tion, and the prices of those numbers which are sold. A detailed chronological list of the 496 issues is then given, followed by a classified list under 29 heads, with some subdivisions, and, finally, by an alphabetical index to the Contributions, Miscellaneous collections and Reports of the Smithsonian, the Bulletins and Proceedings of the National museum, and the First annual report of the Bureau of ethnology. Thus every inquiry that will probably be made is answered beforehand. Is my set complete? Is this volume perfect? What articles are there in this department of science? In what volume or volumes has this man written? In what is this subject treated? How can I get them? How can I procure a set, or get the volumes as they are issued? Indeed, if one must be critical, we should say that answers are provided for some questions which only an idiot could be expected to ask. In the index, not only are references made from the names of the authors, and from the subjects of articles, but from the first words of their titles, however insignificant they may be. Thus we have such entries as *Contributions* to history of fresh-water algae, *Criticisms* of Dr. J. Hahn, *Hints* on public architecture, *Knowledge* of cryptogamous plants, *Means* of destroying the grasshopper, *Method* of preserving lepidoptera, *Narrative* of the Hassler expedition, and scores of others just as unworkmanlike as these, — entries that would make the Index society stare and gasp. In an ordinary book this might be overlooked; but it is unworthy of one which is intended to be one of the monuments of the scientific achievements of our country. It is true, these articles are all indexed in their proper places also; so that the fault is, at worst, one of surplusage. We have seen indexes in which entries were made under *A* and *The*, and there only. Mr. Rhees has not reached this length of absurdity. He may urge that there are people who will look for the articles under the words to which we have objected. It is difficult to over-estimate the mental left-handedness of mankind, but Mr. Rhees is addressing a scientific public. We should be sorry to believe that their training had produced no better habits of thought than he seems to anticipate.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

ASTRONOMY.

Spectroscopic observations of the transit of Venus. — Tacchini at Rome observed the first and second contacts by means of the spectroscope, in the manner first proposed by Young in 1869. He saw the external contact 54 seconds earlier than his colleague Millosevisch, who observed with a telescope in the ordinary way: the second contact (internal) he observed 36 seconds earlier. A discussion shows that the spectroscopic observations are superior in accuracy to the telescopic. An attempt was made to observe the contacts at Palermo in the same way by Riccó, but it failed. At the moment when the planet left the chromosphere, and its atmosphere was on the slit of the spectroscope, both Tacchini and Riccó saw, for a fraction of a second, one or two bands between B and C, which could only have been caused by the planet's atmosphere. — (*Mem. spettr. Ital.*, Dec., 1882.) C. A. Y. [636

Observations of the lunar crater Plato. — A comparison by A. Stanley Williams of a large number of observations taken by himself and others in 1879–82 with a similar series taken in 1869–71 seems to give evidence of change in this crater. Of thirty-seven spots seen in the crater in 1869–71, six were not seen in 1879–82; while seven, not seen during the first period, were seen in the second. The mean visibilities of most of the spots observed in both series agree very closely, but eight show a decided variation in brilliancy. Among the light streaks in the crater, some change was noted, particularly in one which was not seen at all during the first twelve months of the first period, and is now larger and brighter than others previously seen. [This paper is to be continued.] — (*Observ.*, March 1.) M. McN. [637

MATHEMATICS.

Transformation of surfaces. — Professor Enneper, in this article, has reproduced the substance of two previous articles which he has written upon the same subject, with a number of additions. The particular transformations treated of are defined as follows: the corresponding points P and P_1 of two surfaces S and S_1 are so related to a fixed point O, that the plane through the points O, P, and P_1 contains the normals to the surfaces S and S_1 in the points P and P_1. Among other derived surfaces coming under this head are the pedal and negative-pedal surfaces, inverse surfaces, etc. A generalization of Malus' theorem is given; viz., the surface separating two homogeneous media is regarded from a given point O; at a point P of the surface, the ratio of the sines of the incident and reflected rays is a function of the distance O P: the reflected rays are then the normals to a certain surface and its parallel. The author discusses the problem of finding when lines of curvature upon the given surface S correspond to lines of the same kind upon the derived surface S_1. The results in this case are tolerably well known. — (*Math. ann.*, xxi. 1883.) T. C. [638

Geodesic polygons. — The results obtained by the author, Otto Staude, in this paper, are for the most part known; but his method seems to be entirely new. M. Staude attempts, in a measure, to do for quadric surfaces, by aid of hyperelliptic functions, what has already been done for conics by the aid of elliptic

functions. He limits himself to the examination of geodesic polygons traced upon central surfaces of the second degree. Section 3 of the paper is an excursus upon the thread construction (*fadenconstruction*) of the lines of curvature on quadrics. For an intelligible reading of the paper, a previous paper of the author's, 'Ueber fadenstructionen des ellipsoides,' must be referred to. — (*Math. ann.*, xxi. 1883.) T. C. [639

Complexes of the second order. — M. Genty discusses Kummer's sixteen-nodal quartic by the methods of vector analysis. No new results or properties of this surface are given; but the paper is interesting as an application of this particular method. — (*Journ. de math.*, 1882.) T. C. [640

Hypergeometric series. — M. Mathieu studies the differential equation of the second order, satisfied by Gauss's function F $(\alpha, \beta, \gamma, \chi)$, and examines briefly the cases when the general solution of this equation can be expressed in a finite form, and obtains, in consequence, the cases when the function F $(\alpha, \beta, \gamma, \chi)$ can be expressed in finite form. He determines also the cases when the function F $(\alpha, \beta, \gamma, \sin^2\phi)$ is periodic with respect to ϕ, and has 2π for its period. — (*Journ. de math.*, 1882.) T. C. [641

Parallel surface to the ellipsoid. — Dr. Craig discusses the general equation of this surface, and its principal sections. Certain of its singularities are enumerated, and formulae are given for the ratios of corresponding elements of area and length upon the parallel and primitive ellipsoid. A number of formulae are given, referring to the curvature of the surface. Elliptic co-ordinates are employed throughout the greater part of the paper. — (*Journ. für math.*, xciii.) T. C. [642

PHYSICS.

Heat.

