

volume, with maps; "Examination Papers in Elementary Engineering," R. M. Milne; "Alcohol and Life: A Manual of Scientific Temperance Teaching for Schools," J. A. Hunter, illustrated; "Essentials of Practical Geography," B. C. Wallis (Practical Modern Geographies); "A Geography of America," T. Alford Smith (Practical Modern Geographies).

OUR ASTRONOMICAL COLUMN.

MINOR PLANETS.—Mr. H. E. Wood records a number of minor planets on plates taken last year at Johannesburg. They have been identified by M. Louis Fabry (Marseilles Circular, No. 10). The most interesting is 722 Frieda; this planet had not been observed since its discovery in 1911, so its recovery is fortunate. The *Astronomical Journal*, No. 729, contains elements of an unidentified planet discovered at Washington by Mr. G. H. Peters last November. It may be identical with 293 Brasilia, 1906 WF, or 1911 LU. If new, he proposes the name Washingtonia. Prof. Barnard followed the Wolf planet DB until April 4, when its magnitude was 15. It has been so well observed that it ought to be possible to secure its re-observation at the next perihelion in 1922.

THE CEPHEID VARIABLE SU CASSIOPEÆ.—Further investigations of this interesting variable star have been made by W. S. Adams and H. Shapley (*Astrophysical Journal*, vol. xlvii., p. 46). Mr. Shapley had already shown that the variation could not be interpreted as the result of the rotation of a simple ellipsoidal body, and the conclusion that the star is a Cepheid has been verified by the new spectroscopic observations. The range of photographic magnitude, according to Parkhurst, is from 6.52 to 6.99, and the variations of radial velocity, -18 to $+4$ km., are correspondingly small. A period of 1.9495 days satisfies both series of changes, and the epoch of maximum negative velocity precedes the maximum of light by 0.05 day. The spectral type varies from A₉ at maximum to F₅ at minimum. Taking the visual magnitude as 6.23, as given by Boss, the spectroscopic parallax is identical with that derived by Van Maanen, namely, $+0.010'' \pm 0.003''$.

NEW DOUBLE STARS.—Mr. R. G. Aitken's twenty-fourth list, giving details of 100 new double stars, appears as Lick Observatory Bulletin No. 306. This observer's systematic survey of the sky was initiated in 1899, and the present list brings his total published discoveries up to 3000, the region covered being from the pole to declination 14° S., and to declination 22° S. from 13h. to 1h. right ascension. All the stars included are under $5''$ in distance, and in the present list nearly half are less than $1''$ apart, while sixteen do not exceed $0.3''$. The brightest star included is 41 Ophiuchi, the components of which are rated as magnitudes 4.6 and 7.6, the position angle and distance being 298° and $0.52''$ respectively.

JOURNAL OF THE CHALDEAN SOCIETY.—We have pleasure in directing attention to a small astronomical magazine which is issued quarterly by the Chaldean Society under the title of *The Chaldean*. The publication has now reached No. 10 of the first volume, and while dealing with astronomy generally, its special appeal appears to be to observers of meteors. The recent issue includes an article on astronomical photography, and several notes on meteors by Mr. Denning and others. A feature of particular interest is a facsimile of a page from the observation book of the late Prof. A. S. Herschel, which furnishes a good example of the method of recording meteors. Communications should be addressed to the editor, Mr. J. Hargreaves, Bennington, Stevenage, Herts.

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RECENT WORK IN MINERALOGY AND PETROLOGY.

A MINERAL variously labelled johannite and uranopilite in collections has yielded to Messrs. E. S. Larsen and G. V. Brown the composition $RO.UO_3.SO_3.4H_2O$, where $R=Cu,Fe,Na_2$ (the *American Mineralogist*, vol. ii., p. 78, 1917). The new species thus indicated is called gilpinite, from the typical locality Gilpin Co., Colorado; but a Cornish specimen, one of those styled uranopilite, proves to be identical. The authors insist that optical tests under the microscope are characteristic, and that their application shows that more than one-third of the hundred specimens of "secondary uranium minerals" examined from various museums are incorrectly labelled.

Mr. A. E. V. Zealley, in "Notes on Newly Recorded Rhodesian Minerals" (Proc. Rhodesia Sci. Assoc., vol. xvi., p. 17, 1917), includes an account of the stanniferous tantalite of the Victoria tinfield, discovered in 1911, but not hitherto described. Two other Rhodesian occurrences of tantalite are noticed.

