

Research Items.

ANTHROPOMETRY OF THE ABORIGINES OF SOUTH AUSTRALIA.—Dr. T. D. Campbell and Dr. Aubrey J. Lewis have published in the *Transactions of the Royal Society of South Australia* for 1926 observations on 28 aborigines (11 males and 17 females) from the camp at Ooldea on the edge of the Nullarbor Plain. Most of them belong to the Alinjera group, a few to the Wiloorara group. Individual measurements are given, the mean values working out as follows: Stature, 1593.4; cranial length, 187; cranial breadth, 135; nose height, 43.2; nose breadth, 44.8. The means of the indices are: Cephalic, 72.2; facial, 81.7; nasal, 104.6; ear, 53.1; radio-humeral, 81.5. The figures are compared throughout with those collected by Prof. Wood-Jones and Dr. Campbell on varying numbers of individuals, in one case—stature—more than three hundred, and are found to approximate to them fairly closely. They go to confirm the assertion that the aborigine of Central Australia belongs to a pure stock with well-defined and constant physical characters. He is dolichocephalic, platyrhinc, and dolichokerkid, the breadth of his ear is about half its length, while as to his jaw, the mean index is fairly constant though there is considerable individual variation.

EARLY RECORDS OF CALIFORNIAN INDIANS.—Although Bancroft, for the purpose of his "History of California," drew freely on most of the available sources, a re-examination of these, mostly diaries of Spanish priests who accompanied punitive or exploratory expeditions—records not generally available—has shown that they contain much supplementary material of archaeological or ethnological value. Mr. E. W. Gifford and Mr. W. E. Schenk, who have already published material relating to the southern San Joaquin Valley in the *University of California Publications in American Archaeology and Ethnology*, have now issued the data relating to the California Delta region in vol. 23, No. 2 of the same series. The records of the expeditions in question extend from the year 1772 to 1849. They throw an interesting light on the sources of food supply, comment being made on several occasions on the vast quantity of game. At Carquinez great mounds of fresh-water mussel shells were observed in the vicinity of a native village; but probably two different stages of culture were represented. Of the general conclusions which can be drawn, the most interesting is that based on evidence pointing to the infiltration of European influence. In 1819 the capture of forty-nine horses belonging to the Muquelemes near the Calaveras-San Joaquin confluence is significant, and the object of many of these expeditions was to recover escaped converts. The possible mixtures and modifications of physical types which resulted imposes great caution in the interpretation of skeletal evidence from certain groups or regions. Radical differences in cultures are difficult to note. Conclusions as to the numbers of the population require a large margin of error. In 1806 there may have been anything from 3,000 to 15,000 inhabitants. In 1870 the Indian population in this area had fallen to 5.

THE MANDSHURIAN TIGER.—The area inhabited by the tiger in the Far East is widely separated from the main area comprising India and southern China. The Mandshurian tiger, according to recent researches by Baikov, recorded in *Priroda*, Nos. 5-6, 1926, should be regarded as a species distinct from the southern tiger and more closely related to the fossil cave tiger of Europe. It differs even in its habits from the

southern species, which lives in the jungle, for the Mandshurian tiger lives in *taiga*, i.e. in the dense forests peculiar to eastern Siberia, and it definitely dislikes heat, going up to the mountains in summer, while in winter it is perfectly comfortable even during the hardest frosts. The principal prey of the Mandshurian tiger is wild pig, but it is doing a great deal of damage to cattle, while it also often attacks men even in the day-time.

AGRICULTURAL MAP OF RUSSIA.—The Russian Institute of Applied Botany, in Leningrad, has just published a very interesting agricultural map of the country compiled by Prof. I. F. Makarov. The map itself is reproduced on a fairly large scale in colours, and shows, by the 'dot' method, the relative distribution and density of crops in the country, a single dot representing 1000 hectares of crops. This method makes the map exceedingly instructive, as even a superficial glance is sufficient to show the very irregular and peculiar distribution of cultivated land in Russian territory. Very concentrated dots indicate the highly cultivated areas of the Ukraine, of the northern Caucasus, and of the Volga region, while smaller in size but nearly as dense accumulations of dots indicate the numerous oases in the vast deserts of central Asia, which are otherwise quite devoid of dots. Of particular interest to every naturalist is the northern limit of agriculture, which is also shown on the map. The line drawn on the map shows the northernmost limits of actual cultivation of cereals during the last century; it does not coincide, however, with the northern limit of possible agriculture, or with the limit of a stable agriculture forming an economic basis of the population; it lies between these two lines. The course of the line on the map begins in European Russia at lat. 62° and runs eastwards more or less parallel to the White and the Polar Seas, but near the Ural Mountains it suddenly drops to lat. 60°. Having crossed the Urals the line runs across Siberia, now ascending, now descending again. An interesting point is shown in eastern Siberia, where the line forms an enormous loop embracing the lowlands of Yakutsk with the river Lena and its tributaries. The northernmost point in Siberia touched by the line is lat. 65° N., this being in the Yakutsk province; but in the Amur region, between the same meridian, the line comes down only to lat. 43° N., and reaches the Japanese Sea at lat. 45° N. Isolated outposts of agriculture occur in Siberia far beyond the line, and even well beyond the Arctic circle. Apart from the general map, this publication contains a number of regional maps, showing the distribution of crops in various parts of Russia in detail, as well as explanatory text giving much statistical information.

