

Balanced Diets



BALANCED DIETS

PREPARED AND ISSUED

BY

THE BOMBAY PRESIDENCY BABY AND
HEALTH WEEK ASSOCIATION

FOREWORD

BY

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FEW OF THE OPINIONS.

Calcutta, dated 29th April 1935.

This pamphlet supplied a much needed want, namely, to put it dietetically, to give a simple digest of the modern knowledge of food and nutrition. The arrangement and get-up of the pamphlet show as much care, foresight, and thought as the matter contained therein. The plate on the first page strikes a clear note, it does not tell in detail how to make a good diet but by appeal to the eye calls forth the interest. He who runs may read. It clearly realises that the prime need above all is to arouse interest in food and nutrition and its relation to health. The appetite of the casual reader will thus be stimulated to turn over the pages where clear direct information on the methods of making up an inexpensive diet is described.

—H. ELLIS C. WILSON, M.B., CH.B., D.SC.,
Professor of Biochemistry and Nutrition,
All-India Institute of Hygiene and Public Health.

II

Simla, dated 29th April 1935.

The pamphlet on "Balanced Diets" prepared by the Bombay Presidency Baby and Health Association is an admirable publication. The "nutrition" problem is coming to be regarded as a most serious one in India and there is no doubt that masses of people, especially children, are chronically undernourished. This is the more tragic when it is realised that the cause is not so much insufficient food as wrong kinds of food and wrong proportions in food-stuffs. Some of the information in this pamphlet has been available before but never in a practical form based on experience. The ordinary citizen has now available for him in a simple form, information on what he should eat, how much he should eat, and what it will cost him. I hope the pamphlet will have the wide circulation it deserves.

--RUTH YOUNG, M.B.E., W.M.S.,
Director, Maternity and Child Welfare Bureau,
Indian Red Cross Society.

III

Pusa (Bihar), dated 25th April 1935.

I have read the pamphlet on "Balanced Diets" with great interest. It is an admirable piece of work and you have done a great service to the country.

I note with pleasure that you have made use of my process of malting jowar. I shall be glad to hear of your further experiences and to be of any further service in that line.

—RAO BAHADUR B. VISWANATH, F.I.C., F.C.S.,
Imperial Agricultural Chemist,
Imperial Department of Agriculture in India.

IV

Bombay, dated 4th May 1935.

The pamphlet sets forth simple dietaries which enable poor people to solve their food problems at little or no extra cost and with considerable gain to their health. The potentialities of this campaign are unlimited; it is fraught with good for the peoples of India, and it is therefore deserving of recognition and support by health authorities everywhere. Sir Robert McCarrison retired from India last month; the best monument to him is the vigorous prosecution of the task he so ably undertook.

—*The Times of India.*

London, May 4th 1935.

The pamphlet represents the results of an attempt made with the co-operation of Sir Robert McCarrison and others to devise, by actual feeding experiments on school children, a diet that will satisfy physical needs at a cost of from 5 to 7 rupees per month. In this attempt Dr. Tilak and his associates appear to have attained high measure of success by the inclusion with the staple food grains, in common use by the people of India, of soya beans, skim milk powder, rice polishings, fresh ground nut cake, and preparations of sprouted seeds*** We congratulate the Bombay Presidency Baby and Health Week Association on this practical demonstration of what can be effected in improving the diet of the Indian people by the prudent application of existing knowledge.

—British Medical Journal of the British
Medical Association.

The pamphlet gives general information on balanced diets and shows how a person with a very limited income can best spend his money on food so that he may secure a diet as nearly balanced as possible and thus protect himself and his progeny from the ravages of malnutrition—a condition that is shown to be the root cause of many diseases and of lowered general efficiency commonly found in India.

It also incorporates the results of the nutrition work of the past two years of the Association and points out that malnutrition is found more or less in all classes of people.

