Research Items

Racial Crosses in South Africa

IN a study of racial problems in South Africa, which appears in the *Scientific Monthly* of February, Prof. H. B. Fantham, formerly of the University of the Witwatersrand, Johannesburg, records a number of observations of the results of crossing between the various racial groups in the population of the Union. Details are given of fourteen Eur-African crosses, ten Afro-Asian crosses and two Eurasian. Some of the Afro-Asiatic cases have European blood on the African side. There are also native hybrids, the ethnic melting-pot areas being the Kalahari (Bushman-Hottentot-Herrero-Bechuana), the junction of the Vaal and Orange Rivers (Bushman-Koranna-Hottentot-Bechuana) and the north-eastern Transvaal (BaPedi-BaThonga-BaVenda). While the predominant elements in the white population are English and Dutch, there are also survivals of Portuguese and Huguenots; and in recent times Germans and Jews, especially from Central Europe, have been added. There is also the Indian element and a remnant of Chinese labour. The 'Cape coloured', who are the result of Hottentot, Kafir and Malay admixture with Europeans since the days of early settlement, now equal in number one third of the white population. Some of the hybrid-coloured form distinct groups, such as the Griquas (Dutch-Hottentot-Bush) and the Rehoboth Bastards (Boer-Hottentot). A simple case of miscegenation, in which a fair-haired, blue-eyed Belgian married a Zulu woman, produced eight children, who classify themselves as black (2), white (2) and brown (4). In the first generation a 'black' woman married to a Zulu produced two black and two brown; a 'white' woman married to a Zulu produced one black and one white; while in the second generation a 'white' daughter who married her black cousin has a brown daughter. Of the fifteen descendants of the original couple, six approximate to the Zulu type (black), three to the European (white), and six are brown. Socially, the brown are despised by black and white alike. As a result of the observations, the racial crosses are not to be commended. The coloured race has neither the energy nor the persistence of the white, is less stable temperamentally, and is not controlled by the tribal conventions of the native.

Barndoor Fowl in Egyptian Art

MR. G. D. HORNBLOWER comments on the absence of the domestic fowl in ancient Egyptian art in describing a wooden spoon of unknown age and provenance, which he believes to be unique (*Ancient Egypt and the East*, 2; 1935). It was bought from a dealer in Cairo some years ago. Its dimensions are: length, $8\frac{1}{2}$ inches; length of bowl, $3\frac{3}{4}$ inches; breadth of bowl, $1\frac{3}{4}$ inches. The bowl is delicately carved in an oval, such as is found in known specimens of the New Kingdom. The present example is remarkable in that it has a barndoor fowl carved at each end of the handle. The identity is clearly shown by the carriage and upright port of the tail, which differs from the drooping tail of the wild jungle fowl. The bird which usually decorates the finials of a spoon is the duck. The barndoor fowl, of which the representation here appears to be unique, was not introduced into Egypt until the eighteenth dynasty, if not later. This late entry accounts for its absence in the history of art in the country. The conventions for pictures of ordinary life were fixed under the Old Kingdom, and were strictly maintained for later periods by religious conservatism. Therefore, although in Babylon the domesticated jungle fowl has some religious significance, in Egypt it was not admitted as a decorative element in art, unlike the duck and goose, which figure largely in the revered works of the Old Kingdom, and accordingly were admitted freely into later art.

Mortality Rates for England and Wales

A NEW estimate of expectancy of life at various ages is given in the tables published in the Registrar-General's Decennial Supplement, England and Wales, 1931 (London: H.M. Stationery Office). Mortality rates show a great improvement in vitality at all but the most advanced ages. The improvement is most marked at the youngest ages. The probability that an infant will die within a year of birth has decreased between 1931 and 1911 by as much as forty per cent. On the other hand, at advanced ages the 1931 mortality rates are rather heavier than those of 1921 or 1911. The deterioration is compared with the 1921 rates; it first becomes apparent at sixty-nine years of age in males and at seventy-eight in females. This is attributed partly to the survival in the present generation of many of the weaker members of the community, who under former conditions would have succumbed before old age was in sight. The geographical distribution of mortality is of interest. It is heaviest among both sexes in the north of England, and becomes lighter towards the south. In county boroughs, that is, urban areas, mortality is usually heaviest for both sexes, and in rural districts where mortality is lightest the male rate is much lower in relation to the general average than the female. Detailed tables for Greater London show that the male death rates in that area are lighter than for the average of England and Wales up to forty-five years of age, and the female rate is lighter at all ages. However, the outer ring or London suburban area shows a lighter death rate for both sexes than the country as a whole, and lighter than the rates for other urban areas.

