feb., 1883.) S. W. [560]

***Selaginella tortipila*.** — Mr. Baker, in the synopsis of the genus *Selaginella*, which he has commenced, reduces this supposed species of the higher Alleghanies to a form of the very widely distributed *S. rupestris*. — (*Journ. bot.*, Feb., 1883.) S. W. [561]

(Fossil plants.)

Permian Ginkgos and other fossil plants. — Saprota describes a *Salisburia*, or Ginkgo, from specimens communicated by M. Grand'Eury from the Permian of Russia. The author considers the plant as a representative of the most ancient species of Ginkgo, and calls it *Salisburia primigenia*; remarking, that, until now, the Ginkgo has not been known lower than the Rhetic. This is contradicted by the discovery made by Profs. Fontaine and White, in the Permian-carboniferous of Virginia, of fine large leaves, very similar to those of *Salisburia*, described and figured under the name of *Saprota salisburioidea* and *S. grandifolia* (*Second geol. survey Penn.*, PP, pl. 38). If M. Saprota has not seen the specimen, he has at least seen these figures of the leaves, and admitted their close affinity to *Salisburia*, — an affinity supported by the presence of leaves of *Baiera* in the same strata. The memoir describes also a new species of *Nelumbium*, from the lignites of Fuveau, Bouches du Rhône, and mentions a number of plants discovered under the volcanic ashes of Kantal, lower Pliocene. Some of the specimens represent tertiary types, like *Abies intermedia*, a new species; *Corylus insignis*, Heer; *Planera Ungerii*, Ett.; *Acer pseudo-campestre*, Ung.; *Tilia expansa*, Sap.; and *Pterocarya denticulata*, Web. Of species living at the present epoch, he quotes *Salix mauritanica*, Def.; *Viburnum pseudo-tinus*, Sap., nearly identical to *Viburnum rugosum*, Per.; a *Ruscus*, like *R. aculeatus*; a *Ranunculus*, like *R. philonotis*; and *Fagus sylvatica-pliocenica*, whose organs of fructification have been found. The leaves show a gradual passage to the European species, while they are evidently related to the American *Fagus ferruginea*, Michx. — (*Comptes rendus*, April 3, 10, 1882.) L. L. [562]

ZOÖLOGY.

Mollusks.

Report on the mollusks of the north Atlantic. — The Norwegian north Atlantic expedition, under the direction of Prof. H. Mohn, during 1876-78, made, as is well known, valuable researches into the biology, as well as the hydrography, of the deep sea between Norway, Spitzbergen, and Jan Mayen. Sev

eral of their reports have appeared. The last is that of H. Friele on the mollusks, including those belonging to the Buccinidae. It is printed in parallel columns of Norwegian and English, and illustrated by six quarto plates and a map. The paper is practically a monograph of the Buccinidae of the arctic part of the north Atlantic and its shores. The new genus *Jumala* is described for *Fusus Turtoni* Bean and *Neptunea Ossiani* Friele. It is founded on important differences in the dentition. Several species, which had been before but briefly described, are here figured and characterized in detail. *Siphonorbis Dalli*, *S. undulata*, *Buccinum nivale*, *B. sulcatum*, new species, and a large number of new varieties, are described, — not merely the shell, but, in a majority of cases, the embryo, oötheca, operculum, and dentition, with various anatomical and biographical details. Friele finds, like others who have studied large series, that species, in the old-fashioned sense, can hardly be said to exist in the genus *Buccinum*; and, indeed, *Neptunea* is not much better; but the author considers that a certain part of this confusion is caused by hybridization. — W. H. D. [563]

Worms.

