

Research Items

Origins of the Russian Population

In discussing the evidence for a pre-Aryan element in the population of southern Russia, Dr. A. Bachmakoff compares conditions in prehistoric France, where, notwithstanding the evidence of Cæsar, there is reason to believe that the Veneti were a pre-Aryan people, possibly related to the Picts, while in the south the Ligurians and Basques represent two branches of a race which may have extended from the Pyrenees to the Atlas (*Z. Rassenkunde*, 4, 2). In south Russia there is evidence for the existence of a similar pre-Aryan or Japhetic element, upon which the Aryans impinged about 1500 B.C. North of lat. 50° were impenetrable forests inhabited by Finns, but south of this line in the steppe country was a special kind of pre-Aryan population, which appears to be related to that of the Circassians (Kimmerians) of the Caucasus. The Aryans first impinging upon this population were Scythians or Iranians. The Slavs did not move before the Christian era, although it is possible that there were Slavs around Kiev, who were known to the Greeks in 450 B.C. These Proto-Slavs, however, remained quiescent for a thousand years. The effect of this Japhetic element on the Aryans can be estimated at two epochs—first on the Scythians in antiquity, and secondly on the Slavs in the Middle Ages. The first question to be decided is that of the Kimmerians. It would appear that they were a branch of the Circassians, who settled on the banks of the Kouban. They seem to be persistent in Anatolia from the time of the Hittites. The evidence for the existence of this race as a principal element in the substratum of the Russian population is mainly linguistic. The name "Tcherkesses" is found in Kiev. Little Russian names end in *-ko* instead of *-off*. The suffix *oukh*, which appears in Russia, is of frequent occurrence in various forms in names in Asia Minor in antiquity, and there is also evidence for it in Elamite, Mitanni and Proto-Hittite.

Rock-Drawings and Paintings of the High Plains, U.S.A.

In the course of seven seasons' work, the Archaeological Survey of the South-Western High Plains area instituted by the Anthropological Department of the University of Colorado, on the initiative of Prof. E. B. Renaud, recorded a large number of rock-paintings and drawings in Wyoming, South Dakota, Colorado, Arizona and New Mexico, particulars of which have been given from time to time in the reports of the Survey. In the recently issued eighth annual report, Prof. Renaud has brought together and collated the evidence given in these reports, now mostly out of print, and has prefaced the summary description of sites and recorded examples with a general appreciation and discussion of this regional manifestation of aboriginal art, which is not without interest for European archaeologists, more especially as it approximates in its conventionalization of representations of the human form to certain phases of the art of the Stone Age in Europe. No very high antiquity is to be assigned to this High Plains art. The cave paintings of the Cimarron Valley, in which representations of the human form with characteristically square shoulders

are outlined in red paint, have been assigned tentatively by Dr. A. V. Kidder to the Basket Maker culture, with a possible antiquity of some three thousand years; but as was shown quite conclusively by an inspection made when the Survey was at work in New Mexico in 1929, this group stands outside the field of High Plains art. Subject, style and technique in High Plains art corroborate the chronological evidence afforded by the superposition of paintings and drawings one upon another on the rocks and stones upon which they are found, while the representation of the horse indicates that all but the oldest class cannot be prior in date to 1680-90. As regards the significance of these paintings and drawings of human and animal forms and conventional signs, some are obviously phallic, while others equally clearly show relation to the symbolism of religious belief. The remainder appear to record tribal or personal events, or the occurrence of game and water-holes nearby.

Study of Airmen's Reactions

An apparatus for listening to the beating of an airman's heart and recording it to the ground, where it can be reproduced on a sound film, has recently been devised by the Medical Aviation Department of the Soviet Civil Air Fleet. The apparatus will enable the physician to study the condition of an airman without having to accompany him in his flight, and also to ascertain the effect of different altitudes on the human heart. The apparatus resembles a small laryngophone or osteophone, and is fixed to the airman's chest above his heart. It is connected with a radio transmitter in the cockpit, which transmits the impulses to a special receiver installed in the ground laboratory, where it is recorded on a ribbon for reproduction on a sound film.

