

## Research Items.

A TAHITIAN BREAST ORNAMENT FROM ALASKA.—Dr. H. U. Hall discusses in the issue of the *Museum Journal* dated September last, the provenance of an object of exceptional interest recently acquired by the University Museum, Philadelphia. Although it was collected in an Indian village on Admiralty Island, Alaska, it is beyond question a feather breast ornament from Tahiti. Only seven of these are known to be in existence, three being in the British Museum. That they belonged to the highest chiefs is clear, since their adornments include red feathers, sacred to Oro the war god, which could be worn only by persons of this class. They are described by Cook under date September 8, 1777, and possibly, under missionary influence, had ceased to be used so early as 1825, or at any rate not much later. It is therefore improbable that this specimen was carried north by one of the whalers, who did not begin their voyages to the Arctic through Bering Strait until the late 'forties. It would seem most probable that it was taken to Alaska either by Cook or Vancouver, the probabilities favouring the latter. Among the Chilkat it was a clan object and regarded as very precious. It was known as 'raven cape.' The late owner said that the old leaders of her house had boasted of it as a possession which was uncommon. It was regarded as the work of the people of another world. Fragmentary traditions of its origin connect it with the coming of the white man, and refer it to a strange party who made a visit to the land "in company with the first man of the sun."

AN ARCHEOLOGICAL COLLECTION FROM FLAGSTAFF, ARIZONA.—A number of archaeological objects from graves found in Young's Cañon, near Flagstaff in Arizona, has recently been added to the U.S. National Museum, Washington. It is of special significance for the archaeology of the south-western United States, partly because some of the objects are unique; partly because few antiquities have been obtained from this area. The collection was made by Mr. J. C. Clarke in the course of road-making operations, and consists principally of pottery, red, gray, dark, and painted ware, shell bracelets, armlets, and finger rings, a few bone objects, needles, bodkins, and the like. Two rare specimens of polished bone with incised decoration were evidently ornaments for the hair as they were found on a cranium. Cremation was practised and calcined human bones were found in mortuary vessels or burial urns. Mr. J. W. Fewkes, who describes the collection in *Smithsonian Miscellaneous Collections*, Vol. 77, No. 10, directs attention in particular to the pottery, of which the decorative designs are purely geometric, none showing naturalistic forms of men or animals. None is perforated or ceremonially 'killed.' One object is exceptional, a black and white ware ladle, of which the sides and end of the handle are pinched up to form a cradle. This contains a small clay figurine. Similar figurines have been found higher up the Little Colorado, suggesting that the cradle-handled ladle, though rare, was known in Pueblo households. The pottery as a whole resembles the pre-puebloan of the region north of the Hopi Pueblos—a culture which probably at one time spread over the whole of what is now Arizona and is now best represented on the Lower San Juan in the region called Takonabi.

THE ATMOSPHERE AND HUMAN COMFORT.—The *Monthly Weather Review* for October last has an article on "The Relation of the Atmosphere to Human Comfort," by Dr. C. F. Brooks of Clark University.

The journal also contains other articles on the same subject, treating different branches, but all have general reference to America. The work is allied to that undertaken by Prof. Leonard Hill in Great Britain, but an attempt is made to push the study further and to reduce it to mathematical form in order to find a basis by which weather might be classified according to its relation to human comfort. With data of heat emission, heat production, and comfort, Dr. Brooks considers it possible to construct tables which will show for any weather conditions approximately the rate at which a man will cool. We need tables showing for any kind of weather the feeling of cooling which a man will experience under any degree of activity and in any kind of clothing. More calorimetric observations of the actual cooling and heating of man are required. The author hopes that the discussion will be helpful as a pioneering effort.

ASYMMETRY IN MICROSCOPIC ORGANISMS.—In his presidential address to the Quekett Microscopical Club (*Journ. Quekett Micr. Club*, Nov. 1925), Mr. D. J. Scourfield directs attention to asymmetry in microscopic organisms and to the need for observations on the functioning of asymmetrical structures in order to throw light on the vexed question of adaptations. Among the rotifers, the Rattulidæ present a twisting of the body so that practically every part is involved in the asymmetry. Among the Bdelloid rotifers the jaws occasionally show slight differences, and in this group there are two ovaries which function alternately, while in other rotifers there is only one ovary. Mr. Scourfield recalls examples of asymmetry in some Crustacea and refers to the occurrence of androgynous individuals of *Daphnia*, rightly urging the desirability for carefully recording the condition of such examples. He enters a plea for experimental research in the cultivation of microscopic organisms under varied conditions, and we may suggest to the keen amateur that the tracing of the subsequent history of such androgynous specimens which, e.g., exhibit a male antenna on one side and a female antenna on the other, would form an interesting study.

