Research Items.

Cultural Areas in Africa.—In *Africa* for January, Dr. Melville J. Herskovits applies to the ethnological problems of Africa the American method of 'cultural areas'. He suggests nine cultural areas: (1) Hottentot: essentially a herding culture but differing from the Bantu, in that there is no agriculture, and the women have much to do with the herds. The cattle are given as gifts in marriage, but for the wedding feast, not as a dower. The language, with that of the Bushmen, is differentiated by the 'click'. (2) The Bushman: with poor material culture, but high artistic and literary (folklore) ability. The dog is the only domesticated animal, and hunting is brought to a high degree of skill. (3) The East African cattle area: cattle determine a man's position and prestige, and are utilised in all the important ceremonials of life; but they do not furnish food, excepting milk, or when eaten as a ceremonial offering or after they have died. Food is obtained from the produce of the fields, and is the work of the women, to whom the care of the cattle is forbidden. Polygamy prevails, being based on the number of cattle a man commands. (4) The Congo: predominantly agricultural. The people live in rectangular houses, make bark cloth, use masks, practice cicatrisation, and carve human representations. The secret society is important. (5) The East Horn: not sharply differentiated, but shades off from East Africa. The camel and horse slowly take the place of cattle—a marginal area. (6) The eastern Sudan: a nomadic culture organised around live stock. Living in a hard desert area, their first care is the feeding and watering of their animals. The religion is Mahommedanism and the social order is strongly paternal. Clothing is of cloth and the people live in tents. (7) The western Sudan: a marginal area, in which great kingdoms—Benin, Bornu, Haussa—have risen. The economic life is basically herding, agriculture, and trade. (8) Desert: a nomadic area dependent upon trade, camel and horse breeding. (9) Egypt: an area distinct from the rest of Africa, of which the influence on other African culture must have been profound.

Preservation of Fruit and Vegetables.—One of the difficulties in the fruit and vegetable trade is the tendency for periods of scarcity to alternate with seasons of plenty when the market may be glutted with perishable produce, which must be sold at once or thrown away. In such a case the preservation of the surplus for future sale prevents instability of the market and presents the consumer with a constant source of supply of perfectly satisfactory foods, containing all the food values of the fresh materials and often many of the vitamins as well. At the request of the Ministry of Agriculture and Fisheries, the workers at the University of Bristol Research Station, Campden, have compiled a short monograph on the subject of the domestic preservation of fruit and vegetables (Ministry of Agriculture and Fisheries. Miscellaneous Publications, No. 69, "Domestic Preservation of Fruit and Vegetables". London: H.M. Stationery Office, 1929. 1*s*. net). After a short chapter on the theory of preservation, practical details, including numerous recipes, are given for fruit canning and fruit bottling, for jam making, for the preparation of fruit jellies and syrups, and of candied, crystallised, and glacé fruits, for the preservation of vegetables, the drying of fruit and vegetables, and the preparation of chutneys and pickles. Many of the recipes given are based on those which have been in use in domestic households for many generations. The methods described can be used by the housewife or by the manufacturer.

Artificial Ripening of Bananas.—Bananas for export are gathered unripe and their proper maturation afterwards is an important commercial problem, investigations upon which have been undertaken by the Australian Council for Scientific and Industrial Research (*Jour. for Sci. and Indust. Res.*, Commonwealth of Australia, vol. 2, 1929, p. 219). It is recommended that at first the store should not be ventilated, though its air should be kept in motion by a fan, and a temperature of 68° F. and a relative humidity of 85-90 per cent maintained. An addition of coal gas night and morning, in the proportion of one part to 2000 parts of air, is found to accelerate the ripening and to produce more uniform ripening throughout the bunch, probably by means of its ethylene content.

Methods of Tagging Fishes and Crustacea.—With the view of tracing the migratory habits of commercial fishes and the Cape crawfish (*Jasus lalandii*), Dr. Cecil von Bonde (*Fisheries and Marine Biological Survey*. Report No. 6. For the Year 1927–1928. Special Report No. 2. Pp. 1-7 and No. 3. Pp. 1-5) has made use of aluminium tags fixed to the upper lobe of the caudal fin, covering the base of the caudal rays, and finds that these function quite effectively. They are fixed to the fish by means of a pair of tongs, which are figured. He also suggests that there is reason to suspect the spawning ground of the South African eels to be in the deep waters of the Indian Ocean. The difficulty of marking Crustacea, which undergo periodic ecdysis, is overcome by attaching aluminium tags through the ventral flexor muscles lateral to the mid-ventral line, thus avoiding the nerve cord and the blood-vessels. Preliminary tests of this method have been successful.

