Research Items

Standards of Living in Africa

THE problem of raising the standard of living in native Africa, with special reference to the contribution to its solution which may be made by the anthropologist, has been the subject of consideration by Dr. Margaret Read in the light of recent experience among the Ngoni of Nyasaland (International Institute of African Languages and Cultures, *Mem.* 16; 1938. Oxford University Press. Pp. 56. Price 1*s.*). Apart from the difficulty of a quantitative evaluation of the present standard of living in a community existing partly on a subsistence economy, partly on a money economy, the problem of raising the standard calls for a deeper analysis, probing to the values which govern present consumption and the incentives which determine present production—in other words, study of 'institutions'. Study of Ngoni institutions shows that in the past economic activities were dependent upon, and organized through, the social system of the people. In the changes due to cultural contact it is the economic life which has been altered most radically. The native authorities, though deprived of most of their traditional means of wealth, are expected to promote schemes of native welfare more or less on European lines. The fundamental difficulty is that economic progress cannot be dissociated from political and social development, if either are to be maintained. In a brief survey of cattle keeping, agriculture and the paramount chief's market, it is shown that there is no automatic reaction to environment, nor is there any automatic or uniform reaction to culture change introduced by Europeans. The Ngoni have resisted the suggestion of a 'commercial attitude' towards cattle. Their organization of agriculture and distribution of its proceeds have collapsed, owing chiefly to forces outside their control; but in the paramount chief's market he has created deliberately a new form of activity, which though based on an old traditional relationship, meets some of the new needs of the people. The variation in the reactions of the people to efforts to improve their welfare suggests the usefulness of careful preliminary inquiry before introducing innovations such as farm schools and co-operative societies. Economic progress must be in line with political development if either are to achieve stability and permanence.

Manuring of Soft Fruits

Two interesting investigations on the manuring of soft fruits have recently been recorded (*J. Pom. and Hort. Sci.*, **16**; 1938). The first, by T. Wallace, concerns black currants, and the second, by T. Wallace and V. G. Vaidya, refers to strawberries. The black currants, variety Baldwin, were given a series of manurial treatments consisting of farmyard manure, no manure, complete artificials, and complete artificials less nitrogen, phosphorus and potassium respectively. The order of crop yields was the same as that for vigour, namely, farmyard manure, complete artificials, omit nitrogen, omit phosphorus, omit potassium. Severe attacks of *Pseudopeziza Ribis* occurred each year; potash deficiency appears to have decreased susceptibility to this fungus, whilst deficiencies of nitrogen and potassium tended to increase it. The strawberries, variety Royal Sovereign, were given three dung treatments, complete organic manures containing shoddy and dried blood respectively as sources of nitrogen, dried blood without potash, complete artificials, and no manure. Dung produced greatest vigour though the results from shoddy and complete artificials were similar. Dried blood manure with and without potash gave relatively poor vigour and the yields from these plots were low. Evidently dried blood is a poor source of nitrogen for strawberries. The largest yields occurred on the dung plots. Manuring did not affect the ripening season, the proportions of marketable fruit in the crop, or the incidence of pests and diseases.

Seasonal Transmission of Cassava Mosaic

A SHORT paper by Dr. H. H. Storey and R. F. W. Nichols (*East African Agri. J.*, **3**, No. 6, 446–449; May 1938) describes a field experiment upon the transmission of cassava mosaic, a virus disease. Infection experiments were repeated at continuous monthly intervals for two years, and it is thereby established that virus transmission is greatest from February to May, and least from August to October, in East Africa. This would doubtless have some relation with the insect population of the area; but the practical result emerges that planting of cassava in June is most beneficial, since the main period of growth is made when virus transmission is at a minimum.

