Nutritional Problems and Civil Defense

By Sir JACK DRUMMOND, D.Sc.

The foundation of any scientific plan for feeding a civilian population in time of war must be estimates of man's daily need, under various conditions, for essential nutrients. I well recall the anxiety with which we searched the literature in 1939 in order to compile a list of such requirements and the trepidation with which we applied them to calculations of food supplies. In times of peace, scientists can amiably disagree over the need for ascorbic acid without arousing any fears, but the difference between 10 mg. and 50 mg. a day represents a formidable quantity of the vitamin itself or of foods rich in it when the population factor of 44 million has to be applied in times of rigid economy.

You will all recognize how insecure was the foundation of our 1939 calculations by comparison with that now provided by the experimental and practical experience gained during and since the end of the war. There are disagreements between the findings of the two expert bodies that have reported recently. The National Research Council and the British Medical Association do not see eye to eye on every assessment, but the differences are negligible when set against the important fact that there is full agreement on energy requirements.

None of the many lessons we were taught by practical experience during the last war approaches in importance the outstanding demonstration in Western Europe that the provision of energy dominates the nutritional picture. That is not to say that the importance of calories was underestimated. Calories were given much attention, but qualities of food other than their equivalence of energy occupied our thoughts to an extent that now appears to have been unnecessary. It is easy to be wise after an event, so I have no hesitation in expressing the view that the outstanding problem facing those who will be responsible for feeding the civilian population, should another war burst upon us, is to find ways and means of providing the daily energy requirements of the people in the form of palatable and acceptable foods.

Calorie Deficiency Most Harmful

Time and time again during the war years striking illustrations were recorded of the harmful effects of calorie deficiency on working capacity, physical condition, and morale. By contrast, examples of ill health caused by protein deficiency or shortage of vitamins were distinguished by their rarity. I am referring, of course, to conditions in Western Europe, not to those that prevailed in the Far East. I imagine, however, you have in mind, in studying your own problems, conditions comparable with those that we in Great Britain experienced and that affected also France, Belgium, Holland, and other adjacent countries. With such foods as inevitably form the basic diet under these conditions there is small risk of any nutritional disorder arising.

To justify this statement let me give you two examples. During the worst period of the war,

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The late Sir Jack Drummond was the scientific adviser to the Ministry of Food of the United Kingdom, 1939–46. His was the opening paper of the scientific section of the combined conference at Church House, Westminster, December 3, 1951 (see Public Health Reports, July 1952, p. 607).

the winter of 1940–41, when the food supply situation was truly alarming and when civilian morale was being sternly tested by heavy bombing, we, at the Ministry of Food, were under considerable pressure to distribute vitamin preparations to stave off nutritional disaster and boost morale. Our calculations indicated that the food of the people, restricted as it was, provided a sufficiency of all essential nutrients. On that conclusion we stood firm and declined a generous offer to provide what would have been needed to make a nation-wide distribution. A decision that was then taken on what was admittedly rather shaky scientific evidence was amply justified later. A glance at the record of the years 1940–49 recently published by the Ministry of Food (The Urban Working-Class Household Diet, H. M. Stationery Office, 1951) makes that clear.

My second example also concerns vitamins. When representatives of the Allied powers were planning in 1943 the relief of the populations of occupied Western Europe, there was again a loud and insistent demand that huge quantities of vitamin preparations of one kind or another be included in the supplies of food to be brought up in the wake of the liberating armies. Intelligence reports had given a grim picture of the widespread incidence of malnutrition among the populations of the large towns and had laid stress on the need for vitamins. Disregarding these reports (intelligence reports concerning what the townspeople were actually eating, as distinct from what they were able to obtain as rations, were disconcertingly misleading), we based a decision on the common-sense reasoning that as rations of staple foods decrease people strive to eke them out with whatever else they can acquire by hook or by crook. Vegetables usually make up a large part of what can be so obtained, and these, together with the increased extraction of cereal flour that is an inevitable consequence of food shortage, tend to raise the general level of vitamin intake. Again, the decision was fully justified when the condition of the urban populations was examined on liberation. Apart from rare cases, appropriate for medical rather than nutritional treatment, the picture in every town of Western Europe was the simple one of deficiency in calories.

Starling coined in 1915 the aphorism "take care of the calories and the proteins will take care of themselves." Had he been dealing with the food situation in 1939–45, he would have been tempted to link with the proteins all other essential nutrients, for it is certainly true that the shift of balance of foods which wartime restrictions nearly always impose tends to raise the intake of vitamins and of important mineral elements. Under the conditions of emergency that form the background to the study of civil defense the problems of food supply become considerably simplified if this argument is accepted. I firmly believe that the history of the last war provides a wealth of evidence to justify its acceptance.

