

Nutrition Lessons of the Berlin Blockade

By H. E. MAGEE, D.Sc., M.B.

The blockade of Berlin, begun toward the end of June 1948 and continuing until May 1949, has afforded lessons in nutrition that should be useful if a similar situation were to arise.

About 3 months after the blockade began, physicians from the Ministry of Health went to Berlin to examine the food and nutritional situation and to advise the occupation authorities on the feeding of the people in the Western Sectors. Systematic observations were continued during and after the blockade.

Studies were made of the food being brought into the city by airlift, the rationing of the foods, and the mechanics of the airlift, and samples of the population were medically examined from time to time. People were also inspected in factories, on the streets, in hospitals, and elsewhere. The advice given at the time was based on the findings of these studies and observations.

For all practical purposes the people of Western Berlin were dependent on the airlift for all their necessities. There was some smuggling from the Russian Sector and Zone, but this was quite small and could be ignored. The potatoes, vegetables, and fruit grown on the outskirts of the Western Sectors were evaluated on an energy basis and included in the rations. Besides food, the other necessities included the raw materials for industry, fuel, clothing, and medical supplies. Had the occasion arisen for a clear choice between food and any or all of the other imports, first place would, of course, have

been given to food. No such decision was called for and the airlift was able to bring into the city reasonable amounts of all these necessities.

Capacity of Airlift

The big question posed by the blockade was whether there was enough suitable food and the planes to carry it to Berlin. As events transpired the airlift was strained to its utmost capacity, and the amounts of suitable foods available were often far from abundant. Because of these two limitations the airlift just about succeeded in providing sufficient food to keep the population "ticking over." Towards the end of the blockade with summer approaching, it was possible to do some stockpiling and to allow for small expansion of industry; but for the whole time the tempo of life of the citizen was well below that of a normal healthy community.

Foods Carried

The dominant aim was, of course, to transport to the city the maximum nutritive value in the minimum of space and weight. Fortunately, the air forces had had much experience, especially in eastern theaters of war, of transporting food and other needs to armies in the field. In the Berlin airlift maximum use was made of dehydrated and dry foods. The potatoes had most of their 80 percent of water removed, vegetables and fruits most of their 90 percent, with little or no detriment to their nutritive values. Sugar and fats are almost water-free; flour with its 13 percent of water, and oatmeal, macaroni, and other cereal products, and legumes containing 6 to 9 percent of water required no further treatment. Coal and oil for fuel occupied a larger place in the airlift than food. For the first 9 months coal averaged about 2,200 tons and food about 1,140 tons daily. Calculations showed that it would have been more economi-

Dr. Magee, senior medical officer (nutrition) of the Ministry of Health, London, as adviser on food and nutrition to the British Control Commission, was in Berlin during the blockade. He presented this report before the scientific section of the Combined Conference on Administrative and Scientific Aspects of Food in Civil Defense, meeting at Church House, Westminster, December 4, 1951.

cal to fly in hard biscuits, or even bread, instead of flour plus the coal required for baking it, but this scheme was rejected because of the risk of losses from stale bread and because it was considered important for morale that the Berlin bakeries should be kept going.

Another way of economizing bulk and weight is to provide as much energy as possible in the form of fat, since fat contains more energy per unit weight or volume than any other food. On our arrival in Berlin less than 20 percent of the 1,600 calories daily of the ordinary consumer (group III in the table) was contributed by fat. We arranged for the proportion to be increased to almost 30 percent of the calories. Insufficient supplies prevented any further increase. In a similar emergency fats might be increased up to 50 percent of the total calories, but such a high proportion of fat could probably not be tolerated for more than 2 or 3 months.

Little use was made of dried meat, and when it was issued it was far from popular. Canned meat and fish have the great advantage that they do not require cooking and so save fuel, but they get monotonous after a period and their weight is a disadvantage. Dried eggs were much appreciated. They can be packed in paper containers, and, mainly because of their low water content, they contain about double the energy of the same quantity of canned meat. The small ration of cheese which we were able to introduce in November was

very much appreciated and so was bacon when it was available. In a similar situation more cheese, bacon, and ham for flavoring would make possible much more use of dried eggs, and transport would be economized.

Dried milk, whole or separated, is very economical on transport since it contains only about 4 percent of water. We wanted a ration of milk for everyone in Berlin, but this was not possible and it was therefore not given to anyone over 9 years of age. Dried fruit and jams were not plentiful at the time, but some were issued in place of equivalent amounts of cereal foods. They were always well received. They would have a useful place in a like emergency.

Pattern of Diet

The Berlin diet was austere, as can be seen from the table, and only the compelling force of hunger and the fear of political oppression would, I believe, make any civilized community continue to eat a similar diet for as long as the Berliners did. Austerity was no new thing to them; they had, in fact, been accustomed to hard times for more than 3½ years. Communities not so trained might react much less satisfactorily than the docile Berliners to sudden imposition of so monotonous a diet.

