

## Research Items.

**PREFERENTIAL MARRIAGE IN SOUTH AFRICA.**—In *Africa*, vol. 1, No. 4, Werner Erselen studies the conditions of marriage among the various races of South Africa in order to show that the property-family marriage entails a number of obligations on the interested parties. When marriage depends, as it does here, on a bride price, the desire of a young man for marriage, entailing payment of property which he has not yet had an opportunity to acquire, ceases to be a matter for the individual and brings in the family. The bride-price is provided by the family. This among the Bantu is in the form of cattle, their only wealth. The types of marriage are cross-cousin marriage, when the children of brothers and sisters intermarry, but the marriage of the children of sisters is forbidden; the sororate, when a man marries his deceased wife's sister, but it is the third and not the second sister who may thus be acquired; and marriage by inheritance when a man's wives are appropriated by his heirs—the principal heir being the eldest son, his own mother going to a younger brother of the deceased. These forms of marriage with their variations in detail are the natural result of a system of contract between two families based on the exchange of women for cattle or other property of equivalent value. Among the Xosa, where the levirate does not exist, a widow may either marry a stranger who repays the cattle originally paid with a discount for each child already born, and retained by the husband's family, or she has to stay with her husband's people. In the latter case children born as the result of intercourse with non-related men are looked upon as the legitimate children of her deceased husband.

**THE IRON AGE IN ITALY.**—In *Man* for December, Dr. Randall-MacIver discusses recent theory on the absolute chronology of the Early Iron Age in Italy, basing his argument on views recently put forward by Prof. Sundwall. This author holds (1) that the Villanovans were driven from Central Europe by climate change in the ninth century B.C.; and (2) that no painted pottery of Greek origin could come into Italy except via Cumae, and therefore sites on which it occurs must be later than 750 B.C. Against this view Dr. Randall-MacIver argues that, whatever the date of the climatic crisis, it does not fix the date of the migration, which may have taken place long before the final phase of hardship was attained. Further, other motives for migration may have been operative. As regards the second point, it is entirely disproved by recent excavations. The Greek pottery of Canale belongs to the eighth and ninth century, and is directly connected with the Dipylon schools. The sites, then, on which the pottery are found are therefore earlier, not later, than 750 B.C. Dr. Randall-MacIver's own dating places the First Benacci period at 1000 B.C. or earlier, Ducati brings it down to the ninth or eighth century. Dr. Randall-MacIver here makes two modifications. He accepts the rejection of his dating of 850 B.C. for the Warrior's Tomb at Corneto, though he thinks it cannot be later than the first half of the eighth century, and he now puts some of the Vetulonian tombs so late as 650 B.C.

**ORIGIN OF THE FAUNA OF LAKE BAIKAL.**—Lake Baikal in Siberia has always been considered to have a highly peculiar fauna, with a number of forms not occurring anywhere else. Recent investigations of fresh-water faunas of the northern hemisphere tend, however, to disprove that view, since many groups and species of animals which were regarded as endemic

to Lake Baikal have been found elsewhere. Thus the genus of sponges *Baikalospongia* was found in a lake near the river Yenisei; amongst the Oligochæta, 13 species of the genus *Lamprodrilus* are peculiar to Baikal, but four more are now known in Europe and Siberia; a representative of another Baikal genus, *Telescolex*, has been discovered recently in Lake Okhrida in Macedonia; the genus *Propappus* (fam. Enchytræidæ) was known only from Baikal, but one species has been described from Elba and found afterwards in the Volga and other Russian rivers, as well as in Lake Baikal itself; amongst the Crustacea, the genus *Echinogammarus* is represented in Lake Baikal by 39 species, and there are four more species, namely, one in Lake Okhrida, one in the Faroë Islands, one in Tripolitania, and one in Spain, France, and Germany. The Baikal molluscan genus *Choanophthalmus* is also represented in Lake Okhrida. An endemic Baikal diatom, *Gomphonema quadripunctata*, has been recently found in the Khanka Sea, near Vladivostok. Thus the idea of a very high endemism of the Baikal fauna seems to require a revision; the main endemic elements of the fauna are all of fresh-water origin, while there are no relics of an ancient marine fauna, as has been suggested by some authors. These facts lead L. S. Berg (*Comptes rendus*, Acad. Sci., Leningrad, No. 22; 1928) to conclude that the fauna of Lake Baikal has been derived from an upper tertiary fauna of fresh-water, or brackish-water, basins.