Pycnogonida of South Africa.—Prof. Thomson Flynn has described the important forms obtained from South African waters (Fisheries and Marine Biological Survey. Report No. 6. For the Year 1927–28. Special Report No. 1. Pp. 1-36. The Government Printing and Stationery Office, Pretoria, 1928). Of nineteen species examined, only nine had been described previously. The new species *Nymphon bipunctatum*, *N. natalense*, *N. comes*, *Parapalenne calmani*, *Pallenopsis intermedia*, *Pseudopallene gilchristi*, *Anoplodactylus pelagicus*, *Phoxichilidium capense*, *Pycnogonum forte*, and *Tanystylum ornatum* are figured and described. It is interesting to note that as many as thirty-five specimens comprising four species have been captured by a tow-net off Port Natal and that "all the species are of slender fragile type with long limbs, such as may be expected to be good swimmers". *Pallenopsis ovalis*, which has been recorded by Loman from the East Indies, by Calman from the Andamans and from Ceylon, and *Parapallene nierstraszi* by Loman from the East Indies, were obtained from the west and south-west coasts, thus suggesting an obvious relationship between the Pycnogonid fauna of South Africa and the East Indies. This is probably due to the course of the equatorial current, which also exists on the east coast of Australia.

Earth Evolution.—The *Journal* of the Washington Academy of Sciences, vol. 20, pp. 17-25, Jan. 18, 1930, contains an interesting article by B. Gutenberg on "Hypotheses on the Development of the Earth". The ideas involved are to be more fully explained and developed in a future volume (3) of the "Handbuch der Geophysik". He accepts Darwin's theory of the evolution of the moon by fissure from the earth, and supposes that whereas, before this event, the earth's

crust was nearly in hydrostatic equilibrium, afterwards the outer sialic shell was absent from the part whence the moon was removed, so that the hydrostatic equilibrium was completely disturbed. In the Carboniferous epoch, some degree of quiet seems to have been restored, but at this time nearly the whole complex of continents was a single block situated in the southern hemisphere. Under the action of hydrostatic forces, this block separated into pieces which began to drift apart, and do so even to-day; at the same time, the *Polflucht* forces tended to move the whole mass so that about equal parts lay on the two sides of the equator. This having been accomplished, no further large movement of this block as a whole is to be expected, though the continents will continue to spread out and the surface of the extending regions will tend to sink, as is perhaps exemplified in the sinking of the western coast of Europe.

Collisions between Very Slow Electrons and Molecules.—In two recent papers in the *Annalen der Physik* (vol. 3, p. 536, and vol. 4, p. 91) C. Ramsauer and R. Kollath have given an account of some new work upon the collisions of very slow electrons with gaseous atoms and molecules. Using the original form of apparatus devised by Ramsauer, they have now been able to study the motion of the electrons for speeds equivalent to a fall of potential of only one-sixth of a volt. Their results again show a dissimilarity between the behaviour of different gases. Amongst the inert gases, the effective area of helium changes little with the speed of the incident electron, whilst the area of neon decreases continually with fall in electron velocity. Argon, krypton, and xenon, on the other hand, have a single minimum in the area-velocity curves, a property shared by oxygen and by methane. The curves for nitrogen and the oxides of carbon are more complicated. The maxima and minima on these curves occur in general at potentials which are far below the critical potentials of the gases, the small irregularities on the curve for helium, for example, being at about one volt, whilst its lowest excitation potential is just below twenty volts. The authors suggest that the area-velocity curves for all gases may be found to have a minimum even where this has not already been found, when the great technical difficulties in the way of working with electron speeds less than 0·16 volt can be overcome.