Specific heat of water. — The results of experiments on the specific heat of water at different temperatures differ, not only quantitatively, but qualitatively. Rowland and Münchhausen, whose experiments are the most reliable on this subject, have shown that the specific heat of water decreases to about 30°, and thence increases. In order to test these results, Hr. F. Neesen has made some experiments upon this subject with Bunsen's ice-calorimeter. The calorimeter was constructed according to the plan of Schuller and Wartha, in order to avoid the errors caused by the impurities of the snow. Hr. Neesen points out that it is of importance not to begin the experiment until some indications of melting appear in the ice of the calorimeter. If this point is not observed, the change of volume will be too small. The thermometers used were two mercury thermometers, graduated respectively to 0.2° and 0.1°. The results obtained by Neesen are to be considered merely approximate, as sufficient determinations of the specific heat at each temperature were not made. The results, however, agree qualitatively, though not quantitatively, with those of Rowland. — (*Ann. phys. chem.*, xviii. 3.) C. B. P. [643

Electricity.

High-pressure electric accumulator. — Mr. Frederick J. Smith describes an arrangement for prolonging the life of a gas-battery. The tubes containing the electrode are inverted in a tank nearly filled with dilute sulphuric acid. The tank is closed airtight, and the gases, as they are evolved, generate a pressure, which, as shown by a manometer, amounts to several atmospheres by the time the tubes are filled. The amount of gas which can be thus collected in the tubes is, of course, much greater than that collected under ordinary conditions, and the life of the gas-battery correspondingly longer. When a Faure accumulator is treated in the same way, the electromotive force of the polarization is affeced, but to what extent is not yet definitely determined. — (*Phil. mag.*, March.) E. H. H. [644

Bifilar suspension and absolute measurement. — F. Kohlrausch gives a mathematical treatment of the bifilar suspension, obtaining, as the complete expression for the directive force,

$$D = \frac{g}{l}\left[m\frac{e_1 e_2}{4} + \frac{2\pi\rho^4 E}{5}\right],$$

where m is the mass of the suspended body increased by half the mass of the wires; e_1 and e_2, the distance apart of the upper and lower ends respectively; ρ the radius, and E the modulus of elasticity, of the suspending wires; g, the acceleration of gravity; and l, half the mean length of the wires, diminished by $\rho^2\sqrt{\frac{2\pi}{m}}E$. Hence he deduces two methods of measuring the horizontal intensity of terrestrial magnetism, which he calls the bifilar-galvanic and bifilar-magnetic respectively. The first method consists in observing the deflections α of a magnet, and ϕ of a circular coil suspended at a distance a from the magnet, when $H^2 = \frac{D\tan\alpha}{a^3\tan\phi}$, subject to certain corrections. The second method consists in observing the deflections α and ϕ of two magnets, one large in respect to the other, when $H^2 = \frac{D}{a^3(1+T)}\left(1 - \frac{3}{8}\frac{d^2}{a^2} + \frac{\lambda^2}{a^2} - 2\frac{K}{a^3}\right)\frac{\sin\alpha}{\tan\phi}(1 - 2\tan\alpha\tan\phi)$, where d is the distance between the poles of the larger magnet, $K = \frac{M}{H}$ for the smaller magnet, λ its length, and T its torsion-co-efficient. On the 21st of October, 1881, the first method gave .19407, and on the 16th of February, 1882, the second method gave .19389, $cm^{-\frac{1}{2}}g^{\frac{1}{2}}sec^{-1}$, at Würzburg. — (*Ann. phys. chem.*, Dec., 1882.) J. T. [645

ENGINEERING.

Boston water-works. — An elaborate description of the additional supply of water for the city of Boston from Sudbury River, compiled by Mr. A. Fteley, the resident-engineer upon the work during its construction, has just been issued by the city government in a large, finely printed, and copiously illustrated volume. The works for supplying Boston with water from Sudbury River consist of three storage-reservoirs in Framingham, and a conduit from that town to Chestnut-hill reservoir in Brookline. In 1881 Sudbury River furnished to Boston more than twice the quantity of water supplied from Lake Cochituate; and steps have already been taken to increase still further the storage-capacity of the system. The volume begins with a discussion of the sources of supply, the rainfall, and the storage-capacity of the reservoirs. Next follows a general description of the dams and reservoirs, and of the several sections of the work, in all its engineering features. The quality of the water, the gauging of the river, and a discussion of the capacity of the conduit, and the flow of water over weirs, conclude the body of the work. The appendix contains valuable tables on water-supply hydraulics, and a large amount of information for the practising engineer. The work is illustrated with 69 large plates, commencing with a map of the Sudbury River watershed, and giving very fully the construc-

tive details of the dams and conduits. To give the city 40,000,000 gallons of water daily, it is estimated that the storage-reservoirs on Sudbury River should have a capacity of 4,900,000,000 gallons. So far, three reservoirs only have been built; having a capacity, with that of Farm Pond, of 2,000,000,000 gallons, intended to give a supply of 20,000,000 gallons daily to the city. — G. L. V. [646

Anthracite coal-fields of Pennsylvania. — Mr. Charles A. Ashburner read a paper on a new method of estimating the contents of highly-plicated coal-beds, as applied to the anthracite fields of Pennsylvania. The questions of the future production and ultimate exhaustion of these fields are of the greatest importance. In 1860 the population of the United States was 31,443,321, and 8,513,123 tons of coal were produced; i.e., actually shipped to market. In 1870 the population had increased twenty-two per cent (38,558,371), and the production of anthracite was nearly doubled, being 16,182,191 tons. For the year 1880, with a population of over 50,000,000, the product was 23,437,242 + tons. In 1882 the actual production was over 30,000,000 tons. It has been variously estimated that the 470 square miles containing this coal in Pennsylvania will be entirely exhausted in from 140 to 204 years. While Mr. Ashburner does not estimate the ultimate exhaustion, he has devised a method for estimating the contents of these fields from data now being obtained by the careful and practical geological and mining examinations of the state survey. The exact position and detailed structural shape of the coal-beds are first mapped by fifty-feet contour-lines along the floor of the beds, giving, completely and satisfactorily, their geometrical construction and shape. These surfaces are then developed into planes by the development into straight lines of the line of the bed, as cut by paralleled section-planes 1,600 feet apart. This graphical method is attended with errors which are mathematically discussed, and which have been formulated by Mr. Arthur Winslow. This method does not give the true area of the surface of a sphere, cone, or triangular trough. In the case of a sphere, it gives $\frac{\pi}{4}$ of the true area; in a cone, the error increases directly as the secant of the angle which the pitch of the cone makes with its axis; and in a triangular trough, which more nearly represents the shape of the anthracite basins, the error is very much less. A practical test has been made of this method in the Panther Creek basin, between Mauch Chunk and Tamaqua; and the maximum possible error in estimating the surface-area of the coal-beds was found to be 905 of 1 per cent. After the areas are thus found, the contents are obtained by careful measurements made in the mines to ascertain the actual number of tons of coal which are contained in a unit (one acre) of bed-area. In this way it has been estimated that the above basin originally contained 1,032,000,000 ± tons; that the area under development originally contained 92,000,000 ± tons, out of which latter area 54,000,000 ± tons have been taken. — (*Eng. club Philad.; meeting* March 17.) [647

CHEMISTRY.

