

Research Items.

THE PEOPLING OF THE EARTH.—Dr. Aleš Hrdlička in No. 3, vol. 55, of the *Proceedings of the American Philosophical Society*, reviews conclusions on the place of origin and distribution of man put forward in 1921 in the light of the evidence collected by him in his recent journey through parts of Europe and Asia, Australia, and South Africa. On the question of the origin and cradle of mankind, he holds to the view that this must be sought in western and south-western Europe, with probably an early extension of the species, on one hand towards central Europe, and on the other, over the watershed of the Mediterranean. It is probable that by the time the last or Würmian glaciation was approaching, man existed in only one general form—the Neanderthal, which persisted for a very long time into post-glacial times. The view that Neanderthal is a separate species which completely died out is erroneous. It is a necessary stage of man's evolution, and if *Homo sapiens* is given another place of origin, say Asia, a Neanderthal phase must be postulated there. Probably he became much reduced in numbers in western Europe and his place was taken by transitional Aurignacian man who was nearing the modern type, having developed from an extension of the Neanderthal eastwards beyond central Europe, which afterwards returned westwards as Aurignacian man to the place of his Neanderthal forefathers. After the last glacial period there is a rapid extension of culture, and man for the first time in his history becomes capable of furnishing a surplus of numbers needing an extension of his domain. It was during this time that the foundation was laid for man's differentiation into the older human stocks and races. Apart from the corroboration of the above views, three, or rather four, conclusions emerge as a result of Dr. Hrdlička's journey. A link between the Negritos of Africa and of south-eastern Asia has been found in India; it is clear that the Australian (and Tasmanian) is one of the more fundamental races of the world with close connexion with our own ancestral stock; there are in Asia remnants of the old yellow-brown stock from which is derived the American Indian, e.g. the Tibetans; and lastly, in Australia and South Africa new types of white man are developing.

NORTHERN TUNGUS MIGRATIONS.—An examination of the ethnological affinities of the Goldi of the Amur and Ussuri rivers by Prof. S. M. Shirokogoroff in Vol. 57 of the *Journal of the North China Branch of the Royal Asiatic Society* has afforded the author an opportunity to offer suggestions towards the elucidation of the obscure question of the date and course of the various Tungus migrations. The Goldi, sometimes known by the Chinese name of *Yu-pi-ta-tse*, i.e. Fish-skin Barbarians, on account of the use of this material for articles of dress, belong to the southern branch of the Tungus linguistic family; their language may perhaps be regarded as a branch of spoken Manchu, but it shows elements characteristic of northern Tungus dialects. Their culture shows traces of the northern Tungus complex, as well as of Palæasiatic influence. Recently, Chinese influence has been brought to bear upon them by colonisers. From neolithic times to the present day their territory, it is known, has been the scene of struggles between various groups, Palæasiatics, Koreans, Mongols, Tungus, and, later, Chinese. Archæological evidence—walled cities, cemeteries, etc.—shows that at times it has been thickly populated. A comparative study of the cultural and linguistic elements of the Goldi complex shows that this people is of mixed character and origin, which may be explained as an absorption of the northern Tungus, who went from north and

west to the south and east, by the southern Tungus and perhaps Palæasiatic groups. Four different waves of Tungus migration can be distinguished. The first wave occurred before the tenth century, and brought various groups of northern Tungus, probably reindeer breeders and including the Goldi, to the lower Amur, Ussuri, and Sunjari basins. The second wave, about the twelfth century, occupied the territory left by the reindeer breeders. A third wave in the seventeenth century, after the Manchus depopulated the Amur valley, led to certain tribal redistributions in and about eastern Transbaikalia. The fourth wave, which began in the nineteenth century and still continues, is one in which the last of the northern Tungus stock living south of Yakuts are moving eastward into the Amur Government and on to the Manchurian plateau.

ANCIENT SHIPS.—The ships of early explorers were described by Mr. G. S. Laird-Clowes in a recent lecture to the Royal Geographical Society, in which he pointed out how imperfect is the record of early shipping, not merely in actual specimens but also in pictorial representation. Among early forms of vessels the only ones that have been preserved are one or two small Egyptian processional boats; two Roman vessels, not yet raised from the bottom of Lake Nemi; a portion of a lighter of about A.D. 270 found in the Thames; a Frisian ship; and two Viking ships. In the British Isles, beyond the Thames lighter and some dug-outs of doubtful age, there is nothing earlier than a barge of the time of William and Mary, another nearly a century later, and then Nelson's *Victory* and the *Implacable*; or as Mr. Laird-Clowes puts it, there is a blank in the preservation of actual ships from Roman times until the seventeenth century. The pictorial record is less inadequate, but it consists largely of ships broadside on and so gives comparatively little detail of the build and method of construction. Moreover, it is concerned mainly with large ships; the small vessels, which were of chief importance in exploration, were seldom drawn in any detail.