Messrs. R. C. Wells and B. S. Butler describe (Journ. Washington Acad. Sci., vol. vii., p. 596, 1917) a mineral sulphide of tungsten, under the name of tungstenite. The composition is probably WS_2 , and the specific gravity is near 7.4. It looks like graphite, and has a hardness of only 2.5. This mineral occurs in some abundance in a vein with galena, pyrite, tetrahedrite, and argentite, in Salt Lake Co., Utah.

The view advanced by Mr. J. B. Scrivenor in 1910-14 as to the age of the detrital tin deposits of the Kinta district, Perak (see NATURE, vol. xciv., p. 348), has now been disputed in a detailed paper by Dr. W. R. Jones (Quart. Journ. Geol. Soc., vol. lxxii., p. 165, 1917). Mr. Scrivenor urged that these bouldery deposits were derived from the surface of Gondwanaland during the Permian ice-age, which is responsible for the Talchir Beds of India. Dr. Jones, however, connects the tin ore with the Mesozoic granite now *in situ* in the district, and he brings forward strong evidence to show that there is only one alluvial tin-bearing series in Kinta, instead of two, superposed on one another, and separated by a long geological interval.

Those acquainted with the work of Mr. W. H. Goodchild on the Insizwa Range in the Cape Province (Inst. of Mining and Metallurgy, Bull. 147, 1916) will welcome the publication of Dr. Du Toit's researches in the area, extending from 1903 to 1912 (Du Toit and Rogers, "The Geology of Part of the Transkei," South Africa Geological Survey, Explanation of Sheet 27, 1917). The geological map, showing a magnificent series of dolerite sills, penetrating the Karroo strata up to the highest Stormberg beds, is now also issued, on a scale of 1:247600. The Insizwa gabbro, with its copper ores bearing nickel and platinum, is included in the north-east of the sheet, and the memoir contains a map showing the whole of the gabbro-norite masses. The three sulphides—chalcocopyrite, pentlandite, and pyrrhotine—have separated from the igneous rock in the order in which they are here named, as a gravitative differentiation-product in the concave floor of a great sill. Forty-five miles of visible contact along the base of this sill await systematic exploration. The occurrence is discussed, in comparison with that at Sudbury, in the recently issued report of the Ontario Nickel Commission.

Prof. R. A. Daly ("Low-temperature Formation of Alkaline Felspars in Limestone," Proc. Nat. Acad. Sci., vol. iii., p. 659, 1917) describes a dolomite from Water-ton Lake, on the Montana and Alberta border, which contains 34.5 per cent. by weight of orthoclase and

3.1 per cent. of albite. The author compares this with recorded occurrences of albite in Jurassic and other unmetamorphosed limestones in Europe. Issel's discovery (*Comptes rendus*, February 24, 1890) of albite crystals enclosing radiolaria in a Cainozoic limestone may be added to those quoted. Prof. Daly concludes that the alkaline feldspars of Waterton crystallised out, like the European examples, at the sea-floor, or soon after the burial of the associated dolomite, and at temperatures which may have been well under 100° C. Time, he points out, may be an important factor, and this has to be borne in mind in experimental work on such productions.

Mr. W. A. Tarr (*Amer. Journ. Sci.*, vol. xlv., p. 409, 1917) has examined with much care the elongated chert-lumps in the Burlington Limestone of Missouri, a formation of Lower Carboniferous age. Because he finds no remains of siliceous organisms associated with the chert, and only a partial replacement of originally calcareous fossils, he criticises the view that flint is commonly a pseudomorph of portions of the limestone in which it occurs, and remarks that, had the first investigations been made on material collected in Missouri, the theory that attributes the material of flint in other cases to the solution of organic remains would not have been propounded. This shows that the author attaches little weight to the mass of evidence collected outside Missouri; yet his reading has evidently been extensive. No reference is made to the frequent occurrence of silicified oolitic rocks, from the Assynt Limestone upwards, in which all the structure of the original limestone is retained, nor to the remarkable suggestion made by R. Liesegang as to the rhythmic deposition of flint layers by water holding silica in solution. Mr. Tarr does well to emphasise the fact that flint formation goes on at an early stage in the consolidation of limestone, since pebbles of the flint are often found in the next following deposits; but it does not follow from this that flint nodules represent gelatinous matter precipitated directly on the sea-floor. The shrinkage-cracks in the Missouri flint, filled by limestone, and Mr. Tarr's interesting experiments on the precipitation of silica, help towards his conclusion that the flint in the Burlington Limestone is not a replacement of the calcareous rock; but this by no means disposes of the cases where flint masses spread out into successive layers of a limestone, or of the thousands of sections from Cretaceous or Carboniferous material that are stored in European collections. We read this paper with the feeling that, if Mr. Tarr has proved his case for the Missouri example, he has dealt with an exceptional occurrence which certainly deserved description.

