taking place at the present time, as well as some of the more remarkable ones of past ages.

Cuvier club, Cincinnati.

Jan. 5. — In their annual report, the trustees stated that the club expended during the year $238.60 in the prosecution of the game-laws. The extension of the open season for quail through November was suggested as not likely to do injury; and attention was called to the continued pollution of waters, and the consequent destruction of fish. The necessity was urged of protecting the National park from the speculator, and such tracts as the Adirondacks from the wood-chopper.

Academy of natural sciences of Philadelphia.

Dec. 11, 1883. — In an account of the formicaries of the carpenter ant, the Rev. H. C. McCook related observations proving that the females of Camponotus pennsylvanicus, when fertilized, go solitary, and, after dispossessing themselves of their wings, begin the work of founding a new family. This work they carry on until enough workers are reared to attend to the active duties of the formicary; as, tending and feeding the young, enlarging the domicile, etc. After that, the queens generally limit their duty to the laying of eggs, and are continually guarded and restricted in their movements by a circle of attendant workers, or 'court.' The facts are further illustrated and enlarged by a series of observations made by Mr. Edward Potts, in accordance with the speaker's suggestions and directions. They establish or confirm the following points: 1. The manner of depositing the eggs, which, as well as the larvae, are cared for by the queen until workers are matured; 2. The stages in the development of the egg and larvae are partially noted; 3. The time required for the change from larval to pupal state is about thirty days; 4. About the same period is spent in the pupal state, the entire period of transformation being about sixty days; 5. The work of rearing the first broods begins the latter part of June, or early in July; 6. About twenty-four hours are spent by larvae in spinning the cocoon; 7. The ant-queen probably assists the callow antling to emerge from its case; 8. Not only the larvae, but occasionally the antlings, are fed by the queen; 9. The young workers, shortly after emerging, begin the duty of nurses, caring for the eggs, and tending the larvae.

Jan. 1. — Professor Joseph Leidy exhibited specimens of tin ore from the Black Hills, Dakota. They consisted of a mass of granite containing cassiterite, a fragment of quartz with the same, and a mass of pure cassiterite of about one-pound weight. He had also seen several pounds of large grains obtained from gold-washings. From among these he had picked out several characteristic crystals.

NOTES AND NEWS.

THE death, last Friday, of Professor Arnold Guyot of Princeton, removes one more of those distinguished men of broad scientific culture, who, nurtured in Europe, have given the best fruits of their lives to America. His influence on the young men under his teaching was second only to that of his devoted friend and countryman, Agassiz. We shall speak more at length of his life and characteristics in a future number.

— It will be a source of pleasure to those who are aware of the reliable and conscientious character of Dr. Joseph Leidy's contributions to science, to learn that he has been awarded by the Geological society of London the 'Lyell medal,' with its accompanying purse of twenty-five pounds, in recognition of his important services to paleontology. In a letter received from Warington W. Smith, foreign secretary of the Geological society, dated Jan. 25, Dr. Leidy is advised of the award, and requested to depute some fellow of the society to receive the same at the anniversary meeting to be held on the 15th inst., for transmission to Philadelphia.

— The fourth volume of the census reports has been issued from the press. This is upon the 'agencies of transportation,' and includes the statistics of railroads, steam-navigation, canals, telegraphs, and telephones. Naturally the first of these subjects takes up the bulk of the volume, monopolizing 651 pages out of a total of 869. The statistics and discussion of this subject, as well as of telegraphs and telephones, have been prepared by Mr. A. E. Shuman, whose thorough acquaintance with the subjects, and whose painstaking care, are amply illustrated by the reports in question.