FOREWORD

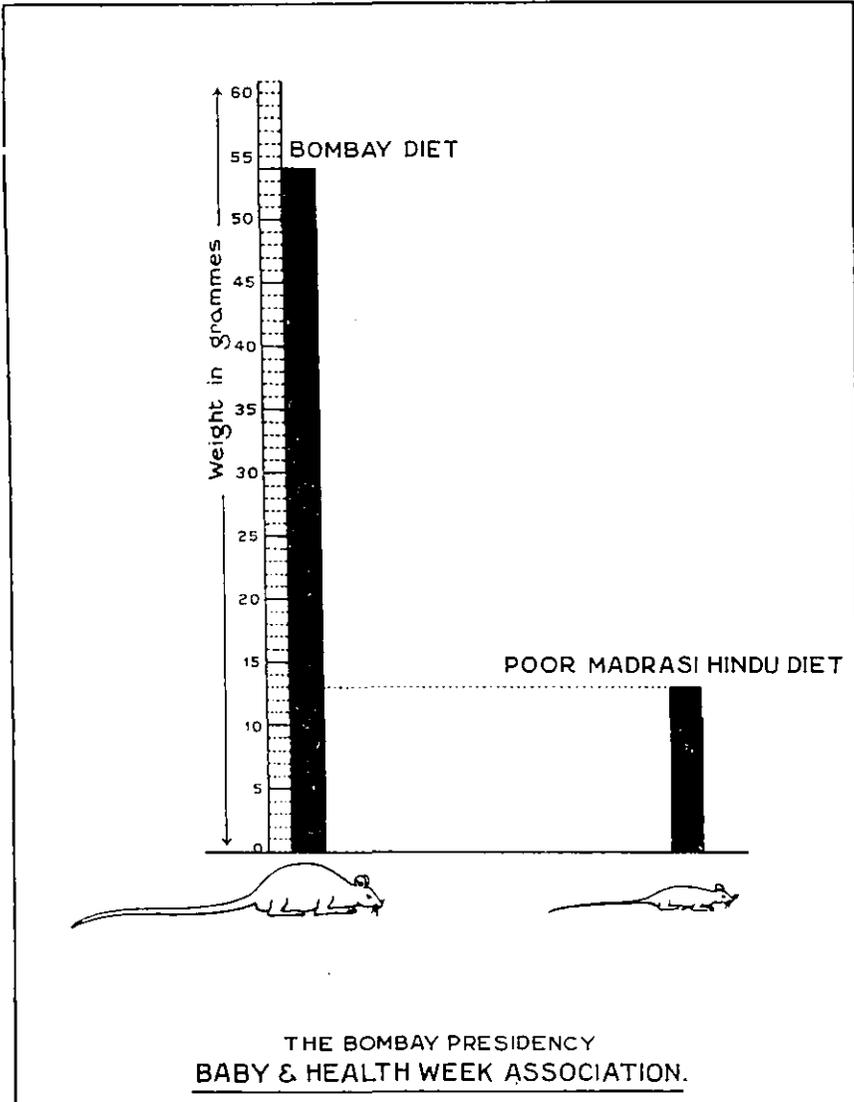
This pamphlet on "Balanced Diets", is one of the best of its kind that I have ever seen. It is accurate in detail, makes use of existing knowledge of food and nutrition in a way most admirable, and goes far to solve the problem facing millions of people in this country; how to obtain a reasonably good diet for Rs. 5 to 7 a month. It should be circulated widely, its principles taught in the schools and practised in the homes of the people. If this be done, great benefits will accrue to those whose need is greatest—the poorer classes.

Nutrition Research Laboratories, }
Indian Research Fund Association, } R. McCARRISON.
Coonor, 15th March 1935.

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BOMBAY DIET

(INTRODUCED BY THE ASSOCIATION)

It contains a variety of whole grains some of which are sprouted. It also includes *soya beans, skim milk powder and butter*. Vegetables are given in larger proportion.

(See page 3 for reference)

POOR MADRASI HINDU DIET

(from McCARRISON)

It contains an excess of highly polished rice with very little of vegetables and milk.

BALANCED DIETS

The Bombay Presidency Baby and Health Week Association have pleasure in issuing this pamphlet giving—

- (1) general information on Balanced Diets, and
- (2) definite suggestions for preparing such diets by all classes of people.

WHAT IS A BALANCED DIET ?