Need 2,900 Calories a Day

I see the major civil defense nutrition problem to be the provision of enough food for all to satisfy hunger, bearing in mind that hunger is closely attuned to energy needs. In round figures that represents 2,900 calories per head per day in the form of supplies to the family. It is a curious fact that this figure applies to a wide variety of conditions of life. It is not greatly influenced by the proportion of the population engaged in heavy physical work nor by different food habits. It is changed substantially only when there is a high proportion of children in the population, as, for instance, in Italy and Eastern Europe.

An energy provision equivalent to 2,900 calories per day per head will not only enable a population to undertake physically all the tasks a grave emergency will present, but with equitable distribution of foods such as were available in Great Britain during 1939–45, it can be made to cover all nutritional requirements without recourse to artificial supplementation of the diet. That, I submit, is a fact of immense practical importance too often obscured by academic discussion of what are, in fact, much less vital problems.

The question of palatability is of no less importance than that concerning calorie supply. Hundreds of striking examples can be drawn from wartime experience to demonstrate how carefully devised nutritional plans can be wrecked by disregarding people's likes and dis-

likes. The half-starved people of Malta threw dried eggs into the street rather than eat an unfamiliar food; rice-eating Hindus in the great famine died before they would touch the millet which relief brought; our troops wore themselves to skin and bone in the Burmese jungle rather than endure the monotony of living exclusively on the famous K ration, one of the most scientifically compounded of all the wartime rations. These facts must not be ignored now that we are again taking stock of the situation. On the contrary, they must color our every thought on emergency feeding. We found by experience in Great Britain that people shaken by bombing don't relish a bowl of hot soup and biscuits. They want a cup of hot, strong tea! It would, I imagine, be coffee if American cities were attacked. Give urgent and serious attention to such problems; their solution will be half the battle won!

Returning now to the all-important calories, consideration must be given to the contingency, a very probable one, that the full provision equivalent to 2,900 calories per head per day cannot be achieved. Any substantial reduction below this figure means either that all go short or that selected groups (e. g., heavy workers, children) have priorities that further reduce the shares of the less fortunate. With the arguments for and against selective rationing I am not here concerned. The whole question is fraught with difficulties and can only be rationally approached in the light of the special circumstances prevailing at the particular place and time. But, however the distribution may be made somebody will have to go short and that somebody will suffer.

Effects of Calorie Deficiency

One deep impression made by the experience during the war is that deficiency of energy intake is associated with signs of a very characteristic nature, signs more immediately recognizable than any of those associated with lack of vitamins or protein about which so much has been written. From the practical standpoint the consequences of energy deficiency are vastly more important than those of any other shortage. They affect morale surprisingly quickly. Discontent, grumbling, and irritability are characteristic signs associated with a reduction in calorie intake of the order of 20 percent, particularly when it affects those engaged in physical work. The loss of weight related closely to the negative calorie balance is of less importance than the disturbances of mental balance. The picture presented by the underfed victims of the war coincides exactly with that drawn by Dr. Ancel Keys from the close study of his volunteers. It is a picture that calls for the closest study by all who are concerned with food plans to meet a new emergency.

As the food supply is reduced below that required to provide the requisite 2,900 calories per head per day there are two clearly marked levels which can be called critical. The first can be placed at about 2,000 calories. Down to this point it is not difficult to devise differential rationing systems which will enable all groups of the population to get along tolerably well for a considerable time. The output of work will not be optimal and there will be other signs of energy deficiency apparent, but in general the picture will not be disturbing. But below this level the task of allotting the available food will become more and more discouraging until a point is reached at about the level of 1,500 calories at which it is quite impracticable to do more than plan for survival unless part of the population is deliberately subjected to starvation in order to enable the remainder to work, as was done in Leningrad during the seige. I am referring, of course, to periods of more than a few weeks.

In summary, my views on the problem seen in its broad perspective can be condensed into two simple conclusions:

1. In the first place attention should be concentrated primarily on the provision of energy. Apart from the special case of mothers and young children, other nutritional requirements are of quite secondary importance.

2. The palatability and acceptability of the foods to be distributed are qualities of the very highest importance. It is of far greater moment to give people in an emergency food they will wish to eat than to offer them something that is nutritious but unappetizing.