The total railroad mileage in operation on June 1, 1880, is given as 87,781 $\frac{97}{100}$. This was under the management of 631 corporations. The total cost of construction was $4,112,367,176, and of equipment, $418,045,458. The assets of the whole system amounted to $5,536,419,788, and the liabilities, $5,425,722,560. The paid-in capital stock aggregated $2,613,606,264, over 80 % of which earned a profit at an average rate of $6\frac{32}{100}$ %. The total number of stockholders (estimated, in part) was not far from 300,000, giving an average of $8,700 of stock to each. The aggregate freight mileage was 32,348,846,693, and the passenger mileage, 5,740,112,502. To illustrate the amount of railroad travel, it may be said that this represents an average travel of 114 miles for each man, woman, and child in the country. The above figures, when contrasted with those representing the condition of the railroad interest in this country at the close of 1882, show an immense growth during the two years and a half. At the latter date there were in operation not fewer than 117,717 miles, an increase of 29,835 miles, while the capital had increased in approximately the same proportion. At that date the total railroad mileage of the globe is given (Spofford's Almanac) as 264,826, of which this country owned over 44 %. The total of all Europe was less than that of the United States, being but 105,895. The statistical tables of the report upon railroads contain, 1°, a general financial exhibit of the several roads; 2°, a general balance-sheet; 3°, traffic operations; 4°, passenger and freight mileage; and,

5°, equipment and employees. A second portion of the report relates to the physical characteristics of the roads, with statistics regarding the history of construction, grades, curves, roadway, and tracks. This is followed by an analysis of the funded debts of railroad corporations, and by a statement regarding the amount and kind of fuel used. The report concludes with a condensed statement of the agreements existing between different railroad companies, and between these companies on the one hand, and express and sleeping car companies on the other.

The report by Mr. T. C. Purdy, upon steam-navigation, opens with a history of that subject, in which the progress of development of the species, the highest type of which is our ocean-going steamship, is briefly sketched. The tables show the number, tonnage, value, capital invested, service, and traffic of our steam-craft. The report upon canals, by the same author, opens with a history of canal construction in this country. Many persons at the present day will doubtless be surprised to learn the extent to which this class of internal improvements was pushed during the period between 1825 and 1840. The total length of canals constructed in this country was $4{,}468\frac{6}{10}$ miles, costing $214,041,802. Of this, $1{,}953\frac{6}{10}$ miles have been abandoned, and a large part of the remainder is not paying expenses. The statistics connected with this report give financial statements, date of construction, dimensions of canals, and the number and dimensions of locks.

The report upon telegraphs opens with a brief discussion of the statistics. The tables contain a general financial exhibit, a statement of volume of business, number of employees, and description of lines. The report upon telephones is of a very similar character. In regard to this, it should be borne in mind that the telephone was in its infancy during the year to which the statistics refer, and that its use has increased enormously during the years which have elapsed since. Following this report is a paper upon the postal-telegraph service in foreign countries, which cannot fail to prove of great interest at this time, when the question of a government telegraph is being actively agitated in this country. This report has been compiled by Mr. Robert B. Lines, mainly from information received from the heads of the departments of postal telegraph of foreign countries through our representatives. It details the history of the postal telegraph in each country where it exists, sketches the methods of business management, and compares the administration by the government with that by private hands, both as to cheapness and efficiency. The following countries support telegraphs which, either wholly or in part, supplant private undertakings: Great Britain, Germany, France, Austro-Hungary, Russia, Switzerland, Belgium, Netherlands, Sweden, Norway, Denmark, Portugal, Roumania, Turkey, Brazil, Japan, Canada, and New Zealand, — in short, nearly every civilized country. In most cases the telegraph has been the property of the state since its introduction, but in a few cases the property has been purchased from private owners. This was the case with Great Britain, who bought out the telegraph companies in 1870. The price paid for the property was based upon the net earnings in the year ending June 30, 1868, by capitalizing that amount at five per cent. The transfer from private to public hands has been found to be advantageous; as not only have the rates been largely reduced, but this department has been more than self-supporting, having earned in twelve years (from 1870 to 1881 inclusive) the sum of £1,996,996. This, however, need not be a matter of surprise; as the uniform rate for twenty words is one shilling (twenty-five cents), and threepence for each additional five words or part of five words. As compared with the rtaes of private corporations in this country, these rates are but little lower for equal distances, while, if we consider the greater density of population and the vastly greater volume of business done in England, it would seem that these rates are relatively quite as high. In most of the continental countries rates are less; and, in all cases where the statistics are given, the expenses of the department have been greater than the receipts.