(*Analytical.*)

Determination of organic matter in potable water. — In an extended examination of the various methods in use for determining the purity of potable water, undertaken by Prof. J. W. Mallet for the National board of health, special attention was given to the 'combustion process' of Frankland and Armstrong, the 'albuminoid-ammonia' process of Wanklyn, Chapman, and Smith, and the 'permanganate' process suggested by Forchhammer. Prof. Mallet finds that it is unsafe to base conclusions on a single determination by the combustion process; and the evaporation should be conducted by means of steam, in such a manner as to preclude the possibility of absorption of ammonia from the atmosphere. It was also found advantageous to conduct the evaporation under diminished pressure at quite low temperatures. In the albuminoid-ammonia and permanganate processes the most desirable results were obtained by keeping the volume of liquid in the retort constant and the permanganate in excess. Prof. Mallet thinks that more importance should be attached to the quantity of nitrites and nitrates than is usually assigned to them; and he finds that they may readily be reduced by phosphorous or hypophosphorous acid. These methods are regarded by him as an insufficient basis on which to reach a decision as to the condition of a water; and they should be made of secondary importance to evidence of a general nature, such as the source and history of the water examined. A thorough biological examination of water polluted in various ways is recommended. — (*Amer. chem. journ.*, iv. 241, 334, 426.) C. F. M. [648

Composition of a spring-water from Salzbrunn. — In an analysis of a spring-water from Salzbrunn, in Silesia, T. Poleck obtained the subjoined results in 1,000 grms.

Sodium chloride	0.05899 grm.
" sulphate	0.18010 "
Potassium sulphate	0.04085 "
Sodium bicarbonate	0.87264 "
Lithium "	0.01140 "
Calcium "	0.71264 "
Magnesium "	0.40477 "
Strontium "	0.00280 "
Manganese "	0.00181 "
Aluminum phosphate	0.00036 "
Alumina	0.00047 "
Silicic acid	0.03460 "
Total	2.23057 grms.

Bromine, boracic acid, barium, and nickel were present in quantities too small to be determined quantitatively. The free carbonic acid in 1,000 grms. amounted to 849.4 cc., at 10.5°, and 740 mm. pressure. This water would be classified as *alkaline-saline*, and also as strong *sodium-lithium*. It contains only minute traces of organic matter. — (*Journ. prakt. chem.*, xxvii. 45.) C. F. M. [649

Origin of arsenic and of lithium in waters containing calcium sulphate. — In examining different natural waters for arsenic, from Martigny, Bachu, and other localities, M. Schlagdenhauffen finds it in quantities varying between 0.0050 grm. and 0.0500 grm. per litre. Since arsenic is found in different varieties of gypsum, the author concludes that it is in the form of calcium arseniate. Its origin may be traced to the marls, where it existed as sulphide. By the action of acid calcium carbonate, it was probably converted into the sulpho-arseniate, and finally into the arseniate. When certain marls are submitted to the action of hydrochloric acid, the solution evaporated, and the residue extracted with a mixture of alcohol and ether, lithium may readily be detected by the spectroscope. Five grms. of the earth contain sufficient lithium to give a distinct red band. — (*Journ. pharm. chim.*, l. 464.) C. F. M. [650

AGRICULTURE.

Symphytum asperrimum as fodder. — This plant is reported to yield a large quantity of palatable and nutritious green fodder, even on poor soil,

and, under very favorable circumstances, to give as many as six crops per year. Experiments by Weiske confirm the fact of a large yield, and show that it is also fully as digestible as good hay, and contains a large proportion of nitrogenous nutrients. It is not always eaten freely, especially in the form of hay, and appears to be best adapted for soiling, or for the preparation of ensilage. — (*Journ. landw.*, xxx. 381.) H. P. A. [651

Fattening different breeds of sheep. — It is a well-known fact, that, in different breeds of the same species, the same fodder may produce very different effects. All experiments hitherto, however, have failed to show any notable differences of digestive power in such cases; and it would thus appear that the observed differences are due to the varying energy with which the constituents of the body are oxidized. In an experiment with two mature sheep, a southdown and a merino, on identical rations, from which identical amounts of the several nutrients were digested, Weiske found that the apparent gain of 'flesh' (nitrogenous matters) was greatest in the merino sheep; but this difference was somewhat more than covered by the greater growth of wool. So far as this single experiment proves any thing, it shows that not only the digestive powers, but also the proteid metabolism, of different breeds of sheep, are essentially the same, and indicates that the differences in the ease of fattening are due to differences in the rapidity with which non-nitrogenous substances are oxidized in the body. — (*Journ. landw.*, xxx. 385.) H. P. A. [652

Valuation of fodders. — The commission appointed in Germany in 1878, to devise a uniform method for calculating the money-value of fodders from their chemical composition, held its fourth meeting at Eisenach, Sept. 17, 1882, a report of which is presented by Prof. J. König. An abstract was presented of papers published on the subject since the last meeting of the commission; and this was followed by a discussion of the results thus far attained. No final conclusions were arrived at; but it was recommended, that, in such computations, the same price be assumed for crude proteine and crude fat, and that the carbhydrates be estimated at one-fifth the price of proteine. It is expressly set forth that this is only a provisional decision, and further investigations and computations are called for. — (*Landw. jahrb.*, xi. 849.) H. P. A. [653

Testing milk. — Jörgensen proposes to use the index of refraction of milk, or of whey prepared from the milk, as a test of purity, and asserts that it shows comparatively small variations, while even a small addition of water is plainly indicated. Chludsinski considers it necessary to determine the specific gravity of the whole milk and of the skim-milk, and the percentage of cream, in order to judge of the purity of a sample, and describes an instrument for this purpose, the specific gravity being determined by weighing a measured quantity of the fluid. — (*Landw. jahrb.*, xi. 701, 835.) H. P. A. [654

GEOLOGY.

Meteorites.