Separation of Mixtures of Gases and Isotopes

A NEW method for the separation of mixtures of gases, which can be applied to the separation of mixtures of gaseous isotopes, is described by K. Clusius and G. Dickel (*Naturwiss.*, **26**, 546; 1938). A vertical hot surface (an electrically heated wire was used) is placed opposite a cold surface. The gas mixture is between the two. The various processes of thermal diffusion and convection result in a concentration of the heavier component of the mixture at the bottom of the apparatus, and of the lighter one at the top. Using an apparatus 65 cm. long and a temperature difference between the surfaces of 300°, a mixture containing 25 per cent bromine and 75 per cent helium was completely separated. With an apparatus 1 metre long and a temperature difference of 600°, pure carbon dioxide was obtained from a mixture of 40 per cent carbon dioxide and 60 per cent hydrogen. With normal neon in an apparatus 2·6 metres long and a temperature difference of 600°, the proportion of isotopes in the gas drawn off at the bottom of the apparatus was ^{20}Ne 68·4 per cent, ^{21}Ne 0·6 per cent, ^{22}Ne 31·0 per cent, whereas normal neon contains ^{20}Ne 90·0 per cent, ^{21}Ne 0·3 per cent, ^{22}Ne 9·7 per cent. When normal hydrogen chloride containing 23 per cent H^{37}Cl and 77 per cent H^{35}Cl was used, the concentration of H^{37}Cl in the gas obtained at the base of the apparatus was increased to 40 per cent. The atomic weight of the chlorine in this mixture is 35·56, 0·10 units greater than the international value of 35·457.

Protection of Telephone Circuits

To the *Strowger Journal* of July published by the Automatic Telephone and Electric Co., Ltd., of Liverpool, Mr. T. B. D. Terroni communicates an instructive paper on the protection of telephone circuits from inductive interference. He first refers to the excessive voltages which occur on telephone lines due to faults on power transmission lines. These induced voltages are sometimes of sufficient magnitude to be a danger to telephone employees and to cause great damage to telephone apparatus. This type of problem occurs on railway systems where privately owned telephone lines run parallel to the track close to the main high-tension distribution network. The telephone lines are used for telephony, signalling and the remote control of sub-stations from a main control station. The danger can be obviated by means of a large inductive coil, called a drainage coil, connected between the two wires of a telephone line, with its mid-point in contact with the earth. A further source of disturbance arises from the fluctuations of the earth potentials, near a power station, when an earth fault occurs. The fault acts as a source of power and the station earth acts as a sink, so that currents flow through the earth. The potential of the earth in the vicinity of the power station may be so high as 3,000 volts above the earth potential at some distance away. When British P.O. lines are hired to operate between 132 kv. grid sub-stations and a central indicating station, trouble is obviated by terminating all the P.O. circuits in special isolating transformers. Cable circuits are much more immune from lightning induction trouble than overhead lines. In desert areas, open wire lines are known to experience high voltages as the result of sand storms. The voltages appearing in the telephone loop are probably due to the charging up of the two conductors by the highly charged particles of sand. The use of neon arresters to discharge these potentials to earth give rise to acoustic shock in the telephone receiver. This is due to the repeated discharges of the lines to earth through the neon tubes, which do not necessarily flash simultaneously. This is remedied by using the new 'atmite' protectors.

Atomic Weight of Carbon

E. Moles and A. Escribano have recently redetermined the atomic weight of carbon (*Comptes rendus*, **207**, 66; 1938). The method involved the determination of the limiting densities of carbon dioxide and oxygen, this being carried out by adsorbing known volumes of the gases on charcoal at the temperature of liquid air, the charcoal being weighed before and after the adsorption. The determinations were made at 760 mm. and 380 mm. pressure, and the limiting density was obtained by extrapolating to zero pressure, assuming the variation to be linear. The values obtained for the limiting densities were: oxygen, 1·427644 gm. per litre; carbon dioxide, 1·963340 gm. per litre. This gives 44·0074 for the molecular weight of carbon dioxide, and 12·0074 for the atomic weight of carbon. This is almost identical with the value obtained by Moles and Salazar in 1934 from the ratio $CO : O_2$, but differs slightly from the value (12·010) accepted by the Committee on Atomic Weights of the International Union of Chemistry, the eighth report of which is just published (*J. Chem. Soc.*, 1101; 1938).