North-sea annelids. — G. A. Hansen, in Norwegian and English (in parallel columns), gives an account of the annelids collected by the Norwegian North-sea expedition of 1876-78 (Christiania, 1882, 53 p., 7 pl., map, 4°). He criticises Malmgren's method of distinguishing and delimiting genera, of which he thinks Malmgren has made far too many on unimportant characters. He points out the constancy of the bristles: "The type of the bristles is the same in all Polynoeae, with the exception of *Melaenis Loveni* and *Polynoe scolopendrina*." The scales, in Hansen's opinion, are much more valuable, being characteristically constant in each species. Möbius and Tauber have gone too far in the opposite direction, of 'lumping' Malmgren's species and genera. Tables of distribution are given, from which it is evident that few families are absent from the frigid area, and the species are the same as those found in temperate waters. *P. globifera* alone indicates that its favorite, if not its sole, habitat is the cold bottom-strata. A number of new species are described. — (*Journ. micr. soc. Lond.*, Feb., 1883, 60.) C. S. M. [564]

Australian Aphroditea. — W. A. Haswell publishes a monograph of the Australian species of this annelidan family, wherein he gives descriptions of about thirty species, of which more than half are new. There appear to be two entirely distinct provinces of distribution, — the northern intertropical shores of Queensland, and the temperate coasts of New South Wales and Victoria. As compared with the same group in northern seas, there is no marked distinction of the forms: the species are different, but the genera the same or nearly related. The first part of the paper is anatomical, and contains interesting notes on the structure of the scales. He corrects Williams's mistake of describing the intestinal coeca as segmental organs, — a mistake repeated by Ehlers, — and himself describes the true segmental organs in *Polynoe*. They are ciliated tubes, opening in a tubercle at the base of the parapodia. Some observations on the sexual organs, the coeca of the intestine, and the pseudohaemal system, are also recorded. The form of the coeca is described. "The interior of the coecum is lined here and there with 'hepatic cells.' These are large spherical or oval cells, with a delicate . . . membrane, and golden-yellow, oil-like contents, with a nucleus, or, more frequently, two or three." Among these yellow cells are others of the same size, but of very different character, containing numerous cells,

each enclosing a spherical green body. Haswell thinks these are the young stages of the yellow cells. — (*Proc. Linn. soc. New South Wales*, vii, 250.) C. S. M. [565]

Anatomy of Ctenodrilus. — Kennel's valuable monograph of the anatomy of *Ctenodrilus* is to be supplemented by a memoir on another species of the same genus (*C. monostylus*) by Zeppelin, who has published a preliminary notice of his results. An abstract will be given here of the final memoir when published. (*Zool. anz.*, vi, 44.) C. S. M. [566]

VERTEBRATES.

Third corpuscle of the blood. — Dr. Richard Norris of Birmingham, Eng., claims to have discovered that the white corpuscles of the lymph peel off the body of the cell, setting the nucleus free. The latter then enters the circulation as a colorless disk, which is ordinarily invisible, having the same refractive index as the *liquor sanguinis*. The disk gradually becomes colored by the endogenous secretion of haemoglobin. He then applies this history to set aside a good many established views concerning the physiology and pathology of the blood. He has presented his opinions in an octavo volume illustrated with numerous plates, forming a revolutionary publication (London, 1882). We should *a priori* give little credence to these surprising conclusions, which have been subjected to telling criticisms by Mrs. Ernest Hart. Norris's principal observation was, that, by certain methods of treatment, colorless disks could be found in the blood, and photographed. Mrs. Hart has repeated his numerous and varied experiments, and shows that the methods employed create the colorless disk out of the red corpuscle by removing, in one manner or another, the haemoglobin. The basis of Norris's theories is thus taken away, and with the base fall all the far-reaching deductions built on it. Nevertheless, although Dr. Norris's interpretations cannot be accepted, it should be remembered that he has published a series of careful and useful observations. — (*Lond. med. rec.*, Oct. 15, 1882.) C. S. M. [567]