AN APPARATUS FOR CATCHING THE MICRO-FAUNA OF THE SEA-BOTTOM.—A new apparatus for this purpose is described by Dr. Th. Mortensen (*Saertryk af Vidensk. Medd. fra Dansk naturh. Foren.* Bd. 80, pp. 445-451). Recent investigations have indicated both the magnitude and importance of the micro-fauna of the bottom deposits in the sea, but it has always been difficult to obtain adequate samples of this, since it is very laborious to sift out microscopic animals from the mass of material brought up in the dredge or trawl, while the Petersen grab, though more satisfactory, gives but a small sample. Dr. Mortensen's apparatus, designed to remedy this, consists of a fine silk net attached to a rectangular iron frame, the whole being prevented from sinking into the bottom deposits by a pair of thin zinc plates which

are attached to the iron frame in front and to one another behind and at either side. They are bent upwards at the anterior end like the runner of a sledge and are almost as long as the net which lies between them. In use the net skims along the surface of the mud and collects an abundant sample of the micro-fauna from the surface layers. When used on a sandy bottom, an iron bar is attached a little distance in front of the mouth of the net so as to stir up the light organisms, which remain floating long enough to be caught in the pursuing net. Excellent results have been obtained in depths up to 94 metres with this net, abundant catches of nematodes, planarians, small annelids, ostracods, copepods, and many small molluscs having been secured.

CHROMOSOME MEASUREMENTS.—The accurate measurement of chromosomes is a difficult field in which little has yet been done. An extensive and laborious series of such comparative measurements has recently been made by Neta Ferguson (*Phil. Trans. Roy. Soc.*, vol. 215 B, pp. 225-253) on the Aloinæ, a group of Liliaceous genera comprising Aloe, Gasteria, Apicra, and Haworthia. More than fifty species were compared as regards the chromosome content of their nuclei. In all these genera there are four long chromosomes and three short ones, but seven species and varieties were found to be tetraploid, having eight long and six short chromosomes. Tables of measurements and graphs of variation in chromosome length are followed by measurements of width in different stages of mitosis, and, finally, the average volume of the chromatin in the corresponding nuclei from nine different species is computed. In the genus *Haworthia* this volume is $40.4 \mu^3$ in *H. Cooperi*, $107.7 \mu^3$ in *H. radula*, and $208.6 \mu^3$ in the tetraploid *H. tessellata parva*. It is concluded that the last has arisen through a duplication of the complete chromosome set of the nucleus. Differences in the mean length of the long chromosomes from species to species are also found, which may be significant.

THE JAPANESE EARTHQUAKE OF SEPT. 1, 1923.—Broadly speaking, the origin of this great earthquake covers the whole of the land and sea-basin, which have undergone conspicuous topographical changes (*NATURE*, vol. 115, 1925, pp. 65-66), and especially the seismic focal zone that crosses the central part of Sagami Bay from north-west to south-east. From an analysis of the seismograms obtained at Tokyo and other stations (*Proc. Imp. Acad. Tokyo*, vol. 2, 1926, pp. 401-404), Prof. A. Imamura suggests that the great earthquake consisted of a group of earthquakes which originated successively at brief intervals in different parts of the focal zone. He distinguishes in particular three earthquakes, though there may have been others in the south-eastern portion of the zone—the first, not a violent earthquake, with its epicentre below the sea and about midway between Misaki and Manazura; the second, three seconds later, a very great earthquake, with its epicentre on land about 30 miles north-north-west of the other; and the third, a very sharp earthquake, about $4\frac{1}{2}$ seconds later still, with its epicentre near the coast and due north of the first epicentre.

