

## Research Items

**The Ovingdean Skull.** This remarkable trephined skull—a deformation, of which only two other examples of prehistoric date are known from Great Britain—is described by Dr. T. Wilson Parry and Miss M. L. Tildesley in *Man* of April. The skull was trawled from the sea about three quarters of a mile from the Sussex coast on January 12, 1935. It belonged to a man about sixty years of age, and its surface and texture denote that it had been interred. It is not complete. At the fore-part of both parietals, an inch from the middle line on either side, are two well-defined perforations. That on the right side is almost circular and measures  $1\frac{1}{8}$  in. by  $1\frac{1}{4}$  in. That on the left is roughly rhomboidal, the long diameter being  $1\frac{1}{4}$  inches and the antero-posterior  $1\frac{1}{8}$  in. The method of trephining employed was that of scraping the bone with a flint flake so as to produce a funnel-shaped hole with sides sloping downwards and inwards towards the lumen, a method followed in the third, or Carnac, phase of the neolithic. The operation was performed during life, as the bone shows a slight attempt at reparation. A severe septic periostitis followed, which must have lasted about six weeks. Miss Tildesley's examination indicates that there is nothing in the type of the skull to indicate its date. Similar shapes occur among the Coldrum skulls, but also elsewhere. Maximum breadth alone can be estimated. The fragment is 143 mm. broad and it is unlikely that the original maximum breadth was more than a millimetre or two more. This lies half-way between the greatest average found in the Beaker folk and the lowest found among the neolithic. The bone is hard, suggesting mineralisation, and light grey in colour. The circumstances suggest a cliff burial, which had fallen into the sea; but its colour and consistency are not the same as other bones from the chalk. At the same time, it is not of an appearance which would suggest that it had come from a submerged neolithic forest bed. The only clue to date is the trephining.

**Initiation in Southern Nigeria.** An account of certain aspects of the *Otu* system of the Isa sub-tribes of the Edo people of Southern Nigeria by Mr. H. L. M. Butcher (*Africa*, 8, 2) indicates the importance of this organisation, which in some respects resembles an 'age grade', in others a caste system, in the social system of the people under the Oba of Benin. As a democratic institution it developed most characteristically in remoter districts where the people were less subject to the power and influence of the Oba. Development, however, was not uniform, and local isolation has produced a number of variants. In some the importance of the passage from grade to grade is ignored. Members of the lowest grades in all groups alike are called 'sweepers of the streets', and consist of all youths who are able to do any work. They perform all communal tasks, such as hewing wood, drawing water, etc. Next are the 'adults' who are in the prime of their strength, and mostly have homes and families. They do such work as may be beyond the power of the youths. The senior members only fight in the serious wars, the minor raids being left to the younger men. Though they have no right to speak in the council, their numbers lend weight to their ideas. Above them are the 'junior elders', heads of families, seniors in the small divisions of

the villages, who in most cases have performed a ceremony to free themselves from communal labour, but are not yet members of the council. Finally, there are the 'elders', the repositories of justice and custom, at whose head is the senior elder. His is the final word in the council, and usually he serves the ancestral ju-ju. In most groups he is the administrative, as well as the religious, head of the community. With the *Otu* are associated two classes of ceremony: the first is a 'qualification' ceremony and the second the group of ceremonies by which promotion is gained within the *Otu*.

**Rats and Mice of the Pacific Islands.** Of the five forms of rats and mice found by the Whitney South Sea Expedition in the Pacific Islands, four are ship-borne, and have a world-wide distribution, the black rat, the Alexandrine rat, the brown or 'Norwegian' rat and the house mouse (G. H. H. Tate, *Bull. Amer. Mus. Nat. Hist.*, 68, 145; 1935). These were probably introduced before the advent of white men, and the distinction between their arrival and that of the species regarded as the only true colonist of the Islands, *Rattus exulans*, is only a matter of degree, for the latter also owes most of its spread to mankind. The native rats belong to the *concolor* group of Malaysia, but none of the island members of the group is identical with any living mainland species or with the forms found in Borneo, the Philippines, Celebes or New Guinea. They tend to be larger than mainland forms, and on some of the islands show slight anatomical modifications. Since all the rats and mice have been transported by man they must have followed his colonisation tracks, but this is not obvious from their present distribution since they show no diminution in number of forms from west to east. Probably the original course of distribution from the mainland was by way of Borneo and the Philippines via the Caroline Islands, rather than through New Guinea and the Solomon Islands.