Munida from the Falkland Islands

MR. G. W. RAYNER makes some very interesting observations on the two closely related species of *Munida*, *M. subrugosa* and *M. gregaria* (Discovery Reports, 10, 209–245; 1935). These two crustaceans are of much importance as food, especially for the whalebone whales, but also for the southern sea lions, fishes and sea-birds, the free-swimming post-larva of *M. gregaria* (the so-called "Grimothea") being met with in large swarms, sometimes covering an area of four miles in length. The larval stages are described, but the two species are much alike and have not been differentiated until the post-larval stage is reached. They are like *Galathea* in many ways and seem to link this genus with the larval species of *Munida* so

far known. The material available is large, especially of *M. subrugosa*, enabling the growth and distribution, as well as probable breeding seasons, of both species to be worked out. The gradual development of the male and female pleopods is described and figured in detail. Several parasites and epizoa are recorded. *M. subrugosa* is apparently more numerous in these regions, but not found in any numbers below 200 m.; both species occur near the coast, *M. gregaria* being remarkable for its neritic distribution and for the swarming habits of the post-larvæ, which have long been known. None of these peculiar swarms occurs far from land. They may be so dense as to give the water a reddish tinge, each swarm being spherical and from one to four feet in diameter, the patches looking like swarms of bees, with the individuals incessantly in motion.

Gastropods from the Dutch East Indies

THE larger marine gastropods from warm waters are well known, and there are no new species in the splendid collection of Mitridæ and Terebridæ now described by Dr. Dautzenberg (Gastéropodes Marins. 1.—Famille Terebridæ. 2.—Famille Mitridæ. Résultats Scientifiques du Voyage aux Indes Orientales Néerlandaises de LL.AA.RR. le Prince et la Princesse Léopold de Belgique. Mémoire du Musée Royal d'Histoire Naturelle de Belgique. Hors Série. Vol. 2, Fascicule 17, 1935.) Numerous striking forms familiar to conchologists are recorded, most of which have a wide distribution. The synonymy lists of some of them are enormous, sometimes filling two or three pages—in the case of *Mitra episcopalis* and *Terebra crenulatus* and *maculata* they occupy more than four each. Only the shells are described. The collecting grounds in these regions must be exceedingly prolific, judging from the present monograph consisting of 208 pages and illustrated by beautifully coloured plates. Besides the better-known and larger forms there are several small species of *Mitra* and allied genera, and here there are several new varieties and new names, whilst there are a few new varieties and new names among the species of *Terebra*.

Marine Fishes of Nova Scotia

Two descriptive accounts of the marine fishes of regions not adequately dealt with hitherto have recently been published. In a paper on "The Marine Fishes of Nova Scotia" (*Proc. Nova Scotian Inst. Sci.*, 19, Pt. I, December 1935), by Vladykov and McKenzie, a complete review is given of all the marine and anadromous fishes (151 species) found around the Nova Scotian coast, with the exception of the Gulf of St. Lawrence. The area under survey lies roughly between latitudes 42° 15′ N. and 47° N., and between longitudes 57° W. and 66° 45′ W. It covers approximately fifty thousand square miles of coastal and 'bank' waters. A key, designed to assist the non-specialist in the identification of native fishes, is given, and 129 outline drawings accompany the descriptions.

Soil Conditions and Lily Growth

THE Lily Conference of the Royal Horticultural Society held in 1933 raised some important questions as to the relation of certain lilies to the kind of soil in which they were grown. Dr. M. A. H. Tincker examined a large number of soil samples, showed that these plants were widely tolerant to acidity and lime content, and has more recently published the results of his experiments on drainage conditions ("Experiments with Lilies at Wisley", R.H.S. Lily Year Book, 1935, pp. 68–75). Lily bulbs planted in the resting condition are very susceptible to water-logging. This fact was established for several species by culture in pots, where the drainage could be controlled artificially, and by plantings at various levels upon the side of a ditch. It is an interesting point that two of the species tested, namely, *Lilium pardalinum* and *L. superbum*, are found naturally in semi-swamp conditions; but an examination of the published records indicates that the bulbs were always well above the water-table.