Nerves of the bile-ducts. — Variot has confirmed and extended Gerlach's observations (*Centrabl. med. wiss.*, xxxvi). The author first gives a brief account of the structure of the bile-ducts and gall-bladder. The nerve-fibres on the ducts are rarely medullated. In gold-chloride preparations one sees the large meshes of the submucous nervous plexus of naked fibres. The ganglion-cells lie mostly in the nodes of the plexus, but are also found elsewhere between the fibres; now and then they are clustered into a little ganglion. A second intermuscular plexus, such as Gerlach described, could not be observed. Nothing was learned of the ultimate terminations. The distribution of the ganglia was studied in longitudinal sections through Vater's ampulla and the neighboring part of the ductus choledocus. At the point of junction is found an extension of Auerbach's plexus. Between the two muscular layers lie the ganglia; but nothing corresponding to Meissner's plexus was found; although, at the junction of the intestinal and ductal mucosa, there is a mass of ganglia. The observations were made on man, dogs, and cobayas. — (*Journ. de l'anat. physiol.*, xviii, 600.) C. S. M. [568]

Salivary alkaloids. — Gautier found in normal human saliva an alkaloid-like non-nitrogenous substance, forming a crystallizable compound with chloride of gold and platinum. In its physiological actions this alkaloid resembled the post-mortem alkaloids (*ptomaines*): injected into animals, it acted like snake-

poison, especially on birds. The directions given for preparing the alkaloid, and information as to the quantity of it necessary to produce lethal results, have, however, been very deficient. Budwin, desiring to obtain further information on the latter point, arrives at results which throw doubt on the whole matter. He finds that fresh extract of 100 cub. cm. of human saliva subcutaneously injected does no harm to frogs, moles, or pigeons. — (*Arch. path. anat. phys.*, xci., 1883, 190.) H. N. M. [569]

The influence of heat and cold upon muscles poisoned by veratria. — It has for some time been known, chiefly from the work of V. Bezold, that veratria exercises a remarkable influence upon muscular contractions. A rapid and powerful contraction is followed by an extraordinarily slow relaxation. In the hope that closer study of the veratria muscle-curve might throw some light upon the nature of a muscular contraction, Lauder Brunton and Cash have made a fresh study of it, especially investigating it under different temperatures. Their work, while not giving much information in regard to this primary point, has led to some interesting results. They find that the influence of veratria varies much with the temperature of the muscle experimented upon. Up to a certain limit, heat increases the effect of the drug; cold diminishes it. Exposure to extremes of heat or cold not sufficient to kill the muscle prevents entirely the manifestation of the usual veratria symptoms. The authors point out, that the modifications which temperature-changes bring about in the action of veratria on muscle suggest that temperature may modify the influence of other drugs, not only on muscles, but on nerves and nerve-centres. Accordingly the different action of drugs on different animals, or on the same animal in various physiological and pathological conditions, may be due in part to temperature differences, physiological or pathological, of the organisms to which they are administered. — (*Journ. of physiol.*, iv. 1.) H. N. M. [570]

Conditions influencing the amylolytic action of saliva. — Working with saliva previously carefully neutralized, — a precaution which has not been always taken by previous observers, but which is clearly necessary on account of the variable acidity or alkalinity of different specimens of saliva, — Langley and Eves arrive at the following conclusions: 1°. Neutralized saliva converts starch into sugar much more actively than unneutralized. 2°. .0015 per cent HCl distinctly diminishes the amylolytic action of ptyalin. 3°. Sodium carbonate also diminishes the activity of previously neutralized saliva, and more the more of the alkaline salt is present. 4°. .005 per cent HCl has a very obvious destructive influence on ptyalin. 5°. Sodium carbonate has a very slight destructive power, but greatly retards the action of the salivary ferment. 6°. Neutralized saliva converts starch into sugar more quickly in the presence of neutral peptone than in the presence of peptone plus dilute HCl. 7°. The larger the percentage of acid in proportion to the peptone, — that is to say, the more acid unemployed in combining with the peptone, — the more marked the injurious influence of the acid. Even before the peptone is completely saturated with acid, the injurious effect, due apparently to the presence of acid-peptone, becomes obvious. 8°. Ptyalin is destroyed by acid combined with peptone much more slowly than by the same amount of acid without the peptone. 9°. When peptone is present, the deleterious influence of sodium carbonate is greatly diminished. Not merely peptone, however, but myosin, alkali albumen, and acid albumen act in the same protective manner. The authors conclude that all ptyalin is