GRAFTING IN PLANARIA.—Prof. H. W. Rand and Amy Browne describe (*Proc. U.S. Nat. Acad. Sci.*, vol. 12, Sept.) the technique they have employed in their grafting experiments on *Planaria maculata* undertaken with the view of ascertaining whether regeneration of a head at an exposed anterior cut surface may be inhibited by the presence of a head grafted relatively near this cut surface. The difficulties of the grafting operation arise from the extreme softness and delicacy of the tissues, the mobility of the pieces and the contamination of the cut surface with mucus. A 3.5 per cent. solution of pure acid-free gelatin in distilled water was made and allowed to cool until it began to stiffen, and was then poured on to cold glass slides where it set, forming a layer about 1 mm. thick. Two *Planaria*, preferably narcotised by chlorotone, were taken, and from the side of the body of one was excised a piece of tissue, leaving a wound appropriate in size for the reception of the graft. The wound was made deep enough to interrupt the lateral nerve cord. This animal having been placed on the prepared gelatin surface, the head was immediately excised from the second *Planaria* and placed with its cut surface against the wound surface of the first one, and strips and fragments of moist gelatin were packed tightly around to prevent separation of the grafted head from the body. The slide was placed in a moist chamber for 18 to 24 hours, after which the gelatin

was carefully picked away and the graft compound transferred to a small dish of pond water. Eight successful grafts of a head on to the side of a body were obtained. After the graft had become well healed in place, the animal's original head was removed. The question was: Will the presence of the foreign head in close proximity to the wound affect the regeneration of a head which would take place in an ordinary beheaded *Planaria*? In one case the stock head was removed and regenerated five successive times, but in other cases it would appear that retardation and inhibition of regeneration was due to the presence of the grafted head.

NEW MOLLUSCA FROM MEXICO, CENTRAL AND SOUTH AMERICA.—Three short papers are before us dealing with new mollusca from these regions. Mr. W. B. Marshall describes eleven new species of "Land and Fresh-water Mollusks from Central and South America" (*Proc. U.S. Nat. Mus.*, vol. 69, art. 12) belonging to the genera *Cyclodina*, *Succinea*, *Ampullaria*, and various *Unionidæ*. Dr. Paul Bartsch, in continuation of a paper published in 1924, treats of "Additional new Mollusks from Santa Elena Bay, Ecuador" (*Proc. U.S. Nat. Mus.*, vol. 69, art. 20). As in the original note, they are marine genera, mostly *Turbonilla*, *Pyramidella*, and *Odotostoma*. The same author also writes on some "New Urocoptid Land Shells from Mexico" obtained by Mr. C. R. Orcutt during his recent botanical explorations (*Proc. U.S. Nat. Mus.*, vol. 70, art. 4). Sixteen species of *Holospira* supposed to be new are described and illustrated.

BOTANY AND HYDROLOGY.—Oscar Edward Meinzer has investigated the uses of plants as indicators of ground water (*Jour. Wash. Acad. Sciences*, vol. 16, No. 21, 1926). He groups desert plants into two general classes according to the adjustments they make for the scarcity of water. On one hand are the true xerophytes, depending for their scanty supply of water on the rains that occur at long intervals, and during periods of drought maintaining themselves in a nearly dormant condition; on the other hand are those plants, termed by the author "phreatophytes" or "well plants," which grow where they can send their roots down to the water table. These plants group themselves in zones and communities according as the topography of the surface varies the depth of the water table. Thus salt grass (*Distichlis spicata*) indicates water 8 ft. to 12 ft. from surface, while mesquite (*Prosopis juliflora*) can reach water so far as 50 ft. below ground. After twenty years of hydrological work, and contrary to popular belief, the author is unable to establish any definite relation between the occurrence of phreatophytes and the quality of the ground water, or to suggest that any species that can grow in even moderately alkaline soil will invariably indicate potable water. Even in desert country, a substantial supply of water is thus available, and the loss of water per acre due to transpiration is probably less than the quantity required to irrigate useful crops. Pumping, however, is an expensive operation, and it is suggested that those hundreds of thousands of acres of desert land should be made productive rather by the cultivation of such promising phreatophytes of economic value as alfalfa (for seed mostly), Bermuda grass, and pecan.