The expression "Balanced Diet" does not mean that different kinds of foods are to be actually weighed daily and used in strict proportion. That would involve a lot of trouble and expense and would be impracticable. It only means that the diet or, more correctly, our daily food should contain the different components of food in a certain proportion. Our body is able to tolerate occasional variation in diet, but a long continued excess or deficiency of one or more components will impair the growth of the young and is frequently responsible for such common complaints as fatigue after slight exertion, headache, a low grade anæmia, dyspepsia, intestinal disorders, unhealthy skin and an increased tendency to infectious diseases. If the defect be great it may lead to rickets, beri-beri, severe anæmia, decayed teeth, gastro-intestinal diseases, diabetes, tuberculosis, etc.

It is well to remember that the food we eat should give us not only (1) sufficient heat and energy for the work our bodies have to do, but it should be capable of bringing about (2) normal growth and repair of the daily wear and tear of tissues, thus ensuring their normal functional efficiency. This double purpose is served by different components of food. Starches, sugars and fats generally serve the first purpose and are therefore called "fuel foods". Proteins, such as are found in milk, eggs, oil seeds, pulses etc., and food-salts and vitamins serve the second purpose and, besides this, they increase the resistance of the body against diseases.

The emphasis laid on Vitamins in the lay literature is somewhat misleading. All the components of food—proteins, fats, carbohydrates, mineral salts, vitamins and water—are equally important in their own way; and what we have to aim at is a diet that will contain them, roughly, within certain proportions. Such diets are called Balanced, Standard or properly constituted diets.

Starchy foods (grains and seeds) are comparatively very cheap and therefore they are in great excess in the diets of the poor. But such diets are often seriously lacking in the growth-promoting and tissue-repairing components of food. The diet of the well-to-do, on the other hand, generally shows an excess of proteins or fats and contains too little of certain food-salts and vitamins. Its deficiency in these is due to the use by well-to-do people of highly refined or preserved foods and to the excessive consumption of proteins, fats and sugars which disturbs the mineral and vitamin balance of a properly constituted diet. The delicate skin of grains and seeds contains their *embryos* from which the young plants spring and these are found to be particularly rich in important food-salts and vitamins so essential to growth and repair of the human body. This skin is removed in polishing rice, in milling wheat and in other similar ways, so that these important substances are lost to us. (See Plate II.)

It will thus be seen that the diet of the well-to-do as well as that of the poor is likely to be defective, though in a different way, and therefore, the information supplied here will be found to be useful to both.

Many of the food-stuffs commonly used contain two or more components of food in different proportions. They also contain varying amounts of vitamins and salts. The quality of proteins and fats also differs in different foods; but if the advice given in this pamphlet be followed, there should be no difficulty in choosing from the food-stuffs available those that, when properly combined, will provide a balanced diet.

THE ROLE OF THE ASSOCIATION IN EVOLVING CHEAP BALANCED DIETS.

The Association put up an elaborate Food and Vitamins Exhibition in 1930 in Bombay and published a Note in booklet form. Since that time food exhibitions have been held and lectures delivered at various places and the attention of the public has been drawn to the fact that the diets commonly eaten are defective. The value of milk, eggs, vegetables and fruits as balancers of diets, i.e. foods, that will remove the defects in the common diets, has been emphasized. As, however, these foods are costly they are not eaten in sufficient quantities by the poor. We, therefore, brought to the notice of the public the importance of Soya Beans, Skim Milk powder, fresh Bran or polishings of rice and fresh Oil-cakes as cheap and yet nutritious food-stuffs that might, to a great extent, serve as substitutes for more costly foods.

These foods are, however, either new to India or are not commonly used by many in the daily dietary. It was, therefore, thought advisable to use them in certain proportions and to observe the effect of the diets in which they were incorporated on the growth and health of children. At the same time it was decided to conduct the experiment in such a way that the total cost of the food per

person per month would remain as low as was consistent with the formation of a nearly balanced diet. This limitation was necessary as the main object was not to find out a perfectly balanced or ideal diet but the best that an average Indian can get with the money he can spend on food. The investigation has thus become one of practical utility to the large mass of people.

The authorities of the Society for the Protection of Children in Western India kindly agreed to give the Association full facilities, on the basis mentioned above, for improving the diet of over a hundred children in their charge in the Byramjee Jeejeebhoy Home, Matunga, Bombay.

