SCIENTIFIC INTELLIGENCE FROM AMERICA *

THE statement, by Professor J. D. Whitney, of the present condition of the geological survey of California, lately presented to the Governor of the State, gives a gratifying picture of the activity and success in accomplishing the objects for which the exploration was authorised. The State Geologist remarks that less has been done than he had hoped, in consequence of the suspension of the appropriations by a preceding Legislature. Since the work was resumed, however, as the result of renewed appropriations by the Legislature of 1869, the survey has been carried on as rapidly as the nature of the service would allow. Among the points particularly engaging the attention of the State Geologist was the completion of the topographical map of California, it being readily understood that this must be a necessary preliminary to a geological map. The survey of Central California was considered especially interesting and important, embracing, as it does, that portion of the State from Owen's Lake on the south to Lassen's Peak on the north, or between 36° and 40° 30′ north and south, and 117° 30′ and 123° east and west, the whole area comprising about one-third of the State, with probably ninety-five per cent. of the population residing in it. Of the portion included within these limits, represented upon four maps, three are entirely drawn and partially engraved, while the fourth is two-thirds drawn, with the field-work of the remaining third yet to be done. A preliminary map, however, of the whole of California, on a scale of eighteen miles to an inch, has been drawn, in compliance with the wish of the community, and will soon be ready for distribution. Besides these, other works connected with the same subject are reported by the State Geologist, being the new editions of the Yosemite Guide-book, and the publication of the first volume of the "Ornithology of California," which is characterised as a work exquisitely illustrated and admirably printed. The remaining volumes of the series of reports are so far completed as only to wait the continuance of appropriations to place them in hand and secure their early appearance. Arrangements have also been made with Mr. Lesquereux to work up the fossil plants of California, and with Dr. Leidy and Prof. Meek in regard to the fossils. Prof. Brewer, of the Survey, is well advanced in the work on the Botany of California, which, when completed, will doubtless be used extensively as a text-book. It is much to be hoped that very liberal appropriations will be made for these important objects, since its chief and his assistants are known to be among the very best specialists in America, and their work has commanded the highest respect among naturalists at home and abroad. The reports themselves are models of perfection in regard to typography and general execution, and are not to be surpassed by the finest European works, whether published by governments or private parties. It may be stated as a well-known fact that much interest has been excited throughout the scientific circles of Europe by the character of the work done under the auspices of the State, and the utmost admiration expressed in regard to its liberality and enterprise; this example being commended to European governments as eminently worthy of their imitation.—A letter from Captain Buddington, the sailing-master of Captain Hall's vessel, the *Polaris*, dated at Upernavik, reports that the party were in good health and spirits; and that Mr. Chester, the first mate, had gone up the coast to bring down Hans Christian, Dr. Kane's Esquimaux hunter, who was to join the expedition.—Among the many works published by the United States government, or at its expense, there are few that exceed in intrinsic value, as well as in beauty, the volumes hitherto printed belonging to the series of reports made by Mr. Clarence King, at his geological and other explorations of the region along the fortieth parallel of latitude. This expedition is still occupied in carrying out the work assigned to it by the engineer department of the army, while reports are now being made of such portions of the work as have been completed. It is nearly a year since the volume upon the mining industry of the Sierra Nevada and other mineral regions of the West was published, as prepared mainly by Mr. J. D. Hague (one of Mr. King's assistants), but including articles by Mr. King himself, and other members of the corps. This was accompanied by a large atlas of plates, and contained full details of all the methods of metallurgical operations and manipulations, together with drawings of machinery, plans of mines, sketches of mining geology, &c. This book has been received with great favour everywhere, and has redounded greatly to the credit of the United States, first in authorising the research, and then in publishing the results in so superior a style. We now have to chronicle the appearance of another volume of the series—namely, the Botany, as prepared under the direction of Mr. Sereno Watson, the botanist of the expedition. This constitutes volume five of Mr. King's reports, and number eighteen of the professional papers of the engineer department of the army. The work embraces a report upon the geography, meteorology, and physics of the region explored as connected with the general botany of the country, catalogues of the known plants investigated, descriptions of new genera and species, and various appendices; these accompanied by forty plates of new or rare species. Another volume of the series is now in press, and will include the zoological portion, as furnished by Mr. Robert Ridgway. This will probably appear in the course of a few months.—The scientific tendency of the age, manifested in the continual springing up of new associations in different parts of the country, receives an additional illustration in the estabiishment of the Natural History Society of Marquette, Michigan, whtch was organised during the month of December, under the presidency of Dr. Hewitt.

