

process of taking place. The present writer's own image with Shelley's lines above quoted is not so much of dead leaves actually moving, as of the leaves rustling, with the sense or *feeling* that they are driven by the wind. The words descriptive of motion give, rather, the feeling of action connected with the leaves, than a picture of movement itself. So, to say that the mountains *rise* is to direct the mental eye upwards, rather than to introduce any picture of objective motion into the mental landscape. So, then, it seems probable, that, while we notice moving rather than resting things, our mental pictures tend to be representations of resting attitudes, rather than pictures of motion. And the greater vividness which descriptions of motion nevertheless possess would seem to be due to the sense of activity that they introduce into our ideas of the objects; and that this sense is connected with the muscular sensations that we are accustomed to associate with all clearly perceived motions seems both probable in itself, and in some wise confirmed by Professor Stricker's observations. The whole leads us, in fact, to another probable

law of mental life; viz., that, since an animal's consciousness is especially useful as a means of directing his actions, the ideas of actions, however they are formed, will naturally be among the most prominent elements of the developed and definite consciousness. We need not make any assertion about the direct source of these ideas. Whether the active muscular sense is a direct consciousness of the outgoing current, or a true sense through the mediation of sensory nerves, the result will not affect either Professor Stricker's argument or our own suggestions.

In conclusion it may be well to say, that, if psychology were already a developed experimental science, such independent and hasty observations and generalizations as our author's would hardly be worth discussion. But as things are, even very imperfectly conducted observations, if they are direct and sincere, must be thankfully accepted. Something of the same sort may possibly hold good of the similarly hasty suggestions that have here been thrown together.

JOSIAH ROYCE.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

MATHEMATICS.

Algebraical equations.—M. Walecki, in a note presented to the Académie des sciences by M. Hermite, gives a proof of a fundamental theorem in the theory of algebraical equations; viz., that every algebraical equation has a root. The theorem being evident for real coefficients, M. Walecki assumes the coefficients as imaginary, and writes the first member of the equation in the form $P + iQ$, and also makes $F(x) = P^2 + Q^2$. He considers first the case of an equation of odd degree, say p ; then it is only necessary to prove that the equation $F(x) = 0$, of degree $2p$, has a root. To do this, he writes $x = y + z$, and distinguishes the odd part in z from the even part in the development of $F(y + z)$, writing thus: $F(x) = \phi(z^2) + z\psi(z^2)$. The resultant of ϕ and ψ is shown to be a real polynomial of odd degree in y , and vanishing for a real value of y . Two cases present themselves: viz., one of the functions ϕ or ψ may vanish identically; and this can only be ψ , for the coefficient of the term of highest degree in ϕ is not zero. Then, ϕ being of odd order, $F(x)$ has a real divisor of the second degree. The second case is when ψ is not identically zero, and when ϕ and ψ have a common divisor, $F(x)$ being then decomposed into the product of two factors. The author shows, then, that in either case a divisor of $F(x)$ is obtained of either the first or second degree, and with real coefficients; thus proving the proposition for an equation of odd order. A similar investigation is given

for equations of even order. — (*Comptes rendus*, March 19.) T. C. [409]

A differential equation.—M. l'abbé Aoust has here given a method for obtaining the formula giving the general integral of the differential equation—

$$x^n \frac{d^n y}{dx^n} + A_1 x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \dots + A_n y = F(x),$$

by aid of a certain multiple definite integral. The quantities $A_1, A_2, \dots, A_n$ are constants. He proposes first to solve the problem of finding a function, ϕ , in terms of another function, ψ ; the two functions being connected by the relation—

$$\psi(x) = \int_0^1 da_n \int_0^1 da_{n-1} \dots \int_0^1 da_1 \phi \left(a_n^{\frac{1}{a_n}} \dots a_1^{\frac{1}{a_1}} x \right).$$

The process for the reduction of this is by substituting

successively z_1 for $a_1^{\frac{1}{a_1}} x$, z_2 for $a_2^{\frac{1}{a_2}} z_1$, etc.; and finally the expression of ϕ in terms of ψ is obtained. The transition from the solution of this problem to the solution of the problem of finding the general integral of the given differential equation is then indicated, and the integral given in the form—

$$y = \sum_1^n M_i x^{a_i} + \frac{1}{a_1 a_2 \dots a_n} \int_0^1 da_n \int_0^1 da_{n-1} \dots \int_0^1 F(a_n a_{n-1} \dots a_1 x) da_1.$$

The quantities $M_1, M_2, \dots, M_n$ are arbitrary constants, and a_1 , etc., roots of a certain algebraical equation. — (*Comptes rendus*, March 19.) T. C. [410]

ENGINEERING.

