

work, which certainly places the village-community theory upon the defensive, and overthrows a considerable part of its assumptions ;

and, apart from its controversial character, as a 'history of land-holding' it possesses the highest value.

## WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

### MATHEMATICS.

**Hyperelliptic integrals.**—The full title of this paper by M. Staude is "Geometrische deutung der additionstheoreme der hyperelliptischen integrale und functionen erster ordnung im systeme der confocalen flächen zweiten grades." Only a brief notice of M. Staude's paper is possible in this place, although its importance makes it worthy of a much more extended one. The paper is divided into five chapters. In the first chapter the author considers the geometric significance of the symmetric algebraic functions of two independent variables, and the differentials of the integral functions of an hyperelliptic form (*gebilde*) of deficiency (*geschlecht*). The second chapter treats of the representation of the *gebilde* in systems of confocal surfaces by aid of hyperelliptic functions, and opens by the introduction of certain transcendental parameters in place of the usual elliptic co-ordinates. An expression is also given of the homogeneous point co-ordinates in space in terms of products of the double theta-functions, and also of homogeneous plane co-ordinates in space by aid of products of two double theta-functions. The third chapter is of particular interest from a purely geometrical point of view. In this the author considers the relations of the addition theorem for hyperelliptic integrals to systems of confocal surfaces, treating particularly the reduction of given sums of three integrals to sums of two integrals of the same kind. The fourth and fifth chapters have not yet appeared, but the author mentions their contents. Chapter four is to treat of the ray-systems of common tangents to two confocal surfaces; and chapter five is to be devoted to a geometrical interpretation of Abel's addition theorem, by aid of which the reduction of the sum of any four of the integrals in question to the sum of two integrals of the same kind is arrived at by a purely geometrical process. — (*Math. ann.*, xxii.) T. C. [471]

**Discontinuous groups of linear substitutions.**—The complete title of M. Picard's paper is "Sur une classe de groupes discontinus de substitutions linéaires et sur les fonctions de deux variables indépendantes restant invariable par ces substitutions." The theory of the elliptic functions has given the first example of a uniform function of a variable which does not change for a group of an infinite number of linear non-permutable substitutions effected upon the variable. The modular functions, i.e., the functions arising from considering the modulus as given by the ratio of the two periods, was for the first considered by M. Hermite. M. Poincaré has treated in his theory of the Fuchsian functions, in all its generality, the subject of functions of one variable which

are reproduced by a group of an infinite number of linear substitutions. M. Picard, in the present memoir, proposes to consider functions of *two* independent variables which may be considered as analogous to the elliptic modular functions. He shows, first, that the Abelian functions do not conduct to functions entirely analogous to the modular functions, and illustrates this by the Abelian functions of the first order. But by taking the case of the Abelian functions of the second order, i.e., of three variables, he has found an indication of the desired extension, and hopes in a future paper to enter more fully into the subject of functions of two variables which are analogous to the modular functions. The present paper is interesting as pointing out the difficulties, and indicating the manner of overcoming them, in an entirely new department of the theory of functions. — (*Acta math.*, i.) T. C. [472]

### PHYSICS.

**Target-shooting.**—From Liagre's theory that errors in target-shooting are compounded of errors in sighting and in levelling, each of which follow independently the law of error, it was shown by Mr. C. H. Kummell that shots of equal probability are arranged in ellipses, which can be reduced to circles of shots uniformly distributed, the integration being much simplified by using the reduced distances and directions. Sir J. Herschel's 'even-chance circle' (ellipse, more generally), the one hit or missed with equal probability, can be deduced from the shots actually found in any given circle (ellipse), the most reliable result being given by the one containing the greatest number of shots, whose radius (mean semi-diameter) is the *most probable* shot. The number of shots falling within this ellipse should be about thirty-nine and one-half per cent. The equations between the even-chance shot ( $\rho$ ), the most probable shot ( $\epsilon$ ), and the average shot ( $r_0$ ), are —

$$\rho = \epsilon \sqrt{2 \ln 2}, \quad r_0 = \epsilon \sqrt{\frac{\pi}{2}}.$$

In determining these from the sums of squares of the vertical and horizontal co-ordinates of the separate shots, the number that miss the target should be considered. The probable position of centre and axes should not be calculated from the observations, unless the true positions are unknown. A target of ninety shots at eight hundred yards' range, by the Irish team at Creedmoor in 1874, gave discrepancies of less than five per cent between observation and theory, in the number of shots within successive rings. One of fifty pistol-shots, at fifty yards' range, showed a similar agreement. — (*Phil. soc. Wash., math. sect. ; meeting* Nov. 21.) [473]