**EMBRYOLOGY OF STYLOPS.**—J. Noskiewicz and G. Poluszyński record (*Bull. Int. Acad. Polonaise Sc.*, Ser. B; 1928) observations on the embryology of the Strepsipteran *Stylops*. The egg is poor in yolk and the cleavage total and equal. During the fourth or fifth cleavage a nucleus is given off from one of the blastomeres into the central yolk mass, which is clearly delimited from the blastomeres and does not divide although its nucleus undergoes two divisions synchronous with those of the blastomeres. After the seventh cleavage the embryo consists of 120 or 124 blastomeres and a quadrinucleate yolk syncytium. About the fifth or sixth cleavage the embryo begins to be two layered and the end result of the cleavage is a morula in which the yolk sphere is peripheral. This stage is transient, for the cells soon assume a radial arrangement in a single layer with a peripheral yolk mass and a central cavity filled with a granular material secreted by the cells. The cells which lie under the yolk invaginate and thus a double-layered cup results. In the cavity of the cup is the yolk mass, the inner layer is the germ layer and the outer is the envelope, apparently equivalent to amnion + serosa of other insects. The germinal disc begins to elongate and the embryo becomes rolled at both ends, and stomodæum and proctodæum are formed. Cells proliferated from the end of the stomodæum gradually surround the yolk and form the mid-gut, which at a later stage has a tubular connexion with the fore-gut, but the proctodæum remains blind. The genital cells are differentiated moderately late as an unpaired mass of cells near the proctodæum.

**FEEDING OF AUTOLYTUS.**—Yo K. Okado (*Quart. Jour. Micr. Sci.*, Oct. 1928) describes the method of feeding of *Autolytus edwardsi*, as observed at Plymouth. This polychaet attacks the tentacles and upper portions of the hydranths of *Obelia*, cutting them off with the toothed tip of the chitinous tube of the protruded pharynx. The pumping action of the proventriculus, which has a valve at each end, causes the food to be

sucked through the pharynx and driven through the ventriculus (reduced in *Autolytus*) into the intestine. The pulsations of the proventriculus are about 120 per minute. The muscular elements of the proventriculus are strong columns, which extend radially from the lining epithelium, and slender semi-annular bands. Each radial column represents a single cell the major part of which consists of undifferentiated protoplasm (with one nucleus), on the periphery of which are the fibrils. In each fibril are four contractile zones, three internodes, and two insertion parts. The contractile zones only stain with hæmatoxylin, and may be compared with the anisotropic bands of the striated muscle of arthropods.

**INDIAN HYDRACARINA.**—A number of fresh-water mites have already been recorded from Ceylon and parts of India. Dr. C. Walter ("Zur Kenntnis der Mikrofauna von British Indien. II. Hydracarina," *Records of the Indian Museum*, vol. 30, pt. 1, 1928) describes a number of new species inhabiting marshy regions from a collection made by Dr. P. A. Chappuis for the most part from the Punjab and neighbourhood. All but one of these belong to known genera, the new genus *Testudacarus* being founded for one species based on one female only. Nearly half of the species recorded, however, are new. One of these, *Alurus scutelliformis*, has the hind legs armed with peculiar blade-like spines somewhat resembling the chela in certain annelids. Only one male and one nymph of this species were found. The paper is well illustrated by line drawings and there is a valuable list in tabular form showing the distribution of all the Hydracarina known from the Indo-Australian region, with a good survey of literature on the subject.

**DEVELOPMENT OF LEPTOSYNAPTA INHERENS.**—S. Runnström, in *Bergens Museums Årbok*, Heft 1, 1927, has an important paper dealing with the development of *Leptosynapta inherens*. The biology is discussed. During the reproductive period the germ cells were shed between 3 and 6 P.M. daily for about a month. There were indications of periodicity in the reproductive activity. An account is given of cleavage, and a detailed study is made of the development of the mesoderm, nervous system, mesenchyme, and spicules. A barrel-shaped larva is produced. Comparison is made between this development and that of other Holothurians and consideration is given to the symmetry of the class and to the modifications of the *Synaptidæ*.

**GENETICS OF THE DUTCH RABBIT.**—Since 1920 an extended controversy has been taking place between Prof. Punnett and Prof. Castle regarding the genetics of the 'Dutch' rabbit. Prof. Punnett now returns to the charge armed with further breeding data (*Jour. of Genetics*, vol. 20, No. 2). These rabbits show a range of colour-marking from almost pure white to entirely black. Punnett interprets the condition as due to a major factor *P* producing the higher grades of pigmentation (and incidentally preventing *heterochromidia iridis*) and two minor factors *S* and *T* which are cumulative in effect, showing more pigmentation in the homozygous than the heterozygous condition. The typical Dutch pattern would be represented by *ppSSTT*. Another minor factor *N* occurs in most self-coloured breeds. Thus the whole colour series is explained by one major factor and three modifying factors. In place of *P*, Prof. Castle postulates three multiple allelomorphs, *Du* for self-colour, *du<sub>s</sub>* for Dark Dutch and *du<sub>w</sub>* for White Dutch, with certain modifying factors in addition. Castle also believes he has found linkage between Dutch pattern and long Angora hair, which Punnett believes is unproved.