Effect of frost upon fire-plug casings.—Mr. Allen J. Fuller referred to a general impression that the freezing of the earth around fire-hydrants has a tendency to gripe fast to the frost-jacket, and lift it with the expanding or heaving earth, which he denied for the following reasons. 1°. The frozen earth slides on the surface of the frost-jacket, because its expansion is greater than that of iron. 2°. As the expansion of the earth must be in proportion to the intensity of the cold, so will it be greater above than below a given point: therefore the first foot of frozen ground will have a greater upward movement than that which is below it, and the second foot greater than the third, etc. Thus it will be seen that the earth below a given point rises more slowly than that above, and its friction is opposed to the one above. 3°. If this is true of feet, it is true of inches and of portions of an inch: therefore there is a retardation movement throughout. 4°. The upward movement of the ground: the freezing being greatest towards the surface, and such movement involving a more complete fracture of the earth surrounding the frost-jacket, it follows that the friction is less at this point than that below it, and in consequence there is less power to move upward than downward. Of course, the above does not apply to any construction that the frost can get beneath.

Mr. Frederic Graff noted and described the form of wooden casing which had been successfully used in the early practice of the Philadelphia water-department.

In response to the theory advanced in regard to the action of frost in raising the casings of fire-plugs, and to the statement that if the base of a structure extended below the frost-line it would not be lifted, Prof. Haupt remarked, that he thought the theory was in part sustained by the fact observed by some of the district surveyors, and verified by the accurate measurements they were obliged to make, that fences moved bodily to the south and east in consequence of the action of the sun and frost upon the ground on opposite sides of them. He thought, also, that the deductions concerning the immobility of structures resting below the frost-line were not fully sustained by the facts; as in the north-west, where ice forms rapidly, he had heard of numerous instances of piles driven for bridges, and extending some distance below the frost-line, having been raised as much as five to six inches in a single night; and he conceived the action in this case to be similar in kind to that of piles driven entirely through solid ground, the only difference being in the amount of the resistance offered by friction and weight of pile. The water, in freezing around the pile, acts upon it as a griper or vice; and the expansion of the various strata or laminae of water, as they become converted into ice, acts as a lever to force up the pile.

Mr. Howard Murphy did not consider the case cited by Prof. Haupt as parallel, as the so-called piles, being driven through water and soft mud, were probably columns resting upon their bases, and depending but little upon the frictional resistance of the mate-

rial through which they passed. Therefore the expansive force upward of the freezing water would be opposed by little more than the weight of the pile; whereas in a fire-hydrant casing, or other deeply planted post, the presumably well-rammed material around the whole length under ground would offer such proportional frictional resistance as to cause the freezing earth to slide up the post rather than to lift it. If the ice could be supposed to act downwards upon the piles in question, it is hardly likely that it would have forced them farther home. — (*Eng. club Philad.*; meeting Nov. 3.) [411]

An enormous steam ferryboat.—The Solano, on the Central Pacific railroad ferry, between San Francisco and Oakland, Cal., was built by the Harlan & Hollingsworth company of Wilmington, Del. The boat is 494 feet long on deck, 406 on the water-line, 116 feet beam, 6½ feet draught, loaded. The tonnage is given as 3,540. The engines are two in number, beam-engines working independently, having cylinders 62½ inches in diameter, and of 11 feet stroke of piston. These engines are each rated at 2,000-horse power. The boilers are 8 in number, of steel, have 19,630 square feet of heating-surface, or about 1,500-horse power according to a usual rating (12 square feet to the horse-power). The wheels are 30 feet in diameter, and are fitted with 24 buckets. There are four lines of rails on the deck; and 48 freight or 24 passenger cars can be carried at once. — (*Mechanics*, July 28.) R. H. T. [412]

Surface-condensers for marine engines.—Cadet engineer J. M. Whitham, U.S.N., compares the performance of surface-condensers of marine engines with the results of a formula for required area of surface constructed by him, and deduces a constant for usual application. He obtains the expression, —

$$S = \left\{ \frac{L}{T_1 - t} + \log_e \left(\frac{T_1 - t}{T_2 - t} \right) \right\} \frac{W}{c k},$$

in which

S = square feet of condensing-surface,
 W = pounds of steam condensed per hour,
 L = latent heat of steam of temperature, T ,
 T_1 = temperature of exhaust-steam,
 T_2 = temperature of feed,
 t = mean temperature of circulating water,
 c = coefficient variable with efficiency of surface,
 k = conductivity of the metal (556.8 for brass, 642.5 for copper).

He finds the usual value of c to be 0.148. He finds that this figure may be increased ten per cent where independent circulating pumps are used. The common value of $c k$ is taken as 82.2252. An inspection of the table of areas in use indicates that the smallest areas are very nearly as efficient, as a rule, as the greatest. — (*Proc. naval inst.*, ix. 303.) R. H. T. [413]

Protection of iron from rust.—As it has been observed that iron embedded in lime-mortar is hindered from rusting, Riegelmann of Hanau uses a paint containing caustic alkaline earth (baryta, strontia, etc.), so that the iron may be protected as it is by lime. The *Neueste erfindung* states that a mixture

of ten per cent of burnt magnesia, or even baryta or strontia, mixed cold with ordinary linseed-oil paint, and enough mineral oil to envelop the alkaline earth, will protect iron by its permanent alkaline action, the free acid of the paint being neutralized. — (*Build. news*, Sept. 14.) C. E. G. [414]

Asphalt mortar. — A composition of coal-tar, clay, asphalt, resin, litharge, and sand, an artificial asphalt, has been used for some years with perfect success on the Berlin-Stettin railway for wall-copings, water-tables, and similar places requiring a water-proof coating. It is applied cold, like ordinary cement. The space to be covered is thoroughly dried and cleaned, and then primed with hot roofing-varnish, the basis of which is also tar. The mortar is then spread cold with the trowel, to a thickness of three-eighths of an inch. If the area is large, another coat of varnish is given, and rough sand strewn on. The material is tenacious, impregnable to rain or frost: a piece exposed four years to the drainage of a slope thirty-three feet high is perfectly sound, and has required no repairs. — (*Centr.-blatt. bauverw.*) C. E. G. [415]

AGRICULTURE.