## ENGINEERING.

**Honigman's fireless locomotive.**—Mr. Honigman constructs an engine in which the steam is supplied by evaporation from a charge of water which is furnished to the boiler at the station, and there brought up to the required temperature and pressure. The shell of the boiler is surrounded by, or may enclose, another vessel, between which and the boiler a narrow space is left, which is filled with caustic soda. The exhaust-steam is discharged into this mass of soda, which at once absorbs it; and the absorption gives rise to a large amount of heat, which is in turn given out, and returned to the water in the boiler, where it produces an additional quantity of steam; and the latter, being exhausted into the compartment containing soda, gives rise to additional quantities of heat; and thus the process is continuous, and the locomotive continues to exert its power, until the solution of soda becomes so far saturated that it can no longer take up the exhausted steam, and supply heat to the boiler, with sufficient rapidity to enable the engine to do its work. When this state of affairs is reached, the engine is recharged, and is again sent out on the line. The soda removed from the exhausted engine is placed in an evaporator and deprived of its moisture, and is then again ready for further service. This seems to be the first attempt to make practical application of the now well-known principle discovered by Faraday sixty years ago, and probably even earlier known on the continent of Europe. It is reported to be tolerably successful, and likely to have practical use where the presence of a fired engine is not permissible. — (*Lond. engineering*, Aug.) R. H. T. [474]

**Compound locomotives in Europe.**—Mr. Borries has read a paper before the Union of German engineers, relating the progress of the compound engine on German railways. They were first introduced by A. Mallet of Paris. There are now forty of these engines at work. They are worked either simple or compound, as desired. They are economical, and may be worked with a wide variation in the amount of power developed, but are somewhat complicated, do not distribute the steam in the manner sometimes found practically desirable in working, and the action of the steam during compression leaves something still to be desired. Mr. Borries has endeavored to obtain a system which should permit the use of double expansion at all times, should be simple, and should permit the proper adjustment of the ratio of expansion at any time, if possible. At starting, steam is admitted to both cylinders, reaching the large engine-cylinder through a 'reducing-valve;' but, after starting, the machine works as a compound engine. At all points of cut-off, he gets nearly equal work done in each cylinder. The engine works easily, and no spark-arrester is needed. The excess of weight and cost is about four per cent above that of other engines: the gain in power is six per cent, and in economy of fuel nine and a half per cent. The engine is considered a success. The best results are reported from passenger-engines thus constructed. — (*Lond. engineering*, Aug.) R. H. T. [475]

**Finishing rails.**—M. Gazan writes to *La métallurgie*, saying that the chemical composition of the steel has very little to do with the strength of the rail: it depends more upon the temperature at which the rail is finished in the mill. Those finished at a high red heat, and which are recognizable by their blue tint, are more brittle and weaker than those which are finished at a lower heat. The latter are usually covered with a reddish colored layer of oxide. In the former case the fracture exhibits a granular, and in the latter case a good steely, surface. M. Gazan thinks, that, in the former case, time is allowed for the formation of crystals which cannot be produced in the latter. If the red-hot metal be worked until it has fallen below the red heat, it does not exhibit crystallization. — (*Railway rev.*, Sept. 8.) R. H. T. [476]

**Compound engines and boilers.**—Mr. M. Coryell, a member of the U. S. naval advisory board, writes that good results have been obtained from recent compound engines. Pressures rarely exceed 100 pounds per square inch (8 atmos. nearly, absolute pressures); but he thinks 150 (11 atmos., absolute) can be carried by adopting, instead of the 'Scotch boiler,' a boiler of but 6 feet diameter (1.8 metres), with cylindrical shell and set in brick-work, — a plan of which great distrust has hitherto been felt by engineers. He suggests a still better scheme, however, — a water-tube 'sectional' boiler, safe for 200 pounds. This would permit fire-surfaces of but a quarter-inch (0.6 centimetre) iron. The use of fire-brick furnace-walls is found to give some economy of fuel. He has found high pressures and great expansion to give good results, and states that at least one successful designer would exceed 20 expansions, — a proposal which is not looked upon with favor by leading engineers. Mr. Coryell would use the beam-engine for screw-ships on account of its perfect balance. He states that engines of 6 feet stroke are in use, making 60 revolutions per minute with 60 pounds (5 atmos.) of steam and a cut-off at 5 inches (i.e., a ratio of expansion of 14.4), and that these engines have been in successful use for nine years, making voyages of five days without detention and with economy. Engines of 88 inches (2.235 metres) stroke have averaged 58, and have sometimes made 71, revolutions per minute. He thinks 4 feet (1.22 metres) the shortest advisable stroke for marine engines, and believes that twice that length will ultimately become common. — (*Mech. eng.*, Sept. 29.) R. H. T. [477]

## CHEMISTRY.

(General, physical, and inorganic.)

**Active oxygen.**—For the purpose of testing the accuracy of his conclusion relating to the action of moist phosphorus on carbonic oxide, which seemed to be disproved by the results of Remsen and Kaiser (*SCIENCE*, i. 704), E. Baumann has repeated his experiments, using apparatus closed with glass stoppers, and taking every precaution to avoid contact of the gases with organic matter of any kind. In one experiment, seven hundred cubic centimetres of carbonic oxide, diluted with air, after passing through the apparatus, in fifteen hours gave 36.6 milligrams of

carbonic dioxide, or 2.6 % of the carbonic oxide was converted into carbonic dioxide. In a second experiment, thirty litres of air containing 2.45 litres of carbonic oxide, when passed through the apparatus, in twelve hours gave 64.6 milligrams of carbonic dioxide, or 1.3 %. The temperature varied between 20° and 26°. Baumann found, further, that hydrogen peroxide was not produced when air was passed over palladium hydrogen, although carbonic oxide was oxidized to a small extent. He concludes, with Hoppe-Seyler, that this oxidation is due to the presence of oxygen in its active condition. — (*Berichte deutsch. chem. gesellsch.*, xvi. 2146.) C. F. M. [478]