**Newfoundland Fisheries.** In the Reports of the Newfoundland Fishery Research Commission, vol. 2, No. 2 (Annual Report for 1933, recently published), good progress in all directions is shown. Besides the technical research into the dried codfish industry and the nutritive value of the Atlantic salmon, the hydrographical and biological investigations are of special interest. There are now available for comparison complete data for both spring and autumn seasons in 1932 and 1933 and partial data for the autumn of 1931. In the last report (vol. 2, No. 1) it was stated that, compared with the conditions in the autumn of 1931, there was in 1932 a much larger influx of arctic water into the Newfoundland area and simultaneously a stronger and opposite influx of saltier water from the Atlantic occurring in the deeper water layers over the Banks. These conditions led to the production of a large body of 'mixed' water suitable for the multiplication of marine forms of life, so that the season on the Banks and the coasts sharing 'Banks' conditions was a good one for the fishery, there being a marked increase in the plankton. In the present report it is shown that this increase continued to a maximum point during the summer of 1933, but that in the autumn there was a sharp decline, apparently coinciding with a marked diminution in the general influx

of arctic water. In 1933 no salps were taken, indicating that Atlantic water, comparatively unmixed with water from other sources, did not invade the area; this is in accordance with the absence of high salinity water. The Copelata form a valuable guide to presence or absence of squid, the movements of which towards the coast of Newfoundland have in the two previous years followed the trend of *Oikopleura dioica*, and the marked increase of the cold water *O. vanhoeffeni* may perhaps always (as in 1933) precede a failure of the squid fishery for bait.

**An Ancient Egg.** The expedition to Texas, sent out by the Harvard University Museum, has discovered the world's oldest egg (Science Service, Washington, D.C.). It is the egg of a dinosaur which lived on the shores of a great inland sea during Permian times, and if the famous dinosaur eggs from the Desert of Gobi may be put at 100,000,000 years old, the age of this new discovery must be of the order of 225 millions of years. The egg, three inches long and rusty in colour, is unhatched and little distorted by the process of fossilisation. Although it cannot be definitely associated with any particular animal, it is believed to be the egg of a large lizard-like reptile, *Ophiacodon*, measuring about six feet from snout to tip of tail, and part of a skeleton of this creature was found near the egg.

**Germination of Lime Seed.** A very full study of the factors involved in securing prompt and abundant germination of the seeds of the lime is reported upon by J. Nelson Spaeth in Memoir 169 of the Cornell University Agricultural Experiment Station. His conclusion is that the pericarp is not important in delaying germination, but must be removed in order to treat the seed coat. Its removal is difficult because it is tough and leathery whilst the seed coat is hard and brittle. Seeds may be extracted by partially digesting the pericarp with concentrated nitric acid. Delay in germination is due to the impermeability of the seed coat; the water-excluding property depends apparently upon the compactness of the cellulose in the outer part of the palisade tissue of the seed coat, and treatment with concentrated sulphuric acid for 10-30 minutes renders the seed coat permeable without injuring the embryo within. In view of the factor causing impermeability, the important result follows that air-dry storage, which dries this impermeable cellulose layer, increases this impermeability, and as a result air-dried seeds after several years storage will remain impermeable to water for some years when placed in stratification.

**A Fungus Disease of Liverworts.** The *Gardens' Bulletin* of the Straits Settlements of January 26 contains an account of a new species of fungus, *Nectria egens*, parasitic upon a liverwort, *Leptolejeunia corynephora*. Mr. E. J. H. Corner is the author of the paper, and shows that the fungus is a superficial parasite the hyphae of which ramify in the grooves between the convex cell-walls on the surface of the liverwort thallus. Food is absorbed through hyphopodia, and the host is not visibly inconvenienced by the parasite. Several other species of *Nectria* are known to attack bryophytes. Characters of the new species are given by a Latin diagnosis, and Mr. Corner has compared it with another bryophilous species, *Neotiella crozalsiana*, a Discomycete fungus with very similar characters except for a "persistently juvenile form of cleisto-

carpic operculate apothecium". *Nectria egens* is, of course, a definite Pyrenomycete, and the paper raises interesting questions as to fundamental differences between Discomycetes and Pyrenomycetes, other than the form of the fruit body.