The average energy intake before our arrival was about 1,800 calories; it was then increased to 2,000 calories per head daily. Fortunately, the winter of 1948-49 was mild, and because

Original food rations for Berlin in grams daily and changes adopted (in parentheses) Nov. 1, 1948

Groups	Bread	Potatoes ¹	Cereals	Meat ²	Fat	Sugar	Cheese	Milk (liter)	Calories	
									Pre-Nov. 1948	Adopted Nov. 1948
Heavy workers, group I ³	600	400	80	100	30(40)	25(40)	—(5)	-----	2,498	(2,609)
Workers, group II ⁴	500	400	60	65	15(30)	20(40)	—(5)	-----	1,999	(2,202)
Employers, group III.....	400	400	40(50)	40	10(30)	20(40)	—(5)	-----	1,608	(1,882)
Children up to 6 years, group IVa.....	300	400	30	20	20	25	-----	-----	1,786	(1,786)
0-1 year.....	-----	-----	-----	-----	-----	-----	-----	0.75	-----	-----
1-6 years.....	-----	-----	-----	-----	-----	-----	-----	.5	1,653	(1,653)
Children 7-9 years, group IVb.....	300	400	35	20	23(25)	40	-----	.25	1,619	(1,633)
Children 9-14 years, group IVc.....	300(350)	400	40	20(40)	25(30)	50	—(5)	-----	1,559	(1,834)

¹ Includes vegetables. ² Includes fish, bacon, ham, and dried eggs. ³ Limited to 4 percent of population.

⁴ Expectant mothers placed in group II from fifth month until end of pregnancy and given 500 cc. milk from 4 months before until 4 months after labor.

of lack of lighting, people spent most of the hours of darkness in bed. There were fairly general increases in weight after the increase in the rations, but this could be attributed also in great measure to the enforced rest and to the mild weather. Signs of undernutrition which were self-evident, especially in boys and adolescents, in men of large physique, and in

parents of large families, declined in severity and frequency after the rations were increased.

Our clinical and other observations convinced us that 2,000 calories a day was a bare minimum and sufficed merely to keep the population at a subsistence level. In addition, the proportion of women, children, and aged was unusually high in Berlin. With all forms of

(Continued on page 625)

Nutritional status of individuals seen in Berlin in November 1948, March and October 1949, expressed as percentages

Group	Number	Dates of examination	Good	Fair	Poor
Men	105	November 1948	61.0	29.5	9.5
		March 1949	75.2	21.0	3.8
		October 1949	84.8	14.3	1.0
Women	52	November 1948	80.8	17.3	2.0
		March 1949	86.6	13.5	
		October 1949	92.3	5.8	2.0
Boys	98	November 1948	42.9	46.0	11.2
		March 1949	82.7	16.3	1.0
		October 1949	89.8	8.2	2.0
Girls	111	November 1948	64.9	27.0	8.1
		March 1949	79.3	19.8	.9
		October 1949	91.9	7.2	.9

NOTE: This table was included in the paper, "The Food and Nutritional Situation in Berlin During the Blockade and After," by Dr. W. T. C. Berry, Dr. P. J. Cowin, and Dr. H. E. Magee, published in the Monthly

Bulletin of the Ministry of Health and the Public Health Laboratory Service, July and August 1951. The paper was discussed in conjunction with Dr. Magee's presentation.

The nutritional status of Berliners, shown in the above table, was assessed by paying particular attention to pallor, tired expression, lethargy, poor posture, diminished muscular tone and development, lack of luster of the hair, and diminished fat. By assessing these criteria and the all-around general appearance, the subjects were classified as in "good," "fair," or "poor" nutritional condition. In November 1948, many of the sample subjects showed all or most of the stigmata. There was slight improvement in January and in March 1949, but in October 1949, the manifestations had almost entirely disappeared, except in a few cases.

The improvement in all groups from November 1948 to October 1949 was striking, but specially so for the boys. Only 43 percent of the boys attained the "good" grade in the No-

vember 1948 examination, but 82 percent were in that grade in March, and 90 percent in October 1949.

The least improvement was shown by the men, and more often than not men of large stature showed more ill effects. Probably the rations were too small for the bigger men, and an appreciable number of men were still suffering from the effects of privation in Russian camps or from the effects of war service. The women were relatively much better nourished at all three examinations. The status of Berlin children in October 1949 was only a little less satisfactory than that of English school children during the same year. Of 3,181 English children examined, 93.8 percent were in "good" nutritional condition, 5.5 percent, "fair," and 0.7 percent, "poor."

muscular activity reduced to a minimum, 2,000 calories daily would probably just suffice for a community of average composition similarly placed, but morale would suffer and discontent would probably develop.

From a strictly health, apart from the political, standpoint, there can be no doubt of the wisdom of those in authority in Berlin of keeping industry going as far as possible. The Berlin dietary, however, should have been on the average about 300 calories more per head daily. Plans were made for an increase of about 150 calories a day, and they would have been put into operation during May 1949 if the blockade had continued. For a community of average composition expected to keep its main industries going on a moderate level, an average diet of not less than 2,300 calories should be provided.