**Determination of the atomic weight of antimony.**—J. Bongartz prepared metallic antimony from antimonious chloride, which had previously been purified by six or eight fractional distillations. The metal was separated by electrolysis according to Classen's method, and it was converted into the sulphide by heating with potassic sulphide. Determinations of sulphur in the purified sulphide were made by Classen's method; viz., by oxidation with hydric peroxide, and weighing the sulphuric acid thus obtained as baric sulphate. The mean of twelve determinations gave 120.193. — (*Berichte deutsch. chem. gesellsch.*, xvi. 359.) C. F. M. [479]

#### AGRICULTURE.

**Conductivity of soils.**—Wagner has made a somewhat extended investigation of the thermal conductivity of various constituents of soils and of the effect upon it of alterations in the structure of the soil and in its moisture. The materials used were quartz sand, kaoline, precipitated calcium carbonate, ferric hydrate, peat extracted with acid and alcohol, and artificial humus prepared from sugar. The quartz was found to be the best conductor, and the humus the poorest, while the other materials occupied intermediate positions. The differences were small, however, and of little significance, compared with those due to differences of texture, compactness, and moisture. Experiments with two natural (calcareous) soils showed that heat was transmitted more slowly in a loose soil than in the same soil compacted, and that these differences were greater the greater the water-content of the soil. The latter factor, indeed, seemed to have more influence than any other. Its effect is due, according to the author, to the fact that it is a somewhat better conductor than the air which it replaces in the interstices of the soil. The heat was transmitted horizontally, so that there was little chance for the transmission of heat by convection. The effect of compacting the material was also studied on the six soil-ingredients mentioned above; and the compacted material was found to transmit heat better than the loose, in every case except the humus, of which the reverse was true. The conductivity was found to increase with the size of the particles or aggregates of which the soil was composed. Observations were also made on the daily variations of temperature at different depths in sand, clay, and peat. The variations were greatest, and extended to the greatest depth, in the sand. The

peat stood at the opposite extreme, and the clay between the two; in these respects, their positions corresponding to their relative conductivity as previously determined. — (*Forsch. agr. physik.*, vi. 1.) H. P. A.

#### GEOLOGY.

##### Lithology.

**The Maine building-stones.**—It is well known, that, at the time Dr. Hawes was attacked by the illness which terminated so fatally, he was engaged in the microscopic study of the United States building-stones. It has been hoped that some one would be able to take up his unfinished work, and, in justice to his memory, render him credit for all that he had done. Whether this desirable work will ever be accomplished is a problem for the future. Meanwhile, the Maine building-stones collected for Dr. Hawes's work have been the subject of a recent paper by Mr. G. P. Merrill. These rocks, together with much data relating to their use, etc., were collected by Mr. J. E. Wolff, now of the Northern transcontinental survey.

Mr. Merrill classes these building-stones under biotite granite, biotite muscovite granite, hornblende granite, hornblende biotite granite, biotite gneiss, biotite muscovite gneiss, diabase, olivine diabase, and argillite or slate. Of the eighty-three quarries in Maine in 1880-82, seventy-four are of granite or gneiss.

The granites vary in color from a light to dark gray, and from a light pink to red. In texture they vary from fine, even-grained rocks, to coarsely granular ones, containing orthoclase crystals an inch or more in length.

The constituents are quartz, orthoclase, plagioclase, biotite, or hornblende, with or without muscovite, apatite, magnetite, zircon, epidote, sphene, rutile microcline, and iron pyrites.

The paper is accompanied by descriptions of the microscopic characters of the granites, which are of value to all interested either in lithology or building-stones.

The gneisses are similar to the granite, and, so far as the present writer's observations have gone, they are of the same origin.

Diabase, under the name of black granite, is quarried at three localities in Maine,—Indian River in Addison, Addison Point, and Vinalhaven. The first locality produces a nearly black rock composed of plagioclase, augite, magnetite, apatite, and secondary hornblende and mica. The other localities produce a similar rock, with the addition of olivine and chlorite.

It is a remarkable freak of fashion which renders rocks of such undesirable composition so much sought for, and extensively used, for polished monumental and ornamental work used out of doors, for which they are entirely unfit. This well illustrates the wide-spread ignorance, even among architects, of the properties of building-stones, even if New York and Boston, coupled with Harvard university, did not furnish striking examples.