The Bishopville meteorite. — Dr. M. E. Wadsworth stated that a microscopic examination showed that the Bishopville meteorite, which fell in March, 1843, was composed of enstatite, felspar, augite, olivine, pyrrhotite, and nickeliferous iron. The enstatite contained many glass inclusions of similar form to the enclosing mineral. Numerous glass inclusions were also seen in the felspar, and many in both minerals were bubble-bearing. Most of the felspar showed the twinning of plagioclase. Glass inclusions have always been regarded, when found in terrestrial rocks, as indicating igneous origin. The composition and structure of this crystalline stone is like that of the gabbro (norite) variety of basalt. While, according to common custom, the speaker might have proposed a new name for this, he preferred to call it a gabbro or basalt, in accordance with the principles announced in Science of March 9. Chladnite, he said, was not a pure enstatite, but a crystalline aggregate of enstatite, felspar, augite, and olivine. The well-marked glass inclusions and the structure of this stone had, according to the speaker, an important bearing upon the question of the origin of meteorites, and were in accord with his previously published views. — (*Bost. soc. nat. hist.; meeting* April 4.) [655

METEOROLOGY.

Aurora borealis. — Herr H. Hansen's observations of the November (1882) auroral displays in Trondhjem, Norway, show that each continued an extraordinary length of time, especially during the week Nov. 12–18. Every night of this week the heavens were illuminated with the auroral light, while it was seen from 8 P.M. on the 17th till 6 A.M. of 18th. The most striking display occurred on the 18th, at 4.30 A.M., when a brilliant corona appeared in the zenith, from which vivid streams of light stretched to the horizon; while luminous waves flowed uninterruptedly from the latter towards the corona, diffusing so strong a light as to enable one with ease to read moderately clear print. — (*Nature*, Feb. 8.) H. A. H. [656

Polar research. — The French magnetic and meteorologic expedition to Cape Horn has taken up quarters at Orange Bay, Terra del Fuego, east side, lat. 55° 31′ S. Observations began Sept. 26, 1882. The party found the climate mild, the temperature, up to the time of the report, ranging from freezing to 61°. — (*Nature*, Feb. 8.) H. A. H. [657

PHYSICAL GEOGRAPHY.

Granular structure of glaciers. — E. Hagenbach-Bischoff reviews the previous study of this question from Hugi to Klocke (*Neues jahrb. miner.*, 1881, i. 23) and Forel (*Arch. sc. phys. nat.*, 1882, vii. 329), and shows by optical and physical characters that each grain of a glacier is a single crystal of ice. The crystals stand with their axes in all positions, so that their contact surfaces form a very irregular network of polygonal planes. When the ice is broken at a temperature below its freezing-point, the subconchoidal fracture is independent of the crystals; but on melting, the crystals separate along their contact surfaces, as is shown by the planes of penetration of a colored liquid (soluble aniline blue is best). As has long been known, the grains are smallest in the *névé*, and largest at the end and bottom of the glacier, where one was found measuring 14, 12, and 9 cm. Forel has thought that this growth comes by the addition of infiltrating water, and that the motion of the glacier is thus aided; but this supposes that the ice is porous enough to allow water to enter, and requires a low internal temperature (for an annual increase of 0.043 cubic or 0.014 linear measure, the ice must average −7° C.). Hagenbach-Bischoff contends that certain crystals grow at the expense of their neighbors: as the expansion of a freezing ice-crystal is greater along one axis than another, it follows that pressure will lower the melting-point by the greatest amount when directed along the axis of greatest expansion; consequently those crystals whose

axes of least expansion are parallel to the direction of pressure will grow at the expense of the neighboring crystals, whose axes of greatest expansion are most nearly parallel to the pressure. Hence only certain crystals grow; the others decrease and disappear: as a result, all the former should have their axes parallel to one another, and to the average greatest pressure when they arrive at the lower end of the glacier. The author found thirteen out of fourteen samples taken from the grotto at the foot of the Rhone glacier to have their axes vertical; others have noticed the same predominance of vertical crystals at the lower end of the Grindelwald and the Aletsch glaciers. It is possible that both these modes of growth occur together. To determine this and other long-lasting mysteries of glacial phenomena, many more observations are needed on the internal temperature and constitution of glacial ice. — (*Verh. naturf. gesellsch. Basel*, 1882, vii. 192; *Arch. sc. phys. nat.*, 1882, viii. 343.) W. M. D. [658

GEOGRAPHY.

(*South America.*)

Eastern Patagonia. — The records have lately been found of an expedition into eastern Patagonia, between lats. 43° and 47°, made in 1877 by the late H. Durnford, an English ornithologist, who died in South America in 1878. Durnford was accompanied by Messrs. Griffiths and Jones from the Welsh colony near the mouth of the river Chupat (Chubut of Moreno), and made a distance of about three hundred miles to the south-west before turning back. Important observations were made on the position and size of several rivers — Sengel, Sengellen, and Chupat — and lakes, — Colguape (Coluhuape) and another equally large (later named Lake Musters by Moreno), — besides many smaller salt lagoons, all shallow, and apparently much decreased from their former extent. The country was very monotonous, showing nearly everywhere the same barren sterility, occasionally relieved by a lagoon or gully containing water. Bare hills and slopes of sandy marl, and volcanic rocks of varied shape and color, from pale brick-red to black, formed the general surface. Sometimes the traveller's way led across deposits of soft, yielding dust, and again over hard, unbroken rock. The animal and plant life, wherever found, was stunted and dwarfed. Evidence of former marine submergence was found on the table-land in well-rounded pebbles, gigantic oyster-shells, and numerous fragments of smaller shells. The rivers are now sunk in many places several hundred feet below the plain, and flow between steep banks. Numerous cairns containing Indian skeletons were found on hilltops. They are carefully built of stone, the blocks often being of a considerable size. The route followed by Durnford's party was like that taken by Moyano in 1880. — (*Proc. roy. geogr. soc.*, 1883, 84.) W. M. D. [659

Rio Pilcomayo. — A brief note furnished by Marguin, a member of Fontana's expedition in search of Crevaux, shows the Pilcomayo to be one of those newly established rivers on a very flat surface, with but little descent to its base-level of drainage. The exploration reached lat. 24° 40′ about one hundred miles from Asuncion, on the Paraguay; and, especially in the upper half of this distance, the river meandered very irregularly through a low forest-covered country, often interrupted by lagoons. Its banks were naturally raised about twelve feet by deposits of sand in five-inch strata, separated by thin layers of vegetable origin; and at time of flood the waters were thus divided into three parallel courses. As the water of the main channel subsided, the overflow drained back through breaches in the banks, having temporarily the appearance of affluents. The channel was often interrupted with snags, and bore signs of frequently changing its position to avoid the bars formed about them. The several neighboring streams (Rio del Fuego, Aguaray-Guazu, mboicae, Confuso del Sur), by which part of the Pilcomayo may have once been discharged into the Paraguay, are regarded as its former channels abandoned by these changes. Marguin recalls Padre Patiño, who attempted to ascend the river in 1721, but was forced back by the Indians on approaching lat. 23°; Van Nivel and Acha's attempt from Bolivia in 1844, which failed to pass a great lagoon at some point farther up stream than Patiño's goal; and, finally, Crevaux' party, which more nearly attained success than any of the others. — (*Comptes rendus soc. géogr. Paris*, 1883, 60.) W. M. D. [660