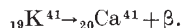
**Brown Rot Diseases of Fruit Trees.** Bulletin No. 88 of the Ministry of Agriculture and Fisheries is devoted to "The Brown Rot Diseases of Fruit Trees" (London: H.M. Stationery Office, 1935. 1s. 6d. net). It is, perhaps, rather significant that this imposing monograph, which is the work of Dr. H. Wormald, replaces a short leaflet of three or four pages. The Ministry has performed a useful service to the fruit-growing community in thus collecting Dr. Wormald's research papers and utilising his special knowledge to review the extensive literature on the subject. This has been accomplished without prejudice to the needs of the practical grower, for descriptions of symptoms and advice on control can easily be separated from the more technical part of the volume. The history of the appearance of brown rot fungi is traced since the first mention of *Monilia fructigena* by Persoon in 1796. It is only of recent years, however, that other fungi have been recognised as causal agents of brown rots. *Sclerotinia* (= *Monilia*) *fructigena*, *S. laxa*, *S. laxa* forma *malii*, and *S. fructicola* are described in the work under review, and cultural characters are also given. A valuable feature of the bulletin is its international nature, which allows a survey of geographical distribution of the fungi to be made, and also outlines their probable effects on commerce. Conditions conducive to infection, and the mode of entry into the host plant are adequately treated, whilst symptoms and control of brown rots on apple, pear, cherry, peach, nectarine, apricot, quince and medlar are described. Twenty-four pages of excellent half-tone illustrations enrich the text, and six pages of bibliography should be very useful to the plant pathologist.

**Chymase and Protease in Micro-organisms.** A year or two ago, Prof. Constantino Gorini showed that the ability of bacteria to coagulate milk may be revealed by pouring milk which has been lightly sterilised on to the surface of a culture of the organism on agar containing such stimulants as broth, peptone, vitamins, yeast water, blood, etc. In a paper read before the Reale Istituto Lombardo di Scienze e Lettere in November last and published in the *Rendiconti*, 67, parts 16-18, Gorini describes the results of the application of this method of examination to a number of bacteria of various types. Among these were 115 strains of *Streptococcus*, of different origins and belonging to 16 different pathogenic species. When inoculated directly into milk, these showed negative or irregular results. On the basis of the chymase and protease indications of the milk-on-agar cultures, it was found that the organisms were divided between the three types, *Streptococcus pyogenes*, *S. agalactiae* and *S. lactis*. The procedure is hence of diagnostic value in distinguishing between chronic mastitis specific to lactifers and harmless to man, and the acute mastitis the infecting agent of which is transmissible to man through the milk. A number (18) of strains of *B. typhi* *flavum* of various origins and eight physiological variants of *B. typhi*, Eberth, all displayed, however, similar behaviour, no differentiating criteria being observable. Extension of the method is suggested as a possible means of distinguishing between bacterial species.



**Apparent Magnitude in Scenery.** Scenery, being a pictorial impression of the outdoor world, does not lend itself to direct measurement, which impairs the spontaneous effect on which the impression depends. In a paper on "Apparent Magnitude in Natural Scenery" in the *Geographical Journal* of March, Dr. Vaughan Cornish attempts to discover some principles applicable to the study, using as his material outline drawings of landscape which he has been in the habit of making, without any direct measurement, during the past forty years. Thus, for example, he compares two alpine panoramas each including the rising sun, drawn at distances of four and forty miles respectively. In the latter case the sun's area was increased 3.16 times the former. The customary explanation is the mental comparison of magnitude between the unvarying sun and the varying angle of the landscape, and in other words that the mountains diminished in size as their distances increased and that the increase in the apparent size of the sun was inversely proportional to the change in the apparent magnitude of the mountains. But an examination of the drawings, of which the view-point was known, showed that the diminution in the apparent magnitude of the mountains was much less than the increase of their distance, and simple measurements revealed the fact that the distant mountains were subjectively magnified to the same extent as the sun. Another among many suggestions in the paper is that the more the eye takes in vertically the more it takes in horizontally and the less impressive are both dimensions.