In this investigation the Association was fortunate enough to have the co-operation of Major-General Sir Robert McCarrison, Kt., Nutritional Expert to the Government of India, Coonoor, and of his assistant Dr. B. G. Krishnan who have offered helpful suggestions from time to time. Lt.-Col. S. S. Sokhey and Dr. K. S. Mhasker, the Director and Assistant Director of Haffkine Institute, Bombay, and Khan Bahadur Dr. N. J. Vazifdar have taken great personal interest in this investigation and have done a good deal of analytical and checking work through their laboratories.

The food expenses in the B. J. Home were about Rs. 4 a month *per child*. The diet was found to be defective in proteins and fats and in many of the vitamins and salts. It was gradually remodelled and brought as near to a balanced diet as possible with the inclusion of soya beans, skim milk powder, rice polishings, fresh oil cake, and preparations of sprouted seeds. *The children have been living on this diet for the last thirty months.* They show a definite and steady increase in the rate of their growth which is over and above what might have occurred on their old diet. Their health is also well maintained; all this has been brought about without increasing the total cost of food per child.

This diet was tested on young rats by Dr. H. Ellis C. Wilson, Professor of Biochemistry and Nutrition, All-India Institute of Hygiene and Public Health, Calcutta. He reported that the diet came to very near the ideal diet as judged by the growth in young rats fed on it and by their freedom from disease. (See Plate I.)

During this period enquiries were conducted in another institution for children (185 boys) where much more milk and ghee was being given per child. Their diet was, however, found to be deficient in total proteins and food salts and its total energy value was also low. The growth of the children was ascertained with reference to their ages and heights and it was found that they were under nourished. Similar enquiries made in regard to the diet of a third institution (400 boys) revealed the fact that it was defective in one or another essential component of food and the growth of the children was in consequence, below normal. About 1,000 children attending the primary schools in Bombay were examined for their height, weight, age and general health, and it was found that

they were nearly 22 per cent. below the standard weight. All these enquiries showed that malnourishment due to defective diets was common.

IMPROPERLY CONSTITUTED FOOD AND NOT MERELY INSUFFICIENT FOOD IS THE BANE OF INDIA.

Sir Robert McCarrison has shown by analysing the diets commonly eaten by various communities in India that they are not as a rule insufficient in quantity but are often defective in quality and that growth and freedom from disease is directly correlated to the character of the diet. The national diets of the Punjabi, the Sikh and the Pathan were found to be well balanced and these people showed ideal growth when the balance of their diets was maintained. The poor Madrasi or Bengali diet, on the other hand, was found to be very deficient in proteins, fats, vitamins and mineral salts; and it is particularly in Bengal and Madras that we find defective growth and the persistence of diseases of faulty nutrition such as anæmia, gastric ulcer, intestinal disorders, beriberi, tuberculosis etc. Sir Robert confirmed these findings by feeding rats on these diets and noting their effects on these animals. It is being increasingly realised that malnutrition which is the bane of India is due not so much to insufficient food as to food that is lacking in health-promoting properties.

We are of opinion that the adoption of the diets recommended here will prove a great step forward in our efforts towards the prevention of disease and improvement of health which is the motto of the Association.

The investigations of balancing the diet supplied the Association with very valuable data for giving concrete suggestions to the public in preparing such diets. Most of the literature on Food and Nutrition gives excellent general information but does not much help people of different economic levels to secure balanced diets. This is probably because no observations of this type have previously been made in India. What an average person wants to know is what kinds of food-stuffs and how much of each he should use per month and how he should prepare them within the money he can afford to spend on food. The information supplied below will help him to solve this difficulty and he will have the satisfaction of getting the best possible diet for his money without having to bother about the exact chemical composition of the innumerable food-stuffs available and the sources and properties of vitamins, salts, etc.

COST OF THE DIETS.