destroyed in the stomach very soon after that first brief stage of gastric digestion in which no free acid is present. — (*Journ. of physiol.*, iv. 18.) H. N. M. [571]

Mammals.

Caudal end of vertebrate embryos. — In his studies on the development of *Melopsittacus*, Braun observed that a constriction is formed around the end of the tail, which leads to the construction of a terminal knob, connected by a thin stalk with the base of the tail. Into this *nodulus caudalis* the chorda and medullary tube originally extend; but they afterward withdraw from it, leaving the nodulus, a ball of mesoderm covered by epithelium, to be finally resorbed. This discovery led Braun to search for similar structures in mammals, and he now publishes his results. His investigations were made principally on sheep embryos, and observations were also made on those of other species. He finds an homologous structure, having, however, more usually a thread-like form. In sheep it may be readily seen in most cases when the tail is from 1.5 to 3 mm. long. His general results are: 1°. The tail of mammalian embryos consists of two parts, — an anterior or basal vertebrate; and a posterior invertebrate and smaller portion, which, from its usual form, may be called the caudal thread. 2°. The vertebrate portion may be partly or wholly embedded in the body (internal tail), and terminates at the sacral vertebrae in front; the division of the tail which protrudes is the external tail. 3°. The caudal thread contains originally the terminal portions of the chorda dorsalis, the medullary tube, and the caudal gut (*schwanzdarm*). These are the first parts of the thread to be resorbed; the rest disappears later, the epidermal covering lasting longest. 4°. The caudal gut is a rectal cecum; before it is resorbed, it breaks up into single parts, of which those in the tip of the tail endure the longest. 5°. The chorda dorsalis projects beyond the last vertebra, its ending being often forked or contorted. 6°. The medullary tube reaches to the tip of the tail or the base of the caudal thread, and its posterior end is probably resorbed. Braun further believes that he has found traces of a neurenteric canal in sheep embryos. He adds a discussion of the tail in human embryos. Finally he homologizes with the embryonic caudal thread, the soft coccygeal appendix of *Innus pithecus*, and similar structures found abnormally in the chimpanzee, orang-outang, and man, and gives citations to prove that the caudal thread exists in human embryos. — (*Arch. anat. physiol.*, anat. abth., 1882, 207.) C. S. M. [572]

Mucous layer of the skin. — Ranvier has made sections of the human skin, hardened in bichromate of ammonia (2%) for two or three months, and then with gum and alcohol. In these the intracellular network is well shown by hæmatoxylin. The fibres of the network project beyond the cell, and establish the union between the cells. In the intercellular spaces these fibres are thicker than within the cells; they have therefore acquired an additional envelope. Ranvier further argues against considering the threads as protoplasm, but maintains that the clear substance in which they are embedded is the true protoplasm in all cells derived from the ectoderm. This is especially maintained for the central nervous system. (His arguments do not appear convincing). — (*Comptes. rend.*, xcv. 1374.) C. S. M. [573]

ANTHROPOLOGY.

