

Research Items

Moravian Racial Types. Prof. V. Suk contributes remarks on the value of selective study in the anthropometric investigation of a population as a means of distinguishing ancestral types, to a study of groups of people in Moravian Wallachia by Dr. K. Augusta which has been published by the Faculty of Sciences of the Masaryk University. Two groups were investigated in a population which has long lived in isolation in conditions which do not invite immigration. The traditional mode of life is agriculture, woodcraft, or herding pursued in woodland clearings. The people here specifically called "Valaques", according to recent theory based on linguistic evidence, are partly of Slovak, partly of Rumanian origin. The principal results of Dr. Augusta's anthropometric examination go to show that they are of mixed origin. Taking the two groups together, they show a medium stature (165.9 cm. and 167.1 cm.); they are brachycephalic (85.2 and 85.8); while the mean circumference of the head increases proportionately with increase in growth of stature. The face is mesoprosopic and the nose lepto- to mesorrhine (69.7 and 70). In pigmentation the eyes most frequently are grey or greenish, while the hair is light brown, next in frequency coming dark brown, and then blond, which, however, is rare, showing only 1.0 and 2.7 per cent. 'Pure' types are rare and the most common by far is the 'mixed light brown'. In the valley of Dinotitza, where the selective method of Prof. Suk was employed and not the statistical method on which the figures above were based, a considerable percentage was found of a type differing from the remainder of the population, darker, taller and more pronouncedly brachycephalic, showing all the marks of a Dinaric origin. This confirms the view that the population of this part of Wallachia is of a different somatic origin from the rest of the population. Its derivation must be sought in Rumania.

The Australian Oyster. T. C. Roughley in his paper, "The Life History of the Australian Oyster, *Ostrea commercialis*" (*Proc. Linn. Soc. New South Wales*, 58, Parts 3-4, 1933), studies the Australian edible oyster of commerce in great detail. This species appears to be confined to the Australian coast, its range extending from the far North Queensland coast to so far south as Wigan Inlet in Victoria. It thrives best in estuaries fed by much fresh water. Spawning always takes place on the chief bed studied (Port Macquarie) during spring tides when two or three hours on the ebb and often when a heavy sea is running outside, the temperature being usually 72°-76° F. In other places the oysters appear to spawn partially at intervals, and spawning proceeds daily or almost daily during the whole of the spawning period over five months. There is, however, great irregularity in the spawning of these New South Wales oysters, the reason probably being that the bulk of the oysters are grown in the tidal zone where temperature fluctuations, varying from cold water to hot sun in the course of a few hours, are enormous. A sex change is indicated in this species by the fact that practically all, if not all, young oysters spawn for the first time as males. Nine oysters were found (1-3 years) which contained both ova and sperms in the gonad. The determination of sex in this oyster does not appear to be governed by the amount of food available.

Feeding of the Fairy Shrimp. A. G. Lowndes has recently recorded observations on the feeding mechanism of the fairy shrimp, *Chirocephalus diaphanus* (*Proc. Zool. Soc., Lond., Part 4; 1933*). By keeping the animal in a fixed position while causing a current of water to flow past it at the rate of two feet per minute (the normal rate of swimming of the shrimp), the movements of the appendages under approximately normal conditions can be observed. The author has also employed the polygraphic process, that is, taking photographs about 20 per second, by means of which the movements of the limbs can be recorded. He states that the commonly accepted view that *Chirocephalus* feeds chiefly on suspended particles is incorrect; its chief food consists of detritus. The larger food particles, for example, filamentous algæ, leaves of mosses, etc., are not sucked into the median ventral groove between the appendages, but are pushed in by the endites and pushed towards the mouth by the spines and setæ on the basal endites or gnathobases, which may act in apposition. Suspended particles drawn into the median groove cannot settle there by reason of the increase in the rate of flow as the groove narrows, nor is it likely they can be caught by a secretion of mucus. The movement of the limbs is irregular and only roughly metachronal. Any account of feeding which demands precise co-ordination of the limbs is untenable. The exopodite, regarded as the chief swimming limb, functions as a propeller and not as a paddle. Sars's view, that the primary function of the phylopod post-oral limb is respiratory, is upheld (see also p. 329 of this issue).

Fungi Imperfecti. Referring to a notice in NATURE of December 16, p. 936, of Mr. J. Ramsbottom's presidential address to the Quekett Microscopical Club, in which the suggestion was made that many of the Fungi Imperfecti are mutants from heterothallic strains, Mr. H. A. Dade, of the Gold Coast Department of Agriculture, in a letter to the Editor, describes some unpublished work of his which supports the suggestion. In 1928 he showed that the common tropical *Thielavia paradoxa* is the conidial stage of a *Ceratostomella*, *C. paradoxa*, which is heterothallic. So far, the perfect stage has been found only on the Gold Coast. After the publication of his account, he received numerous cultures from other countries which differed much in cultural characters though not sufficiently to merit specific distinction. Some few when mated with the original strains formed perithecia, others did not. Two vigorous Ceylon strains formed perithecia when crossed with the (+) and (-) Gold Coast strains, but not when mated together, the loss of this power presumably being due to mutation.