If, however, full employment were the aim, then the target would have to be considerably higher than 2,300 calories. The diet should also be made less austere than the Berlin one, for example, by increasing the rations of meat (meat, bacon, fish, and eggs) and cheese, and by making more use of dried fruits, jam, and cereals of low moisture content, such as rice. Everyone should have a ration of not less than 9 ounces of milk in dried form and adolescents and children, not less than 18 ounces. Whole milk is better than separated milk because of its higher energy value.

Vitamins

Provided the flour supplied is of not less than 80 percent extraction, there would be no need to take special precautions about the vitamin B complex. In Berlin we found no clinical evidence of deficiency of any of the B factors. The flour was of 85 percent extraction or more, and on our recommendation it was fortified with calcium, as in the United Kingdom.

We reckoned that the average vitamin C intake in Berlin was probably 5–10 mg. daily; the dried potatoes and vegetables contained appreciable amounts. At no time were we able to find any evidence of scurvy, even after extensive search. Nevertheless, a ration of 150 mg. ascorbic acid weekly was made available early in 1949. In similar circumstances there would

be no compelling need to supply a ration of ascorbic acid during the first 3 months of the blockade unless supplies were readily available. Concentrated fruit juices are obviously ruled out because of their bulk.

We did not find any evidence of vitamin A deficiency and only after prolonged search did we find a few cases of mild rickets in children. The Germans are accustomed to use "Stoss-therapie" as a prophylactic measure, and it may be that children born before or early in the blockade were protected in this way. Supplies of concentrates of these vitamins were meager when we arrived in Berlin, and a ration of cod liver oil was arranged for children up to the sixth year, but this was not found to be possible for pregnant women. In a like emergency, pregnant and lactating women and children up to 5 or 6 years should have a ration of cod liver oil or similar fish liver oil.

Rations

The original Berlin ration scale was a relic of the Kommandatura days. It can be seen from the table that the energy content of the rations decreased from 1,786 for children 0-1 year, to 1,559 calories at 14 years. We tried to get this absurd scale altered to bring it into conformity with physiological requirements, and to get a special ration for adolescents, but for several reasons this was not done. In any similar situation comprehensive rationing of all foods would, of course, have to be introduced, and the plan of rationing would have to take strict account of the needs of every section of the population which might, for example, be classified into the categories suggested in the report of the Committee on Nutrition of the British Medical Association, 1950. The division into categories should be made as fine as possible so as to minimize the risk of gross inequalities in rations in relation to needs. Those of large physique, both adolescents and men, with large energy requirements would still remain a problem. If the blockade were to last for only 2 months or so, it would probably not be necessary to make any special provisions for them, but if it were to extend beyond this time then special arrangements should be made. In a small community this should not present in-

superable difficulties. In Berlin the large man of 6 feet or more, with emaciated appearance and vacant expression, who could not get enough to eat was one of the most pathetic sights.

Condiments

Table salt is most important; it is indeed indispensable and should be brought into the beleaguered city without delay. Pepper, chilies, mustard, and other spices should also be brought in. They take up little space and are important in improving the palatability of otherwise dull and unappetizing food. Carriage of salt to Berlin presented difficult problems. Some salt always manages to escape from the containers, and because of its hygroscopic properties it fouls the controls of land planes. Eventually, it was carried in seaplanes which flew from Hamburg to one of Berlin's lakes. Imports of alcohol should be restricted to spirits intended for the sick, but for the maintenance of morale the controlling authority might find it expedient to provide a ration for adults. In Berlin one of the breweries was kept going at a much reduced level of output, the object being, I believe,

more to keep the brewery in working order than to supply any particular need. The issue was on a very small scale and went to clubs and to a few German restaurants which were able to open toward the end of the blockade. Tea and coffee should be provided in generous amounts; they occupy little space. The coffee issued to the Berlin population probably played an important part in the maintenance of morale.

Packing of Food

Flour formed the greatest bulk of the Berliners' food. It was carried in sacks which packed easily into the aircraft. Dried potatoes, vegetables and cereals, and dried eggs were put up in ration units in small rectangular cases made of strong paper. They were packed in cardboard boxes, which packed easily into the aircraft and were convenient to handle. Canned meats and fish were packed together in cardboard boxes; these fitted easily into the plane and were not difficult to handle, but the weight of the metal was a great disadvantage. The only alternative, dried meat, had also a serious drawback; people soon got tired of it.

Reconditioning Salvaged Food in Britain, 1943-45



In 1943 salvaged canned goods were cleaned under makeshift conditions (above). The average output was 1,700 cans per man-week. The other photograph is a view of a workroom in a specially designed reconditioning depot in 1945.



The depot was capable of sorting, reconditioning, and repacking 600,000 cans per 48-hour working week with a staff of 150, mainly women. The average output was 4,000 cans per man-week.