Food of Passenger Pigeon

ALTHOUGH the passenger pigeon has been extinct for many years, the stomachs, with food-contents, of eleven individuals have recently been discovered in the collections of the U.S. Biological Survey (according to a report circulated by Science Service, Washington, D.C., Oct. 21). The food materials were examined by Phœbe Knappen, who records that nine tenths of the items were of vegetable origin, the remaining tenth of animal origin. Acorns formed the greatest part of the food, next came oak-galls, followed by fruits of the pokeberry, a common weed, and grains of wheat. It is suggested that the predominance of acorns and oak-galls points to the disappearance of the primeval forests of North America at the hands of the woodman, as sharing with the activities of hunters, in the extermination of this once abundant bird.

Bee-Keeping in India

ATTENTION may be directed to the appearance this year of a third edition of the bulletin on bee-keeping by Mr. C. C. Ghosh, published by the Imperial Council of Agricultural Research, India (Mis. Bull. No. 6. Delhi: Manager of Publications, 3s. 3d.). This brochure has helped to stimulate bee-keeping in India besides being used in several other

countries. In the present edition not much change has been deemed necessary beyond the incorporation of some new facts about enemies and the hives of the Indian bee, together with the addition of some fresh illustrations. It may be added that while the native Indian bee is easily kept, its yield of honey is much smaller than that of the hive bee in Europe.

Japanese Brachyura

Two papers on crabs from Japan have appeared (*Sci. Rep. Tokyo Bunrika Daigaku*, Section B, 2, Nos. 37 and 39; 1936). The first, by T. Sakai, "Report on the Brachyura collected by Mr. F. Hiro at Palao Islands", describes a large number of species, chiefly inhabitants of coral reefs, mainly from Kororu Island and Iwayama Bay, but some forms usually inhabiting the muddy or sandy shores are also included. There are 36 species belonging to 24 genera, one of the species, *Chlorodopsis (Cyclodius) palaoensis*, belonging to the Xanthidae being new to science. Several of these had not been recorded before from Japanese waters. Good photographs are given of a number of forms, but we look forward with interest to the promised work "Crabs of Japan" in which coloured figures are to be published. The second paper, by K. Koba, "Revision of the Specific Name of a Crab as a Second Intermediate Host of *Paragonimus westermani* in Formosa", corrects the identification of the crab *Potamon (Geotelphusa) obtusipes* (Stimpson) which was found by Nakagawa in 1915 to be the intermediate host of a trematode *Paragonimus westermani* (Kerbert) from the Sintiku District of Formosa. The crab is now determined to be *Potamon (Potamon) rathbuni*, and the author gives a revised description of the species with figure.

Copepods from the Great Barrier Reef

THE systematic account of the pelagic Copepoda, by Mr. G. P. Farran, is now published (British Museum (Natural History) Great Barrier Reef Expedition 1928-29. Scientific Reports, 5, No. 3. Copepoda. 1936). Further work on habitat, relative abundance, and seasonal and vertical distribution will follow in a separate paper. The species fall into three groups: the reef forms which have their centre of distribution in the shore waters of low salinity, though also often found outside the reef, the open epiplankton, and the deep-water fauna. Of these the first group has been well sampled, but the second and third are not so complete. The greater number belong to the Calanoida—53 from the open sea with 3 new species and a new genus, 37 from deep water with 8 new species and a new genus, and 30 (or 31) from the coastal waters with one new species. The new genus *Tanyshinus* is formed for the new species *T. naro* from the open sea. Its systematic position is in the neighbourhood of *Spinocalanus*, *Mimocalanus* and *Monacilla*. In *T. naro* the rostrum consists of a single stout point with no trace of rostral filaments. As *Monacilla tenera* has a 2-pointed asymmetrical rostrum with one of the points much stronger than the other, it is suggested that a single rostral process might arise by the suppression of the smaller point. The second new genus, *Scolecocalanus*, from deep water, is formed for the two new species *S. galeatus* and *S. lobatus*. There are only seven species belonging to the Harpacticoida, the remaining forms being members of the Cyclopoida, chiefly from the open sea. One new genus from deep water is formed for the new species *C. parva*.