Mr. Merrill's remarks on the properties of building-stones need to be received with caution, especially

those regarding some of the red granites of Maine; for he has probably never seen them after their polished surfaces have been long exposed to the weather. — (*Proc. U. S. nat. mus.*, vi. 165.) M. E. W. [481]

#### MINERALOGY.

**Cassiterite.**—W. P. Blake notes the occurrence of cassiterite as stream-deposit, as well as in place in the Black Hills, Dakota. It occurs in a coarse crystalline granite, yielding sheets of mica of commercial value, and large cleavage blocks of feldspar. In addition, spodumene is found abundantly in gigantic crystals. — (*Amer. journ. sc.*, Sept.) S. L. P. [482]

**Lithiophilite.**—Two analyses of this manganese variety of triphillite are given by S. L. Penfield, — one from a new locality in Norway, Me.; the other from Branchville, Conn. The analyses fully substantiate the formula of the species  $\text{LiMnPO}_4$ , in which a part of the manganese has been replaced by iron. — (*Amer. journ. sc.*, Sept.) S. L. P. [483]

**Augite.**—The calculation of several augite analyses is given by C. Doelter, in which he shows, that in addition to the usual meta-silicate,  $\text{R}''_2\text{Si}_2\text{O}_6$ , the alumina and alkali, when present in various amounts, are united in molecules of the general formula,  $\text{R}'\text{R}''_2\text{SiO}_6$ , of which he recognizes the following distinct molecules, which are isomorphous with each other and with the meta-silicate  $\text{R}''_2\text{Si}_2\text{O}_6$ :—



(*Min. petr. mittl.*, v. 224.) S. L. P. [484]

#### BOTANY.

**Hybridization of Zea.**—Dr. Sturtevant writes, concerning the supposed direct manifestation of hybridization in the fruit of the first year, "We have as yet no station data whereby this belief can be verified." — (*Rep. N.Y. exper. stat.*, i. 1883.) W. T. [485]

**Fed and unfed sundews.**—Büsgen briefly reviews the experimental efforts thus far made to determine the value of animal food for carnivorous plants, and gives the results of some feeding-experiments with *Drosera rotundifolia* carried on by himself at Strassburg.

To avoid the inequality certain to exist in plants gathered from their native habitat, containing unequal quantities of reserve material, and of different ages, Büsgen used seedlings, arguing that the slight weight (.02 mgm.) of the seed, and especially of its nutrient contents, renders the dry weight of all plants essentially equal at the beginning of the experiment. By averaging the results obtained from many plants, individual peculiarities could be eliminated for the most part; and, by subjecting the seedlings to fluid-cultures with different fluids, the necessity of nitrogenous compounds in the water absorbed by the roots was susceptible of determination.

All of these possibilities were not realized in the experiments reported, which extended through two seasons, since comparatively few plants were experimented upon, and these were cultivated on cakes of

peat of unknown composition, saturated with the culture-fluid used. The results were measured by the size and vigor of the grown plants, their fruitfulness, and, finally, the dry weight of all their parts.

Without giving the details of the experiments, — which, though not perfect, appear to be the most satisfactory yet performed, — we may state that they seem to show quite conclusively that plants of this species, properly fed with animal matter (aphides) through their leaves, are individually stronger, more fruitful, and of greater weight, than those subjected to the same conditions but unfed; thus corroborating the conclusions of Francis Darwin, Rees and Kellermann and v. Raumer. It seems, however, as if the organic nitrogen cannot wholly replace that derived normally through the roots, but appears as useful for the plant only when supported by a certain quantity of nitrogenous salts (cf. Liebig, 'Die chem. in ihrer anwend. auf agric. u. physiol.', i. 436). — (*Bot. zeitung*, nos. 35, 36.) W. T. [486]

#### ZÖÖLOGY.

**Animal chlorophyll.**—Th. W. Engelmann maintains that the diffuse green observed by him in certain Vorticellas is genuine chlorophyll, and not due to the presence of any vegetable matter. The species was found near Utrecht, and is related to *V. campanula*. The green coloring is diffuse, but is restricted to the ectoplasm. To study it, Engelmann employed the bacteria method, and found that the bacteria accumulated about the animalcule; whence he concludes that the green produces oxygen. Examined with the microspectroscope, the activity of the green Vorticella, as measured by the gathering of bacteria about it, varies in the same way, according to the wave-length of the light in which the animal lies, as does the activity of vegetable chlorophyll under corresponding circumstances. From these and other observations, Engelmann deduces the existence of true living chlorophyll, not of vegetable origin in this protozoon. The article is a contribution to the controversy concerning the existence at all of animal chlorophyll. [Engelmann relies upon the distribution of bacteria in the field of the microscope as a test for the distribution of oxygen. It is obviously hazardous to assign to living organisms whose peculiarities are most imperfectly known the value of a specific chemical test. We must look upon the 'bacteria method' with suspicion, because the idea, which is very ingenious, does not rest upon an established certainty. (*Rep.*)] — (*Pflüger's arch. physiol.*, xxxii. 80.) C. S. M. [487]

**Morphology of the primitive streak.**—Repiachoff has confused the primitive mouth (urnmund) with the blastopore. Owing to this, he attempts to disprove the connection of the primitive streak and groove with the primitive mouth by insisting upon the well-established point, that the blastopore is connected only with the posterior end of the primitive groove, overlooking the fact that the blastopore corresponds only to the posterior part of the primitive mouth, the edges of which unite all the way in front of the blastopore to make the primitive streak and

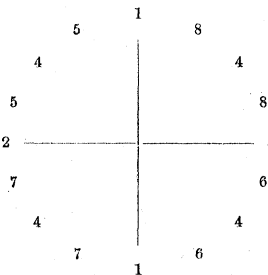
groove, if the latter is present. There appears to be a wide-spread difficulty in comprehending the concrescence of the edges of the primitive mouth to form the axis of the vertebrate body. — (*Zool. anz.*, vi. 365.) C. S. M. [488]

#### Coelelerates.

**The life-history of American medusae.**—Although *Turritopsis* is one of our most interesting hydromedusae, its metamorphosis has been entirely unknown. Brooks has added to McCrady's graphic description of the adult an account of the larva and of the changes through which the young medusa passes. The larva is very similar to *Tubiclava* Allman; and the medusa buds are carried upon short stems which grow out from the main stem, just below the hydranth. When set free, the medusa has eight tentacles and a short simple proboscis; but the endoderm-cells of the radial canals soon become thickened to form the great cellular peduncle, which is the most characteristic mark of the genus. Adult specimens of *Turritopsis* often contain the singular *Cunina* larvae which were discovered in this situation by McCrady.