BEATING OF THE EARLY EMBRYONIC HEART.—The Report of the Department of Embryology of the Carnegie Institution of Washington (from Year Book No. 24), which is located in Baltimore, shows the wide range of investigations in progress, e.g. on cleavage stages in the pig, the origin of the notochord, the development of the blood-cells, and a re-analysis of the different types of cells by the aid of staining living blood smears, the study of early human embryos—a well-preserved 7-somite embryo has been carefully investigated—and a number of other lines. Of interest to all biologists is P. N. Johnstone's work on the heart of living chick embryos. In addition to making observations on the morphology of the living embryonic heart he has studied the origin of the first pulsations, and finds they first appear at the 10-somite stage in the primitive ventricle. Starting at a definite spot on the right border of the ventricle, the beating area spreads until the entire ventricle is engaged in rhythmic contractions. It is some time later that the pulsations begin in the primitive sinus venosus, so that at the outset the sinus venosus does not serve as a "pacemaker" for the ventricle. The author further confirmed this by placing a ligature between them which did not alter the rhythm of the ventricle, but later, by the fourth day of development, such a ligature produces heart block, showing that the rôle of

pacemaker or rhythm control has then shifted to the sinus venosus. Mr. Johnstone devised a method for stimulating these small hearts electrically, and found that the earliest period at which the chick's heart can be influenced by electrical stimulation is the middle of the third day: that is, long after the atrium, permanent ventricle and bulbus arteriosus have become functionally active.

THE CLASSIFICATION OF INSECTS.—*Bull. 162, Agri. Research Inst., Pusa (1926)*, is a publication of 101 pages devoted to "Tentative Keys to the Orders and Families of Indian Insects." Its author, Mr. T. Bainbrigge Fletcher, has compiled this synopsis in order to meet a long-standing want for a modern guide to the detailed classification of Indian insects. Present-day tendencies are towards the recognition of an increasing number of orders and families among insects, and it has become progressively difficult for isolated workers, in a country so extensive as India, to keep in touch with recent changes. Mr. Fletcher has, to a large extent, followed the classification of Brues and Melander (whose system is based upon that of Handlirsch), and recognises thirty-two separate orders. In many cases it is still largely a matter of opinion as to what criteria are to be accepted as being of ordinal value. We note that the author has wisely united the Mallophaga and Pediculina (Siphunculata) into the single order Anoplura; but, on the other hand, the Zoraptera and Psocina, which are closely related to each other, are retained as separate orders. The increasing number of families of the larger orders is the outcome of specialisation and intensive study; and, in India alone, there are 86 families in the Coleoptera, 75 in Hymenoptera, and 73 in Lepidoptera. The fact that only a small number of families do not find a place in these keys (since they are unrepresented in India) is a feature commending the Bulletin to workers in other lands besides those in the country for which it is written.

WISCONSIN ALGÆ.—Of great interest to algologists is the publication of the second part of Prof. G. M. Smith's "Phytoplankton of the Inland Lakes of Wisconsin" (*Bull. Univ. Wisconsin, Serial No. 1270*, pp. 227, 1924). This volume deals with the Desmidiaceæ. It quite reaches the high standard set by the earlier publication, and it is a necessary work of reference to all interested in this subject. Four new species and seventeen new varieties are described, most of them belonging to the genus *Staurastrum*. Among a small number of new combinations is the transfer of *Dictyocystis Hitchcockii* (Wolle) Lagerheim to *Cosmocladium*. The work of European authorities, notably West and Borge, has been thoroughly assimilated and collated.

THE SWAMP CYPRESS OF CHINA.—At a meeting of the Royal Irish Academy on March 16, a paper was read by Prof. A. Henry, giving a detailed account with photographs and drawings of the Chinese swamp cypress, known to science as *Glyptostrobus pensilis*. This species has died out in the wild state, and is only known in cultivation in two restricted localities around Canton and Foochow. It has been preserved from extinction by the superstitious beliefs of the peasants, who plant it on the north side of villages to bring luck, and amidst rice-fields to increase the crop. Adapted to wet, marshy situations, it develops peculiar curved "knees," which are woody growths from the roots, projecting above the ground. The function of the knees is to enable the roots to breathe, whenever the soil happens to be inundated. The genus is a very ancient type, and its fossil remains have been found throughout the Tertiary era, widely spread over the northern hemisphere in North America, Europe

and Asia, extending as far north as Spitsbergen, Greenland and Alaska. Its twigs and leaves have been gathered in the Eocene beds at Ardtun in the Isle of Mull, in company with similar remains of two other genera, Ginkgo and Cryptomeria, all three being now represented in China by three living species, which can scarcely be distinguished from those that flourished at the beginning of the Tertiary era. Ginkgo is also unknown at the present time in the wild state, and owes its preservation to the Buddhist priests who plant it around their temples. Prof. A. Henry, who was assisted in the microscopical work and drawings by Mrs Marion McIntyre, gave in addition a comparative account of the American swamp cypress *Taxodium*, which is much better known to science than *Glyptostrobus*. The photographs of the latter, obtained recently from China, are the first to be published of this interesting tree.