MIOCENE MOLLUSCA FROM FLORIDA.—Julia Gardiner has studied and discusses "The Molluscan Fauna of the Alum Bluff group of Florida" (U.S. Geol. Survey: *Professional Paper* 142, A-D). The Alum Bluff deposits comprise three distinct faunas, which characterise three formations known in descending order as the Shoal River, the Oak Grove Sand and the chipola. The whole series is overlain

by the Choctawhatchee Marl, and is referable to the Miocene age. The author briefly sketches the history of the Alum Bluff group and gives a map of the places of its occurrence, with tables of the distribution of the fauna and local distribution of the species. The systematic descriptions (occupying some 147 pages) follow, arranged according to Dr. Dall's classification, and include many new species, while the 27 plates of fossils are a delight to look at. Each of the four parts into which, for some occult reason, the paper is divided, is furnished with an index. One index to the whole would have been much more useful and satisfactory.

OIL SURVEYS IN NORTHERN ALASKA.—A recent bulletin of the United States Geological Survey (No. 783-E) by Messrs. P. S. Smith, J. B. Mertie, and W. T. Foran, is in the nature of a progress report of the extensive surveys being undertaken in this territory, more particularly the Naval Reserve of 35,000 square miles set aside by President Harding in 1923; the main object of this work is the location of possible oil deposits and, if successful, their development under Government administration. Oil has been definitely proved in the Reserve in the vicinity of Cape Simpson, where two distinct seepages occur, but under what conditions it originated and in what quantity it is available, are points as yet undetermined. The general interest of the report is that part of it which touches on the special problems of development which must necessarily arise when exploiting an oilfield near to or within the Arctic Circle. For example, climatic conditions make it impossible for ships to gain access to the Reserve by sea except in the period between August 1 and early September—“even during this short period they run the hazard of being caught in the ice and lost.” Clearly any quantity of petroleum won from this region could not be moved by ocean-going vessels, especially as there is no harbour as yet suitable to ships of the tanker class. Alternatively, pipe-line transport from the Reserve to an ice-free harbour would probably have to be more than 1000 miles long. “Through half this distance even trails, on which all supplies and materials would have to be hauled, are lacking, and for a third of the distance there is not even timber enough to build shelters for the workmen.” Similar circumstances apply to railway construction, the cost of which would be prodigious. A further serious factor in the present case is that if the oil in transit is to be used for purposes of national defence, the line of supply would have to be safeguarded; in fact, the whole region would demand protection in view of its remoteness from Government centres. Thus a very large oilfield and a commensurate production would be necessary before the cost of practical solutions to these problems could be economically justified. Save for the strategic factor, much the same reasoning applies to the development of oilfields in north-west Canada, concerning which we hear much from time to time.

ANTARCTIC METEOROLOGY.—The *Boletín Mensual* of the Argentine Meteorological Office, of which the issue for 1923 has now been published, contains a résumé of the observations taken at 8, 14 and 20 hours at 74 meteorological stations in the Republic, including two stations outside the Republic at South Georgia and the South Orkneys. These observatories are the only permanent ones existing in antarctic and subantarctic regions, and so have particular value. In spite of their low latitude, $60^{\circ} 44'$ south, the South Orkneys had only three months with a mean temperature above freezing point, and the highest mean, in February, was only 1.2° C. In midwinter the mean fell to more than 10° below freezing point. In South

Georgia conditions were more temperate, eight months having means above freezing point, and in the warmest month the mean rose to 6.1°C . Precipitation at the South Orkneys showed the low level for the year of 481 mm.; at South Georgia it was 1257 mm. These figures, which represent fairly well the average conditions, are of interest in relation to the heavy glaciation of both island groups.

VISCOSITY OF METALS.—Parts 1 and 2 of vol. 134 of the mathematical and physical division of the *Sitzungsberichte* of the Academy of Sciences of Vienna contains a paper by Dr. F. Hettwer, of the Physics Institute of the University, on the viscosity of metals. The specimens were cylinders 0.8 cm. diameter, 10-14 cm. long, with their axes vertical. The upper end was clamped in a fixed support, the lower in a support to which a given torsional couple about a vertical axis could be applied by means of weights. The temperature was kept constant by water circulation. The twist of the cylinder produced was measured by means of a circular scale, and its small changes by means of a mirror and scale. When first the torsional couple is applied, elastic fatigue affects the twist for some time, and the observations taken during the daytime for 10-14 days afterwards are used. The values of the viscosity obtained are: for lead 4.7, tin 24, aluminium 75, and zinc 330 multiplied by 10^{14} . For alloys the laws of viscous flow appear to be more complicated than in the case of pure metals, and the viscosity higher.

