

## Research Items

**Human Skeletons at Hythe.** The skulls and long bones preserved in the ossuary of the church of St. Leonard at Hythe, which were examined by Prof. F. G. Parsons nearly thirty years ago, have been subjected to further study by Dr. G. M. Morant and Miss Stoessiger. As a supplement to their report, which appeared in *Biometrika*, 24, 1932, Dr. Morant has now published a general account of the origin, history and character of the collection so far as his research has carried him ("The History of the Human Skeletons preserved in the Ossuary of the Church of St. Leonard, Hythe." F. J. Parsons, Ltd. Pp. 41. 1s. 6d.). The place of their storage is neither crypt nor charnel-house, but a passage-way under the chancel, made when the church was enlarged in the early thirteenth century, to serve as part of the processional path. On the basis of the thigh-bones, the number of individuals represented is at least 4,000. Popular tradition attributes them to those slain in a battle fought in 456 A.D. between Britons and Saxons, or to Danes who landed in 843, or to French who raided the coast in 1295. An examination of the bones shows that they consist of an almost equal number of male and female and vary widely in range of age, children alone not being present. It is concluded that they are the remains of inhabitants of the parish, extending over a considerable period of time, placed in the church for safe keeping after inhumation. Anthropologically they present peculiar characteristics, for which the only known parallel in the British Isles is found in the skeletal remains of indeterminate age from Spitalfields in London, which were brought to light at the extension of the Fruit Market in 1926. This Spitalfields series bears a close resemblance to a series from Pompeii and to another of Etruscans of the Roman period from north Italy. Not only does the Hythe type resemble that of Spitalfields closely, but it is also closely allied to modern series from Bologna, Czechoslovakia and Rumania. The Spitalfields people were probably Roman inhabitants of London of Italian origin and it is, therefore, probable that the Hythe people are descendants of foreigners who settled in the locality in Roman times.

**Protective Habit of Desert Kangaroo Rat.** Seth B. Benson has observed that a desert kangaroo rat (*Dipodomys deserti*) brought into the neighbourhood of objects which it regarded with suspicion, kicked considerable volumes of sand upon them, apparently with the view of discovering whether they were alive (*J. Mamm.*, 16, 67; 1935). During a period of about five minutes, it skirmished in front of the objects (in this case a pile of bread crusts), and the skirmish ended with the rat turning about, kicking sand upon the pile with force and precision by using its hind legs, and immediately whirling about to watch the effect of its storming. This action was repeated half a dozen times. It explained why the author had previously found many of his small mammal traps set off and partially buried in the sand, because the amount of sand thrown and the force with which it was thrown were enough to effect these results. The suggestion is that this action is a defensive action likely to be of particular value against such an enemy as the sidewinder snake (*Crotalus cerastes*), which inhabits desert places and is known to feed upon kangaroo rats.

**Researches upon the Tubercle Bacillus.** Konrad E. Birkhaug describes in two lengthy papers observations upon the general characters of several strains of the tubercle bacillus (*Ann. de l'Institut Pasteur*, 54, No. 1, p. 19; No. 2, p. 195; 1935). Avian, bovine and human strains show little difference in morphological characters, but are liable to dissociate spontaneously into three types of colonies, the *Ch* (chromogenic), *R* (rough), and *S* (smooth). For the avian strain, the *S* variety is the dominant type, and *Ch* and *R* varieties are relatively rare. For the mammalian strains, the dominant type is the *R* variety, and the *S* and *Ch* varieties are rarer. These varieties are not stable, but frequently change one into another both *in vivo* and *in vitro*. The *Ch* and *S* varieties develop at laboratory temperature (20°-30° C.), but the *R* variety develops only at 37°-40° C.; none of them develops anaerobically. The *R* varieties of the avian and mammalian strains are more resistant to dyes and disinfectants than the *Ch* and *S* varieties, but the latter are more resistant to heat and light than the former. The *Ch* variety of both avian and mammalian strains are generally avirulent to animals.

**A Brown Rot Fungus.** The brown rot fungi of tree fruits have received considerable attention of late years. Various species of the genus *Sclerotinia* are the chief causal fungi, but a brown-spored discomycete, *Lambertella Corni-maritima*, has recently been found to produce brown rot symptoms upon a variety of fruits and vegetables (T. H. Harrison and A. F. Helaly, *Trans. Brit. Mycol. Soc.*, 19, Part 3, 199-214, February 1935). Dr. Harrison made a tour of some of the fruit areas of western Europe in 1931, and found apothecia of a fungus upon mummified pears in Switzerland and south Germany. They seemed to be characteristic of *Sclerotinia cinerea*, but were identified by Mr. S. P. Wiltshire as the fungus named above. Dr. El-Helaly made cultural studies of the fungus, which tolerates a wide range of acidity, and produces fruit bodies upon a variety of media. It excretes pectinase and oxidising enzymes, and induces disease upon apple, pear, plum, quince, orange, lemon, turnip and parsnip.

**Insect Pests of Lavender.** Dr. H. F. Barnes, of Rothamsted Experimental Station, has recently published a discussion on "Lavender Pests" (*J. Roy. Hort. Soc.*, March 1935). Few caterpillars were known to attack this fragrant crop, but the present article describes no less than thirteen species which have used it for food. Most of the species are very general feeders, and the list includes such common moths as the buff and white ermines, the garden tiger, lesser yellow underwing and the cabbage moth. Excellent half-tone plates illustrate both the caterpillars and the moths bred from them. Each species is described in detail, and its host range is given. The dot, bright line brown eye, small angle shades, gothic, mouse, bearded chestnut, silver Y, and willow beauty moths have all been described, in addition to those mentioned above.