**Radioactivity of Potassium and Rubidium.** Klemperer (*Proc. Roy. Soc., A*, March 15) has investigated some anomalous and interesting features of the  $\beta$ -decay of potassium and rubidium. According to Fermi's theory and Sargent's empirical rules, the decay period of a  $\beta$ -transformation is connected with the upper energy limit of the  $\beta$ -spectrum, and if these rules are applied to potassium, they give a period of a few minutes or a few days, according to whether the  $\beta$ -transition is of the 'allowed' or 'forbidden' type. The measured half decay period is of the order  $7.5 \times 10^{11}$  years on the assumption that the heavy isotope,  $^{41}_{19}\text{K}$ , is alone active, and it is therefore necessary to examine alternatives to the simple reaction,



It must be noted that  $^{41}_{20}\text{Ca}$  has never been found by mass-spectrum analysis of old potassium minerals. Gamow has suggested as alternative schemes, (1) the simultaneous emission of two  $\beta$ -rays, (2) an  $\alpha$ -decay, followed by the observed  $\beta$ -decay which comes from a short-lived halogen atom; and (3) a slow  $\beta$ -decay followed by the observed  $\beta$ -rays which come from short-lived calcium and strontium atoms. Klemperer has examined the first coincidence Geiger counters, and the second and third by chemical separations and the use of a linear amplifier. The results were negative in each case. He suggests that the  $\beta$ -rays come from undetected, rare, but still long-lived isotopes,  $^{40}_{19}\text{K}$  and  $^{86}_{37}\text{Rb}$ . The anomalous lifetime of these elements (with respect to the Sargent rules) would be explained if they had a large nuclear spin, the  $\beta$ -ray being then a kind of 'super-forbidden' transition. Newman and Walker (*Phil. Mag.*, April) also suggest that the radioactivity of potassium may arise from  $^{40}_{19}\text{K}$  or  $^{42}_{19}\text{K}$  and that of rubidium

from  $^{86}_{37}\text{Rb}$ ,  $^{87}_{37}\text{Rb}$  or  $^{88}_{37}\text{Rb}$ . Their suggestion that these isotopes could be produced experimentally by neutron bombardment is probably not practicable.

**Discovery of Mephitic Air.** In 1772, Daniel Rutherford (1749–1819), professor of botany in the University of Edinburgh, published his "Dissertatio Inauguralis de Aere Fixo Dicto aut Mephitico", in which he announced among other matters his discovery of 'noxious air', afterwards called nitrogen. In *Science Progress* (29, 650; 1935), D. McKie has made an interesting analysis of the part of the dissertation concerned with nitrogen and shows that, contrary to the usual statement, Rutherford did not use the name 'mephitic air' for this gas, but for the 'fixed air' (carbon dioxide) discovered by Black, referring to nitrogen as another species of noxious air. He found that when an animal was confined in a limited volume of air it presently expired and the air was reduced in volume and rendered incapable of supporting fire or life. Removal of 'fixed air' by alkali did not restore it to its former wholesomeness. The relations to Priestley's discoveries are considered, and it is concluded that Rutherford's work was quite independent. Rutherford did not arrive at any clear explanation of his results, and did not see that the 'noxious air' (nitrogen) was a constituent of the atmosphere, regarding it rather as air combined with phlogiston.

**A New Relativity Theory.** A second instalment of Sir Shah Sulaiman's new theory of relativity has appeared (*Proc. Acad. Sci. U.P. India*, 4, 217); the first part appeared in the same journal (4, 1) in August 1934. The author retains Euclidean space, and as much as possible of Newtonian dynamics, the chief deviation being the hypothesis that gravitational, electrical, and magnetic forces do not act instantaneously, but are propagated with a velocity nearly equal to that of light. Light is supposed to consist of 'radions' emitted from the surface of bodies, and gravitation of 'gravitons' from their entire mass. From these hypotheses four 'universal principles' are deduced. Two of these, akin to Doppler's principle and aberration, deal with the modification of the magnitude and direction of the gravitational force upon a moving body, and these are applied to the advance of the perihelion of Mercury, the deflection of light by gravitation, the spectral shift, and the experiments of Michelson and Morley, and of Bucherer. Another gives a formula for the relative velocity of two moving bodies, which is applied to the experiments of Fresnel and of Fizeau. The remaining one is applied (in outline only) to the fine structure of the hydrogen spectrum. The idea of an expanding universe is firmly rejected, though it is allowed that some nebulae, formerly part of our galactic system, have left it on parabolic paths. In short, an attempt is made to give an alternative explanation for the whole range of phenomena usually adduced in support of Einstein's theory. It is difficult to form a definite opinion whether the author's work is entirely sound, but he has evidently studied all the standard works. The mathematics has been checked by two competent mathematical physicists, and the work has been carried out with the encouragement of Prof. M. N. Saha. If it can stand the test of criticism, it will obviously be of great importance.