The English pattern has been shown by Castle to be closely linked with the Dutch; English × Dutch giving 3:1 ratios in *F<sub>2</sub>* except for rare cross-overs. The English rabbit has a factor for self-colour plus an inhibitory factor *I*, hence *IIPP* with certain minor factors. By matings with White Dutch, conclusions are drawn by Punnett which support his interpretations. The special value of this work lies in the analysis of what appears phenotypically as a more or less continuous series of colour patterns.

**POST-EOCENE MOLLUSCA OF NORTH-WESTERN INDIA.**—Nearly three years ago we directed attention (*NATURE*, Feb. 13, 1926, p. 246) to the publication of the first part of "Descriptions of Mollusca from the Post-Eocene Tertiary Formations of North-western India," by the late Dr. E. Vredenburg. Now, after inevitable delays, the second part has appeared under the editorship of Mr. H. M. Lahiri (*Mem. Geol. Surv. India*, vol. 50, pt. 2). It deals with the remainder of the Gastropoda and the whole of the Pelecypoda from the stratigraphical divisions distinguished by Blanford as the Nari, Gaj, and Mekran. Close on two hundred species, many being new, are carefully described, some in great detail, and figured from the author's photographs on 22 plates executed by the Survey in most admirable manner. There is a good index to the whole volume at the end.

**SOUTHERN RHODESIAN MINES.**—The Geological Survey of Southern Rhodesia has published in its *Bulletin* No. 13 a number of miscellaneous reports by Mr. F. E. Keep, State mining geologist. There are nine of these reports, five of them, namely, those on the Glen Hume and Glen Brook Gold Blocks, the Cactus mine, both in Gwelo district, the Lone Tree mine in Salisbury district, the Belvedere mine in the Belingwe district, the claims of the Parthenon Syndicate in the Hartley district being essentially gold mines; whilst there are also reports on the Belingwe antimony claims, upon the Copper Duke and Golden Duke mines in the Hartley district, upon Devitt's asbestos claims in the Selukwe district, and upon the Neardy mine in the Makoni district, which appears to carry copper and good lead ores. Apparently none of these mines is yet in a highly developed condition, and the reports, though extremely valuable for those locally interested in mining, cannot be said to be of any notable general importance.

**SUPPORT OF UNDERGROUND WORKINGS.**—The Safety in Mines Research Board has just issued Paper No. 45 dealing with the support of underground workings in certain of the more southern coalfields of England, including North and South Staffordshire, Cannock Chase, Shropshire, Leicestershire and South Derbyshire, Warwickshire, Forest of Dean, Bristol and Somerset, and Kent. The report gives a quantity of useful information, particularly in respect of the use of steel supports, the value of which is slowly beginning to be appreciated. A useful feature is a glossary of the mining terms employed; these differ so much in different parts of England that their inclusion is a distinct advantage, more particularly for those whose experience has lain in the other coalfields of Britain. There is a very useful summary of recommendations, some of which are deserving of the widest possible application, because a recommendation such as that "it is a good practice to keep in each district of the mine at least one day's supply of all lengths of timber in use," is a recommendation that might well be extended to all the coalfields of Great Britain, and the same may be said of many of the other recommendations; it is interesting to find that the authors of the report strongly recommend self-adjusting steel props both

for economy and safety, and also state that "when once steel arches are tried their use is generally extended." There is no doubt that the Committee of the Safety in Mines Research Board, which is studying the question of the support of underground workings, is one of the most useful that the Board has yet set up.

**MADAGASCAR AND ITS OIL LANDS.**—The mention of oil possibilities of certain countries conjures up all kinds of technical controversy, and it must be said that Madagascar, despite the Indo-Asiatic affinity attributed to it by Dr. A. Wade recently, prompts many conflicting impressions. If we admit that "geologically the island is an extension of the fundamental gneissic platform of Africa," which scarcely anyone would be prepared to gainsay, it is a little difficult to reconcile "every other point of view" with this Indo-Asiatic perspective drawn by that author during the course of his paper read before the Institution of Petroleum Technologists on Dec. 11 last. Most of the previous work on Madagascar has emanated from French writers, and it is certainly useful to have a modern English version by one who has spent considerable time in studying the geology of that island. But we feel that a more appropriate title for the paper would have been "The Geology of Madagascar," for the author scarcely makes out an encouraging case for its oil possibilities; he is, in fact, indicatively cautious in this connexion, his concluding remark being: "None can say that the island is devoid of possibilities in this direction." In so far as oil is concerned, seepages and tar sands occur at Triassic horizons; these overlie Permian beds with characteristic *Glossopteris* flora, in turn resting on the archæan platform. The whole sequence, in fact, is strongly reminiscent of south and south-east African stratigraphy, equally of parts of Asia, but scarcely of the oil-bearing regions of that continent. Most of the trials for oil seem to have been unsuccessful; prompted by the Pechelbronn operations, French engineers even had the idea of 'mining' some of the oil sands, but, unfortunately, there existed practically no pressure which would cause flowage, as the rocks were near the surface. Our impression is that Madagascar provides excellent territory for geological study, but that commercial possibilities of oil are somewhat remote.