*Nemopsis Bachei* is another very common medusa, the young stages of which have hitherto escaped observation. Brooks has reared it from a *Bougainvillea*, and has traced the metamorphosis of the medusa.

*Phortis gibbosa* McCr. has been reared from a very singular campanularian hydroid which was washed ashore in great abundance at Fort Macon, on denuded *Aglaophenia* stems. Only one medusa escapes at a time, and this soon becomes larger than the entire gonotheca. The order in which the tentacles appear is shown in the following diagram.



The larva of *Amphinema apicatum* Haeckel is a *Perigonomus*, which grows upon the sand-tubes of *Sabellaria*. When set free, the medusa has no trace of the apical process, which is an adult feature, although it has usually been regarded as a larval characteristic. When five days old, the medusa begins to assume the adult form: the apical process is developed, the umbrella becomes like that of the adult, the oral folds appear, and the upper end of the proboscis becomes enlarged. — (*Stud. biol. lab. Johns Hopk. univ.*, ii. 465.) W. K. B. [489]

#### Mollusks.

**Extramarine mollusca of New Guinea.**—Tapparone Canefri has undertaken a general work on the mollusca of New Guinea, of which the first part has just appeared in the shape of a fine octavo vol-

ume of three hundred pages and eleven plates. In proof-reading, typography, and illustrations, it presents a marked and favorable contrast to many Italian scientific publications. The second volume will contain the marine mollusks: the others find a place here. From such a region many novelties might be expected. The author, however, is conservative; and the divisions newly proposed are not numerous, though a considerable number of new species are described and illustrated. *Bellardiella* (Martensiana) from Port Dorey is a *Pupinella* in which the peristomal sulcus is replaced by a tube posteriorly directed, behind the lip. *Sulcobasis* and *Cristigibba* are sections of *Helix*, typified by *H. sulcosa* Pfr. and *H. tortilabia* Less. respectively. *Cyclotropis* (papuana) differs from *Assimineia* by its perforated base. *Physastra* resembles a thick-shelled reversed *Limnaea* with a dehiscient epidermis. We doubt if it should be referred to the *Physidae*. Lastly, the section *Microdonta* is proposed as a section of *Unionidae* for *U. anodontaeformis*, in which the anterior cardinal teeth are thin, compressed, and nearly parallel with the margin.

Besides full descriptions or synonymy of species, the work contains useful tables showing the exact distribution of each species and group of species, as far as known, and also dissections of the generative organs, and illustrations of the dentition of a number of species. The work will also appear as volume xix. of the *Annals of the Museo civico di Genoa*, and is provided with a good index. — W. H. D. [490]

**Structure of the oyster-shell.**—Observations by Osborne show that the shell is formed by the crystallization of lime in the conchioline (not, as stated, chitinous) layer, as is generally believed. The structure of other species was found less easy of investigation; and the complexity of structure in many molluscan shells would indicate that the process of formation is not universally the same. — (*Stud. biol. lab. Johns Hopk. univ.*, ii. 4.) W. H. D. [491]

**Slime-spinning by *Arion hortensis*.**—Mr. Roebuck, having received a specimen an inch long, observed it crawling on a flat paper-knife, from which it projected in a horizontal position into the air, with only the end of its tail touching the knife. Emitting a thread of slime, it hung by it to a distance of four inches; and when, on reaching a support, the thread was severed, it immediately shrank into a minute, scarcely visible point of slime. — (*Journ. conch.*, July, 1883.) W. H. D. [492]

#### Insects.

**Distribution of the occident ant.**—Rev. Dr. H. C. McCook made a communication on the geographical distribution of the occident ant, *Pogonomyrmex occidentalis*. The specimens upon which the communication was based were collected by Prof. J. E. Todd in Dakota. He reports that the species is confined to the bottom-lands along the Missouri River; and has not pushed eastward through the territory. This corresponds remarkably with Dr. McCook's conclusion, both from his own observations and those made under his direction by Dr. Horace Griffith of

Marengo, Io., that this ant does not dwell east of the Missouri River, in Missouri, Iowa, and Minnesota; that it avoids eastern while abounding in western Nebraska; and that it is not found in Kansas farther east than Brookville, which is near the site reported by Prof. Todd. The structure of the ant-hills, and the harvesting habits of the species, were described. Mr. T. Meehan, to whom had been referred a small quantity of the *débris* collected from one of the nests by Prof. Todd, reported that there were no seeds among the pebbles, but that there were a number of calices, or undeveloped capsules, of a leguminous plant, *Dalea alopecuroides*, which is common on the plains. Dr. McCook had been puzzled to explain why such intelligent creatures should be detected in harvesting immature seeds, until, upon inquiry, he found that leguminous plants have a succession of flowers; so that there may be mature seeds and flowers on a plant at the same time. It is evident that the ants were not harvesting out of season, but were occasionally deceived, and cast out to the refuse-heap the calices that contained no edible seed. — (*Acad. nat. sc. Philad.*; meeting Nov. 21, 1883.) [493]