* Communicated by the Scientific Editor of *Harper's Weekly*.

ON THE CARPAL AND TARSAL BONES OF BIRDS *

THE author stated that he had followed with great interest the work of Huxley, Cope, Morse, and others, in tracing out the ornithic characters in the Dinosauria. While following these relations he had noticed a marked difference in the characters of the carpus and tarsus of the two classes. It seemed strange that a group of bones so persistent in the reptiles as well as in the mammalia should be so obscure or wanting in birds. Owen objects to the term tarso-metatarse, as he believes the existence of a tarsus has not been demonstrated. W. K. Parker, in 1861, on the osteology of Balæniceps, questions if the lower articular portion of the tibia is not the homologue of the mammalian astragalus and not an epiphysis. Gegenbaur has now shown that in one stage of the young bird there is a proximal tarsal ossicle, and a distal tarsal ossicle, the first one anchylosing with the tibia, the distal one likewise anchylosing with the metatarse. Thus, the term tarso-metatarse is quite proper. While this was a great step toward a proper understanding of these parts, Mr. Morse believed that a nearer relation would be found in the discovery of another proximal tarsal bone. In those reptiles he had examined, whatever the number of tarsal bones, there were always in the proximal series one corresponding to the tibia, and another corresponding to the fibula. He had found this feature in birds. In studying the embryos of the eave swallow, bank swallow, king bird, sand piper, blackbird, cow blackbird, bluebird, chirping sparrow, yellow warbler, and Wilson's thrush, he had found three distinct tarsal bones, two in the proximal series answering to the tibia and fibula, and one in the distal series. The first two early anchylose, and present an hour-glass-shaped articular surface as Prof. Cope has described in the astragalus of Lælaps. The final anchylosis of these conjoined ossicles with the tibia, formed the bicondylar trochlea so peculiar to the distal end of a bird's tibia. The distal tarsal ossicle became united with the proximal ends of the metatarse, as has been shown. In the carpus he had found four perfectly distinct ossicles, the distal carpal bones becoming united to the base of the mid and outer metacarpals, the other two remaining free, though the ulnar carpal in some cases anchylosed with the ulna. In the king bird and yellow warbler, he had found a fifth carpal on the radial side.

* Abstract of paper by Prof. E. S. Morse, read at the Indianapolis meeting of the American Association for the Advancement of Science. Reprinted from the *American Naturalist*.

SCIENTIFIC SERIALS

THE *Journal of Anatomy and Physiology*, Second series. No. ix., November 1871.—The first article in this number is by Prof. Humphry, "On the Anatomy of the Muscles and Nerves of *Cryptobranchus Japonicus*," an animal which has been only rarely dissected. The muscular system presents no points of great peculiarity or interest, resembling very closely that of other *Urodela*. With respect to the nerves, no trace of the third, fourth, or sixth cranial could be found in either orbit, though the third and fourth, both of very small size, were found in the cranial cavity; previous dissectors had described the sixth as a