We recommend two types of Balanced Diets:—One for the poor class of people costing, *in cities*, about Rs. 5 per month per *adult* person, and another costing Rs. 7 per month for those who are in a position to buy better quality food-stuffs. The cost is about the

same whether the diet be (a) vegetarian or (b) non-vegetarian. Service charge is not included. The calculation is based on wholesale rates at present current in Bombay; retail rates will be slightly higher. The figures of cost are, however, enough to show that balanced diets can be secured with much less money than what is usually supposed to be necessary.

The cost of such a diet ought to be somewhat less in villages where milk, meat, eggs, vegetables, grain and firewood can be had at rates cheaper than the whole-sale rates in Bombay.

The Diet Tables are constructed on a liberal basis; we have shown the actual quantities of food-stuffs required per month in order to facilitate the calculation of costs in any locality. The quantities are given in lbs., and ozs., as local weights and measures vary in different places.

TABLE A—Balanced Diet at minimum cost. (Vegetarian.)

Number.	Group.	Food-Stuffs.	Quantity per man per month.		Per man per day calculations.								Group No.	
					Quantity in	Proteins (in grams).			Fats (in grams).		Carbo-hydrates (in grams).	Calories.		
						Ozs.	Good.	Fair.	Low.	Good.				Low.
1	Rice	Rice Broken (Kant)	Lbs. 20	Ozs. 10	Ozs. 11	...	19.69	...	...	1.48	286.99	1248	1
		Rice polishings	...	1	14	1	...	5.90	...	5.6	...	7.00		90
2	Other Cereals	Wheat, Bajri and Jowar, etc.	9	6	5	...	...	16	...	8.60	105.10	520	2
8	Pulses	Lentils, tur dar, peas, beans, etc.	3	10	1.95	}	...	17.80	2.70	44.55	275	3
		Whole Horse grams	1	8	0.8									
4	Soya Beans	Soya beans	2	13	1.5	...	14.40	...	7.0	...	14.25	175	4	
5	Vegetable Oils	.....	2	4	1.2	...	...	...	...	34.00	...	802	5
6	Animal Fats	Genuine Ghee or Butter	1	7	0.75	...	...	...	21.0	...	...	189	6
7	Skim Milk Powder	2	13	1.5 = 15 ozs. of skim milk.	...	14.4	2.2	...	21.75	165	7
8	Oil Cake	Ground-Nut Cake	0	15	0.5	...	6.65	...	...	0.80	66.5	60	8
9	Sugar...	Jaggery (goor) or Sugar	1	14	1	...	...	...	...	...	25.00	100	9

10	Root and Fruit Vegetables ...	Tomato, carrots, onion, potato, etc.	5	10	3	1.0	...	...	0.9	...	9.60	42	10
11	Leafy Vegetables...	Spinach (palak) cabbage, "bhajee", etc.	11	4	6	2.4	...	...	0.19	...	7.20	42	11
12	Condiments and Salts ...	Chili, ginger, pepper, cloves, "amli" etc.	...	...	...	...	...	...	...	...	...	...	12
Total ...			...	48.70	17.80	63.84	16.00	86.89	42.53	528.09	9208.00		
						97.64		79.42					
Less 5 per cent. for waste ...			...	2.43	...	4.88	...	3.97	26.40	160.15			
			...	46.27	...	92.76	...	75.45	501.99	8042.85			

N. D.—Figures for the analysis of foods into Proteins, Carbohydrates and Fats and for their Calorie value have been taken largely from Sir Robert McCarrison's book "FOOD". An enlarged edition of this Diet Table can be had separately on good paper at anna one a copy from the Honorary Provincial Secretary.

TABLE B—Balanced Diet at minimum cost. (Non-Vegetarian.)