COTTON IN TANGANYIKA.—The report of the Department of Agriculture of the Tanganyika Territory for 1924-25 shows, among other developments, a remarkable extension of cotton-growing among the natives. The Department is the only legal source of cotton-seed supply to natives and the chief source to non-native planters. Figures show an increase in seed distribution to natives from 481 tons in 1923 to 1594 tons in 1925. The lint production has increased by 64 per cent. in the last year. Furthermore, it is of interest to note the general superiority, as judged from brokers' reports, of the native-grown cotton over that raised on non-native estates. Extensive experiments are being carried out on the time of sowing in relation to rainfall and on the spacing that gives the best results. Studies of the pink bollworm of cotton, which has apparently been known in Tanganyika since the Germans imported seed in 1898, leads to the probability that it is not indigenous but was introduced from India through Egypt. With the strict control on the movements of seed, it is hoped that this pest may be kept in hand.

SURVEYS IN SOMALILAND.—In the January-February number of the *Bolletino* of the Royal Italian Geographical Society, Messrs. G. Stefanini and N. Puccioni give a long account of the expedition to Italian Somaliland in 1924, undertaken by Mr. Stefanini under the auspices of the Italian Government and the Italian Geographical Society. A map on a scale of 1 to 1,500,000 accompanies the paper and covers the south-western part of the country as far as the Juba river. A number of short papers dealing with the general scientific results of the expedition, in particular anthropology, are appended.

HISTORICAL RUSSIAN DIAMONDS.—The jewels of the "Russian Diamond Treasure" have recently been thoroughly examined by the distinguished mineralogist Dr. A. Fersman, and in a series of papers of historical as well as scientific interest, many of the legends and misconceptions that have crept into the descriptive literature of these stones are corrected (*Bull. de l'Acad. des Sciences de l'U.S.S.R.*, 1922, 1925 and 1926). The "Shah" diamond is a remarkable elongated octahedron of Indian origin, which bears engraved inscriptions of three different dates. Soon after the first engraving in 1591 it passed into the possession of the Great Moguls, and in 1665 it was seen by Tavernier in the palace of Aureng-Zeb. In 1739 it was seized by the Shah Nadir and carried from Delhi to Persia. In 1829 a Russian diplomatic agent was murdered in Teheran, and to conciliate the Tsar the famous gem was presented to Russia. The "Orlov" diamond is the largest of all the old

stones of Golconda, and it is now identified by Fersman as the "Great Mogul," also seen by Tavernier in 1665. The Shah Nadir possessed this beautiful gem for some time after the conquest of Delhi, and with the "Koh-i-noor" it was mounted in the Persian throne. The "Orlov" was stolen and passed through various adventures until 1773, when it was purchased by Prince Orlov and presented to Catherine II. Since then it has held pride of place in the sceptre of the late Tsars. The "Koh-i-noor," which has often been described as the "Great Mogul," lost its historical Hindu form in 1862, when it was re-cut, after having been presented by the East India Company to Queen Victoria in 1850.

**PLATINUM DEPOSITS IN SOUTH AFRICA.**—In the *Trans. Geol. Soc. S. Africa*, vol. 28, 1925, pp. 83-133, Dr. P. A. Wagner describes the platinum occurrences in the norite zone of the Bushveld complex. Taken as a whole, they constitute the world's greatest primary concentration of that metal, the localities of the deposits being scattered along the norite periphery for nearly 400 miles. The distribution indicates that extreme magnetic differentiation was essential for platinum concentration. It is shown that in dunite, unusual basicity of the residual fractions, together with the presence of fluorine, were the most probable conditions essential to the formation of rich deposits. The metal also occurs with magmatic nickel-copper-iron sulphides which are indigenous to the rocks in which they occur. The sheets of sulphidic rocks are invariably floored and roofed by anorthosite, suggesting a preliminary necessity for the separation of calcic felspar, and indicating a type of differentiation dependent not on gravity alone, but more particularly on gas pressure. Here sulphurous gases were presumably responsible both for the peculiar rock differentiation and for the extraction and concentration of the platinum. Where the sulphidic magmas were brought into contact with dolomites or sheared banded ironstones, contact deposits of platinum-bearing sulphides were formed. The paper is a most valuable contribution both to economic geology and to the theoretical aspects (which still remain confused) of ore-genesis and magmatic differentiation. The views of W. H. Goodchild and J. E. Spurr on these topics are here supported by much of the newly recorded evidence.