The archeology of Russia. — Count Ouwarof of Moscow published, in 1881, a work on the prehistoric archeology of Russia. As to paleolithic man,

the author sums up the result of his researches in a few sentences. 1. His existence is completely demonstrated. 2. He had spread himself to the north as far as 33° 35'. 3. The Chellénne epoch of Mortillet has not yet been met with in Russia. 4. The Moustarian epoch, on the contrary, is well represented, as well in Poland (Zawisza) as in the Crimea (Mérekowsky). 5. The epoch of Solutré has not been observed. 6. The epoch of La Madeleine has been well identified in Poland and in the Crimea. Regarding the neolithic age, the author believes that in Russia there is no such hiatus separating it from the paleolithic as seems to have existed in France and Belgium. Count Ouwarof has enjoyed and utilized rare opportunities for extensive researches over the vast Asiatic and European territory under the domination of the Czar. — J. W. P. [574]

The human fauna of the District of Columbia. — With reference to the former aborigines, Prof. Otis T. Mason stated that the remains were of three kinds, — so-called drift implements on the surface, chipped implements on the surface, and soapstone quarries. While former censuses had stated the population of the district, the health and police records had not been published in such form as to give good results. The death-rate is as follows for seven years:—

Year.	POPULATION.			DEATHS.			DEATH-RATES.		
	Whites.	Colored.	Total.	Whites.	Colored.	Total.	Whites.	Colored.	Total.
1876	106,741	50,859	157,600	2,090	2,072	4,162	19.58	40.74	26.35
1877	109,505	52,870	162,375	2,190	2,014	4,204	20.00	37.39	25.89
1878	112,340	54,960	167,300	2,167	2,068	4,235	19.29	37.63	25.32
1879	115,247	57,053	172,300	2,196	2,113	4,309	19.06	37.03	25.00
1880	118,236	59,402	177,638	2,085	2,121	4,207	17.63	35.71	23.68
1881	121,300	61,760	183,060	2,205	1,931	4,136	18.18	31.27	22.59
1882	124,441	64,212	188,643	2,353	2,218	4,571	18.91	34.54	24.23

In this table should be noticed the preponderance of colored deaths, the diminishing death-rate, and especially the better health of the excessive colored population.

The crime of the district was also discussed, and some very interesting facts elicited. In the census year the arrests were as follows:—

	Popula- tion.	1879.		1880.	
		Arrests.	Per cent.	Arrests.	Per cent.
Males . . .	83,578	10,839	.1297	11,432	.1367
Females . . .	94,046	1,771	.0188	2,126	.0226
Total . . .	177,624	12,610	.0709	13,558	.0763

All births in the district are not recorded, so that it is impossible to draw safe conclusions regarding the natural increase of population. The sources of information, in collating the material for this paper, were the census-office, the board of health, and the superintendent of police. — (*Biol. soc. Wash.; meeting March 2.*) [575]

Bandelier's investigations in New Mexico. — The language, manners, and arts of the modern Indians were examined with minute care. The ruins which antedate the sixteenth century, according to

architectural characters, are divided as follows: 1. Cave-dwellings; 2. Cliff-houses; 3. One-story buildings of stone, forming scattered villages; 4. Large houses with retreating stories. "There appear to be, in fact, but two types of aboriginal architecture in New Mexico, — the many-storied communal house and the one-story building of stone. The latter is either found in villages on the level ground and on gradual slopes, or clustering on rock-shelves, and scattered in recesses like the so-called cliff-houses. The cave-dwellings appear as an incidental form, resulting from the ease with which the rock was hollowed out, or from the existence of natural cavities, which, from their size and the security of their position, afforded advantages superior to those of independent buildings." — (*Bull. arch. inst. Amer.*, No. 1.) J. W. P. [576]

Mohammedans in the world. — A writer in the Missionary herald makes the following calculation of the Mohammedans in the world: Turkish empire, 20,000,000; Persia and the Caucasus, 12,000,000; India, 41,000,000; East Indies, 23,000,000; China, 5,000,000; Egypt, 8,000,000; Morocco, 2,750,000; Algiers, 2,920,000; Tunis, 2,000,000; Tripoli, 750,000; Sahara, 4,000,000; Soudan, 38,000,000; Zanzibar, 380,000; Central Asia, 14,000,000; total, 173,800,000. — (*Miss. herald*, March, 1883.) J. W. P. [577]