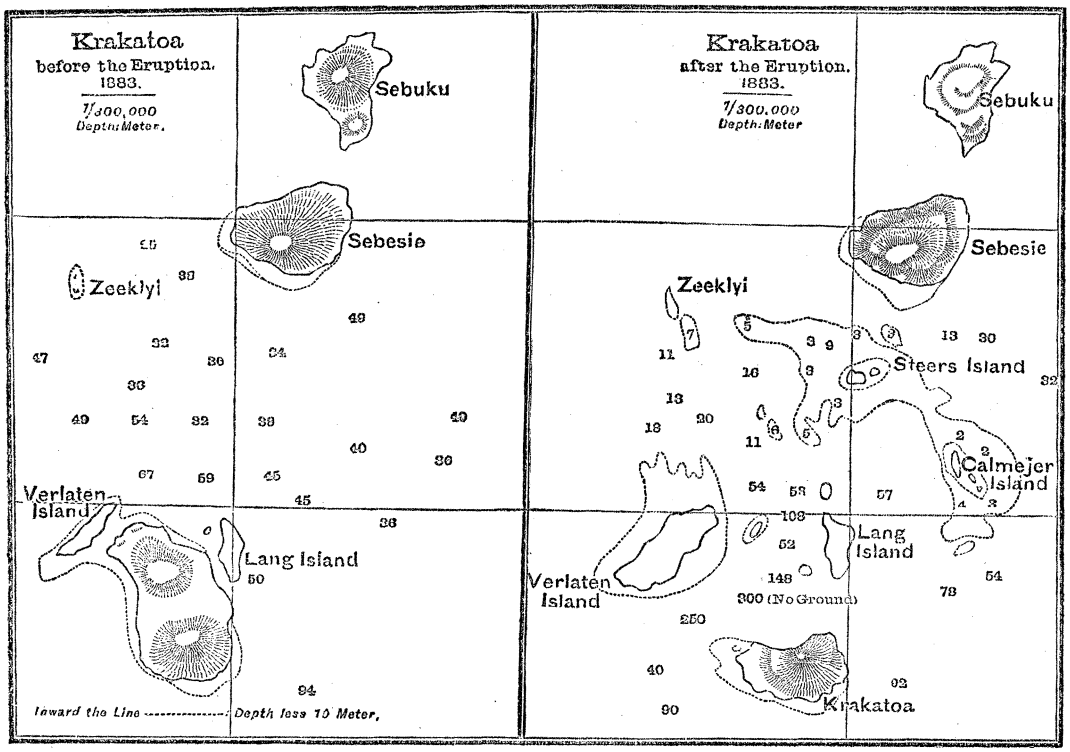
The volume has a very full general index.

— Wedenskii states (*Centralbl. med. wiss.*, 1883, 465) that he has been able to demonstrate the presence of the negative variation of the natural nerve current in a stimulated nerve by means of the telephone in a way similar to that described by Bernstein and Schönlein for the muscle. The quality of the 'nerve-tone' obtained does not differ from that of the telephonic muscle-tone. When, by tying a string around it, the physiological continuity of the nerve was destroyed, the peculiar nerve-tone caused by interruptions of the negative variation current disappeared, while that caused by unipolar action, and of a purely physical origin, could still be heard. The latter tone, however, could be distinguished from the true physiological nerve-tone both by means of its peculiar quality and by the fact that it required a greater strength of stimulus for its production than the former. Chemical and mechanical stimulation were also tried, and in each case a definite noise was heard. When the nerve was stimulated by means of a constant current, a peculiar noise was heard, in accordance with the law of contraction, either at the opening or the closing of the current.