Reserve Materials in the Felled Tree

AN interesting paper by S. E. Wilson on "The Fate of Reserve Materials in the Felled Tree" (*Forestry*, 9, No. 2; 1935) is of interest since it would appear to afford some light on seasoning investigations. As is well known, forest trees are usually felled in the winter when the sap wood contains abundant reserve food materials. These, as starch, sugar, fat materials, etc., occur within the living storage cells. The fate of the reserve materials is now shown to depend on the treatment of the timber after felling. If the log is kept whole, and the bark retained to prevent rapid drying, the storage cells continue alive until all reserves are exhausted; whereas if the timber is converted quickly, and the cells killed by desiccation or kiln-heat, the reserve materials remain intact and cannot thereafter be removed by any known treatment. Timber containing reserve materials is shown to be a ready prey to wood-tunnelling beetles, for example, *Lyctus*, and sap-staining fungi. The author puts forward suggestions for the co-operation of forest botanists with timber technologists in order to extend the knowledge of these important reserve materials with the view of the better utilisation of British (and it may be added tropical) timber trees.

Geology of Kap Dalton, Greenland

ONE of the three areas in Greenland where Tertiary sediments have been found is Kap Dalton in East Greenland. Here, well-preserved marine fossils and plant remains occur together, the age being probably Lower Eocene. During a second visit to the locality, a conglomerate consisting entirely of pebbles of igneous rocks—including highly alkaline types—was discovered at the base of the sediments by L. R. and H. G. Wager. In a report on the geology, L. R. Wager devotes special attention to these rocks, since they represent types not previously met with in the North Atlantic Tertiary Province (*Medd. om Grønland*, Bd. 105, No. 3; with coloured geological map and 6 plates of photomicrographs). The varieties described include malignite, monchiquite, kersantite, tinguaite, soda-trachyte, trachyandesite, trachybasalt, leucite-nephelinite and nepheline-leucitite. It is suggested that the pebbles are derived from a volcanic area, injected by hypabyssal and plutonic rocks, which once overlay the region about Davy Sound, and that the known alkaline intrusive rocks of Cape Parry, Cape Fletcher, Antarctic Harbour, etc., may be remnants of the same igneous field. The evidence available in 1918 suggested to Holmes that the later phases of igneous activity in the North Atlantic were the more alkaline; Wager now presents evidence that the earliest phases were also characterised by highly alkaline types. The petrological problem

offered by the area is like that of the Permo-Carboniferous association, in the Midland valley of Scotland, of vents of basic alkaline types with sills and dykes of quartz-dolerite.

Geology of San Juan, Colorado

THIS region is one of unusual geological variety and interest, and the summary description now presented by Whitman Cross and E. S. Larsen (U.S. Geol. Surv. Bull. 843, 1935) will be widely welcomed as a preliminary to the more detailed studies now in preparation. A long succession of Pre-Cambrian events is displayed in the San Juan Mountains, including the formation of important series of injection complexes. At some time between the late Pre-Cambrian and late Jurassic a stock of alkaline rocks was intruded about Iron Hill. The oldest rock of this complex is a limestone, believed to be of hydrothermal origin. This was followed by uncompahgrite, a coarse-grained melilite-rock, which in turn was followed by a large mass of pyroxenite. There were intruded successively ijolite, nepheline-syenite, syenite, nepheline-gabbro, and finally quartz-gabbro. The increasing silicification of the rocks is notable. Beginning in the Miocene, the great accumulation of volcanic rocks that makes up most of the mountains was built up. These are mainly andesites, quartz-latites and rhyolites with associated breccias and tuffs; they include the extensive Potosi series of the Miocene and, after the reduction of the region to a fairly smooth surface (the San Juan peneplain), the almost equally extensive Hinsdale series of the Pliocene. In Quaternary time, after the earliest stage of glaciation (three stages have been recognised) local flows of andesite were erupted in the south-east. The region has been famous for its sources of gold and silver, with some lead, zinc and copper. The deposits occur mostly about intrusive bodies of Tertiary age or along faults in the volcanic rocks.