Relative value of soluble and reverted phosphoric acid. — Experiments by Voelcker gave no result, the differences between the unmanured plots being greater than those between manured and unmanured plots. Wildt, in experiments in five different places, found in one case that the soluble form gave the greatest increase, in three cases no effect could be observed from the phosphoric acid in any form, and in one case the results were contradictory. — (*Biedermann's centr.-blatt.*, xii. 514.) H. P. A. [416]

Influence of quality of seed upon the crop. — One of the most important conditions of a successful vegetation experiment is uniformity in the seed used. With this in mind, Hellriegel has investigated the effect of variations in the absolute weight, and in the specific gravity of seeds upon the growth of the resulting plants. He finds, that, of seeds (of barley) having the same specific gravity, the heavier seeds produced at first more vigorous plants than the lighter. As the plants continued to grow in good soil, the differences gradually diminished, until, at the time of harvest, they had entirely disappeared. When the plants grew in poor soil, the effect of differences in the seed was more lasting, and even affected the total weight of the crop. Differences of specific gravity in seeds of the same weight produced no recognizable effect upon the crop. The stage of ripeness of the seeds affected the development of the plants in the same direction as it did the absolute weight of the seeds; the riper seeds being heavier, and producing the most vigorous plants, and the differences being most manifest on a poor soil. Essentially the same results were obtained in experiments with potatoes. The attempt was also made to raise potatoes of greater or of less specific gravity, by selection; the heaviest or lightest being continually selected for seed. The experiment was continued through three seasons, with a negative result. — (*Ibid.*, xii. 530.) H. P. A. [417]

MINERALOGY.

Albite. — This mineral usually occurs somewhat impure, owing to the presence of small quantities of potassium and calcium. C. Baerwald claims to have found for the first time a perfectly pure albite from Kasbék, Caucasia, in which no trace of potassium or calcium could be detected, and which yielded, on analysis, SiO_2 (68.75). Al_2O_3 (19.73). Na_2O (12.29) = 100.77; gravity, 2.618. This albite is regarded as of special interest in relation to Tschermak's theory, that the soda-lime felspars are all isomorphous mixtures of a pure soda felspar (albite, $\text{Na}_2\text{Al}_2\text{Si}_6\text{O}_{16}$) with a pure lime felspar (anorthite, $\text{CaAl}_2\text{Si}_2\text{O}_8$), giving a continuous series between the two extremities which vary in physical properties. Pure albite not being known, an idea of its properties was arrived at by calculation, and the author regards it of interest to compare the albite from Kasbék with the theoretically pure albite of Tschermak.

FOUND ON ALBITE FROM KASBÉK.		CALCULATED BY TSCHERMAK.	
Gravity	2.618		2.624
Angle of base on brachypinnacoid,	86° 22'		greater than 86° 29'

When examined with crossed nicols and sodium light, the extinction upon a basal section was found to be $2^\circ 17\frac{1}{2}'$ on either side of the twinning-plane; and, with a section parallel to the brachypinnacoid, the extinction took place at an inclination of $18^\circ 23\frac{3}{4}'$. These values vary considerably from those arrived at by Schuster, respectively $4^\circ 30'$ and 19° ; but the author regards his values as especially correct, being obtained by experiment on pure material, and not by calculation. — (*Zeitschr. kryst.*, viii. 48.) S. L. P. [418]

GEOGRAPHY.

(*Arctic.*)

Population of the Chukchi peninsula. — Dr. Aurel Krause gives a *résumé* of the exploration of this district from the middle of the seventeenth century, and a discussion of the ethnic relations of its people, largely from the observations of himself and brother during their late travels. To this is added a small ethnological map, showing the distribution of the various stocks on either side of Bering Strait; and a valuable vocabulary, chiefly of Chukchi words, but containing also some words of the Asiatic Eskimo, and some recognized as jargon. — (*Deutsche geogr. blätter*, vi. 3.) W. H. D. [419]

Hydrography of the Siberian Sea. — Otto Pettersson contributes to the second volume of the 'Scientific results of the Vega expedition' a study of this subject, illustrated by charts of the Kara Sea, and of that part of the Arctic Ocean between Novaia Zemlia and Bering Strait which has been named the Norden-skiöld Sea. An important part of the paper consists in the discussion of the movements of the ice in the Kara Sea, which, the author concludes, depend less on wind and weather than on the varying amount of warm surface-water which enters the Kara basin in different years. This warm water depends largely upon the discharge of the great Siberian rivers, and differs according to the time when the ice in them

breaks up in different years. As a complement to this investigation, may be mentioned a paper on Nordenskiöld's explorations, printed by Fr. Schmidt of the St. Petersburg academy of sciences, in which the author endeavors to clear up some doubtful points in the observations made on the Vega voyage, by combining with them the results of explorations by Saunikoff, Hedenström Anjou, and others. — W. H. D.