Antioquia. — The narrative of a journey through this north-western province of Colombia, by Fr. v. Schenck, gives an entertaining account of its inhabitants and their condition. On the way inland from the northern seacoast, Schenck found the navigation of the Magdalena a difficult undertaking, from its numerous sandbars, and shifting, entangled channels. Below Magangué its valley is fairly cultivated; but farther up stream the forest wilderness is hardly broken for a long distance, and the towns named on the maps are represented by a few huts occupied by negroes and chinos, who supply the river-steamers with wood. This region is very warm and unhealthy. The ruins of a few chapels remain from the early times of Spanish occupation, but they have been long abandoned by the priests. Farther south, where the river forms the eastern boundary of Antioquia, which Schenck regards as the best province of the country, there is more clearing; the people are industrious, and of a much better morality than those of Spanish descent generally are, so that the traveller calls them Puritans. The road from Nare (about 150 met. elev.), on the Magdalena, westward to Medellin (1,480 met.), crosses two ranges that rise to 2,220 and 2,530 metres. An interesting description is given of Medellin, where the author found a curious mixture of civilized comforts with the makeshifts of an isolated region. An excursion was made northward, over a plateau, to the gold district of Santa Rosa de Oros, and beyond to the falls of the Guadalupe (lat. 6° 46′ N.), — the highest (250 met.) in Colombia, surpassing those of Tequendama (139 met.), near Bogotá, in the surrounding scenery as well as in height. The falls of the Guadalupe have also the advantage of being well seen from a neighboring point of view, where the stream is in sight from its upper placid flow, past the rapids to the cataract, which glides over a sloping, rocky surface to the gorge below. The climate of Antioquia is considered healthy, except in the low, warm valleys. In January and February the air is cool, and the sky clear. There are two rainy seasons, — in the north, from March to June, and from August to November; and in the south, from March to May, and from September to November. The rainfall thus seems to depend on the solar culmination; and the dry season, on the occupation of the country by the trade-winds. — (*Peterm. mitth.*, 1883.) W. M. D. [661

BOTANY.

Cryptogams.

The rot in European grape-vines. — Professor Millardet of Bordeaux, in a paper entitled 'Pourridié et Phylloxera,' explains how the attacks of the well-known Phylloxera destroy the grape-vines in France.

The insect produces larger swellings in the roots, which Millardet calls nodosities, and smaller swellings, which he calls tuberosities. The nodosities appear at any time from April to September, whilst the tuberosities are not found before August. The rotting of the roots is caused by the invasion of a fungus which enters through the cracks in the nodosities and tuberosities. According to Millardet, the fungus is what is known as Rhizomorpha subterranea when it occurs in the ground, and R. subcorticalis when it grows in the roots and stems. Hartig and others consider the fully developed form of the Rhizomorpha to be the toadstool (Agaricus melleus), which is common near Bordeaux, especially on oaks. The mycelium of this fungus makes its way into the soil of the vineyards from neighboring groves, and enters the roots of the vines which have been attacked by the Phylloxera, and produces a white rot, commonly known as pourridié. The writer concludes as follows: "It is beyond doubt, that the disease caused by Phylloxera predisposes to that of the rot. Should one say in these cases that the vine succumbs to the rot and not to the Phylloxera? Evidently not; since, without the Phylloxera, the rot would not have made its appearance." — W. G. F. [662

Two curious fungi of the United States. — The two genera Testicularia and Cycloderma were described by Klotzsch in 1832; but since that date botanists have been unable to recognize the two genera with certainty. Cooke now describes a new Cycloderma Ohiensis, and shows that the Milleria herbatica of Peck is the long-lost Testicularia cyperi of Klotzsch. — (*Grevillea*, March, 1883.) W. G. F. [663

Bangiaceae of Naples. — The eighth monograph of the fauna and flora of the Bay of Naples comprises the Bangiaceae, by Dr. G. Berthold, and is of interest, since he now gives the details of the formation of the spores; these are formed by the action of antherozoids on the cells of the thallus, which can hardly be said to produce trichogynes, as is the case in all other Florideae, to which, however, the Bangiaceae apparently belong. — W. G. F. [664

Bacteria in fishes. — Olivier and Richet have examined 150 fishes of different genera and species, and find, in all cases, that there are microbes in the blood and lymph. They conclude, that, contrary to what is believed to be the case in other vertebrates, microbes occur normally in the fluids of fishes. — (*Comptes rendus*, 1883.) W. G. F. [665

Phenogams.

Functional differentiation in stamens. — Fritz Müller adds Mollia, Sagerstroemia, and Heteranthera to the list of plants having two sets of stamens in each flower, one of which attracts insects, and supplies them with food, while the other serves for pollination by their aid. Experiments show that the crape-myrtle (Sagerstroemia), though self-sterile, is readily fertilized by pollen from either set of stamens of another variety grown in other gardens. The dull color of the longer stamens in the cases mentioned, and of the long stamens in short and mid-styled flowers of the trimorphic Lythrum, is explained as beneficial, as their lack of conspicuousness renders these unprotected stamens less liable to the depredations of pollen-eating insects than would otherwise be the case. As examples of plants whose stamens are differentiated into sets having different forms and offices, but without the color-contrasts found in most instances, a species of Cassia and Solanum rostratum are mentioned. — (*Nature*, Feb. 15.) W. T. [666

Capture of prey in Sarracenia. — In a compilation on pitcher-plants, Mr. James makes the curious suggestion that the insects which are found so abundantly in the pitchers of Sarracenia purpurea are first intoxicated by feeding on the pollen or nectar in its flowers, whence they fall into the leaves. — (*Amer. nat.*, March.) W. T. [667

Bee-flowers. — In his 'signs and seasons,' John Burroughs states that hepaticas are sometimes fragrant, sometimes scentless, the same being true of the arrow-leaved violet. Humblebees perforate flowers of the locust for their nectar, and hive-bees afterward make use of the openings. Rarely the honey-bee works upon the blossoms of trailing arbutus. In midsummer it reaps a harvest from the smooth sumach. It has also been observed on the white oak and skunk cabbage. — (*Century mag.*, March.) W. T. [668