THE ELECTRICAL CONDUCTIVITY OF THE ATMOSPHERE.—The issue of the *Physikalische Zeitschrift* for Dec. 1 contains an account of the observations made on this subject during the past three years by Dr. Rose Stoppel, with the assistance of the *Notgemeinschaft der deutschen Wissenschaft*. The conductivity was determined by the leak from an insulated wire 150 cm. long, 0.2 cm. in diameter, which was charged every half-hour by contact for an instant with one pole of a battery of 200 volts, the other pole of which was earthed. The decrease of potential of the wire was recorded every two minutes by a Benndorf electrometer. The observations were made in a cellar in Hamburg and in a dark room in Akreyri in the north of Iceland. At each place of observation the conductivity has a daily period with a maximum between 4 and 6 in the morning local time, un-influenced by the period of midnight sun, but much reduced at times of aurora. The variations of conductivity are not to be accounted for by changes of sunlight, of temperature, pressure, or degree of saturation of the air, and are probably due to cosmical radiation undetected up to the present time.

METHODS OF TESTING ELECTRIC LAMPS.—The very large number of incandescent electric lamps which have to be tested to stringent specifications each year by the Bureau of Standards for the American Government departments have made it necessary to invent new methods and auxiliary apparatus so as to speed up the tests and reduce the cost. An initial photometric test of the lamp in lumens per watt is first made. Fortunately the changes in life output and efficiency for changes in voltage are sufficiently consistent for lamps of a given type to permit of computation of the required voltage at which the lamp is to be run for a life test. This voltage is considerably higher than the manufacturer's nominal service rating, and hence, as the life is much shorter, a great saving in time and money is effected. All lamps are rated and tested on the basis of total light output in lumens and efficiency in lumens per watt. As the factors for deducing the mean spherical candle-power of vacuum tungsten lamps from the

mean horizontal candle power are known, they are actually measured on a horizontal photometer bar. Other lamps are measured on an integrating sphere 30 inches in diameter, the test lamp occupying a fixed position within the sphere. Very large lamps are measured in an 88-inch sphere. These three photometers have special auxiliary devices by which the necessary computations are made in a semi-automatic manner at the time the observations are taken. Detailed descriptions of these devices are given in a paper, "Recent Developments in Lamp Life-Testing Equipment and Methods," published by the U.S. Bureau of Standards (No. 325). One great advantage of the methods described is that the scales employed may be easily and quickly read without eye-strain.

MAGNETISATION IN ALLOYS.—The Bell Telephone System in the United States maintains a very large research organisation called the Bell Telephone Laboratories Inc. In these laboratories G. W. Elmen discovered permalloy, an iron-nickel alloy with a permeability enormously greater than that of iron in low magnetic fields. This alloy is of the greatest importance in submarine telegraphy. In the *Bell Laboratories Record* for December, L. W. McKeehan writes an interesting popular paper giving what he calls a physical background to the properties of permalloy. In the new alloy, X-ray analysis shows that there is apparently nothing peculiar about the crystals. It exhibits a uniform solid solution of iron and nickel. A great deal of study has been devoted recently to magnetic measurements of elastically deformed specimens. It appears that permalloy acts in an entirely natural manner. It is known that magnetisation of iron, nickel, and cobalt is accompanied by changes in the interatomic forces. This is shown by the minute changes in overall dimensions. If these changes take place suddenly, energy ought to be expended, and this the author identifies with magnetic hysteresis losses. Magnetic hysteresis losses are abnormally low in permalloy. When its components iron and nickel are separately magnetised, the iron expands and the nickel contracts in the direction of the magnetic axis. It is probable, therefore, that somewhere in the region of iron and nickel alloys there will be neither expansion nor contraction on magnetisation. Two Japanese experimenters have reported that the critical composition where this phenomenon occurs makes the magnetic behaviour of permalloy most strikingly abnormal. The atoms of the iron and the nickel act together in groups and there are no sudden changes in their position. Hence hysteresis loss does not take place. This theory ought to be helpful in discovering other magnetic alloys of great theoretical interest and commercial importance.

ARTIFICIAL SILK.—The *Journal of the Royal Society of Arts* for Dec. 10, 1926, contains a paper on artificial silk, read before the Society on Nov. 17, by T. Brough, chief designer of Messrs. Courtalds, Ltd. Artificial silk possesses certain features which make it distinct from the natural substance, and for this reason its name is rather misleading, but the resemblance between the two fibres is seen from the description of the processes by which they are produced. Of the four processes now in use for the production of artificial silk, the viscose is the most important, about seventy-six per cent. of the world's supply being manufactured by this method. By judicious use of artificial silk, either alone, or with the assistance of other fibres such as cotton, worsted, or natural silk, a large variety of beautiful textures can be woven, and illustrations of examples of these fabrics are reproduced.