[420]

New charts of north-east Siberia.—The Hydrographic office of the navy department has issued a chart of Plover Bay, derived from Russian surveys by Maksitovich, and one of the Anadyr River estuary, founded on the surveys of the Telegraph expedition in 1865, with corrections by Russian officers on the ship Haidemak, in 1875. Following an error of the Russian hydrographic office, the title of 'Port Providence' is given to the whole of Plover Bay, and the latter name to the smaller and included port, in direct reversal of the custom of American and other navigators for the last thirty years. — W. H. D.

[421]

Graah's investigations of 1829-30 in Greenland.—Apropos of Nordenskiöld's Greenland expedition, a very full account of Graah's voyage, and a deserved tribute to his qualities as an explorer, appears in the last number of the *Deutsche geographische blätter*. This is doubly useful, as the account of the journey originally published has long been out of print, and difficult to obtain. The same number contains a statement and criticism of the hypothesis offered by Nordenskiöld in regard to the interior of Greenland, from the pen of Prof. Börgen, whose views have been sufficiently confirmed by the results of the voyage, so far as yet made public. — W. H. D.

[422]

(Africa.)

The Portuguese in Africa.—In support of the rights claimed by Portugal on the Kongo, and elsewhere in the interior of Africa, a memorandum was issued, some time since, by the geographical society of Lisbon, in which it was claimed for Portuguese explorers that they had revealed to science precise and exclusive information in regard to the orography and hydrology of the Dark Continent. The plea of this memorandum has been traversed by President Wauters, of the Royal Belgian geographical society, in a very lively and interesting article. Without expressing an opinion as to the merits of parties now struggling for supremacy on the Kongo, attention may be called to the manner in which the author shows how the characteristics of the hydrology of the interior of Africa on ancient charts were derived. Two centuries before the Christian era, Eratosthenes, from information obtained on the Ethiopian expedition of Ptolemy Philadelphus, described with tolerable accuracy the chief features of the river-system of Abyssinia, and placed the source of the principal branch of the Nile in a lake situated to the southward of that country. Ptolemy and the Arabian geographers added other lakes and branches, the details of which appear to have been based chiefly on rumor and imagination. In 1444 certain Abyssinian monks visited Rome on an ecclesiastical errand; and, from infor-

mation derived from them, Brother Mauro corrected the geography of that part of the Nile basin comprised in the Abyssinian watershed, the remainder finding its source on a vast marsh located in the centre of the continent. This appeared on his celebrated *Mappe-monde* in 1458.

According to the author and Father Brücker, the curious network of lakes and rivers found on the globes of Martin Behaim and medieval geographers, which suggest so curiously the lakes and rivers now known to exist, were all derived from the sources above mentioned. In many cases the names of the lakes and towns can be recognized; and in suppressing synonyms, and replacing Abyssinian rivers (which appear spread over central Africa on such maps) where they belong, the central region of the continent becomes almost a blank. It was reserved for the celebrated De Lisle, in the early part of the last century, to sweep from the charts every thing not due to actual observation, leaving to Livingstone and his successors the occupation of the blank thus made by delineating the physical features recognized in these modern and only authenticated explorations. — (*Bull. soc. Belg. géogr.*, ii. 1883.) W. H. D.

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BOTANY.

Synonymy of higher cryptogams.—The 'Nomenclator der gefässkryptogamen,' by Carl Salomon, gives the genera and species of the higher cryptogams, together with their synonyms, and the geographical distribution of the species, — a work which is much needed by students in this department of botany. — W. G. F.

[424]

Ohio fungi.—The third part of the 'Mycological flora of the Miami valley,' by A. P. Morgan, has appeared, and includes the species of Agaricini from *Coprinus* to *Leuzites*. The paper is accompanied by colored plates of two new species, — *Coprinus squamosus* and *Hygrophorus Laurae*. — (*Journ. Cinc. soc. nat. hist.*) W. G. F.

[425]

Phycologia Mediterranea.—In this volume of about five hundred large octavo pages, Prof. F. Ardissoni of Milan describes the Florideae of the Italian coast, followed by the Bangiaceae and Dictyotaceae, under the heading *Incertae sedis*. From the context, however, one understands that the writer considers the two last-named orders to be nearly related to the Florideae. The descriptions and synonymy are given in full in Latin, and there are many notes in Italian on the microscopic structure and development. The antheridia of *Spyridia* are said to be unknown. They have, however, been described and figured in American specimens of *S. filamentosa*, which also occurs in Italy. — W. G. F.

[426]

Pollination of Asclepias.—Dr. Taylor speaks of the temporary capture of flies by *A. purpurascens*, and of the removal of pollinia by them on their escape, and suggests that North-American botanists examine the insects caught on our asclepiads for the peculiar pollen-masses (*Sc. gossip*, Sept.).