New Transformation Product in the Trans-Uranium Series

PREVIOUS work has shown that the irradiation of uranium with neutrons gives rise to three transformation series, the first two of which have been followed as far as eka-platinum (atomic number 96) and eka-osmium (atomic number 94) respectively, whilst the nature of their emitted radiation makes it possible to assume that eka-gold (atomic number 97) and eka-iridium (atomic number 95) respectively are further produced. In the third series a β-radiating uranium of half-life 23 min. only has been detected, which possibly gives rise to eka-rhenium. The three series may be summarized as follows: (1) $^{92}U + n \rightarrow (^{92}U + n)$

$$\xrightarrow[10\ \text{sec.}]{\beta} {}^{93}\text{eka-Re} \xrightarrow[2{\cdot}2\ \text{min.}]{\beta} {}^{94}\text{eka-Os} \xrightarrow[59\ \text{min.}]{\beta} {}^{95}\text{eka-Ir}$$

$$\xrightarrow[66\ \text{hr.}]{\beta} {}^{96}\text{eka-Pt} \xrightarrow[2{\cdot}5\ \text{hr.}]{\beta} {}^{97}\text{eka-Au ?}$$

; (2) $^{92}U + n \rightarrow (^{92}U + n)$

$$\xrightarrow[40\ \text{sec.}]{\beta} {}^{93}\text{eka-Re} \xrightarrow[16\ \text{min.}]{\beta} {}^{94}\text{eka-Os} \xrightarrow[5{\cdot}6\ \text{hr.}]{\beta} {}^{95}\text{eka-Ir ?}$$

; (3)

$$^{92}U + n \rightarrow (^{92}U + n) \xrightarrow[23\ \text{min.}]{\beta} {}^{93}\text{eka-Re ?}$$

The transformation products in the first two series are isomeric nuclei, those in the second series being always of longer half-life than in the first. This led Hahn, Meitner, and Strassmann (*Naturwiss.*, **26**, 475; 1938) to look for an activity of eka-iridium in the second series of long half-life, since the eka-iridium of the first series has a half-life of 66 hr. By irradiating 10–20 gm. of uranium for some months with neutrons within paraffin, and examining the products, the existence of a new transformation product with a half-life of about 60 days was indicated. The genetic position of this product is still uncertain, but it would appear to be the eka-iridium of the second series that was sought.

Evolution of Eclipsing Binaries

DR. ZDENĚK KOPAL has recently published a paper (*Mon. Not. Roy. Astro. Soc.*, **98**, 8; June 1938) in which he examines the fission theory of the origin of binaries and also the question of an evolutionary progression or of a statical interpretation as suggested by their physical properties. It is well known that the ratio r_1/r_2, where r_1 and r_2 denote the radii of the primary and secondary, respectively, decreases with an increase in the separation of the components. Thus in the closest systems the primary is much larger than the secondary, the reverse being true in the widest systems, and the present separation is a rough criterion of the stage of evolution, provided the components were originally in contact. A difficulty arises here. The total angular momentum of the system resides chiefly in the orbital momentum, and as separation can be effected only by internal action, such as tidal friction, there is little scope for such taking place at the expense of the rotational momenta of the constituent stars. It appears that the eclipsing systems must have larger stores of angular momenta in the rotation of their components than can be obtained on the assumption that they rotate as rigid bodies with constant Keplerian angular velocities. It is suggested that the interior may rotate more rapidly than the surface layers. If this took place, so that rotational and orbital momenta are comparable, observational facts are not essentially incompatible with the fission theory.

the liberation of lysocithin. R. J. Williams described the isolation and properties of pantothenic acid—a universal growth stimulant present in all cells. J. F. Toennies presented evidence that sensory stimulation may evoke a reflex which leads to the appearance of antidromic inpulses in dorsal spinal roots. A. v. Muralt demonstrated an apparatus which plunges nerve trunks into liquid air while impulses are actually passing, so that various evanescent effects of the impulses can be detected. F. Schütz demonstrated an apparatus for studying adsorption on foam, which may be useful in separating substances of physiological importance. J. S. Fruton described the results of the study of the action of various proteinases on simple peptides, which show that they may act specifically on the link between one particular pair of amino acids. A. C. Ivy demonstrated the masculinization of female rat embryos by the injection of male hormone into the mother during pregnancy, and also the reverse effect on male embryos. Another demonstration showed the same effect as the result of the injection of the embryos themselves by laparotomy. E. H. Venning and J. S. L. Browne described the results of a study of the physiology of progesterone by estimating its excretion product in the urine. R. D. Wright and H. W. Florey described interesting experiments on the secretion of the colon. L. A. Maynard, C. M. McCay and G. Sperling demonstrated experiments in which rats lived longer than normal rats and retained their youthful appearance, when they were fed on a diet which was deficient in calories, but otherwise complete.

