

11h. 30m. p.m. on November 27. The commencement of the flight was estimated to lie half-way between a Cygni and  $\zeta$  Ursæ Majoris, and after pursuing a vertical path the meteor died away before reaching the horizon. The colour of the object was yellow, its shape that of a pear, a round head followed by a tapering tail. The meteor travelled slowly, and no persistent trail was observed.

**SATURN'S RINGS.**—A communication from Prof. Pickering to the *Astronomische Nachrichten* (No. 4216, p. 267, November 26) contains the following messages received from Prof. Lowell:—"Condensations in Saturn's rings confirmed here and measured repeatedly. They are visible symmetric and permanent. Outer situated near the outer edge, ansa *b*, inner at middle of ansa *c*. A conspicuous relative gap also detected and measured at 1.56 radius from the centre of the planet. Ring easily seen. Placed further south from shadow at west than east." This message was dated November 7, and the following was dated November 22:—"Ring shadow on Saturn bisected, black medial line, phenomenon explicable by extra-plane particles only."

**THE RECENT TRANSIT OF MERCURY.**—No. 21 of the Paris *Comptes rendus* (November 18) contains a number of communications regarding the observations of the transit of Mercury which took place on November 13.

At the Nice Observatory the times of the contacts were observed with several different instruments, and micrometer measurements of the polar and equatorial diameters were made. For several seconds "before" the second contact black ligaments were seen by MM. Javelle and Simonin, and before third contact; the black disc of the planet was seen to be surrounded by a whitish or yellowish appearance. The measurements of the diameters are not consistent for different observers, but they all agree in making the polar diameter the shorter. M. Charlois saw very distinctly the black ligament after the second and before the third contacts, its thickness being less than the diameter of the planet. The unsteadiness of the image rendered the proposed astrophysical observations almost impossible.

At the Lyons Observatory observations of the times of contact and measurements of the diameters were also made, and none of the three observers was able to see any peculiar feature on the planet's disc.

M. Bourget, at Toulouse, found the planetary disc distinctly blacker than the nuclei of the neighbouring sun-spots, and, at intervals, suspected that it was surrounded by a slight, pale yellow border.

At Marseilles, where a number of observations of contacts and of diameters were made, M. Borrelly noted that the disc was of a dark violet colour, and appeared to be surrounded by a nebulous greyish ring of light nearly as thick as the diameter of the planet. The same observer believes he saw Mercury as a small dark disc surrounded by a violet annulus about an hour before first contact. Paying special attention to the matter, M. Esmiol was unable to discern the slightest deformation of the horns of the planet as it crossed the sun's limb at entry, but saw a sharply defined ring, of about three seconds in thickness, around the dark disc of the planet during the whole of the transit.

With the smaller magnifications at the Bourges Observatory, both the yellowish aureole and the luminous spot were seen, but Abbé Th. Moreux believes both of them to be subjective phenomena. At the beginning of the observations the bright spot was to the east of the centre, but at the end it appeared to be to the west. With a magnification of 325 it always appeared central.

Comte de la Baume Pluvinel, who had set up special spectroscopic apparatus at the Nice Observatory, was unable to find any modification of the solar spectrum near the planet's limb, although he especially examined the absorption bands of oxygen and water vapour, both visually and photographically.

Arrangements were made for observing the possible spectroscopic phenomena, visually and photographically, at the Solar Physics Observatory, South Kensington, but clouds prevented the observations being made. The planet was only seen for a few seconds some little time after the commencement of the transit, and appeared as a well-defined black disc.

NO. 1988, VOL. 77]

## SOME RECENT WORK IN PALÆONTOLOGY.

AMONG palæontological papers sent to us, the following have a faunistic bearing:—

Mr. F. R. Cowper Reed ("Memoirs of the Geological Survey of India," "Palæontologia Indica," new series, vol. ii., mem. 3, 1906) describes the lower Palæozoic fossils of the northern Shan States, Burma, and points out that we know very few fossils from pre-Devonian rocks in southern Asia. The rich finds in Burma, which have mainly become revealed through the survey by Mr. T. D. La Touche, are consequently very welcome. Dr. Bather has furnished thirty-four pages on the cystideans, and Miss Elles has assisted in the description of the graptolites, which are represented by three species of *Monograptus* (p. 90). The critical remarks on genera by Dr. Bather and Mr. Reed render the memoir of general importance. The Naungkangyi beds, which doubtless include more than one stage (p. 83), are shown to have affinities with the Lower Ordovician of northern Europe. La Touche believes the Nyaungbaw beds to be Upper Ordovician; but the fossil evidence is scanty. The Namhsim Sandstones (p. 152) are correlated with the European Wenlock. The Zebingyi beds, which contain abundant *Tentaculites elegans*, side by side with *Monograptus*, are of later age, and the fauna verges on that of the Lower Devonian of Europe; but the presence of *Monograptus* leads Mr. Reed to regard these Burmese strata as uppermost Silurian, the fauna heralding that which afterwards spread into the Mediterranean or south European province. The fine plates in the memoir are from drawings by Mr. T. A. Brock.