It is characteristic of the association of the sciences in technical industries that geologists should be asked to look for "pulpstones." Mr. L. H. Cole has, in consequence, tested certain Canadian sandstones "to determine their suitability as pulpstones" (Canada, Dept. of Mines, Mines Branch, Bull. 19, 1917). These are used in wood-pulp mills, and should tear the fibres apart rather than cut them. In the case of sandstones, the grains should be of medium size and medium angularity, and the stone must resist considerable stresses. Diagrams of the grinding machines add interest to this useful bulletin.

Mr. H. Ries describes a gritty plastic "clay" resembling löss (*Amer. Journ. Sci.*, vol. xlv., p. 316, 1917), which proves to consist of 98.5 per cent. of small crystals of dolomite and 1.5 per cent. of iron oxide and alumina. He suggests that the flat faces of the dolomite rhombs, coming into contact or separated only by a film of water, may account for the plasticity, surface tension holding the grains together, but allowing of slipping along their faces.

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The phosphate deposits of Saldanha Bay, north-west of Cape Town, have been reported on by Dr. A. L. Du Toit (*S. Africa Geol. Survey, Mem. 10, 1917*). The material contains from 10 to 22 per cent. of phosphoric oxide; but this is mostly combined with aluminium and iron, having been produced by the action of ancient guanos on underlying granitic rocks. The author discusses the value of such phosphates as fertilisers, making no attempt in his summary to reconcile the somewhat contradictory statements of agricultural chemists, but pointing out the need for experiments on natural lines under biochemical conditions. His proper mistrust of Germany should not have led him into the error of asserting that the citric acid test of availability of phosphorus was "devised in Germany for the purpose of enabling that country to supply the markets of the world with highly citric-soluble basic slag."

Mr. T. A. Jaggard, jun. (*Journ. Washington Acad. Sci.*, vol. vii., p. 277, 1917), describes the phenomena presented by the *aa* and *pahoehoe* types of Hawaiian lava during the cooling of the mass. He suggests that the quantity of confined gas for each unit of volume of melt may be a controlling factor. The expansion of gas in the *aa* type may be more rapid, but "with so many variables there is no cause for wonder that the distinction is as yet unexplained." The author proposes the term "dermolith" for the *pahoehoe* type, which has a crust or skin as its chief character, and the term "aphrolith" (foam-stone) for types of lava which divide on the surface, like *aa*, into lumpy vesicular units. He prefers "lith" to "lite" as a termination, on the well-established analogy of "monolith."

Prof. R. A. Daly has furnished a useful synopsis of our knowledge of the nature of rocks in the Pacific islands (*Bull. Geol. Soc. America*, vol. xxvii., p. 325) and urges that much more observation is required. He believes that, so far as can be judged at present, the primary magma under the Pacific is of basaltic composition, giving rise to andesites and picrites by differentiation, and to alkaline rocks by solution of comparatively small proportions of limestone.

G. A. J. C.

THE BIRD CULT OF EASTER ISLAND.

IN the issue of *Folk-lore* for December last Mrs. Scoresby Routledge gives a singularly interesting account of the bird cult of Easter Island. The sacred bird is the sooty tern (*Sterna fuliginosa*), and the valued privilege of securing the first egg is a matter of competition between members of the Mata-toa group, the right to become a competitor being acquired only by supernatural agency. The selection is made through a dream vouchsafed to a divinely gifted individual, the Iviatua. The candidate on selection takes a new name, and the bird-name thus conferred was given to the year in which victory was achieved, thus forming an easily remembered system of chronology. It is also significant that this bird cult is connected with the statues for which the island is famous. The bird-man used to spend his official year on the mountain in which the monoliths were quarried; the bird initiation of children was also performed in connection with the statues, and the ring design on the back of the images was reproduced at the ceremony on the children's backs. There seems reason to believe, says the writer, that the people who originally celebrated the bird cult included in it reverence for the statues. The ancestors of the present inhabitants were, therefore, either the makers of the monoliths of Easter Island, or, if the bird worshippers represent a more