Extreme Ultra-Violet Spectra.—Further details of the important work of B. Edlén and A. Ericson on extreme ultra-violet spark spectra (see NATURE, Nov. 2, 1929, vol. 124, p. 688) are given in the *Zeitschrift für Physik* for Jan. 21. The spectrograph designed for this purpose by Prof. Siegbahn is relatively simple in construction, the spark chamber being a modified Siegbahn metal X-ray tube exhausted from one lead of a pump, the other lead from which evacuated the main chamber of the instrument. The grating used had a radius of curvature of 101 cm., and was ruled over an area of 35×50 mm.^{2}, the ruling being performed at the National Physical Laboratory, Teddington. The plates used for photographing the spectra were Schumann plates with glass only 0·4 mm. in thickness, these being considered preferable to several other types of plates and films that were tested. More reproductions of spectra are given than were shown in NATURE, perhaps the most interesting of which are enlargements of two multiplets at 834 A. and 1175 A. taken in the first order, which show very well the detail which can be recorded, the two lines at 832·75 A. and 832·92 A. being clearly separated. A note added in proof states that it has now been found possible by the use of a more intense spark as source to push the limit of the spectra still farther into the ultra-violet (see NATURE, Feb. 15, 1930, p. 233). The first members of the hydrogen-like spectra of doubly ionised lithium (Li III.) and of trebly ionised beryllium (Be IV.) have been found at 135·02 A. and 75·94 A. respectively, and considerable extensions of the spectra of doubly ionised beryllium (Be III.) and of the third, fourth, and fifth spark spectra of aluminium have also been made in the same region.

Oxides of Nickel.—Measurements of the heats of solution in sulphuric acid of nickel hydroxide and of its various oxidation products, the results of which are given by Giordani and Mattias in the *Rendiconti dell' Accademia delle Scienze Fisiche e Matematiche di Napoli* (1929), indicate the existence, between NiO and Ni_2O, of two intermediate oxides. Of these, the one with the higher content of active oxygen determines the characteristic potential of the anode during the greater part of the discharge of the alkaline accumulator.

Respiration Apparatus.—This assembly of apparatus for indirect calorimetry, designed by Dr. E. Simonson, of Frankfort a. M. and manufactured by Askania-Werke A. G., of Berlin Friedenan (London agent, O. G. Karlowa, Abford House, Victoria, S.W.1) differs but slightly from existing models such as the Douglas-Haldane equipment. A diverting manifold (see Fig. 1: 8-12) is attached directly to the mouth-

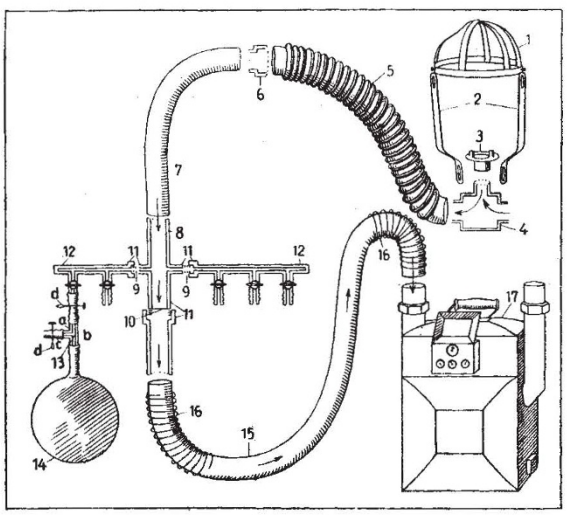

FIG. 1.

piece (4), permitting of the sampling of expired air for analysis in either a rubber or cellophane bag (14), while the volume of expired air is obtained from the dry meter (17). A variety of orifice plates with packing rings (9) are available with capillary metal tubes which can be closed individually, thus enabling the removal of short or continuous samples (about 1 litre) of the expired air in a protracted experiment. The volumes per unit time of these samples, naturally, will depend on the cross-sectional areas of the orifices, which are always predetermined. It thus becomes possible to withdraw samples for analysis at any stage of the experiment and to measure the basal metabolic rate before and after the experiment. The diverting manifold is obtainable in a portable form for strapping on the back and weighs about $2\frac{3}{4}$ lb. The apparatus may find application in experiments of long duration where the more expensive chambers or closed circuit assembly are at present used.