Development of the Cotton Hair

ON this subject, Dr. F. M. L. Sheffield has recently published a note of considerable interest (*Empire Cotton Growing Rev.*, 13, No. 4; 1936). This note makes it clear that a state of affairs exists in the outer coat of the developing cotton seed in the early days following fertilization, which has not been sufficiently considered when attempts are made to generalize on these developmental processes. As growth proceeds in the expanding ovule, naturally cells of the epidermal layer continue to multiply and divide, but these dividing cells are interspersed among other cells or cell groups, which are rapidly expanding into hairs, so that fully differentiated and meristematic cells are ultimately interspersed. Dr. Sheffield directs attention to this unusual state of affairs and contrasts it with the apical meristem or the cambium, though it will be recalled that in the cambium there are usually ray cells interspersed between the long cambium initials which are clearly in a different state of differentiation. Hair production in early stages of leaf development is probably also associated with similar appearances in the epidermal sheet. Dr. Sheffield concludes that the amount of variation, associated with hair development, occurring from cell to cell of a single seed and from seed to seed within a single boll is greater than the differences in development between varieties or even between Old and New World types of cotton. Cell divisions were seen in the epidermis of Sakel cotton seeds up to the tenth day after pollination and probably occurred later than this—but the general trend of these observations is to minimize the significance of the exact length of time for which cell divisions were seen and to stress the great variety of conditions of cell development to be found over the surface of the seed.

Gas Storage of Apples

IN view of the increasing interest of commercial growers in gas storage methods, a recent paper by Kidd and West (*J. Pom. and Hort. Sci.*, 14, 3, 276; 1936) is deserving of attention. The experiments described were carried out with Cox's Orange Pippin apples at the Ditton Laboratory over a period of three years. It was found that low-temperature breakdown increased in severity with increasing carbon dioxide concentration, but did not occur at temperatures above 34° F. Fruit stored at 34° F. in September reached the end of its storage life by the end of October whatever the storage atmosphere. Brownheart, which appears early in the storage life, developed most severely in high carbon dioxide atmospheres (15 per cent) and was accentuated by low oxygen, whilst 'core flush' or browning in the core region increased with increasing oxygen concentration. Very little fungal rotting occurred, and this seemed unaffected by the composition of the atmosphere. In general, for long-period storage, minimum wastage from the above causes was obtained with an atmosphere containing 2.5 per cent oxygen and 5 per cent carbon dioxide at 34° or 39° F. The same atmosphere, at 37.5° F. and 39° F., also proved best for the development of the characteristic Cox flavour, which is only fully apparent after the fruit has been removed from store and kept in air at room temperature for a few days. Development of good yellow ground colour was favoured by high temperature and high oxygen concentration, whilst retardation of softening appeared to be due to the effect of carbon dioxide.

Whilst there was some variation in different seasons, it was concluded that the maximum storage life of Cox's Orange Pippin (about seven months) was obtained at 39° F. in an atmosphere containing 2.5 per cent oxygen and 5 per cent carbon dioxide. These conditions cannot be obtained by simple controlled ventilation, but require some means of removing the excess carbon dioxide. It is worthy of note that disastrous results followed the storing of ripe Worcester Pearmain apples along with unripe Cox's, the storage life of the latter being reduced almost to one third, due to the stimulating effect of ethylene evolved by the Worcesters.

Distribution of Earthquakes in the Kwanto (Japan) District

SINCE the great Kwanto earthquake of September 1, 1923, a network of thirteen seismological stations has been arranged in the district round Tokyo. The quarterly Seismometrical Reports issued by the Earthquake Research Institute give a list of all the earthquakes that were sensible in Tokyo, with, in most cases, the position of the epicentre and the depth of the focus. Two interesting papers, in which the distribution of these earthquakes is considered, are included in a recent *Bulletin* of the Institute (14, 420-426, 427-437; 1936). In the first, Mr. T. Nagata examines the distribution of the foci in two regions in which they are chiefly clustered, the northern part of Tokyo Bay and along the Rivers Kinugawa and Tonegawa. During the years 1924-30, the foci in the former region lay as a rule at depths of 70-80 km.; but, during the years 1931-35, there were few foci at a greater depth than 60 km., showing that the instability produced in the lower part of the crust by the Kwanto earthquake of 1923 is gradually diminishing. In the second region, the earthquakes were most frequent at depths of 40-50 km. in both intervals. Messrs. N. Nasu, T. Hagiwara and S. Omoti deal with the same subject. By projecting the foci in five sub-regions on vertical planes, it is shown that the distribution is funnel-shaped, and that there are two sources at depths of more than 100 km., one below Kumagaya and the other beneath the northern part of Sagami Bay.