RECENT LOWERING OF SEA-LEVEL.—It is well known that Daly has presented evidence supporting the view that a world-wide lowering of sea-level, amounting on an average to about six metres, has taken place during post-glacial time. This has been

recently extended by the observations of Wentworth and Palmer on the islands of the North Pacific. They find a lowering of the ocean level of 12 to 15 feet. W. A. Johnston, however (*Am. Jour. Sci.*, 1926, p. 253), has failed to find evidence of such a relative movement along the Pacific Coast of Canada. A further contribution to the subject of recent movements of the strand line is now made by A. F. Buddington in the *Am. Jour. Sci.*, 1927, p. 45. He has examined more than four thousand miles of coast in south-eastern Alaska, and he states that wherever the conditions have been favourable, remnants of relatively uplifted sea-cut rock benches are found near the present level of high tide. The estimated lowering of sea-level is between 12 and 16 feet. This, however, is but the last of a series of post-glacial uplifts. Near Juneau, old beach deposits have been found at elevations of 600 feet or more, and well-marked platforms produced by marine planation occur at various levels up to 200 feet.

LAND MOVEMENTS DURING THE JAPANESE EARTHQUAKE OF SEPT. 1, 1923.—The remarkable elevations and depressions measured in the bed of Sagami Bay have already been referred to in *NATURE* (Mar. 29, 1924, vol. 113, pp. 473-474). The corresponding movements on land form the subject of a valuable paper by Major-General H. Omura, of the Land Survey Department (*Bulletin of the Earthquake Research Institute*, vol. 1, 1926, pp. 65-68). Immediately after the earthquake this Department began the revision of precise levelling, and during the following years, from 1924 onwards, it has been engaged in carrying out a revision of the triangulations over the central region. The admirable map which accompanies the paper shows the changes of level in the land surrounding Sagami Bay, zones of uplift and depression for every fifth of a metre being represented, from +2 metres and upwards to -1.2 metres and below. The more important elevations occur along the coast of Sagami Bay and in the Boso peninsula. The main area of depression lies inland to the north-west of the bay, and it is noteworthy that one of the principal zones of depression is about 30 miles north-north-west of the centre of the first disturbance, that is, it is close to the centre of the second movement (see *NATURE*, Jan. 22, 1927, vol. 119, p. 139).

IGNEOUS ROCKS OF MOUNT GIRNAR.—More than twenty years ago Dr. J. W. Evans made a representative collection of rocks from the Girnar and Osham Hills in Kathiawar. A systematic examination of the types represented has now been made by M. S. Krishnan, and his results are published in the *Records of the Geol. Surv. India*, 58, 1926, p. 380. Almost simultaneously a field and structural study of the Girnar rocks appeared in the *Journal of Geology*, 34, 1926, p. 289, by K. K. Mathur, V. S. Dubey, and N. L. Sharma. These two papers taken together have greatly extended our hitherto scanty knowledge of the phases of igneous activity which followed the great outpourings of the Deccan plateau-basalts. At Girnar the basalts were domed up by a laccolith in which olivine gabbro, diorite, and monzonite crystallised. A circular system of fractures around the dome was intruded by granophyre; and, in the gabbro, dykes of nepheline-syenite and lamprophyres are found in close association. The differentiation of the parent magma is attributed to fractional crystallisation, and support is given to Bowen's hypothesis of the origin of nepheline-syenite, involving the removal of orthosilicate molecules by volatile fluxes. A series of analyses is presented by Dr. Krishnan, and it is noteworthy that the variation diagram constructed from the results is of the broken

and jerky type which seems to correspond with the suggested process of fractional crystallisation.

GABB'S CALIFORNIAN FOSSIL GASTROPODS.—The well-known American palaeontologist, W. M. Gabb, described in two volumes, published in 1864–69 by the Geological Survey of California, the fossils collected by the members of that Survey. He did not, however, designate type specimens or indicate type localities, items required in present-day palaeontological research, while in some cases his figures were restored and embodied parts of more than one specimen. Mr. R. B. Stewart now seeks to rectify all this so far as the *Gastropoda* are concerned (*Proc. Acad. Nat. Sci. Philad.*, vol. 78), and after careful study of the original specimens deposited by Gabb with the Academy of Natural Sciences of Philadelphia, and those which had drifted into other collections, has carefully described and illustrated the now selected types. More than 150 species have been dealt with, but 20 are still missing. It has been considered necessary to create 14 new genera. The 13 plates of figures from retouched photographs by Miss H. Winchester are good and should amply meet the requirements of students.