Like *Apocynum*, the milkweeds have long been known to catch insects not adapted to fertilize their flowers; and irritable movements have several times

been ascribed to their pollinia or stamens (e.g., Kirby and Spence, 'Entomology,' 7th ed., 167; Willdenow, 'Principles of botany,' 321; Potts, *Proc. Philad. acad.*, 1878, 293). In reality the insects are captured by a purely mechanical action of the fine V-cleft in the saddle of the pollen-mass, which seems especially adapted to hold the tarsal hairs of insects, especially certain Hymenoptera.

The pollinia have been frequently noticed on insects. Bee-keepers often complain that their bees become so weighted with them as to be unable to regain the hive. Potts (*Proc. Philad. acad.*, 1879, 207) mentions one bee which bore the remains of thirty pollinia; and Bennett (*Pop. sc. review*, 1873, 343) speaks of a butterfly which had eight entire masses, and the bases of eleven others, on one of its feet. Curious mistakes have also been made in descriptive entomology through a failure to recognize these bodies when they have been met with on insects. Savigny, in his great work on Egyptian insects ('Hymenoptera,' pl. 11), figures one as an appendage of the maxillary palpus of a Larrid; and his figure is copied by Westwood ('Modern classif.,' ii. 197), who says (p. 201) that 'it may possibly be the effect of disease.' Reakirt (*Proc. ent. soc. Philad.*, ii. 357) described them as natural appendages of the tarsi of a butterfly, giving them the name of eupronychia. If I am not mistaken, a species of *Mantispa* has also been characterized by the presence of these pollen-masses; but I am unable to refer to the description.

Among the numerous modern accounts of the pollination of the genus, none is more thorough than that given by Delpino, in his 'Fecondazione nelle piante antocarpee,' 1867. — W. H. D. [427]

ZOOLOGY.

Rare forms of microscopic life.—Dr. A. C. Stokes recently described and exhibited specimens of a new species of *Acinet*, a stalked, loricate infusorium. At the same time he called attention to an example of the blue *Stentor* (*Stentor ceruleus* Ehrenberg) which he thought had not been mentioned heretofore as found in America. He also announced that he had recently collected the beautiful rotifer, *Stepanoceros Eichhornii*, which, though abundant in Europe, appears not to have been previously found in this country. Specimens of *Salpingoeca urceolata* were also shown, which in no way differed from marine specimens. All the above forms of minute life were found in Watson's Creek, a small fresh-water stream in Mercer county, N. J. — (*Trenton nat. hist. soc.*; November meeting, 1883.) [428]

Mollusks.

Pulmonata of central Asia.—E. von Martens publishes a valuable contribution to our knowledge of central Asiatic Mollusca. The region treated of is between the frontiers of China and the Caspian, for which material has been gathered by Prjevalski, Potanin, and Regel. Besides descriptions of new forms, it contains a review of the fauna, with a tabular exhibit of the distribution of the different species. The central Asiatic *Helices* are broadly divisible into two groups: the one, characterized by

reddish and yellowish tints of coloration, and related to the *Fruticicola* of Europe, is more northern in its distribution; the other, allied to *Xerophila*, inhabits the Thian-Shan region, and is distinguished in general by sharper sculpture and a whitish color. Several forms common to the pleistocene and to the boreal region are found here, while several sections of the *Helices* not found in the pleistocene are also absent from central Asia. The fauna is more nearly related to that of the post-tertiary, or northern American, than to the existing fauna of middle Europe. The fresh-water snails are European, but *Unio* is conspicuous by its absence. A supplement by Schacko gives anatomical details of several species. — (*Mém. acad. St. Péterbourg*, (7), xxx. no. 11.) W. H. D. [429]

Mediterranean oysters.—The Marquis de Gregorio has undertaken a special study of the Mediterranean oysters, recent and fossil. Two short papers printed at Palermo give some preliminary results; among other things determining the existence in a living state, on branches of red coral, of the true *Ostrea cochlear* of Poli, believed to have become extinct. We recall, however, the identification of this species some time since, by Dr. Jeffreys and others, from specimens attached to a telegraph-cable which had been recovered from great depths for repairs. — W. H. D. [430]

Mollusks at the fisheries exhibition.—Dr. J. Gwyn Jeffreys prints some notes on the Mollusca exhibited. Leaving out oysters, which were well represented from Great Britain, the United States, and France, the collections are not remarkable. British Columbia showed a fine example, in spirit, of *Cryptochiton Stelleri*. This species, by the way, though rare in European collections, is abundant in proper localities from Santa Barbara, Cal., north and west to the extreme limit of the Aleutian Islands. It is eaten raw by the natives of Alaska. Norway showed a small collection of fine specimens of her mollusks, as did the museum of Gothenberg, Sweden. The most important and interesting collection was that of the *Vega*, dredged in the Arctic seas from Norway to Bering Strait by Baron Nordenskiöld. Among these was a *Pleurotoma* (from the description, closely resembling *P. circinata* Dall, of the Aleutian Islands), which Dr. Jeffreys believes to be larger than any other known species, and to which he has applied the name of *P. insignis*. — (*Ann. mag. nat. hist.*, Aug., 1883.) W. H. D. [431]

Worms.