The most popular discussions were on urinary excretion, the chemical transmission of nervous impulses, steroids, the adrenal cortex and the hypophysis. It was unfortunate that the last two of these discussions were held simultaneously.

The pharmacologists held a special meeting at which they discussed the scope and future of their science. Sir Henry Dale accused them of not taking an active interest in the important new remedies which are being introduced so rapidly, and of leaving the practical application of hormones, vitamins and chemotherapeutic agents to physiologists, biochemists and pathologists, who often have no medical training. Various speakers replied that pharmacological teaching does in fact keep up to date, and that pharmacological research is more likely to be fruitful if pharmacologists are allowed to study what interests them, than if they are diverted to the study of the practical applications of the work of others. Pharmacology has been handicapped because it has been regarded as a handmaid of medicine. Its proper scope includes not only the study of the scientific basis of therapeutics, but also more general problems of how drugs act, methods of assay and standardization, the absorption and fate of drugs, factors determining the intensity of their action and their toxic effects not only on man, but also on other forms of life such as insects, weeds, worms, protozoa, and bacteria. The pharmacologist must know something of many sciences, but diversity of interests has been stimulating in the past and is likely to be so in the future.

On Thursday evening the members of the Congress were divided into groups with common interests, and entertained to dinner in various parts of Zurich. Interesting speeches of welcome and of gratitude were made and there were various other postprandial entertainments.

The final meeting was held on Friday afternoon. Prof. A. V. Hill presented the report of the permanent International Committee. Prof. L. A. Orbeli was elected to succeed Pavlov on this committee and there was some general discussion of procedure. Sir Henry Dale, on behalf of the Physiological Society, invited the Congress to meet in England in 1941 and this invitation was accepted. Prof. Houssay put forward an invitation to Buenos Aires in 1944, which was received with enthusiasm.

The Swiss committee is to be warmly congratulated on the arrangements for this Congress, which were simple and worked smoothly and without delay. Membership was limited to genuine physiologists approved as such by national committees, so that the temporary physiologists who have attended some recent congresses were excluded, but this arrangement is unfortunately open to abuse, since it makes it possible for genuine physiologists to be excluded for political reasons. About 1,100 members registered, and they were officially accompanied by 260 other persons. There were no Russians, but most other nations were well represented. A number of Spaniards, including Prof. Negrin, were able to come.

J. H. GADDUM.

Twelfth International Horticultural Congress

THE formal opening of the Twelfth International Horticultural Congress took place at 11 a.m. on August 12 in the Plenary Hall of the Congress Building (Kroll Opera House), Berlin, when the president, Herr R. Walther Darré, Reich Minister for Food and Agriculture and Reich Peasant Leader, gave a speech of warm welcome to all members, who represented about fifty nations. Addresses were also delivered by Herr Johannes Boettner, managing president; Prof. F. Angelini, first vice-president of the Congress; and Dr. J. J. L. van Rijn, vice-president of the International Institute for Agriculture, Rome. The British delegation was headed by Dr. H. V. Taylor, of the Ministry of Agriculture, and included Sir Arthur Hill, Sir Frank Stockdale, Colonel F. R. Durham, R. G. Hatton (East Malling), F. J. Chittenden and Dr. M. A. H. Tincker (Wisley).

In view of the numerous and varied horticultural problems to be discussed during the week, twenty sections were set up embracing all branches of horticulture, such as growing of fruits and vegetables, nurseries, nomenclature, park and garden planning, education, physiology, etc. As it was quite impossible to attend all the sectional meetings, the present account cannot claim to be complete, and mention can be made only of the few sections visited. In the Section of Education great interest was shown in the international exchange of young gardeners. M. Tubart outlined the existing position and made proposals for the further extension of the system. In