Effect of Hydrogen on Photo-electric Cells

IN a paper read to the Physical Society on November 27, Dr. N. R. Campbell and R. S. Rivlin continue the investigations on the effect of hydrogen on the time lag of argon-filled photo-electric cells, the results of which were published in previous papers to the Society. In a paper read last April, the proportion of hydrogen required to produce the decrease in time-lag was left undetermined as it was thought that elaborate apparatus would be required. It has been found that the problem can be solved very simply and with sufficient accuracy by using a Pirani gauge. The gauge is of the simple type in which a constant potential difference is maintained across the bridge, and the out-of-balance current is read. The experiments show that all that is necessary is to attach such a gauge to the cell, fill it with argon to a suitable pressure, and carry out the tests by adding or withdrawing hydrogen and plotting the results. When the pressure of the argon in the cell is about 0.2 mm., the effect of introducing a small proportion of hydrogen into the argon, keeping the voltage constant, is to decrease the magnification and decrease the time lag. Both these effects increase rapidly as the amount of hydrogen is increased up to about 2 per cent by volume. The rate of increase

then falls off and becomes negligible at about 6 per cent. The exact variation of the effects with hydrogen is complicated and depends on the nature of the cell. It is pointed out that the effects were correlated with hydrogen free in the cell, and that it is conceivable that the direct cause was hydrogen adsorbed on the cathode in an amount which is in equilibrium with the amount free in the cell.

Aetylcholine containing Heavy Hydrogen

IT is well known that the pharmacological activity of choline is very greatly increased by acetylation. It is announced in a communication to the Editor by Prof. H. Erlenmeyer, H. Lobeck and Prof. K. Fromherz, University and the Roche Research Laboratories, Basle, that replacement of the hydrogen in the acetyl group by heavy hydrogen yields a product the action of which on the frog's heart is indistinguishable from that of acetylcholine itself, but is about thirty per cent less active on the blood pressure and on leech-muscle. Details of the work are to be published in *Helvetica chimica Acta*.

Ignition of Explosive Gases

G. MOLE (*Proc. Phys. Soc.*, 48, 857) has put into a quantitative form the theory of Finch and his collaborators that ignition and self-propagating combustion of an explosive gaseous mixture are determined by the building up of a suitable concentration of excited molecules. A differential equation is set up for the activation and deactivation of molecules. The solution shows that the mixture can remain in equilibrium indefinitely unless a source of activation greater than a critical value is applied. When such a source is applied, an explosion begins after a calculable time. The igniting power of a high-frequency source of activation, for example, an electric spark, can be calculated as a function of frequency, and from comparison of this result with experiment, the average life of an activated molecule of carbon monoxide is found to be about 0.4 microsecond.

Thin Metallic Films

Up to the present, it has been found that metallic films only a few atoms thick show no electrical conductivity, and that the resistivity of films many atomic layers thick is much higher than that of the bulk metal. A. C. B. Lovell (*Proc. Roy. Soc.*, A, 157, 311) has succeeded in depositing films of rubidium on pyrex glass which show conductivity when the number of atoms deposited is less than that for a complete monatomic layer. The films were deposited by evaporation on a surface which had been cleaned by prolonged heat treatment in high vacuum. The films show a decay of conductivity with time, but this decay became slower with low temperature and thicker films. A film of 40 Å. thickness was completely stable at 90° K. The thickest films (up to 90 Å.), though still invisible, carried currents up to 0.5 amp. and obeyed Ohm's law, the current density being at least 10⁶ amp./sq. cm. The variation of resistivity with temperature and film thickness agreed quantitatively with a simple theory of the shortening of the mean free paths of electrons by collision with the boundaries of the film. The decay of the conductivity of the film with time may be qualitatively explained by the aggregation of the rubidium into islands under surface tension forces. The presence of traces of impurities on the surface influences these surface tension forces and leads to a rapid break-up of the film (see also NATURE, 137, 493; 1936).