Notes on worms.—C. Vignier has published a preliminary notice of his researches on the annelid *Exegone gemmifera* in the *Comptes rendus* (xcvi. 729), and promises a full memoir. — W. H. Caldwell gives, in the proceedings of the Royal society of London (xxxiv. 371), a preliminary note on the structure and development of *Phoronis*. — A third preliminary publication is that on the development of *Borlasia vivipara*, in the *Bulletin scientifique du département du Nord* (v. 462), by W. Salensky. — In the journal of the Linnaean society of London (xvii. 78), Dr. T. S. Cobbold describes *Ligula Mansoni*, n. sp. Twelve

specimens were found, in a Chinese, lying in the sub-peritoneal fascia about the iliac fossae, and behind the kidneys; a single one being found lying free in the right pleural cavity. They were twelve to fourteen inches long, and an eighth of an inch broad, and come near *Ligula simplicissima*. — H. Griesbach has given a preliminary report of his observations on the connective tissue of cestods, as studied in *Solenophorus*. His article appeared in the *Biol. centralbl.* (iii. 268). — J. Poirier found in the intestines of *Palonia frontalis*, from Java, three new Amphistomidae, for which he establishes two new genera, — *Homalogaster* and *Gastrothylax*. Three species are described and figured (*Bull. soc. philom. Paris*, (7), vii. 74). — J. Chatin reports a few observations on the histological alterations occasioned in man by trichinosis (*Ibid.*, 107). — The larvae of *Gordius* occur both in fishes and in many insect-larvae. In opposition to Villot, von Linstow maintains that the insects are the real hosts, and the parasites are present in fishes only accidentally, from their feeding on infested insects. — (*Zool. anz.*, vi. 373.) C. S. M. [432]

VERTEBRATES.

Direct irritability of the anterior columns of the spinal cord. — Mendelssohn, in the present paper, states that he has repeated all of the experiments of Fick upon the irritability of the anterior columns, and obtained similar results. In his own experiments, special efforts were made to prevent any escape of current on stimulating. The spinal cord was laid bare in its whole extent, and isolated from the surrounding parts by caoutchouc. The anterior and posterior columns of the cord were stimulated just below the brachial plexus, which had been previously divided; and the movements of the gastrocnemius muscle which resulted were registered upon a myograph. In some cases the anterior portion of the cord was completely separated from the posterior by a section running from the origin of the sciatic to the cervical cord. It was found in all cases that the reaction of the anterior columns was shorter than that of the posterior columns; that is, the time between stimulation of the cord and contraction of the gastrocnemius was less in the first case than in the second, the difference in time varying from 0.01 to 0.025 of a second. Assuming that the contraction resulting from stimulation of the posterior columns is reflex, then that resulting from stimulation of the anterior columns must be direct. — (*Arch. anat. physiol.*, 1883, 281.) W. H. H. [433]

Fishes.

Sudden increase of a rare sunfish. — Professor A. C. Apgar recently referred to the results of a fishing-excursion in central New Jersey. He found that the hitherto rare species of sunfish (*Mesogonistius chaetodon*) was remarkably abundant, and in a short time gathered seventy-five specimens. Where heretofore the common spotted sunfish (*Enneacanthus simulans*) and the still more abundant 'pumpkin-seeds' (*Lepomis gibbosus*) have been the characteristic species, these now appear to be largely crowded

out by the small banded sunfish, which but a short time ago was only to be found in scanty numbers and in very limited localities. — (*Trenton nat. hist. soc.*; November meeting, 1883.) [434]

Birds.

Anatomy of Biziura. — From the dissection of two males of *B. lobata*, Mr. Forbes finds that this duck forms an exception in that its trachea is simple, and devoid of a bulla, and that a subgular pouch, comparable to that of the bustards, exists. The ambiens tendon perforates the patella, as in *Phalacrocorax* and the *Hesperornis* of Marsh. — (*Proc. zool. soc. Lond.*, 1882, 455.) J. A. J. [435]

Does the Carolina wren mimic? — Dr. C. C. Abbott read a short paper on the habits of the Carolina, or mocking-wren (*Thryothorus ludovicianus*). He had carefully studied a pair of these birds for a year, seeing the male bird at least three times each week, from September to September. In all that time he had never heard the male bird utter a note not distinctively its own. Prof. Austin C. Apgar remarked that he had been familiar with the song of this wren for years, but had not heard it mimic; yet in all works on ornithology that refer to this species it is called the mocking-wren; and the habit is more or less referred to by Wilson, Audubon, and by Baird, Brewer, and Ridgway, in their 'History of North-American birds.' — (*Trenton nat. hist. soc.*; meeting Sept. 19.) [436]

The tongues of Tenuirostres. — In this paper, Gadow describes the modifications of the tongue which adapt it for sucking. The basal portion of the tube is formed by the rolling-up of the tongue, while the tip is formed by the rolling-up of the divided portion. In the *Melaphagidae* the end is broken up dichotomously into several tubes, and only the external borders of the tubes are lacinated. In the *Hectariniinae* the end is formed of only two tubes, and the internal edge is lacinated. In the hummers the tongue is double to near the base. Some peculiarities of the serpi- and mylo-hyoid muscles are mentioned. We notice that the author gives the anterior cornua of the hyoid apparatus as obsolete, though he describes the os entoglossum as double. From this we infer that he has forgotten that the ossa entoglossa are the anterior cornua. — (*Proc. zool. soc.*, 1883, 62.) J. A. J. [437]

Mammals.