Origin of anemophilous flowers. — Adaptation to fertilization in the wind-swept, treeless areas over which they prevail, is believed by Grant Allen to be the reason for the inconspicuous wind-fertilized flowers of grasses, which are considered degenerate descendants of conspicuous-flowered plants related to the Liliaceae. Passing notice is given to the pollination of rushes, sedges, and related plants. — (*Macmillan's mag.; Pop. sc. monthly*, March.) W. T. [669

New Passifloreae. — The collection of Passifloreae made by M. André in Ecuador and New Granada in 1875 and 1876 has been worked up by Dr. Masters. It comprised nine species of Tacsonia and over thirty of Passiflora, half of which are new. The list is accompanied with numerous critical notes and with revised synonymy, as supplementary to Masters's monograph of the order in the 'Flora Brasiliensis,' and to Triana and Planchon's of the New Granada species, — all the more valuable for the unusual excellence of André's specimens, and his descriptive notes and careful analytical drawings from the living plants. — (*Journ. Linn. soc. Lond.*, Feb., 1883.) S. W. [670

ZOÖLOGY.

Mollusks.

Disease in oysters. — A new disease has recently appeared in the Rappahannock oysters, called, locally, 'the black spot.' A small black spot, imperceptible to a careless observer, appears upon the oyster, and shortly afterward death ensues. All around the spot the meat is good; but this, when bitten into, proves bitter and nauseous. It is considered the most serious of the afflictions to which the mollusk is subject. — (*Hopson's Sea world*, March 15.) W. H. D. [671

Venus mercenaria in Britain. — It appears from a note by Mr. F. P. Marrat, that Venus mercenaria L., our round clam or quahaug, has become naturalized in British waters. In 1869, Capt. I. H. Mortimer introduced this shell-fish into England, where specimens were put into the sea at Southport, at the mouth of the Mersey, and at Crosby, on the Lancashire coast. It is believed that an American, Mr. H. D. Brandeth, doing business at Liverpool, and residing at Hilbre Island, near the mouth of the Dee, deposited both this species and the American oyster in the waters adjacent to the island, four or five years ago. At all events, large numbers of the shells of the Venus have recently been found by collectors, cast up on the shores near Hilbre Island in such a manner as to indicate that this species has become fully acclimatized there. — W. H. D. [672

Insects.

Innervation of the respiratory mechanism in insects. — Dr. O. Langendorff denies Dönhoff's state-

ment that respiratory movements in insects cease after decapitation. Experiments on humble-bees, wasps, cock-chafers, and dragon-flies, show that these movements continue in the abdomen after removal of the head, and even of the thorax. Indeed, in some cases, sections of the abdomen of a dragon-fly, as small as one ring and a half, continued the rhythmical respiration. It is therefore evident that the nerve-centre for respiration is not in the head. A decapitated cock-chafer breathed for an hour. Heat was found to increase the activity of respiration in mutilated, as in healthy individuals. Graphic illustrations are given of normal respiration, and compared with those obtained from decapitated specimens. — (*Archiv anat. phys.*, 1883, 80.) E. B. [673

(*Economic entomology.*)

Food of Carabidae and Coccinellidae. — The view of the habits of the two principal predaceous families of Coleoptera, which is common among entomologists, is largely due to hasty generalization, based upon insufficient data. Observations of the food of these beetles have hitherto been left almost wholly to chance. Two years ago Prof. S. A. Forbes and Mr. F. M. Webster published the results of a series of careful investigations of this subject. This work has been continued by Prof. Forbes, who now gives the result of an examination of the contents of the stomachs of 175 specimens (representing 38 species and 28 genera) of Carabidae, and 38 specimens (7 species and 4 genera) of Coccinellidae. A great diversity of habits of the different genera appears. Thus no trace of vegetable food was found in Calosoma; in Galerita, from 6% to 12% of the food was vegetable; in Pterostichus, 20% to 25%; and in Harpalus, 87%. In the Carabidae as a whole, 57% of the food was vegetable, and 36% insects. In the Coccinellidae, 45% was spores of fungi, 14% pollen of grasses and Compositae, and 35% insects. — (*Bull. Ill. state lab. nat. hist.*, No. 6, Jan., 1883.) J. H. C. [674

Food of Wisconsin birds. — Under the title 'Economic relations of Wisconsin birds,' Prof. F. H. King publishes notes on nearly three hundred species which occur in that state. This work is of especial interest to economic entomologists, as it contains the results of an examination, by a very careful worker, of the contents of the stomachs of over eighteen hundred birds. To the original observations are added notes from the publications of various ornithologists; so that a fairly complete *résumé* of what is known respecting the food of each of the species is given. — (*Wisc. geol. surv.*, i.) J. H. C. [675

VERTEBRATES.

Motor-nerve endings. — W. Kühne has published two articles on this subject, having extended his observations to a considerable number of vertebrates. He gives descriptions of the manifold forms of the terminal ramifications of the axis-cylinder in various species. As the best method of bringing this *axial-baum* into a visible state while preserving its natural form, he recommends giving a minimum dose of curare, and then sending tetanic electric irritation through the nerve. After this treatment, the motor-plates can be seen with surprising ease and distinctness. Particularly important is his new method of isolating the end-plates. Gold preparations are softened in slightly acidified glycerine until the muscular fibres can be pressed apart, which, being done, isolated terminal plates are found, showing the real arborization, which is quite different from the apparent arborization before isolation. The ramifications are composed of the axis-cylinder, and a sheath of substance to which Kühne gives the not very suitable name of stroma, and which separates the axis-cylinder from the fundamental substance of the motor-plate. A fuller notice will be given upon the appearance of the definite memoir, with the promised illustrations. — (*Verh. naturh.-med. ver. Heidelb.*, iii. 97, 212.) C. S. M. [676

Nerve-endings in muscles. — The terminal ramifications in Rana are formed, according to Trinchese, of little disks, placed at more or less regular distances from one another, being separated by a homogeneous intermediate substance. From these (Kühne's) ramifications, on the side towards the muscles, run out numerous very fine filaments. The 'longitudinal striae' (fibrillae?) of the muscle have a similar structure to that of the axis-cylinder, being formed of disks united by clear intermediate substance; and the disks are united by lateral filaments with one another. In the intercostal muscles of the boaconstrictor the motor-plates are often subdivided into five or six parts, lying asunder, though connected by filaments. — (*Att. accad. lincei*, 1882, 83.) C. S. M. [677

Motor-centres in the cerebral cortex. — As an appendix to an article on the irritability of the spinal cord, Schiff enters into a long discussion on the nature of the so-called 'motor centres' in the gray matter of certain convolutions of the cerebral hemispheres. The article is too long and too polemical to be briefly abstracted, but is well worth reading. Schiff points out, that, with the exception of Ferrier, all experimenters (even including Fritsch and Hitzig) have given up the belief that the irritable areas are the motor centres for voluntary movements, and account for the phenomena following stimulation in other ways. Schiff's own belief is, that the so-called motor areas are but reflex centres, in which, during the normal functioning of the body, tactile nervous impulses are reflected to the true and deeper-lying motor centres. — (*Pflüg. archiv*, xxx. 212.) H. N. M. [678

Mammals.