RADIO IN THE WHALING INDUSTRY.—The use of radio telephony by fleets of whaling ships has made the whaling industry a much less strenuous one. When one of the vessels, equipped with a $\frac{1}{2}$ -kilowatt Marconi telephone set, sights a number of whales, possibly after several weeks' searching, the other ships of the same fleet are immediately informed by telephone, and all can then make for the best spot for hunting. The 'factory ship' that also accompanies the fleet is simultaneously directed to the most suitable position for taking charge of the catches. A simple code is employed, so only the ships concerned can interpret the messages. The apparatus used is highly efficient, as messages have been heard up to distances of two thousand miles. Until a few years ago, whales were caught by harpooning from rowing boats. Now fast steam launches equipped with 1000 horse-power engines are used for the pursuit. Harpoons are projected from guns instead of being thrown by hand. Practically all the carcass is converted into oil, cattle cake, and other marketable commodities. On several ships this season, Marconi direction finders have also been fitted. As the magnetic compass is of little use in the Antarctic regions, these finders, which are independent of the earth's magnetism, have proved of great value. Like the telephone sets, the direction finders are worked by the harpoon-gunner and require no special operator. The Ross Sea, which is enclosed by an ice barrier with only one seasonal outlet, can now be safely invaded and large catches have been made in it.

DETECTION OF INTERNAL FLAWS IN RAILS.—For some years it has been known that it is possible to detect internal flaws in steel samples of uniform section by magnetic means. The method has not hitherto received much attention, since it is necessary to thread on to the end of the sample the magnetising and test coils. A recent improvement which eliminates this difficulty is described in a paper by Masuhiro Suzuki in *Science Reports*, Tohoku Imp. Univ., vol. 15, No. 4, p. 479. The method has been applied to rails actually in service with important results. The magnetisation of the steel is effected by a large horseshoe electro-magnet which rests a very short distance above the surface of the rail on small rollers. Between the poles is one test coil which need only be placed on the surface. Any irregularity in the rail is then detected by a deflexion of a galvanometer connected

to this coil as the whole apparatus is traversed along the rail. Flaws, segregated areas, and overstrained regions are then readily detected. The latter is an important point, since portions of the steel which, although not yet actually flawed are potential flaws, are clearly picked out. As an example of this may be mentioned periodic irregularities found in a new rail free from marked segregation or flaws. The author ascribes these to the effects produced in the rail-straightening process after it had been rolled. Although the present work is confined to rails, the modified method is applicable to a large number of similar examinations such as tyres and ropes.

THERMAL DECOMPOSITION OF OZONE IN THE PRESENCE OF HYDROGEN.—R. O. Griffith and K. McKeown have extended their experiments on the catalytic effect of gases on the thermal decomposition of ozone to include the effect of hydrogen on the same reaction at 78° and 100°. Details of the work have been published in the *Journal of the Chemical Society* for Dec. In addition to the deoxygenation process, water is formed by the reaction, $H_2 + O_3 = H_2O + O_2$, and the interpretation of the results is more difficult. The velocity coefficients of the two reactions show that the catalytic effect of the hydrogen is positive, and a possible explanation of the results, involving a series of intermediate reactions, is given.

EFFECT OF SUNLIGHT ON COTTON.—The effect of sunlight on cotton fabric is the subject of No. 1016 of the Aeronautical Research Committee's Reports and Memoranda (London: H.M. Stationery Office, 1926. 1s. net), by G. Barr and Isabel Hadfield. It has been found that the determination of the viscosity of a solution of cotton in cuprammonium hydroxide forms a much more sensitive method of following the deterioration in sunlight than that used in the past, namely, the change in tensile strength. After exposure, the cotton shows increased reducing properties, and it is evident that chemical and not merely physical change has taken place, although further work on fabric exposed in the absence of oxygen is necessary before it will be possible to decide to what extent the change in the fabric is an oxidation process.

A NEW TRANSFORMATION OF COBALT.—Measurements have been made by Hakar Masumoto (*Science Reports*, Tohoku Imp. Univ., vol. 15, No. 4, Oct. 1926) of the electrical conductivity, thermal expansion, heat changes, and magnetic properties of cobalt at high temperatures. For the purest sample, all of these show a discontinuity around 477° C. on heating and 403° C. on cooling. From X-ray analysis it is shown to be probable that below this temperature cobalt crystallises as close-packed hexagonal material, while above it is face-centred. Both forms are ferromagnetic. The effects of iron and nickel on this change have been investigated, and in each case the added metal lowers the temperature of the change rapidly. Especially is this the case with iron, about 4 per cent. of which element lowers the change point to 0° C. Some observations are made on the changes in the iron-cobalt and nickel-cobalt systems respectively which occur below the solidus. So far as the latter alloys are concerned, they appear to form one series of solid solutions throughout. The system iron-cobalt is more complex, and as the iron content is raised the structure at room temperatures passes from close-packed hexagonal to face-centred cubic, and then finally to body-centred cubic at about 21 per cent. of iron. In each case there is a small zone in which the mixed phases are found.