Innervation of the movements of the iris. — In the reflex narrowing of the pupil, which takes place when the eye is exposed to light, it has been generally accepted that the afferent fibres concerned in the act follow the same general course as that taken by the rest of the fibres of the optic nerve, passing along the optic tracts to a centre somewhere in the neighborhood of the corpora quadrigemina. Bechterew has shown that this is not the case. Section of the optic tracts in various places, from the chiasma to the corpora geniculata, causes no dilatation of the pupil, and does not interfere with the reflex narrowing of the pupil when exposed to light. Injury of the corpora geniculata and of the corpora quadri-

gemina, so long as the lesion in the latter case does not extend so deep as to involve the origin of the oculo-motor nerves, gives the same result. Lesions of the gray matter of the lateral and posterior walls of the third ventricle, on the other hand, cause a widening of the pupil, and a loss of the 'direct' light reflex in the eye of the same side. If, however, the eye on the uninjured side is exposed to the light, a narrowing of the pupil of both eyes takes place, appearing to show that the lesion has involved only the afferent fibres, and not the reflex centre. The author's view of the path of the fibres is, that they leave the optic nerve at the chiasma, pass directly into the gray matter of the walls of the third ventricle, and end finally each in the nucleus of the oculo-motor nerve of its own side. The fibres do not cross anywhere in their course, since lesions of either side affect only the corresponding eye; and a sagittal section of the floor of the ventricle or of the chiasma is without effect. The nuclei of the oculo-motor nerves he considers as the true centres for the reflex; and the commissural fibres connecting these nuclei explain the occurrence of the indirect reflex, that is, the narrowing of one pupil when the pupil of the other eye is exposed to light. The dilatation of the pupils which follows painful stimulation of any portion of the periphery of the body cannot be owing to stimulation of fibres running in the sympathetic; since, in the first place, the widening is not maximal, as it is when the sympathetic is directly stimulated, and, in the second place, this reflex is entirely destroyed when a deep section is made behind, or in the posterior part of, the corpora quadrigemina. He explains the action of painful stimuli as an inhibition of the normal light reflex contraction of the pupil.

The pathological reflex paralysis of the iris, which occurs in certain diseases, in which the iris does not respond to stimulation of the eye by light or to painful stimuli of the body, is owing, he thinks, to an affection of the gray matter of the third ventricle. — (*Pflüger's archiv*, xxxi. 60.) W. H. H. [438]

ANTHROPOLOGY.

Languages and ethnology.—In a recent communication, Gustav Oppert proposes to divide languages, according to the mental propensity towards concreteness or abstractness possessed by the various races, and exhibited in their speech, into concrete and abstract languages. The concrete division is again separated into the heterologous (having special words when persons of different sex address each other), and homologous (males and females use the same words as if addressing their own sex). The abstract division is separated into digeneous and trigeneous. In the former all things are either masculine or feminine: in the latter there are three genders. Each division is again subdivided into three classes, as follows: 1°. Elder and younger relatives have special terms, sex denoted by the words 'male' and 'female,' or by modulation; 2°. Having special terms for elder brother and elder sister, but one in common for younger brother and younger sister; 3°. Having four distinct terms for each variety of kinship. Representing the concrete and abstract by C and A, their classes by α and β , and their groups by 1, 2, and 3, and the monosyllabic, incorporative, euphonic, euphonic inflectional, alliteral, agglutinative, agglutinative inflectional, dissyllabic inflectional, inflectional synthetical, and inflectional analytical, by I., II., III., IV., V., VI., VII., VIII., IX., and X., any

PHYSIOLOGIC.		HETEROLOGOUS α .			HOMOLOGOUS β .			DIGENEUS α .	TRIGENEUS β .
		1	2	3	1	2	3		
I.	Monosyl. . . .	- -	- -	- -	- -	- -	Chinese?	{ Old Egyp- tian.	- -
II.	Incorp. . . .	{ Many American, Basque.	Algonquin.	- -	{ Corean, Transgan- getic, Kfranti, Tibetan.	- -	- -	- -	- -
III.	Euphonic . . .	- -	- -	- -	{ Mandingo, Yoruba.	- -	- -	- -	- -
IV.	Euph. inflect. .	- -	- -	- -	- -	- -	- -	Hausa.	- -
V.	Alliteral . . .	- -	- -	- -	Kongo, etc.	- -	- -	- -	- -
VI.	Agglut. . . .	{ Polynesian, Australian.	Narrinyeri.	- -	- -	- -	- -	- -	- -
					Malayan.	{ Tungu- sian, Mongol- ian.	- -	- -	- -
VII.	Agglut. inflect. .	- -	- -	- -	- -	- -	{ Japanese, Fins, Turkish, Dravidian, etc.	- -	{ Hindustani, Bengali, Singhalese.
VIII.	Dissyl. inflect. .	- -	- -	- -	- -	- -	- -	Semitic.	- -
IX.	Inflect. synthet.	- -	- -	- -	- -	- -	- -	- -	{ Sanskrit, Zend, Greek, Latin, etc.
X.	Inflect. analyt. .	- -	- -	- -	- -	- -	- -	- -	{ Italian, German, English, etc.