— E. and F. N. Spon announce A pocket-book of electrical tables, for the use of electricians and engineers, by John Munro and A. Jamieson; Absolute electrical and magnetic measurements, reprinted from *Nature*, by A. Gray; Handbook of sanitary information for householders, by Roger S. Tracy.

— The deaths are announced of Mr. Hugh Powell, the first English optician to construct objectives on the water-immersion principle, and one of the founders of the Royal microscopical society, of whom only five now remain; and of the venerable Professor Sven Nilsson of Lund, known for his zoölogical work and his investigations on the prehistoric inhabitants of Scandinavia.

—A correspondent of *Nature*, who has evidently had a good opportunity to study the results of the Krakatoa eruption, and has made soundings in the neighborhood, writes, that instead of the sixteen new volcanoes which were at first reported, and the total destruction of Krakatoa, there is still a considerable portion of the island, and that the greater part of the destruction seems to have come from the wave produced by the eruption and the fall of the masses of material which were thrown from the northern portion of the island. Krakatoa at its northern end now rises in a steep wall eight hundred metres high; and, of his resigning the superintendency of the natural-history section of the British museum. Although about eighty years of age, he is still vigorous, and reads papers before the learned societies at nearly every meeting. The establishment of a natural-history museum was long an object for which he toiled. Over twenty years ago he published an address 'on a national museum of natural history,' in which he stated his view relative to the need for, and the proper organization of, such an institution. The new museum is in a large degree the result of his labor.



where was once land, soundings of three hundred and sixty metres have been made without finding bottom. A large portion of this material appears to have been deposited a few miles to the north, as shown in the map, by the new islands of Steers and Calmejar, and the shoals to the north of Lang Island, which seems to have been about on the line between the upheaval and downfall, and has not been changed materially in size. All the islands are covered with ashes; the destruction of life having been nearly complete, even in Sebuku, the first patches of green showing themselves on the small islands farther north.

—Professor Richard Owen has ceased to be a commoner, having been knighted by the Queen. A banquet was given him by his colleagues on the 21st of January, as a sort of farewell celebration on the event

—The annual course of lectures given under the auspices of the University of Pennsylvania consists this year of The development of the house, by Rev. R. E. Thompson; Why doctors exist, and how they work, by H. C. Wood, M.D.; First aid in emergencies, by J. W. White, M.D.; Order and progress, by Mr. A. S. Bolles; The romance and realities of animal locomotion, by Mr. E. Muybridge; A glance at the lowest forms of life, by J. Leidy, M.D.; Chemistry in the industrial arts, by Mr. S. P. Sadtler; The creation of an empire, or, The life and work of Count Otto von Bismarck, by Mr. E. J. James; Relation of American forests to American prosperity, by J. T. Rothrock, M.D.; How electricity is measured, by G. F. Barker, M.D. The course began Jan. 11; and a lecture will be given every Friday evening till March 21, except on Feb. 22.

— Charles Scribner's Sons announce an important book, by Professor Arnold Guyot, entitled "Creation; or, The biblical cosmogony in the light of modern science."

— The Pilot chart of the North Atlantic Ocean for February shows a smaller number of wrecks than were given on that of last month. The thick scattering of wrecks along our coast from Cape Hatteras to New York, and on the January chart farther north, as compared with those charted on the European coast, attracts immediate attention, but may be due to the more complete information received by the hydrographic office from vessels entering American ports, rather than to greater carelessness or recklessness on the part of American navigators.

— Dr. H. Laspeyres has been appointed professor of mineralogy in the university at Kiel, and Dr. F. Kurtz of Berlin, professor of botany at the university at Cordoba in the Argentine Republic.

— Over a million visitors passed the turnstile of the South Kensington museum during 1883; and since the opening of the museum in June, 1857, the number of visitors is stated to have been 22,675,912.

— The course of 'practical lessons' in anthropology, of the Parker memorial science class, began Jan. 6, and will continue to March 30. Among the subjects of the essays to be discussed we find 'Infant education,' 'Language and its evolution,' 'Heredity,' and 'Allopathy *vs.* homoeopathy.'