**Dipterous maggots in man.** — Dr. Samuel Lockwood exhibited a full-grown dipterous larva taken from the inner ear of a man at Paterson, N.J., Aug. 30. There was a perforation of the membrana tympani. The man had suffered seven days from its presence. The grub had entered the outer ear, but eluded an attempt to extract it by re-entering the drum. Appearing again in the external ear, it was extracted with forceps, and kept alive for several days. He referred to certain papers read to the society (one in 1880, and a sequel in 1881), in which he described specimens of dipterous larvae passed by a man in large numbers, and which he determined to be larvae of *Sarcophaga carnaria* and *Anthomyia canicularis*, which had come of eating tainted cold meat and cold boiled cabbage. He had also shown a larva, which he could not determine, which had been vomited by a girl. The larva taken from the man's ear he had determined to be the viviparous flesh-fly, *Sarcophaga carnaria*, and thought that the man had eaten meat on which were the freshly laid larvae, which, being very small, might easily be unperceived. If the man had coughed during the eating, he might have thus thrown one of the larvæ against the entrance to the eustachian tube, and it could readily ascend the epithelial walls, feeding upon the mucus on its way. The larva had attained full growth, and, about to pupate, was restless to find a nidus: hence the good fortune of its twice entering the outer ear from the rent in the tympanum. Dr. A. V. N. Baldwin remarked that he had recently found a cluster of grubs, hard-packed, in the external ear of a man in Bellevue hospital; to which Dr. Lockwood replied, "Probably the parent fly had oviposited there when the man was asleep, attracted by the fetid odor of a diseased ear." — (*N. Jers. micr. soc.*; meeting Nov. 19.) [494]

**Spinning-habit of Psocus.** — Rev. H. C. McCook announced that the small neuropterous insect, *Psocus sexpunctatus*, had recently been found, for the first time in America as far as he was informed, on the

Wissahickon Creek, Fairmount Park, Philadelphia, by Mr. S. F. Aaron. The family of the Psocidae is of peculiar interest in being the only true insects which spin webs in the imago state. The generally larval function of web-spinning might, perhaps, be correlated with the rank which zoölogists assign the Neuroptera as the lowest in the order Insecta. It is, however, a striking example of the diverging and independent lines along which life-forms have sprung up in nature, that a function which belongs to the larval stage of insects, and which appears in the imago stage only in the lowest type of the same, should appear as the most permanent and characteristic function of the spider, — an animal, which, although it is now commonly given a lower place in the same sub-kingdom with the insect, is certainly very differently and but little less highly organized. It would be a difficult task to trace, or even imagine, any evolutionary connection between the web-spinning spider, the web-spinning lepidopterous larva, and the web-spinning neuropterous imago. There is, indeed, the common factor, the spinning-function; but the physiologist fails to perceive any use or combination of the same which can unite the organisms in which it inheres. — (*Acad. nat. sc. Philad.*; meeting Nov. 27.) [495]

#### VERTEBRATES.

**Action of the respiratory movements on circulation.** — Taljanzeff states, that, in violent breathing, partial or complete inhibition of the contractions of the right side of the heart may take place, without, however, any fall of arterial pressure resulting; the blood being forced from the right to the left side of the heart by the action of the breathing-movements on the heart, especially on the right ventricle. He has discovered, also, that if the branches of the vagus going to the lungs are cut, and their central ends stimulated, a decided reflex action on the heart and blood-vessels is obtained. In most cases the heart was slowed, giving the well-known 'vagus pulse,' and the blood-pressure lowered; though in one experiment there was a fall of aortic pressure without any change in either the force or rate of the heart contractions. — (*Centralbl. med. wiss.*, 1883, 401.) W. H. H. [496]

**Vaso-motor nerves of the leg.** — In a brief preliminary communication, Bowditch and Warren give some of the results of an investigation upon the vaso-motors of the extremities. Their method of determining the contraction or dilatation of the blood-vessels was to enclose the limb in a plethysmograph, — a method undoubtedly very delicate and accurate, but possessing the disadvantage that it gives only the general result of the stimulation of the nerve on the blood-vessels of the limb as a whole, and furnishes no indication of local dilatations or constrictions which may take place. They find that stimulation of the peripheral end of the divided sciatic may cause either constriction or dilatation. When the induction-shocks followed in rapid succession (16 to 64 in a second), a constriction of the blood-vessels was the general result. When the stimuli followed more slowly (4-0.2 in a second), a dilatation was

produced. With a medium rapidity of stimulation, a contraction was observed in the beginning, followed by a dilatation. The latent period of vaso-constriction was estimated at 1.5"; that of vaso-dilatation, at 3.5". The vaso-dilator effects continued for some time after the cessation of the stimulus. — (*Centr.-blatt. med. wiss.*, 1883, 513.) W. H. H. [497]