The domestic animals of Camargue. — Col. Basserie gives some interesting facts regarding the domestic animals of this large, low-lying, and marshy island, which is situated at the mouth of the Rhone. The sheep, of the Rambouillet breed, are small and rough, but of peaceful disposition, and very vigorous. They furnish good meat and wool, which has long been esteemed in France for its length and fineness. The cattle are black, small, nervous, and very energetic. They live in the wild state in the great marshes of the island, and are absolutely of no value to the husbandmen; nor do they furnish a means of entertainment, as they did in the days when bull-fights were not prohibited. The horses, which, like the cattle, receive almost no care, and are constrained to feed upon the coarse vegetation of the marshes, and to endure great and sudden changes of temperature and thirst, are small and ill-appearing, having massive jaws, and large and prominent joints and ligaments. They are, nevetherless, hardy, energetic, and subject to few diseases. In color they are light gray. — (*Bull. soc. agric., etc., de la Sarthe*, xxviii. 521.) F. W. T. [679

The nature of elephant's milk. — "According to the *Moniteur scientifique*, the milk of the elephant has a composition very closely allied to that of cow's milk. The globules of butter are large, transparent, and have sharply defined contours. The fatty matter has a clear yellow color. It is liquid at ordinary temperature, and solidifies at 18° C. below zero." — (*Revue scient.*, Jan. 13.) F. W. T. [680

ANTHROPOLOGY.

American archeology in Europe. — Dr. Daniel G. Brinton called the attention of the Numismatic and antiquarian society of Philadelphia, on March 1, to the following facts, with reference to the studies of American prehistoric antiquity. The stone sculptures, first discovered by Dr. Habel and described in the Smithsonian contributions to knowledge, have been removed from Santa Lucia Cozumelhualpa, near Guatemala, to the Royal museum of Berlin. Prof. Adolph Bastian, director of the museum, has published a description of them in a quarto of thirty pages, with three full-page lithographic plates. Within the last year or two, Prof. Leon de Rosny has visited Madrid, Dresden, Basle, and other cities, to study the relics of American civilization. In Madrid he identified the continuation of the 'Manuscript Troano,' which he is now preparing for the press. Count Hyacinthe de Charencey has collected into an octavo volume of a hundred and ninety-five pages his essays on American philology and paleography. Dr. Hamy discusses the cross of Teotihuacau. The Marquis of Nadaillac has brought out a volume on prehistoric America; and Dr. Max Steffen gives us a monograph on the agriculture of the ancient American civilized peoples, — the Aztecs, Mayas, Chibchas, and the Quichuas. The full titles of these works are given in the paper cited. — J. W. P. [681

The Mexican national museum. — It may not be known to all the readers of SCIENCE that the land of the Aztecs is no longer open to the indiscriminate plunder of relic-hunters. There is at the national capital a museum, rich especially in relics of ancient Mexican history. A quarterly report is issued, called *Anales del museo nacional de Mexico*, now in its third year, which is liberally circulated to libraries throughout the United States. Much of the space in this publication is devoted to archeology and decipherment of ancient inscriptions. The principal contributors are J. Sanchez, Gumesindo Mendoza, Orozco y Berra, and Sr. d. Jcazbalceta and Alfredo Chavero. Señor Chavero has for a long time been prosecuting his studies upon the ancient Mexican calendar; and Señor Mendoza has collected a large number of Nahua myths, which he is giving to the world. The anales is printed by Ignacio Escalante, No. 1, Bajos de San Agustin, Mexico. — J. W. P. [682

Anthropology of France. — The study of the natural history of man is very similar to the science of geology. It is possible to select a certain epoch, — say, the glacial, — and trace over all the earth the evidences of its extent. We may seek to comprehend the succession of all the epochs throughout our planet; or, selecting a particular locality, the specialist may study minutely the exact order in which the various strata have manifested themselves there. The anthropologist now traces up the wanderings of the Celtic stock, now seeks to unravel the mystery of races, and finally, circumscribing his search to his own land, inquires how various stocks of men have succeeded one another in its borders. Such a work has M. Gustave Lagneau done for France. Various tentative efforts were made, and their results published in current French scientific journals. Finally his perfected labors found permanent utterance in the *Dictionnaire encyclopédique des sciences médicales*, under the title *Anthropologie de la France;* and this has been separately printed by G. Masson, Paris. The subject is treated under two forms: 1. Ethnologie analytique, ou Étude spéciale de chacune des races ayant concouru à la formation de la population de la France; 2. Ethnologie synthétique, ou Étude générale de l'ensemble de la population de la France considérée dans sa complexité ethnique. — J. W. P. [683

The Indian-office report. — In addition to the mere detail of annuities and reservations, the report of the commissioner of Indian affairs is becoming more and more useful to the anthropologist. The volume for 1882 is, in this respect, the most valuable that has appeared. The report proper, filling eighty-two pages, covers the whole ground of administration, draws attention to abuses, and suggests important reforms. This is followed by a hundred and ninety pages of finely printed digests of correspondence with agents. By carefully running over these letters, one gets here and there some precious bits of information gathered by witnesses on the spot. Indian legislation, government liabilities, directory of agencies, the disbursement of funds, executive orders, catalogues of tribes and reservations, — are all minutely and intelligibly set forth. The report on education includes school population, number and accommodations of boarding and day schools, attendance, cost, native and white teachers, results in the number who can read, and in the acres ploughed, produce raised, and stock owned. The industries taught in each boarding-school are given in each case.