The manuscript Troano. — After the brilliant feats in paleography of Grotefend and Champollion, — the former in deciphering the cuneiform; the latter, the hieroglyphics of Egypt, — nothing seems too hard for the student of philology. Of all the outstanding languages, the Maya of Yucatan presents the greatest temptation to the decipherer. In the forthcoming fifth volume of Contributions to North-American ethnology, published by Major J. W. Powell, Dr. Cyrus Thomas presents a monograph upon the Manuscript Troano, already published separately, and occupying 237 quarto pages, illustrated by 31 plates and 101 figures. This volume is the result of years of study, and the last word in an elaborated form of many preliminary utterances and publications. In typography, illustrations, and indexes, it realizes our ideal of a book, yielding the maximum of information and pleasure for the minimum of effort on the part of the reader. In an Introduction, by Dr. Brinton of Philadelphia, are clearly set forth the phonetic system of Central-Americans, the description thereof by Spanish writers, references to Maya literature in the native language, the existing codices, and the previous efforts at interpretation that have been made. Dr. Thomas clearly defines his method in his preface: "I have studied the manuscript somewhat in the same way the child undertakes to solve an illustrated rebus, assuming as a stand-point the status of the semi-civilized Indian, and endeavoring, as far as possible, to proceed upon the same plane of thought." The results attained are as follows: 1. The work was a ritual or religious calendar. 2. The figures in the spaces are symbols, or pictographs, relating to religion, habits, occupations, and customs. 3. It was prepared for people living away from the sea. 4. They were sedentary, agricultural, and not warlike. 5. The evidences of human sacrifice are very meagre. 6. The cross was a religious emblem. 7. Although the figures move from right to left in pairs, the characters are in columns, to be read from the top downwards, columns following each other from left to right. 8. There is no rule for the arrangement of parts in compound characters. 9. The characters are not true alphabetic signs, but syllabic; some are ideographic; others abbreviated pictographs. 10. The work was written

about the middle or latter half of the fourteenth century. 11. The Ahau, or Katun, was a period of twenty-four years; and the great cycle, of three hundred and twelve years; also the series commenced with a Cauac instead of a Kau year. 12. Brasseur was right in supposing that the work originated in Peten. In a future issue we hope to present a review of this work. — J. W. P. [578]

Cranimetry for general use. — Confusion of the worst kind exists among the craniologists in the following particulars, — the base line or orienting of the skull, what marks or characters have anthropologic significance, and the comparative value of the various parts. We have even a French school and a German school. Both of these have been simplifying their methods of late. The Germans held a craniometric conference at Munich in 1877 (*Corr.-blatt.*, 1878, No. 7), one in Berlin in 1880 (*Corr.-blatt.*, 1880, 104-106), and finally came to an agreement at Frankfurt in 1882. The result of the last meeting now appears (*Corr.-blatt.*, No. 1, 1883), signed by the most distinguished craniologists in Germany. A model-chart in blank accompanies the report, with spaces for number, source, sex, age, skull, countenance, and indices. The number of measurements required are very reasonable, and they are not difficult to make. — (*Corr.-blatt. deutsch. ges. anthrop.*, xiv., No. 1.) J. W. P. [579]

EGYPTOLOGY.