Practical Methods of Soil Heating. A good deal of attention has recently been focused on the question as to whether raising the soil temperature in glass-houses by artificial means would be a commercial proposition in Great Britain as it has been in Scandinavia. Investigations on the matter have been carried out at Cheshunt Research Station and the results recently described by Dr. W. F. Bewley (*J. Min. Agric.*, 40, 1047). Cables consuming 1 kilowatt per hour at 240 volts were laid 16 in. below the surface of the soil. Heat was applied

from 10 p.m. until 6 a.m. for the first twelve weeks after planting. In the case of tomatoes, those grown on the heated soil showed more rapid growth, cleaner roots, earlier flowering and quicker fruit maturation than the plants on the untreated soil, and in 1929 the total crop was 20.7 per cent higher in the former case. Similar promising results were obtained with cucumbers. The chief problem, however, was cost. The cables, which are expensive, deteriorate rapidly, and further, the annual renewal of cucumber beds necessitates relaying the wires each season. Twisted strands of galvanised steel wire (14 s.w.g.), however, showed no corrosion after three seasons and proved considerably cheaper. The price of heating, even at $\frac{1}{4}$ d. per unit, also is high, since about 5 watts per square foot are required to raise the temperature 6° F. (from 66° to 72°). Another and cheaper method of soil heating which gave promising results was that derived from an underground extension of the ordinary hot-water pipe system. The temperatures found to give good results were 70°–75° F. Further advice on the subject can be obtained on application to the Director, Experimental and Research Station, Cheshunt, Herts.

Colour Photometry. The rapid extension of the use of coloured luminous electric discharge tubes for lighting and advertising purposes has raised into prominence the question of how best to measure the candle powers of coloured lights, and Mr. H. Buckley and his colleagues at the National Physical Laboratory have tested the methods available. The results at which they have arrived were communicated by Mr. Buckley to the Illuminating Engineering Society in a paper read before the Society on February 20. The original method of comparing the brightness of two sources of different colours is both difficult and unreliable, but the newer 'flicker' method is easy to carry out and reliable. The 'calculation' method, which depends on the determination of the energy distribution of the light source and on the effect which each colour produces on the eye, while it gives accurate results, is tedious and requires skilled work with a spectrophotometer. Mr. Buckley advocates the use of coloured screens the absorption of which throughout the spectrum is observed by the spectrophotometer and which when placed between a standard light and a photometer of either of the above types will give an approximate match with the coloured light to be measured. A small field of view seems an advantage.

Acid Catalysis in Non-Aqueous Solvents. A number of reactions are catalysed in watery solution by acids irrespective of the precise nature of the latter. R. P. Bell (*Proc. Roy. Soc., A*, Jan.) has studied the catalytic effect of a number of acids in solution in chlorobenzene, benzene and some other solvents. The catalysis in such solvents must be due to the acid molecule and not to the other products formed in presence of a dissociating solvent like water. The reaction studied was the re-arrangement of *N* bromoacetanilide to form *p*-bromoacetanilide, and the reaction was followed by using the liberation of iodine from acid potassium iodide by the *N* bromoacetanilide. It was found that the catalytic power increased in the same order as the strength of the acids, as measured by their dissociation constants in water. Picric acid occupies an anomalous position, possibly because of tautomerism in the picrate ion. Quantitatively, the catalytic power increases less rapidly than

the dissociation constant in water, the values being connected by a 0.3 power law. Very similar results were obtained from some less accurate measurements in benzene solution and from a few experiments in ethyl nitrate and ethylene chloride. The rates of reaction in chlorobenzene are 10^4 – 10^5 times less than those calculated on the assumption that every collision is effective that takes place between a reactant molecule and a catalyst molecule with the proper energy of activation.

Action of Solvents on Coal. Of the methods employed for studying the constitution of coal, none has been more popular than the use of solvents to separate constituents of different character. The range of solvents used by different workers is large and the report on "The Action of Solvents on Coal" (Fuel Research Board Technical Paper No. 37, H.M. Stationery Office, 4s. 6d. net) containing a critical survey of work in this new field, supplemented by experimental study, will be useful to all engaged in this branch. Unfortunately, the selective action of solvents is never clear-cut, and the character of coal shows infinite variety, leaving opportunity for great diversity of findings. Even since the writing of the book, new complications have appeared in the discovery that some solvents can, by reaction or condensation, produce resinous matter which has at times been attributed to the coal. Moreover, it has been shown that the portion capable of extraction can be considerably increased if the coal be first reduced to dimensions of the order of one micron.

Reinforced Concrete Structures. Steel, with its great tensional, and concrete with its great compressive, strength, possessing similar coefficients of expansion, seem to have been intended for combination in structures. Rules controlling the use of any form of construction must necessarily be framed on conservative lines in the absence of scientific data, and when wide application precedes detailed research caution is the more required, but experience gained shows that without impairing safety greater economy in the employment of these materials as re-inforced concrete is possible. To meet this national need and the requirements of the London County Council, which is revising the London Building Act, a committee was set up by the Department of Scientific and Industrial Research under the chairmanship of Sir George Humphreys to consider improvements in the regulations for re-inforced concrete work, and this committee with the information on the better and more scientifically prepared materials now obtainable before it, has produced a code of practice based on present-day knowledge which will admit of considerable economies being effected. An entirely new feature of these regulations is the permission of three grades of work allowing greater stresses, or, in effect, less material to meet the required stresses, where more care and skill is given as adjudged by the tests required on samples made as the work proceeds. The code defines the materials and details of construction allowed and gives the strengths to be shown by tests when called for. Though actually only applicable to the area administered by the L.C.C., it is expected that the code will form a standard for use throughout the country. During the work of the committee, the investigation at the Building Research Station under Dr. Stradling has proved a valuable asset.