

This process would in time leave only insoluble materials, and the soils would be barren and useless.

The earth is saved from this fate by the re-fertilisation of the soils from the primary rocks of the interior, which are rich in lime, alkalis, and phosphorus. Movements within the earth upraise igneous rocks to form highlands and mountains, and their constituents are washed down the slopes and renew the fertility of the lowland plains.

The tilting of the rocks on the surface in consequence of the internal shrinkage makes another essential contribution to the economy of Nature. Many of the most useful minerals lie in the old rocks, and if they were still horizontal the minerals would be so deeply buried that their discovery and

economic working would be impracticable. But as the rocks have been tilted and folded the mineral seams are exposed on the surface, where they are easily found and can be profitably mined.

Hence the interaction of the different parts of the earth machine has rendered possible the evolution of man and still controls his destiny; for it keeps the earth's surface drained and habitable, it distributes the seas so that the land is supplied with rain and fresh water; it maintains the constituents of the air at the balance required in the breath of life, and it raises from the interior the minerals that renew the fertility of the soil and provide the mechanical engineer with the materials that have rendered possible the development of modern civilisation.

### The Adequacy of Human Diets.

THE importance of the food supply in the preservation of normal health and well-being is generally recognised among scientific observers, but the necessity for a scientific selection of the food, in addition to that due to the dictates of appetite, is not always realised by many classes of the population. Dietary surveys, carefully performed, will indicate the adequacy, both quantitative and qualitative, of popular diets, in terms of accepted standards; when estimates of the cost of the diets are also made, data are available as to the minimum cost of an adequate food supply under different conditions. At the same time, encouragement may be given to education on the planning of adequate diets at minimum expense, especially if the surveys indicate that many dietaries are not only inadequate but also expensive.

J. B. Orr and M. L. Clark (*Lancet*, vol. 2, p. 594; 1930) have recently completed a survey of 607 families in seven cities and towns in Scotland. The information was collected from the housewives and is considered to be fairly reliable. For the calculation of the composition and energy value of the diets, Sherman's and Plimmer's tables were used. These tables allow for inedible material in the food purchased, but not for waste, for which 10 per cent should probably be deducted from the figures given for food consumption. Allowance must also be made for the fact that the food requirements of women and children differ from those of men; it is customary to express their requirements as a fraction of that of an adult man, taken as equal to 1, so that the 'man-value' of the diet of each family was calculated, using Cathcart's table. No account, however, was taken of the occupation of the adults. The mean man-value for each family was 4.86; the calorie consumption per man per day was 3609 cal., composed of 108 gm. protein, 574 gm. carbohydrate, and 86 gm. fat. The consumption in individual households varied widely from the mean, as shown by coefficients of variation of 20-30 per cent. Cases of insufficient calorie consumption were, however, relatively few; a larger number showed an intake of 4000 cal. per man per day or more, indicating either an unnecessarily high consumption or excessive waste. The average

is slightly higher than that found in previous studies in Great Britain, but lower than in those carried out in other countries. Protein accounted for 12.3 per cent, carbohydrate for 65.5 per cent, and fat for 22.2 per cent of the calories.

A less satisfactory state of affairs was disclosed when the protein, calcium, phosphorus, and iron intakes were determined. The protein consumption was below the standard in about two-fifths of the families. The average figures found for the minerals were: calcium 0.86 gm., phosphorus 1.70 gm., and iron 0.0143 gm. per man per day. The figures for calcium and phosphorus are slightly above Sherman's estimates of an adequate intake, that for iron slightly below. About one-quarter of the families were receiving too little calcium and phosphorus, and nearly two-thirds too little iron.

Cathcart's figures for man-value are based on maintenance requirements; when a more stringent standard (Hawley's) was employed, which makes allowance for the fact that growing children require relatively more of certain constituents than adults, a larger number of families showed deficiencies in their intake of protein or minerals. In fact, most of the diets appeared incapable of supporting the optimum rate of growth.

The results of the survey probably explain, at any rate in part, the results obtained by G. Leighton and M. L. Clark when extra milk was added to the diet of school children (*B.M.J.*, vol. 1, p. 23; 1929). It was found then that the addition of about a pint of extra milk daily to the diet was followed by an increase in the growth rate, indicated by increased weight and height as compared with the controls. Separated was as good as whole milk, but biscuits had no such effect; separated milk is a good source of protein and minerals, and to these a part at any rate of the good effect can be ascribed. Orr and Clark conclude that the dietaries of urban households can be considerably improved by the addition of milk to supply protein, calcium, and phosphorus, and of green vegetables to supply calcium and iron; both would also supply any vitamins deficient in a carbohydrate-rich diet.