Reception of Wireless Signals Underground

THE penetration of electric waves through the surface layers of the earth and the consequent possibilities of wireless reception underground are subjects of important scientific and technical interest. In a recent paper (*Hochfrequenztechnik und Elektroakustik*, **47**, 12; 1936), Dr. D. Doborzynski describes the results of an experimental contribution to this subject. Simple tests of broadcast reception on the medium-wave band (250–550 m.) were carried out in two caves at the village of Ojców, near Cracow, Poland. These caves are about 20 metres and 25 metres respectively below the ground and are situated in the limestone region of the Jura Mountains. The caves are very wet inside, and stalactite and stalagmite formations are present. The experiments were made in the evening in July and August, 1935; and, using an inverted L aerial, the successful reception of signals from various European broadcasting stations was obtained at distances ranging up to 1,000 km. Although no actual measurements were made, the signals, in general, appeared to be of the same intensity as those observed under similar conditions on the surface of the ground above the caves. In the case of the local broadcasting station at Cracow, 17 km. away, there was a noticeable reduction in the signal intensity in the caves over the values observed on the surface. This matter is to receive special attention in a more detailed investigation to be carried out in the future.

Enzyme Action in Heavy Water

THE reports on the influence of heavy water on biological processes, including enzyme action, have been conflicting, and the data so far obtained for enzyme action are too meagre to be properly evaluated. Amylases catalyse hydrolytic reactions in which water is an important factor, and M. L. Caldwell, S. E. Doebbeling and S. H. Manian (*J. Amer. Chem. Soc.*, **58**, 84; 1936) have described experiments with preparations of pancreatic amylase of exceedingly high purity and activity. The heavy and ordinary water used were carefully purified and were shown to be free from oxidising substances (ozone and hydrogen peroxide). It was found that 100 per cent heavy water has no marked influence on the hydrolysis of starch by pancreatic amylase, provided the conditions of the experiments are such as to minimise the deterioration of the enzyme. The inactivation of pancreatic amylase, however, is more rapid and more pronounced when the amylase is held at 25° in highly purified heavy water than in similarly purified ordinary water.

Approximate Heat Capacities of Gases

THE failure of the equation

$$C_p = a + bT + cT^2$$

to represent heat capacity data over large ranges of temperature has led to several other attempts to obtain a useful and sufficiently accurate formula. I. N. Godnev (*J. Amer. Chem. Soc.*, **58**, 180; 1936) shows that the equation

$$C_p = C_{p_0} + \Sigma\varphi(\theta_x/T) + aT + bT^2$$

holds very satisfactorily if C_p is the value calculated from spectroscopic data, and $\varphi(\theta_x/T)$ is the Planck-Einstein function, tables of which are available. The equation was applied to carbon monoxide, nitrogen and sulphur (S_2) in the range 100°–5,000° K., in which interval it is allowable to put $b = 0$. The value of φ is taken, in these cases, for two degrees of freedom. This equation is not at all cumbersome in use, and its extension to other gases would be interesting.

Gasoline Efficiency

DR. M. R. FENSKE, of the Pennsylvania State College, recently reported to the American Chemical Society on the progress made by scientific workers in increasing gasoline efficiency. According to Science Service, of Washington, D.C., he emphasised the fact that efficiency of the modern gasoline engine depends on compression ratio. As this ratio is increased, 'knocking' appears, unless the octane number of the gasoline is correspondingly increased. Average automobile gasolines have an octane number of about 70 and gasolines of the ethyl type 78–80. Last year, however, chemists produced a gasoline having an octane rating of 92. One million gallons of this was ordered by the United States Government for use in army and navy aeroplanes. A similar quantity is to be delivered to the Government during the first six months of this year, and an intimation has been given that in future orders the octane number will again have to be increased. The primary cause for stress on gasoline efficiency is that the more miles of flight a gallon of fuel can produce the greater is the load the aeroplane can carry, and the longer its range of flight. These factors are of vital importance in the case both of commercial and bombing aeroplanes.