Dr. Carl Diener deals with the fauna of the Tropites-limestone of Byans, on the south-west flank of the Himalayas, adjoining Tibet and Nepal (*ibid.*, ser. xv., vol. v., mem. 1, 1906). The author visited the sections in 1892, and extensive collections have since been made by the Indian Geological Survey in 1899 and 1900. The cephalopod-fauna includes *Atractites*, *Orthoceras*, and a fine series of ammonites, these last furnishing 155 species out of 168 forms of all kinds known from this horizon (p. 188). This fauna is now well illustrated. We have already referred (*NATURE*, vol. lxxiv., p. 530) to the conclusion that in Byans, in one limestone band 3 feet in thickness, the dissimilar Carnic and Noric faunas of the Alps are both represented. Transitional types of ammonites are not, however, discoverable, and the apparent mingling of the faunas is held to be due to lack of sedimentation, whereby a thin stratum represents a prolonged epoch of Triassic time.

In the succeeding memoir (*ibid.*, mem. 2) Dr. Diener describes "the fauna of the Himalayan Muschelkalk." The beds are mainly of Upper Muschelkalk age, yielding numerous cephalopods. India is no longer inferior to Europe in the number of species known from this stage. Ten species of cephalopods, and three common species of brachiopods (p. 135), are identical with those of Europe.

Mr. H. Woods, working, like Mr. Cowper Reed, in Cambridge, describes the Cretaceous fauna of Pondoland for the Geological Survey of Cape Colony ("Annals of the South African Museum," vol. iv., part vii., 1906). He has also had the advantage of examining Mr. Griesbach's collection in the Hamburg Museum. The whole deposit in Pondoland is regarded by Mr. Woods as Upper Senonian. Mr. Brock must again be congratulated on the beautiful plates accompanying the memoir.

Mr. S. Tokunaga (*Journ. Coll. of Science, Univ. of Tokyo*, vol. xxi., article 2, 1906), in a paper on fossils from the environs of Tokyo, has made good use of material close to the city itself, in beds hitherto regarded as Pliocene. The fauna is almost entirely molluscan, but the author has secured from it a few remains of *Elephas antiquus*. Carefully comparing his results with those of his predecessor Brauns, who wrote in 1881, he is persuaded that the affinities with the European Crag beds have been overstated; and he brings the deposits round Tokyo forward into post-Pliocene or "Diluvial" times. The new species, and many already recorded, are figured on five large plates.

We may perhaps refer here to Mr. Schuchert's discussion of the Carboniferous and Permian beds of Russia.

India, and America (*American Journal of Science*, vol. xxii., 1906, pp. 29 and 143), since the treatment is mainly palæontological. The conclusion arrived at is that as yet we cannot determine whether the Permian is an independent system; but hopes are expressed that the unbroken section of 9000 feet in south-western Texas, opening in Carboniferous strata, may throw important light on the true Permian sequence. The Permian faunas usually known to us are detached members of an obviously larger system, which may prove after all to be the Carboniferous.

We have received also a number of papers dealing with special divisions of fossil organic remains:—

In the Transactions of the Geological Society of South Africa, vol. ix., 1906, p. 125, Messrs. Mellor and Leslie describe the fossil forest exposed, during an unusually dry season, in the bed of the Vaal near Vereeniging. The river had etched out, as it were, the roots of trees, bedded below in coal, and a picture of a land-surface lay revealed, probably of Permian age. The authors believe that the roots and associated stems belong to *Næggerathiopsis*. Photographs are given of this interesting exposure, which may not again become visible for many years.

Fusulina, like Nummulites, has an interest for all geologists, apart from the fact that it is a handsome representative of the Foraminifera. Mr. H. Yabe (*Journ. Coll. Science, Univ. of Tokyo*, vol. xxi., article 5, 1906), in describing a Fusulina-limestone from Korea, discusses the genus in general, and adds a new subgenus, *Neoschwagerina*, to the three proposed by Schellwien, viz. *Fusulina s.s.*, *Schwagerina*, and *Doliolina*. He corrects (p. 17) a reference to Fusulina-limestone in Borneo, originating in the *Geological Magazine* in 1875, and points out that Sumatra was the locality referred to. A useful summary of the distribution of such limestones is provided, and Brazil, Persia, Turkestan, and the Salt Range are grouped together as regions on the coast of the Carboniferous "Mediterranean Ocean" (p. 24). Our knowledge of Fusulina-limestone in Asia is still extending (see the recent discoveries in Burma, "Records Geol. Surv. of India," vol. xxxv., 1907, p. 52), and stratigraphers may well read Yabe's paper in connection with Schuchert's faunistic review, to which attention has been directed above. A Japanese author who writes in such good English may perhaps be excused for using "foraminifera" throughout as a singular noun.