branch from the fifth in the orbit, but this could not be found in the present specimen. The three divisions of the fifth cranial nerve were distinct, but the ophthalmic and supra maxillary left the skull by a common foramen. The vagus gave off branches answering to the spinal accessory, and also a large lateral nerve which ran back along the body, giving off no branches until it reached the great lateral muscles of the tail, and in that differing from the corresponding nerve of fishes. The spinal nerves resembled in most points those of man very closely, the brachial and crural plexuses were, however, much more simple, which Prof. Humphry thinks is associated with a less perfect specialisation of the action of the limb muscles; and below knee and elbow the course of the nerve trunks in the fore and hind limbs was almost identical.—The next paper is by Prof. Flower, "On the composition of the Carpus of the Dog." The os centrale had previously never been recognised in Carnivora, and both Cuvier and Owen regarded it, in those animals in which it is present, as a dismemberment of some element of the carpus; Gegenbaur, however, regarded it as itself a true carpal element, though never able to discover the state of things in those cases in which it was absent. However, in the skeleton of a dog six weeks old, Prof. Flower finds that the so-called scapholunar bone consists of three distinct pieces, viz., a distinct scaphoid and lunar, and a third piece evidently answering to the os centrale; thus confirming the view that the latter is a true primitive carpal element.—Dr. Messenger Bradley gives an account of the brain of an idiot, who during life could taste and hear well, and could repeat a few words in a parrot-like manner, but was congenitally blind, and never recognised any one, or, although not paralysed, made any attempt at locomotion. His bones were extremely fragile, fracturing invariably if he jerked a limb against the bed. The brain when removed weighed twenty-eight ounces: most of the fissures and lobes of the cerebrum were present, but (notwithstanding the small size of the hemispheres) were relatively small. The island of Reil was small and very simple. The corpora quadrigemina were very small, which is interesting, taken in connection with his blindness. The cerebellum was relatively large, the vermiform process was imperfect, the pyramid and short commissure entirely absent, and the left hemisphere considerably lighter than the right. The bones throughout the body when examined microscopically were found permeated with oil drops and granular matter, but when these were washed away normal bone structure could be made out, except an unusually large size of the Haversian canals.—Prof. Young contributes some facts in the anatomy of the shoulder girdle of birds, showing that the only movement of the humerus in flight which is anatomically possible, is that in a figure of eight.—A short description by Mr. Watson, of the digestive, circulatory, and respiratory organs of the Indian elephant, follows.—The action of the chlorides of platinum, iridium, and palladium when introduced into the blood of dogs is the subject of an interesting paper by Dr. Blake, of San Francisco.—Prof. Turner describes the variations of nerves in the human body which he has lately met with, and then follows a paper by Prof. Struthers on the Great Fin Whale, the most interesting points being a careful account of the muscles of the fore-limb, helping to clear up some points as to the homologies of the bones; and the discovery, for the first time in this species, of a bony rudiment of the femur, though Prof. Flower had previously noticed a cartilaginous one.—Mr. Garrod gives some observations made on himself showing that the exposure of the nude body to a temperature below 70° F. causes a rise in the internal temperature of the body; which is greater the lower the temperature of the surrounding air down to 45°, the lowest point at which observations have been made. This he attributes to a contraction of the cutaneous vessels driving the blood inwards, and also lessening the conducting power of the skin. Exposure to a temperature of 70° causes no rise.—A detailed description of the anatomy of the Malayan Tapir, by Dr. Murie, and of the muscles and nerves of the chimpanzee and anubis, by Mr. Champneys, do not admit of a short abstract being given of either of them.—The Report of the Progress of Physiology, by Drs. Brunton and Ferrier, is very full, and contains short accounts of many matters of great interest. The anatomy report is postponed.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, January 24.—Mr. Joseph Prestwich, F.R.S., president, in the chair.