language may be indicated, as in chemistry, by a symbol; as, C β 1 II. = Corean, Tibetan, etc. — (*Journ. anthrop. inst.*, xiii. 32-52.) O. T. M. [439]

Muskoki strategy.—The following method of Indian stratagem is told for the first time by Mr. H. S. Halbert. When a small party of Muskokis wished to attack a Choctaw village, they would arrange themselves in ambush at convenient intervals to within three hundred yards of the village. The bravest man would now crawl up as near the village as practicable, dig a pit and place himself in it, where he would wait until daybreak. The first

Choctaw whom he then saw stirring about near his ambuscade he would shoot down, spring forward, and scalp him in the twinkling of an eye. He would then flee toward the second ambuscader. If he was pursued, which was generally the case, the pursuer received the fire of this ambuscader. The two warriors then fled to the third man in ambush. If the pursuers still followed, they received the fire of this man. The three now ran to the fourth ambushed warrior, where the same scene was enacted; and so on until the place of the last man was reached. — (*Amer. antiq.*, v. 277.) J. W. P. [440]

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

Geological survey.

Paleontology.—Mr. Lester F. Ward, paleobotanist of the survey, is at work preparing a catalogue of fossil plants, with their geological relations, which will probably be published during the coming spring. Fifty-one boxes of Fort Union fossil plants, collected by Mr. Ward near Glendive, Montana, last July, have been received at the office of the survey.

A paleontological report on the paleozoic fossils of the Eureka district of Nevada, by Mr. Charles D. Walcott, is almost ready for the press. The number of paleozoic fossils from this district exceeds four hundred species.

During the month of October a large number of Potsdam fossils from Saratoga, N. Y., and some Trenton fossils from Trenton Falls, N. Y., were added to the collections in the hands of Mr. Walcott, who has charge of the department of paleozoic paleontology.

One of the papers in the fourth annual report of the survey is 'A review of the North-American fossil Ostreidae,' by Dr. C. A. White. It will be illustrated by forty-eight full-page plates of figures, giving figures of all the leading species of fossil forms of oysters, and of the leading varieties of *Ostrea virginica*, for comparison. For it, also, Professor Angelo Heilprin furnishes a revised catalogue of the tertiary oysters; and Mr. John A. Ryder adds a concise life-history of the common oyster, illustrating its anatomy, and giving the results of his recent experiments in the artificial propagation of oysters.

Chemistry.—A laboratory, to be in charge of Prof. F. W. Clarke, is being organized in connection with the survey. Heretofore the chemical work of the survey has been done at various laboratories scattered through the country, and at the field-laboratories at Denver, Salt Lake City, and San Francisco. A laboratory for physical experiments will probably be established in connection with the chemical division.

West-Virginia forests.—During September and October, Col. George W. Shutt examined the southern and eastern portions of West Virginia with especial reference to the distribution of timber, its economic value, and the facilities of transportation to market

via the streams of the region. He travelled over a thousand miles by wagon, and two hundred on horseback, and expresses the opinion that nearly one-half of the state is covered with a virgin forest, the value of which, if rendered marketable, would amount to billions of dollars.

Geology.—In making an excavation a few weeks ago for a building on Connecticut Avenue, in the north-western section of Washington, D. C., the interesting discovery was made of the remains of a subterranean forest. The fact was mentioned at the meeting of the Biological society of Washington, Nov. 2, by Professor Lester F. Ward; and, from the excellent preservation of the wood, the opinion was expressed that it was simply a collection of drift-wood that had been washed into a ravine in comparatively recent time. Mr. W. J. McGee of the Geological survey, who has been working up the geological structure of the District of Columbia for some time, had also examined the locality in question, and was of the opinion that the deposit was of quaternary or prequaternary age. A few days after the meeting of the Biological society, above mentioned, he, with Professor Ward, Mr. G. K. Gilbert, and Mr. J. B. Marcou, re-examined the buried forest; and Mr. McGee's opinion was confirmed,—the stratum was found to underlie the quaternary gravels of the district. The occurrence is of interest, since the slightly altered wood undoubtedly represents the end of the long interval extending from the cretaceous to the beginning of the quaternary, during which the lignite beds and iron-ore deposits, so common in the region, were formed.

Publications.—The survey has just issued a miscellaneous work, one of a series of statistical papers, which is distinct from the Monographs and Bulletins, but, like them, is for sale at cost price (fifty cents in this case). The title of this work is, 'Mineral resources of the United States,' by Albert Williams, jun., chief of division of mining statistics and technology. In its 813 pages it gives the statistics of our mineral production for the year ending June, 1883, and also a mass of information in relation to the production of coal, petroleum, iron, copper, lead, and zinc. It also treats of building-stones, clays, fertili-