An important criticism on the views of Prof. J. E. Duerden as to the primary hexamerous character of rugose corals appears from Mr. T. C. Brown in the *American Journal of Science* for April. Brown selects *Streptelasma rectum*, one of the Devonian corals examined by Duerden, as a type, and discovers, in its earliest stage a primary set of four septa, two forming a bar across the calicle, the other two (alar septa) being set obliquely on the cardinal one. In the next stage a secondary septum appears in each of the comparatively large cardinal spaces, and joins the alar septum obliquely. Here, then, a pseudo-hexameral effect is temporarily produced. The author comments on Mr. R. C. Carruthers's recent paper in the *Annals and Magazine of Natural History*, which describes a similar succession of septa, but which puts forward a different view as to the mode of development of the first pair of secondary septa. We may feel sure that Prof. Duerden's work will be further stimulated by the parallel and critical investigations to which it has given rise.

Mr. Frank Springer uses the discovery of the disc of *Onychocrinus* as a basis for a complete review and a new analysis of the genera of *Crinoidea flexibilia* (*Journ. of Geology*, vol. xiv., 1906, p. 467). Drawings were made from Angelin's specimens by Mr. G. Liljevall, of Stockholm, who discovered, in the course of his work, that *Ichthyocrinus* has an extra (primitive radianal) plate in the right posterior ray. Springer thereupon examined numerous specimens of this genus from other localities, and states (p. 478) that the Silurian ones agree with those drawn by Liljevall, while the Carboniferous ones have no radianal. For the latter, which are regarded as showing an evolutionary elimination of a primitive character, the genus *Metichthyocrinus* is now proposed. A comparison is instituted (p. 504) between the progressive variation in position and the final removal of the radianal in time,

and the similar events that affect the anal plate during the life-history of *Antedon*. The six figures illustrating the disc of *Onychocrinus* are unfortunately not numbered, and some ingenuity is required before they can be fitted in with their descriptions.

The characters of certain labyrinthodont footprints have led the Rev. Longinos Navás, S.J. (*Boletín de la Sociedad Aragonesa de Ciencias naturales*, tomo v., 1906, p. 208), to form a new species, *Chirosaurus ibericus* or *Cheirotherium ibericum*; but surely the reference of the beds at El Moncayo, in which the specimen occurs, to the Silurian (p. 212) rests on far too little evidence. Footprints of *Chirosaurus* from Lower Triassic strata are, moreover, already known in Aragon, and are cited by our author. The fact that he is not startled by his own conclusion shows that, in his zoological studies, the succession of vertebrate forms has not as yet attracted him.

Mr. G. R. Wieland (*Science*, vol. xxiii., 1906, p. 819, and vol. xxv., 1907, p. 66) brings together good evidence on "Dinosaurian gastroliths." The surface of such stones, even when they are flints, shows "a higher polish than wind or water ever produces." The dinosaurs are, moreover, credited with a selective taste for brightly coloured pebbles.

In a paper on the origin of the Wasatch deposits of the Big Basin (*American Journal of Science*, vol. xxiii., 1907, p. 356), Mr. F. B. Loomis describes (p. 363) a new species of *Lambdotherium*, and one of *Glyptosaurus*, a terrestrial lizard. The fauna, which includes *Eohippus*, *Phenacodus*, *Coryphodon*, *Crocodylus*, aquatic turtles, and a few fishes, is explained as having accumulated in flood-plains, and not in a lake-basin, as has been generally asserted.

The Rev. T. Gardner, S.J., describes and illustrates several types of small stone implements formed by primitive man in Rhodesia ("Zambesi Mission Record," vol. iii., 1906, p. 149). The author points out that many of the specimens now found upon the surface may have been once deeply buried, and were washed out during the sudden bursts of rain. We are already familiar with the argument as to the antiquity of such implements in Africa, based on their occurrence in the river-gravels cut through by the Zambesi gorge. In Father Gardner's paper we are brought into touch with some of the first discoverers of these interesting forms, including the observant author and the scholars of St. George's School in Bulawayo.

Finally, fossil man receives a whole-hearted greeting from the Positivists, represented by Dr. Canclon, in an essay on "Le Progrès aux Temps paléolithiques" (*Revue positiviste internationale*, 1907). The proofs of this paper have not been very carefully corrected; but its acceptance of long ages of mental progress in man, as not incompatible with Comte's conception of human nature, will no doubt be of service in certain quarters, where science has hitherto seemed fraught with pessimism rather than with a guiding inspiration. G. A. J. C.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Dr. Barclay-Smith has been appointed university lecturer in advanced human anatomy as from Michaelmas, 1907, until Michaelmas, 1912.

Prof. H. S. Carslaw has been approved for the degree of doctor in science.

The degree committee of the special board for mathematics is of opinion that the work submitted by J. B. Hubrecht, of Christ's College, entitled "An Attempt at a Spectroscopic Investigation of the Solar Rotation," is of distinction as a record of original research.

WE learn from the *Revue scientifique* that the University of Lyons has accepted a gift from M. Théodore Vautier of 4000*l.*, the income from which is to be devoted to research work in experimental physics.

SIR EDWARD H. CARSON, P.C., M.P., will distribute the prizes and certificates at the Borough Polytechnic Institute on Thursday, December 12. Mr. J. Leonard Spicer,