Art in Egypt. — In a discriminating review of Perrot's great work, Miss A. B. Edwards says, M. Perrot "has so thoroughly entered into the spirit of ancient Egyptian culture, so firmly grasped the central idea of ancient Egyptian belief, that he has been enabled, not only to trace those influences through every ramification of Egyptian art, but, from a purely philosophic stand-point, to survey and treat his subject as a co-ordinate whole. This it is which gives pre-eminent value to the present work. This it is which we here find attempted and achieved for the first time. And, in truth, it is only within the last few years that such a work has become possible." — (*Academy*, Feb. 17.) H. O. [580]

Pithom-Succoth. — The Egyptian exploration fund of England has signalized its advent to Egyptian soil by a discovery promising great results. M. Naville, on the suggestion of Maspero, director of the Boolak museum, began exploration at Tel-el-Maschu-

ta, — a heap of ruins beside the Sweet-water Canal, south of the railway, east of and near Mahsamah, and about fifteen miles west of Ismailia. He writes, Feb. 12, 1883, "I have a piece of good news to begin with. Tell-el-Maschuta is Pithom, or, in other words, the temple of Tum, in the city or region of Thuku, which Dr. Brugsch has identified with Succoth. . . . I can give it for certain from the inscription of a statue belonging to a priest of the temple." M. Naville also found a Roman milestone with the inscription, —

DD NN VICTORIBVS
MAXIMIANO ET SEVERO
IMPERATORIBVS ET
MAXIMINO ET CONSTANTINO . .
NOBILISSIMIS CAESARIBVS.
AB ERO IN CIVISMA
MI VIII P.

'Ero' would be the transcription of Ar (Ari or Aru), which means the storehouse, and which is found on the statue of the priest. His titles are "the chief of the storehouse of the temple of Tem [Tum] of Theku [Thuku]." Reginald Stuart Poole and Miss A. B. Edwards regard this as a momentous discovery. — (*Academy*, Feb. 24, March 3.) H. O. [581]

Love-songs. — How the ancient Egyptian young men and maidens confessed their love, and rejoiced or mourned, may be learned from Maspero's translation of the hieratic papyrus of Turin, published in facsimile by Pleyte and de Rossi, pl. 79-82. This had been translated by Fr. Chabas (*Rec. of past.*, vi. 156); but a rearrangement of the broken parts of the papyrus has enabled Maspero to gain a clearer view of the whole. Maspero sees a clear resemblance between the Hebrew and the Egyptian conception of love, and suggests that a comparison of the Hebrew with the Egyptian language of love would explain some points now obscure. — (*Journ. asiatique*, Jan.) H. O. [582]

Geographical lists of Karnak. — The only text of these lists open to students is the very faulty one in *Les listes géogr. des pylones de Karnak*, etc., edited by Mariette in 1875. In an open letter to Brugsch, which is accompanied by two pages of facsimiles, Golenischeff offers many corrections of these lists. He says, "While these lists are of the greatest importance, the study of them in the faulty copies in Mariette's Karnak is not to be recommended." — (*Zeitsch. ägypt. sprache*, 3 heft, 1882.) H. O. [583]

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Bureau of ethnology.

Explorations in the Mississippi valley. — Mr. P. W. Norris, on behalf of the bureau, devoted last summer to the examination of mounds and other antiquities of the valley of the Mississippi. His explorations were confined chiefly to eastern Iowa and south-western Missouri, though trips were made to Wisconsin, Minnesota, and Mississippi. Among the results of the work, we mention the following: —

Several somewhat extensive groups of effigy-mounds were discovered in north-western Iowa. One of the groups bears a strong resemblance to one referred to in William Pigeon's singular volume.

In the same region ancient earth-works were found in which the enclosing wall is of the form given in De Bry's figures of the Palisades.

From a mound opened in Wisconsin, a copper kettle, silver bracelet, silver rings, and a silver locket were taken, indicating its modern origin. Two new localities of Indian pictographs were found, and the drawings copied.

Besides stone implements, pottery, pipes, and other evidences of aboriginal art usually found in mounds, two very nicely carved statuettes were obtained in Mississippi. Mr. Norris's collection consists of nearly a thousand specimens.

Professor Cyrus W. Thomas is in immediate charge of these mound-explorations; and the work of the past season is represented by a collection of nearly three thousand five hundred specimens.

Department of agriculture.

Results of field experiments with various fertilizers. — Professor Atwater has given the results of a large