**THE JAPANESE EARTHQUAKE OF 1923.**—Continuing his investigation of the great Kwantō earthquake, Prof. T. Ogawa now presents evidence in favour of the hypothesis of magmatic injection, and adverse to the alternative tectonic theory (*Jap. Journ. of Geol. and Geog.*, vol. 3, No. 3). Omori determined the mean depth of the hypocentra of shocks in the Kwantō region as 34.5 km., and Ogawa combines this result with Shida's conclusion that the 1923 earthquake began as a deep-seated fracture. The depth of fracture is so great that an injection of magma seems to be implied as the underlying cause, particularly as the depth is also that deduced from other evidence as the upper boundary of the magmatic zone. On plotting the epicentra of all the great shocks of the region since the twelfth century, they are found to coincide with a zone of eruptive rocks. It is suggested that the association of volcanic eruptions with great earthquakes—recognised in South America long ago by Humboldt and Darwin—is a genetic one. The extraordinary 'depressions' and 'upheavals' of Sagami Bay revealed after the 1923 earthquake provided evidence for the tectonic theory, but Ogawa shows that this is not conclusive. He interprets the changes of level as due to the shifting of sediments of mobile consistency by a process of

submarine gliding initiated by the earthquake and intensified by the long waves of the *Tsunami*. The new explanation further accounts for the fact that the alleged crustal movements are limited to the floor of Sagami Bay and do not extend to the surrounding land.

**THE LAW OF FORCE WITHIN THE ATOM.**—In two papers which were communicated to the Vienna Academy of Sciences in 1924 and have now been issued as parts 9 and 10 of volume 133 of the *Sitzungsberichte*, Dr. Hans Pettersson describes his observations of the number and ranges of the H-particles ejected from carbon, aluminium, magnesium, nickel, and copper at angles exceeding  $150^\circ$  from the paths of the  $\alpha$ -particles used in bombarding the atoms. He finds that the numbers are less than would be expected on the current theory, and concludes that some of the bombarding particles are retained by the nucleus. He also shows that the change from repulsion of like charges by each other to attraction at atomic distances, which observations have rendered probable, may be explained by the displacement of the negative charges of the nucleus towards, and of the positive away from, the approaching  $\alpha$ -particle without departing from Coulomb's law. On this theory the surface of zero force has a radius for carbon of 1.34, for aluminium of 1.22, and for gold of 1.09 times the radius of the nucleus.

**THE SULPHUR COMPOUNDS OF KIMMERIDGE SHALE OIL.**—Technical literature contains numerous references to the sulphur content of Kimmeridge shale oil, and numerous unsuccessful attempts have been made to eliminate this undesirable constituent. Most of these trials have proceeded, however, without any knowledge of the form in which the sulphur occurs. It was left to Messrs. F. Challenger, J. Haslam, R. J. Bramhall, and J. Walkden to determine the problem, and the results of their work were presented to the Institution of Petroleum Technologists on February 9 last. So far back as 1885 Victor Meyer established the presence of thiophen and its homologues in coal tar, a factor having direct bearing on the sulphur condition in shale oil; subsequent researches of Mabery on American petroleum, Thierry on Persian crude oil, and Scheibler on shale oil from the Tyrol and south of France, led to the recognition of thiophen derivatives in these oils. In their investigation the authors paid special attention to that portion of the Kimmeridge oil volatile in steam, representing an average of 30 per cent., and successive fractions of the oil were examined independently. The fractions tested were—(i.)  $93^\circ$ , (ii.)  $109^\circ$ - $117^\circ$ , (iii.)  $117^\circ$ - $126^\circ$ , (iv.)  $132^\circ$ - $140^\circ$ , (v.)  $158^\circ$ - $167^\circ$ , (vi.) 105-115/27 mm., (vii.) 115-140/27 mm. From (i.) a small amount of thiophenmercurichloride was obtained on treating part of the fraction with alcohol, mercuric chloride, and sodium acetate. In the case of (ii.) a large amount of 2-methylthiophen was isolated; the presence of 2-ethylthiophen and 2:3-dimethylthiophen (2:3-thioxen) was established for (iv.). Fraction (v.) yielded a complex derivative, not yet definitely identified, approximating to the propyl-, methyl-ethyl-, or trimethylthiophen. From the fraction (vi.) naphthalene and thionaphthen were obtained by use of picric acid and mercuric acetate; the compound thiophthen is also suspected in this portion of the oil. As will be noted, these products are all derivatives of thiophen, but the authors have also succeeded in establishing the presence of tetramethylene sulphide and similar derivatives. These results may lead to the formulation of a successful desulphurisation process.