**Cosmic Ray Bursts and their Variation with Altitude.** The bursts of ionisation (Hoffmann *Stösse*) which are produced in a closed chamber, have been studied by C. G. Montgomery and D. D. Montgomery (*Phys. Rev.*, March 15) at stations the altitude of which lay

between sea-level and 4,300 metres. The bursts were observed with and without lead above the chamber. The rate of occurrence of bursts increases with height much faster than the total intensity of the cosmic rays. The frequency distribution of bursts of different size remains approximately constant. The authors interpret their results in terms of Swann's theory, according to which the number of non-ionising primary cosmic rays remains constant as they go through the atmosphere, producing bursts *en route*. The probability of burst production, however, decreases as the rays pass through the atmosphere. On this view the probability of burst production in lead must follow a different law from the burst production in air.

**Glare from Motor-Car Headlights.** The dangers of the dazzle produced by motor-car headlights at night have been well known to every motorist for many years, but no thoroughly satisfactory method of preventing it has yet been devised. In a report issued by the Department of Scientific and Industrial Research (Paper No. 16, "The Evaluation of Glare from Motor Car Headlights". London: H.M. Stationery Office, 1s. 6d. net) it is pointed out that many factors contribute to the problem of glare; it is therefore very difficult to make practical road trials to assess the merits of various devices. This report gives a scientific method of analysing the various contributing factors, a knowledge of which is essential before the relative merits can be adjudged of the various devices. The term 'glare' is used to denote the driver's power to detect objects ahead of him on the roadway. The principal factors involved in determining this power are the candle-power in the direction of the observer's eye of the approaching light, the relative positions of the two cars and the object to be detected, their speed and the reflection factor of the road surface. The results obtained enable a quantitative study to be made of the conditions of visibility in the cases of a simple headlight using no anti-dazzle device, a dipped and swivelled headlight and a headlight giving a flat-topped beam. A factor of primary importance is the threshold difference in brightness between an object and its surroundings. Owing to the absorption or scattering of light by the atmosphere, the threshold value depends largely on the presence of mist or fog. Unfortunately, this threshold value varies with the previous exposure to light of the observer's eyes. The methods described in this report should enable the existing types of headlight beam to be compared quantitatively, and should aid in the discovery of the best type of beam for universal adoption.

**Artificial Radioactivity Produced by Neutron Bombardment.** E. Fermi and his co-workers have published (*Proc. Roy. Soc., A*, April 10) an account of their further experiments on the production of artificial radioactivity by neutron bombardment, of which preliminary accounts have already appeared in Italian. The most interesting result is the enormous increase in the activation of many elements when a quantity of a hydrogen-containing substance such as water or paraffin wax is placed in the neighbourhood of the element and neutron source. Some elements do not show this increase of activation, but it is observed in every case where the product of irradiation is known to be isotopic with the original element. Fermi's explanation of this effect is the slowing down

of the neutrons by impacts with hydrogen nuclei. The slow neutrons are very effectively captured by atomic nuclei, giving rise to new radioactive nuclei. A number of experiments have been performed to elucidate this effect. It is shown that the slow neutrons are strongly absorbed by some elements; the nuclear cross-section of cadmium, for example, reaches the relatively enormous value of  $10^{-20}$  sq. cm. The capture of the slow neutrons is in some cases accompanied by a  $\gamma$ -radiation. Chadwick and Goldhaber have shown (see *NATURE* of January 12, 1935) that the capture results in the case of boron and lithium in the emission of particles of short range. Fermi attempted to find an effect on the activation due to varying the temperature of the hydrogen-containing block. Such an effect might be expected if the neutrons were slowed down to velocities comparable with thermal velocities. No temperature effect was found; but Fermi points out that this result is not quite conclusive about the final velocity of the neutrons [see also this issue of *NATURE*, pp. 903-5]. Experiments have been made on the scattering of the slow neutrons, and they show that once the velocity is reduced to values at which the high efficiency of capture appears, the scattering by hydrogen is also considerable, the mean free path being of the order of a few millimetres in water. A small increase in the activation is observed when other elements such as lead, silicon and carbon are used instead of water or paraffin, and the mechanism of production of slow neutrons seems in this case to be obscure. The paper contains also some theoretical considerations on the properties of slow neutrons, and a systematic account of the activation of a large number of the elements.

**Oxidation of Carbon.** A new method discovered in the Northern Coke Research Committee's Laboratory of evaluating metallurgical cokes was outlined in a paper before the Durham University Philosophical Society by Dr. H. L. Riley, the director, on May 10. It is well known that in reactivity to oxygen, charcoal stands at the head, and graphite (or diamond) at the foot of the series of fuels, with low temperature, gas, and metallurgical cokes between. Some precision has been given to such determinations by earlier work at the station leading to a quantity known as the 'critical air blast', which is the minimum current of air which will maintain the combustion of a standard coke sample. This value is of considerable value in the choice of cokes for the domestic fire. In experimenting with wet oxidation methods, it has now been found that determination of the carbon dioxide liberated on oxidation of a graded coke sample by means of a saturated solution of potassium dichromate in syrupy phosphoric acid is a valuable indication of the quality of coke for metallurgical purposes. The above order of reactivity is reversed, except that the position of wood charcoal is anomalous (sugar charcoal is unreactive), and also diamond. There appears to be correlation with the proportion of graphite present, retort carbon oxidising readily. It was suggested that the reactivity to oxygen depends on hydrocarbon impurities, whereas these are relatively stable to the wet method, while the latter attacks the long weak valencies (3.4 A.) between the layers of graphite in the crystal lattice. Further, the negative chromate ion must be supposed to attack the positive centres, which must be present since graphite is a conductor of electricity like a metal.