Whole number of Indians	259,632
School population of uncivilized	34,662
Boarding-schools for uncivilized	73
Day-schools " "	105
Boarding-school accommodations of uncivilized	4,903
Day-school " " "	5,299
Average attendance	5,569
Cost to government and religious societies	$355,102
Cost of Carlisle, Hampton, and Forest Grove	$141,276
Number who can read	14,532
Bushels of corn raised	12,713
" " vegetables raised	17,200
School population of five civilized tribes	9,315
Boarding-schools	14
Day-schools	199
Boarding- and day-school accommodations	8,528
Pupils in boarding-schools	1,043
" " day-schools	4,596
Cost to the five nations	$151,950
" " religious societies	$8,089
Number who can read	29,600

A great variety of information respecting population, industries, subsistence, vital and criminal statistics, completes the volume. — J. W. P. [684

Krao, the human nondescript at the Westminster aquarium. — Her appearance and mental condition, and that of her father, are described by A. E. Keane, who holds, that, should the statement in regard to the latter prove true, it would appear that a hairy and straight-eyed race, kindred to the Ainos of Japan, exists in Farther India. — (*Nature*, xxvii. 246.) F. W. T. [685

The Wyoming historical society. — Publication No. 4, of the Wyoming historical and geological society, contains an illustrated description of the finer specimens of Indian earthenware pots in the society's collection. The vessels are of the wide-mouthed variety, like the old dinner-pots, and are equal to any of the same class found in the West. — J. W. P. [686

EGYPTOLOGY.

Pithom-Succoth. — The explorations at Tell-el-Maschuta, carried on under the direction of the eminent Egyptologist, Naville, are yielding further fruit. A statuette of red granite, 65 cm. in height, with inscriptions, contains "the name Pithom (Pa-tum) three times in a form varied from that first found; the name of the god Tum, in Pa-tum, being written ideographically." — "The back bears a laudatory inscription, saying how well this functionary

discharged his duties, and served his king Osorkon II., of the twenty-second dynasty, whose monuments are very rare." — "Several fragments, with portions of the cartouche of Osorkon II." were also found, and "a hawk in red granite more than a metre high, bearing between his claws one of the cartouches of Ramses II., the presumed builder of Pithom." — (*Academy*, March 10.)

One ruin in Egypt has been fully explored. M. Naville, with sufficient funds at hand, has, in less than two months, 'completed the examination of Pithom.' The result has been the identification of the site, and the determination of some geographical and historical problems. Inscriptions in Greek and Latin prove Pithom to have been Hero, 'the storehouse,' and Heroöpolis, 'the store-city.' M. Naville says, "It was Ramses II. who was the founder of the city. He built the storehouse and the temple, but did not finish what he had begun. In the line of the Dromos we find great blocks of granite and of a hard calcareous stone, which had evidently been brought there to make some large tablets or statues, which have been left with marks of the sculptor only. The temple was small, and (the city being chiefly a storehouse and a fortress) had no reason to have many works of art." The Egyptian exploration fund, through the liberality of Sir Erasmus Wilson, has reaped the reward of employing a cool-headed Egyptologist of the first rank, and placing sufficient funds at his command to do his work quickly and thoroughly. — (*Academy*, March 17.)

H. O. [687

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

PUBLIC AND PRIVATE INSTITUTIONS.

Harvard university, Cambridge, Mass.

The chemical laboratory. — During his journey in Europe last year, the director added very materially to the means both of instruction and of research at the laboratory. A dynamo-electrical machine, with an adequate motor, has been placed in the basement of the building. The apparatus required for investigations in the new branch of the science, called thermo-chemistry, has been procured. Several hundred valuable specimens have been added to the mineral cabinet, and placed on exhibition in the cases; and a favorable opportunity enabled the director to procure, at small cost, several thousand characteristic mineral specimens for the use of students. It has been very difficult, hitherto, to procure suitable specimens in sufficient number and variety for the large class in mineralogy; and this want having been thus supplied, the laboratory teaching in this subject will be made more effective.

Museum of comparative zoölogy, Cambridge, Mass.

The Schary collection of fossils. — The most valuable accession received during the past year is the collection of Silurian fossils of Bohemia, brought together by the late J. M. von Schary, which has been purchased from his heirs. This collection is of the greatest value to American paleontologists, as it will give them the means of comparing the types of the great collections which have formed the basis of the works of Barrande and of Hall. Some idea of the magnitude of this collection may be formed from the fact that it contains over a hundred thousand specimens. Of these, probably two-thirds of the collection — no less than 1,231 species, representing 157 genera — are identified.

The Schary collection, taken in connection with those brought together from American localities, now makes the museum collection of paleozoic fossil invertebrates one of the finest in existence.

Peabody museum of American archeology, Cambridge, Mass.

Shellheaps on the coast of Maine. — The material obtained during last summer's explorations of shellheaps on the Damariscotta River and Muscongus Sound, is of special interest. At the heap on Keene's Point, considerable pottery was found, and an unusual number of stone implements. In addition to the ordinary implements made of bone, a harpoon-point was obtained, having two barbs and a perforation, showing that it was attached to a shaft by a string. In another heap, on Hodgdon's Island, Mr. Gamage found a similar perforated point with a single barb. These are believed to be the first specimens of this character from the Atlantic shellheaps; and they are of special interest, from their close resemblance to points from the North-western Coast. Most of the stone implements were rudely chipped forms; but one polished stone celt was found at some depth in the heap at Keene's Point. This deposit consists principally of clam-shells; although the valves of oysters, quahaugs, and scallops, were found, as well as the shells of Buccinum and Natica. Many broken bones of animals were abundant. The most common were those of the deer, moose, and bear; but those of the fox, otter, skunk, beaver, seal, and several other species of mammals, are noted; also the bones of several species of large birds, those of a turtle, and several species of fishes, as the codfish, flounder, devil-fish, and sturgeon. Human bones were obtained from a shellheap on Fort Island; and portions of a human skeleton dug out of the great oyster-heap at Newcastle were secured. A spear-point of bone was found by Mr. Phelps, about one foot below the surface, in the Keene's Point heap; and above it, just under the sod, he found an iron point of nearly the same size and shape, which was probably made out of a piece of hoop iron in imitation of the earlier bone implements. An iron spear and an iron axe of very old form were also found in the shells near the surface of the deposit, which, with a small clay pipe of a kind made in England about the middle of the seventeenth century, found also by Mr. Phelps ten inches deep in the shells, show that this particular deposit was added to by the Indians after contact with the whites, though there can be no doubt that it was commenced long before that time.

State university of Kansas, Lawrence.

Weather report for March. — The temperature, rainfall, cloudiness, and wind-velocity were below the March averages. An occurrence unprecedented in Kansas was the continuous cloudiness of the last eight days of the month, during seven of which the wind did not change from a north-east direction.

Mean temperature, 40.90°, which is 0.90° below the average March temperature of the fifteen preceding years. The highest temperature was 69°, on the 17th and 22d; the lowest was 16°, on the 19th; monthly range, 53°: mean temperature at 7 A.M., 34.84°; at