—The following communications were read:—(1) "On the Foraminifera of the Family Rotalinæ (Carpenter) found in the Cretaceous Formations, with Notes on their Tertiary and Recent Representatives," by Prof. T. Rupert Jones, and Mr. W. K. Parker, F.R.S. The authors enumerated the Rotalinæ which have been found in the Cretaceous rocks of Europe, and showed by tabular synopses the range of the species and notable varieties in the different formations of the Cretaceous system. For the comparison of the Tertiary Rotalinæ with those of the Cretaceous period the following Tertiary formations were selected:—the Kessenberg beds in the Northern Alps, the Paris Tertiaries, the London Clay, the Tertiary beds of the Vienna Basin, and the English and Antwerp Crags. The authors also enumerated the recent Foraminifera of the Atlantic Ocean. The authors stated that of *Planorbulina* several species and important varieties of the compact, conical form occur throughout the Cretaceous series, and that those of the Nautiloid group are still more abundant. The plano-convex forms are represented throughout the series by *P.* (*Truncatulina*) *lobatula*; but the flat concentric growths had not yet come in. *Planorbulina* extends down to the Lias and Trias. *Pulvinulina repanda* is feebly represented in the uppermost Chalk, but forms of the "*Menardii*" group abound throughout the series. Species of the "*elegans*" group are peculiarly characteristic of the Gault, and some of the "*Schreibersii*" group are scattered throughout. These two groups extend far back in the Secondary period. The typical *Rotalia Beccarii* is not a Cretaceous form, but the nearly allied *R. umbilicata* is common. *Tinoporus* and *Patellina* occur at several stages; *Calcarina* only in the Upper Chalk. The above-mentioned types are for the most part still living, but the "*auricula*" group of *Pulvinulina* is wanting in the Cretaceous series, as also are *Spirillina* and *Cymbalopora*, except that the latter occurs in the Maestricht Chalk. *Discorbina* and *Calcarina* make their first appearance in the uppermost Chalk. The chief distinction between the Cretaceous and the existing Rotalinæ was said to consist in the progressively increasing number of modifications. The authors concluded by disputing the propriety of regarding the Atlantic ooze as homologous with the Chalk. The president suggested the possibility of some of the minute Foraminifera being transported fossils derived from earlier beds than those in which they are now found. Dr. Carpenter observed that the mode of examination to be adopted with Foraminifera was different in character from that which was applicable to higher organisms. The range in variation was so great that an imperfect examination of Nummulites had sufficed to make M. d'Archiac reduce the number of species by one half; and all the speaker's subsequent studies had impressed upon him the variety in form and in sculpturing of surface on individuals of the same species. When out of some thousands of specimens of *Operculina*, say, a dozen pronounced forms had been selected, such as by themselves seemed well marked and distinct, it might turn out that after all there was but one species present with intermediate varieties connecting all these different forms. He thought the same held good with Rotalinæ, and that there were osculant forms which might connect, not only the species, but even the genera into which they had been subdivided. This fact had an important bearing on their genetic succession, especially as it appeared that some of the best-marked types were due to the conditions under which they lived. The temperature in tropical seas differed in accordance with the depth so much, that when 2,000 fathoms were reached a degree of cold was attained such as was to be found in high latitudes; and in consequence the deep-sea forms in tropical latitudes assumed the dwarfed character of those in shallower seas and nearer the pole. He suggested caution in drawing inferences from forms so subject to modification, both spontaneous and due to the depth of the sea, especially as connected with abundance of food. Prof. Ramsay remarked that geologists would be pleased to find Foraminifera exhibiting, like other organisms, changes in some degree connected with the lapse of time. These low forms, however, could hardly afford criteria for judging of the age of geological formations, while at the same time such ample means were afforded by the higher organisms for coming to a conclusion. He cited, for instance, the Cephalopoda, as proving how different were the more important forms of marine life in Cretaceous times from those of the present day. He thought that no one who had thoroughly studied the forms of ancient life would be led to ignore the differences they presented, as a whole, from those now existing.—Prof. Jones, in reply, observed that the question of whether the Foraminifera in a given bed were derived or not was to be solved partly by their condition and partly by their relative proportions, but that in most