#### Mammals.

**Birth of a mandrill in captivity.**—A mandrill was born in the Hamburg zoölogical garden in July, 1882. It lacked the brilliant coloring of the face characteristic of the adult, and had but weakly developed face-wrinkles. The countenance and posterior callosities were flesh-colored. Only the upper and posterior portion of the head and a space on the median line of the back were dark. — (*Zool. garten*, xxiv. 1883, 235.) F. W. T. [498]

**The circulation in the kidneys.**—This paper by Cohnheim and Roy furnishes an extremely important and interesting addition to our knowledge of the physiology of the kidney, and will undoubtedly, with the future work that is promised on the subject, throw much light also on the etiology of some of the diseases of that organ. The method which they employed in their investigation cannot be thoroughly understood without reference to the plates which accompany the article. It is sufficient to say that the organ was enclosed in a sort of plethysmograph, to which Roy has given the name of oncometer, by means of which variations in volume of the kidney can be registered. With regard to the normal circulation in the kidneys, it was found that both the respiratory and pulse waves were shown in the kidney tracing, as well as the Traube-Hering waves, when these occurred.

Stimulation of the vaso-motor centre directly by means of dyspnoea, as well as stimulation of the central end of sensory nerves, caused a strong and rapid diminution in volume of the kidney, owing to the contraction of its vessels. This diminution in volume occurs when both splanchnics are cut; but in those cases in which they succeeded in severing the kidney from all external nervous influences, the kidney, instead of contracting, showed an increase in volume corresponding to the general rise of blood-pressure.

The influence of the splanchnics on the kidney circulation was especially studied. Section of the splanchnics caused no increase in the volume of the kidney, so that the tonic influence which these nerves have been supposed to exert on the kidney-vessels is rendered very doubtful, though the authors do not care to make any positive statement with regard to this point. Stimulation of either the central or peripheral end of the divided splanchnics gave a strong diminution in volume of the kidney. The fact, that, after section of both splanchnics, stimulation of the central end of a sensory nerve still causes a contraction of the kidney, shows that vaso-motor nerves pass to this organ by some other path. In order to cut off the kidney from all external nervous connection, it was necessary to divide not only the nerve-trunks in the hilus, but also to destroy the external coat (tunica

adventitia) of the blood-vessels. In cases in which this was successfully accomplished, they could obtain no distinct evidence of a vaso-motor tonus of the kidney-vessels. Stimulation of the nerves of the hilus showed the presence only of vaso-constrictor and sensory nerves: in no case did they obtain any evidence of vaso-dilator nerves.

The circulations in the two organs are, to a great extent, independent of each other. Clamping the renal artery on one side has no effect at all on the circulation in the other kidney, and the same may be said with regard to the closure of other large arteries of the body. Throwing ice-cold water, or water heated to 50° C., on the whole of the skin surface of the animal, has little or no effect on the kidney circulation; a fact which seems to indicate that the direct connection between the functions of the skin and the kidney is not so close as has been supposed. A future paper on the influence of the composition of the blood on the circulation in the kidney is promised. — (*Virchow's archiv*, xcii. 424.) W. H. H. [499]

#### ANTHROPOLOGY.

##### **Ethnology of Yunnan and the Shan country.**

—Mr. Colquhoun has traversed the region lying between Canton and Rangoon, including Yunnan, the south-western province of China. The details of his exploration have been published in the *Proc. roy. geogr. soc.*, Dec., 1882, in a volume entitled 'Across Chrysee,' or will appear in a work now preparing on the Shan country. From Canton westward the people were pure Chinese; west of that, to the Yunnan frontier, the people were mixed on the rivers; and aboriginal races were found inland. Throughout Yunnan the chief population consisted of Shans disguised under a great variety of tribal names. Lolo and Miao-tzu, aborigines and Thibetans under the name of Kutsung, were seen. Mr. Keane, commenting upon this paper, said that amongst the Yunnan tribes were the widely dispersed Lolo people, who seem to extend in isolated groups from Szechuen, Kwei-chew, and Yunnan, down to the Tonquin highlands, and who by some travellers had been described as physically more like Europeans than Indo-Chinese. — (*Journ. anthrop. inst.*, xlii. 3.) J. W. P. [500]

**North-eastern Papua.**—During a period of six years, 1875-81, Mr. Wilfred Powell made frequent visits to the eastern coast of New Guinea. Torres Straits has become famous as a pearl-fishing ground, worked by fleets of large boats built for the purpose, and manned by natives from all parts of Polynesia. The most fever-cursed portion of the island is the low alluvial plain skirting the Gulf of Papua, opposite Queensland. Here is found the only cannibalism known to the author to exist on the island. The whole of the population here are of a lower type than those in the more elevated districts to the east. At Brumer Islands the two races meet and intermingle,—the darker and more barbarous type of the Gulf of Papua and the south-west coast, and the lighter colored and better featured type, more resembling the Polynesian, inhabiting the south-east and the eastern peninsula. The last-mentioned people are numerous

and industrious. The women are respected, and irrigation is carried on by means of bamboo pipes joined with gum. Obsidian is used for many purposes, such as shaving their heads and faces, carving wood, etc. — (*Proc. roy. geogr. soc.*, Sept.) J. W. P. [501]