— The annual watch-trials undertaken at the Yale college observatory for the encouragement of horology are now in progress, and watches or marine chronometers whose record is to appear in this year's observatory report will be received not later than April 15. The report is published the latter part of June. Full particulars of the conditions of the watch-trials will be furnished upon application to the secretary of the observatory.

— Dr. Benjamin Sharp has been appointed professor of lower invertebrata by the council of the Academy of natural sciences of Philadelphia. Dr. Sharp is a graduate of the University of Pennsylvania, from which he received the degrees of Doctor of medicine and Doctor of philosophy in 1881. He afterwards studied under Leuckart in Leipzig, and under Semper in the University of Wurzburg. He took his degree from the latter after presenting a thesis in German on the anatomy of Ancylus. A translation of this memoir has been published in the proceedings of the academy, and is considered an important addition to our knowledge of the group of animals described. Dr. Sharp was granted the privilege of studying at the Bavarian table in the Zoölogical station at Naples, an honor rarely granted a foreigner. Dr. Sharp proposes delivering lectures, during the coming spring, on the lower forms of life. The course will, in some degree, supply the lack of biological instruction in Philadelphia, which has recently been the subject of public comment.

— Barnum's 'white elephant' arrived at the Zoölogical gardens on Jan. 17, since which time it has attracted much attention. To call the elephant 'white' is certainly to use that term in a very broad sense. The general color of the animal, which is a male about seven feet high, is a light gray, perhaps a shade lighter than is usual. The only parts which approach white are the tips of the ears, the breast, a space in front of and behind the eyes, the middle of the forehead, and a space under the ears. The color in these regions is a sort of dull fleshy tint, although the blotch on the forehead has a brownish tinge. The blotches are very irregularly margined, and plentifully sprinkled with small spots of the normal gray of the body. A much more remarkable feature than these slight irregularities of color is the length of the tail: the tuft at its extremity all but touches the ground. The elephant appears to be in excellent condition, and has fine pointed tusks.

— Upon the resignation of Professor (now Sir) Richard Owen from the superintendency of the British museum, the trustees of that institution have unanimously chosen Professor William H. Flower, LL.D., F.R.S., F.Z.S., etc., to be his successor. In accepting this position, Professor Flower will probably sever his connection with the Museum of the Royal college of surgeons, of which he has been for a number of years the conservator. In the latter position he also succeeded Professor Owen.

The election of Professor Flower to the prominent and responsible post of superintendent must be regarded as a very happy occurrence. His numerous contributions to mammalogy (especially to the knowledge of the cetacea) and to other branches of zoölogy entitle him to the high rank which he holds in England and throughout the scientific world. His administrative ability is amply displayed in the perfection to which he has brought the arrangement of the collections of the Royal college of surgeons.

The keepers of the several departments of the Natural-history museum who are next in rank to the superintendent are as follows: keeper of zoölogy, Dr. Albert Günther; assistant, Arthur G. Butler; keeper of geology, Dr. H. Woodward; assistant, R. Etheridge; keeper of mineralogy, L. Fletcher; keeper of botany, W. Carruthers.

Professor Flower is at present engaged in the preparation of a series of lectures on anthropology, to be delivered in the coming spring; in the publication of a complete catalogue of the collection of the College of surgeons; and of numerous scientific papers of importance, notably, one upon the Delphinidae.

— The sixth fasciculus of Dr. Fisher's *Manuel de conchyliologie* has appeared, carrying the work from Siphonaria, through the opisthobranchs, nucleobranchs, and to the beginning of the prosobranchs, including the Toxoglossa and Rhachiglossa as far as the Volutidae. The character of the work is fully maintained, or, if any thing, becomes more satisfactory as the better-studied groups are taken up. About three-fifths of the work has now appeared.

— *Papilio*, a journal devoted solely to Lepidoptera, and published for three years as the organ of the New-York entomological club, under the superintendence of Mr. Henry Edwards, is to be transferred to Philadelphia, and edited by Eugene M. Aaron.