**CANADIAN FUELS.**—The Mines Branch of the Canada Department of Mines has recently issued its report of "Investigation of Fuels and Fuel Testing for the year 1926" (Ottawa: F. A. Acland). The report indicates activities designed to promote the more efficient utilisation of fuels, accumulation of analytical data as to present and potential fuel resources, and actual experimental work to discover methods of exploiting fuels in the future. There is a draft of instruction for the proper burning of various fuels currently used in the domestic furnace, which requires a technique more exacting than the open grate. The analytical work has merely a local interest, but the study of the distillation of oil shales and the treatment of the Alberta bitumen sands has a wider interest. The crude bitumen extracted from the sand was in the form of a stubborn emulsion which was successfully resolved. It was shown that this bitumen formed promising stock for cracking by the Dubbs and Cross processes for the preparation of gasoline. This information is interesting, although the present low prices of crude mineral oil is a bar to development of such processes.

**THE CORONA VOLTMETER.**—It is well known that the maximum value of the potential difference between

two spherical electrodes at the instant of the disruptive discharge can be computed with an accuracy of about one per cent, provided that the potentials of the spheres at the instant of the discharge are equal and opposite. This is one of the standard methods used by electrical engineers for measuring very high voltages. A more accurate method is by means of the corona voltmeter, the principle of which was first employed by Prof. J. B. Whitehead, of Johns Hopkins University. If two perfectly clean concentric metallic cylinders have a voltage applied between them, and if this voltage be gradually increased, then at a definite value the inner cylinder begins to emit light at its surface, ionisation can be detected and a characteristic sound can be heard. The beginning of breakdown can be detected by noticing any of these phenomena. A very thorough experimental study of the corona voltmeter by H. B. Brooks and F. M. Defandorf is published in the October number of the *Journal of the Bureau of Standards*. They find that except in noisy surroundings the aural detection method can be advantageously employed. Although a motor generator set was running in their laboratory, yet by using aeroplane headset telephones with a resistance coupled amplifier, they had no difficulty in making accurate measurements. Spark-over in a corona voltmeter must not be permitted. With aural detection the noise made is deafening, and the spark is injurious to the inner cylinder. The experiments show that when air at atmospheric pressure is used between the cylinders, then the ratio of their radii should not be less than twenty. For commercial work the corona voltmeter as at present constituted seems to be too complicated. Its accuracy, however, being in the neighbourhood of 5 in 10,000, leaves little to be desired.

**FREQUENCY CONTROL BY QUARTZ OSCILLATORS.**—In the United States, where there are very many broadcasting stations, great care has to be exercised in controlling the frequencies of the radio or carrier waves which they emit so as to avoid interference between them. When interference takes place, a high-pitched whistle which may spoil the programme is heard by the listeners. The Federal Radio Commission arranges so that the frequencies between any two stations always differ by more than 10,000 cycles. The difference frequency nominally, therefore, is not less than 10,000 cycles per second, and this 'beat' note is unobjectionable even if it could be heard. Few radio receivers could amplify, and fewer loud speakers could reproduce this note. In practice, however, it is very difficult to control the regulation sufficiently accurately to avoid beat notes. In the *Bell Laboratories Record* for September, a description is given of the principle of a device used by the Western Electric Co. to regulate the frequencies of the radio waves by means of quartz oscillators. The frequency of these oscillators depends on their thickness and their temperature. The variation of the period of vibration with temperature can be either positive or negative, depending on the cut of the crystal, and varies in amount from about 30 to 80 cycles per million per degree centigrade change in temperature. The crystal is ground until the desired frequency is approximately correct. The final adjustment is done by controlling the temperature at which the crystal operates. In practice the temperature of the crystal is maintained constant whatever the temperature of the room. The crystal is enclosed in a heat insulated box and the temperature of the interior is controlled by thermostatic means, the heating circuit being opened and closed by a vacuum relay. The frequency of a radio transmitter controlled thermally in this way is stated to be constant within a few parts in a million.