**The Masai people in East Africa.** — Zanzibar is now a commercial centre, dominated over by British interests and British trade. It is therefore a matter of great importance to establish an expeditious caravan route over the range in which are Mounts Kilimanjaro and Kenia to Lake Victoria. In the way of this route are the Masai, a tribe reputed to be savage and aggressive. Last autumn Mr. J. T. Last, a physician missionary, made a journey to the Masai country, and reports much that is interesting to the ethnologist as well as to the geographer. The Masai seem to belong to the great Galla race. The extent of their country is very large. The majority are of average height, and the women are about as tall as the men. There is a marked difference in features between the pure and the mixed Masai, the former being of a much higher type. The author describes the scanty dress of the men, one article of which is the *olding'ori*, a heart-shaped piece of goat-skin, serving more for a seat than covering. The women are completely clothed and extravagantly ornamented. There is no iron in their country, nor do they know how to work it. Their domestic animals, weapons, mythology, burials, marriage, crimes, polygamy, and modes of building are all fully described, and a copious vocabulary closes the paper. — (*Ibid.*) J. W. P. [502]

**Serpent venom.** — The destruction of human life by the bites of poisonous serpents is so great in many countries, that it becomes really an anthropological problem to ascertain the amount of damage, and to seek the remedy. Dr. Robert Fletcher has brought together much information, and a great deal of the literature, in a paper read before the Washington philosophical society in May last. Sir Joseph Fayrer states the average mortality from serpent-bites in India to be fully 20,000 annually. In 1869 the returns were obtained through official sources, from a large part of India, with unusual care and accuracy. In a population of nearly 121,000,000, representing an area of less than half the peninsula of Hindostan, the deaths were 11,416, or nearly one in 10,000. Of these deaths, there were caused by

Cobra . . . . .	2,690
Krait ( <i>Bungarus ceruleus</i> ) . . . . .	359
Other snakes . . . . .	839
Unknown snakes . . . . .	6,922
No details . . . . .	606
	<hr/>
	11,416

In 1880, 212,776 poisonous snakes were killed and paid for; and in 1881, 254,968.

Even in Europe the number of accidents from snake-bite is very large. In one department of France, La Haute-Marne, the government paid, in six years, for the destruction of 17,415 vipers. — (*Amer. journ. med. sc.*, July.) J. W. P. [503]

**Mythologic parallels.** — Gaidoz, commenting the tendency to trace the myths and folk-tales of Europe to the Aryans on the high plateaus of India, remarks, "that we cannot rest upon those eminences, but must prolong our inquiry over the whole earth: they are not Aryan, they are human." The discussion of resemblances in culture seems to land us ever in a double corner between the supposition that humanity reproduces ever the same phenomena under the same conditions, and the theory that similarity proves contact of some kind. M. Gaidoz cites two very interesting but far remote similarities. Among the ancient Romans, driving a nail was a religious practice, oft resorted to as a remedy against certain maladies, or a preservative against enchantments. Numerous references to this practice will be found under the word 'clavus,' by M. Siglio, in his 'Dictionnaire des antiquités grecques et latines,' p. 1240-1242; and in the chapter upon the nail in the *cella* of the temple of Jupiter, in Preller's 'Roemische mythologie,' 2d ed., p. 231. The law demanded that the rite (*clavi figendi causa*) should be performed by one high in authority, and, in cases of great public calamity, by the dictator himself. Now pass beyond the Pillars of Hercules to the mouth of the Kongo River, and listen to the words of Charles de Rouvre (*Bull. soc. géogr.*, Oct., 1880, p. 323): "Finally there are the *n'doké* fetishes, under the care of priests called *gangazambi*, who are reputed to have the power to cause to speak. An offering is made to the *n'doké* of one or more pieces of cloth and tafia. A nail is then driven into the image, while the *ganga* or the suppliant formulates his demand." 'The barbarians are older than we,' said Plato; and this form of nail-driving into the heart of the image, in order that our prayer may pierce the heart of the god, is much older than the Roman custom. M. Gaidoz further connects this custom with votives on oratorios, on trees, on church-walls, etc., for many purposes. In conclusion, the author insists that the beliefs of classic antiquity are to be studied not only in ancient texts, but in a past far more remote. — (*Rev. hist. relig.*, vii. 5.) J. W. P. [504]

**Hypertrichosis.** — The development of hair on abnormal parts of the body has received the names Hypertrichosis universalis when it occurs over the whole body, and H. partialis when only over limited portions or in patches. The abnormality may be the period of development, in which case it would be heterochronic. It may be sex, as the beard of certain females, where it would be heterogenic. In the first case mentioned above it is heterotopic. Dr. J. G. Garson of London has collected photographs of distinguished cases of hypertrichosis, and states his conclusions as follows: "As to the cause of abnormal hair-growth, the atavistic theory seems to me to be the most probable explanation, as here we would not have to trace the atavus far back, and in the normal body we have the atavistic germ present, though in a rudimentary condition. It would, therefore, be what Gegenbauer terms a paleogenetic form of atavism. — (*Journ. anthrop. inst.*, xiii. 6.) J. W. P. [505]