F. M. Williams and J. E. Lockwood have carried out a similar survey among farm and village

families in Central New York, with the addition that the costs of the diets were also worked out (*Bulletin* 502, April 1930, Cornell University Agricultural Experiment Station, Ithaca, N.Y., U.S.A.). The survey in each family covered a period of four weeks and both bought and home-grown food was included, the cost of the latter being credited at current average wholesale prices. The standards used were similar to those employed by Orr and Clark, though the table for calculating the 'man-value' of a family with respect to energy requirements was not quite the same. In addition, an 'adequate food cost unit' was employed; this was obtained by taking the annual retail value of a diet supplying 3400 calories daily, a 'man's' requirements, as equal to unity, and expressing the cost of other diets as a fraction thereof. The adequate food cost scale was found to diverge slightly from the energy scale, especially in the case of children

and when diets of low energy value were employed, since, for calories consumed, the cost of these is relatively high.

The analysis showed that 42 per cent of the village families and 64 per cent of the farm families were adequately fed. In many cases home-produced food made a substantial contribution to ensuring the adequacy of the diet and accounted for a considerable part of the retail value of the food consumed. In the inadequately fed families, it appeared that poor food selection rather than poverty was the cause of the poorness of the diet: the deficiency was most marked in the minerals, less so in the protein and calorie consumption. As in Orr and Clark's study, over-consumption was observed in a number of families.

The result of the study indicates the importance of proper selection of the food, and the addition to income represented by a supply of home-grown produce.

### News and Views.

WHEN the Expiring Laws (Continuance) Bill came before the House of Lords on Dec. 15, Viscount Hailsham's amendment, which provided for the continuance of the Dyestuffs (Import Regulation) Act, 1920, until Dec. 31, 1931, was carried by 87 votes to 14. Viscount Hailsham sketched once again the circumstances attending the birth, decline, and revival of the industry in Great Britain. During the past ten years the progress made has been so remarkable that success appears to be the main argument used against the continuance of a protective measure. Although the Council of the Colour Users' Association expressed a majority opinion in favour of the lapse of the Act, the president of that Association holds the contrary view; any risk of undue exploitation in the matter of price is removed by the undertaking which the dye-makers have given. Lord Parmoor (Lord President of the Council) repeated the Government's view of the matter as involving conflict between dye-makers and dye-users. The dye-makers have been put into a position in which they can compete with imported dyes; they have built up a great industry, for which everyone is grateful, but the time has now come to make the change in the interests of the dye-user. The Earl of Crawford said that so far as research is concerned, this industry has been a triumph. Some of the most remarkable discoveries in organic science have been made by men working on dyestuffs. The industry is emphatically a key industry, is of great importance in defence, and is becoming the focus from which pharmaceutical progress radiates. The Marquess of Reading said that the matter is not one of free trade or protection; Lord Cowley claimed that the continuance of the Act would be a burden on the textile industry, a view which was challenged by Lord Newton, who showed how small is the cost of the dye contained in a suit of clothes. Lord Arnold, Paymaster-General, contended that the dye industry would not be injured. Hence the present situation, besides being of political interest, may lead to a comprehensive scientific examination of a scientific and industrial problem.

THE Slaughter of Animals Bill, which passed its second reading in the House of Commons on Dec. 12, would make compulsory in England the modern methods of slaughter already in vogue in Scotland, Holland, and elsewhere. This measure has been vigorously resisted for many years by the meat traders, but their opposition has now been withdrawn except as regards the inclusion of pigs. The questions at issue were mainly questions of fact which could be, and nearly all have been, settled by experiments and observation in a scientific way. In 1925 the meat inspectors of the City of London Corporation conducted trials on an extensive scale, and since then other trials of a scientific character have been carried out, notably that by Dryerre and Cameron of Edinburgh. It is to be regretted, therefore, that some members of Parliament attempted to deal with these matters of fact by means of disingenuous rhetoric. One member, for example, dramatically produced two skulls, as evidence of the relative merits of the poll-axe and the humane-killer; whereas the City of London meat inspectors had tested this point by observations on no fewer than 1745 animals. Again, Messrs. Marsh and Baxter circulated to every member a manifesto in which they alleged that the humane-killer causes 'blood-splash' in pigs, and quoted in support of this view veterinary opinions all dated 1923 or earlier; whereas in 1925 the City of London meat inspectors examined more than 700 shot pigs, and found that "in not one of them was splashing in the slightest degree observed". Humanitarians may learn a lesson from the rapid progress that has been made by the humane-slaughter movement in recent years. Most of its advocates have worked by patient insistence on verifiable facts, and its success has been far greater than that achieved by some other good causes in the promotion of which there has been recourse to exaggeration and rhetoric.

THE Pilgrim Trust, founded by Mr. Edward S. Harkness of New York, has made one of its first gifts to the Royal Institution. The Trustees have allocated