Number.	Group.	Food-Stuffs.	Quantity per man per month.		Per man per day calculations.							Group No.	
			Lbs.	Ozs.	Quantity in	Proteins (in grams).			Fats (in grams.)		Carbo-hydrates (in grams).		Calories.
					Ozs.	Good.	Fair.	Low.	Good.	Low.			
1	Rice	{ Rice Broken (Kani)... Rice polishings ...	20	10	11	...	19.69	...	...	1.43	286.99	1248	1
2	Other Cereals	Wheat, Bajri and Jowar, etc.	11	4	6	...	...	19.16	...	4.34	126.80	624	2
8	Pulses	{ Lentils, Tur dal, Peas, beans, etc. Whole Horse grams	1	14	1	...	6.50	..	...	1.00	16.20	100	3
4	Soya Beans	Soya beans	1	14	1	...	9.60	...	4.7	...	9.50	119	4
5	Vegetable Oils	.....	1	14	1	...	...	...	...	28.00	...	252	5
6	Animal Fats	Tallow, Lard, mutton fat, etc.	1	14	1	...	...	...	28.00	...	...	252	6
7	Skim Milk Powder	.....	1	0	0.5 = 5 ozs. of skim milk.	4.8	...	...	0.75	...	7.25	55	7
8	Oil Cake	Ground-Nut Cake	0	15	0.5	...	6.65	...	...	0.80	6.65	60	8
9	Flesh Foods	Meat, fish, eggs, etc...	5	10	8	17.9	...	...	6.0	...	...	126	9

10	Sugar	...	Jaggery (goor) or sugar	...	1	14	1	...	...	...	...	...	25-50	100	10
11	Root and Fruit Vegetables	...	Tomato, carrots, onion, potato, etc.	...	5	10	8	1-0	...	...	0-9	...	9-60	42	11
12	Leafy Vegetables...	...	Spinach (palak), cabbage, "bhajee", etc.	...	11	4	6	2-4	...	...	0-19	...	7-20	42	12
13	Condiments	...	Chilli, ginger, pepper, oloves, "amli" etc.	...	...	...	...	...	...	...	...	...	...	...	13
14	Salts	...	.....	...	...	...	...	...	...	...	...	...	...	...	14
Total				...	...	41-30	26-10	52-94	19-16	46-14	36-37	515-65	3185-00		
								98-20			82-51				
Less 5 per cent. for waste				...	...	2-05	...	4-91	...	4-12	25-78	159-25			
				...	...	39-25	...	99-29	...	78-49	489-87	3025-75			

N. B.—Figures for the analysis of foods into Proteins, Carbohydrates and Fats and for their Calorie value have been taken largely from Sir Robert McCarrison's book "FOOD". An enlarged edition of this Diet Table can be had separately on good paper at anna one a copy from the Honorary Provincial Secretary.

TABLE C—Balanced Diet at moderate cost. (Vegetarian.)

Number.	Group.	Food-Stuffs.	Quantity per man per month.		Per man per day calculations.							Group No.	
					Quantity in	Proteins (in grams).			Fats (in grams).		Carbo-hydrates (in grams).		Calories.
			Lbs.	Ozs.	Ozs.	Good.	Fair.	Low.	Good.	Low.			
1	Rice	Rice polished ...	7	8	4	...	7.20	...	...	0.50	104.40	452	1
		Rice (unpolished) ...	11	4	6	...	18.80	...	...	0.51	183.80	594	
		Rice polishings ...	1	6	0.75	...	3.97	...	4.20	...	5.25	67	
2	Other Cereals	Wheat, Bajri and Jowar, etc. ...	15	0	8	...	..	25.54	...	5.74	169.00	892	2
3	Pulses	Lentils, Tur dal, Peas, beans, etc. ...	2	4	1.2	...	14.50	...	...	2.00	32.40	200	3
		Whole Horse grams... ..	1	8	0.8								
4	Soya Beans	Soya beans ...	1	14	1	...	9.60	...	4.60	...	9.50	116	4
5	Vegetable Oils	.....	1	14	1	...	...	...	...	28.00	...	256	5
6	Animal Fats	Genuine ghee or butter ...	1	6	0.75	...	...	...	21.00	...	...	189	6
7	Milk	Milk ...	9	6	5	6.75	...	...	10.87	...	6.12	150	7
8	Skim Milk Powder	.....	2	18	1.5 = 15 ozs. of skim milk.	14.40	...	...	2.25	...	21.75	165	8

9	Oil Cake	...	...	Ground-Nut Cake	...	0	15	0.5	...	6.60	...	...	0.80	6.60	60	9
10	Sugar	...	...	Jaggery (goor) or sugar	...	2	18	1.5	...	...	...	...	...	38.25	150	10
11	Root and Fruit Vegetables	...	...	Tomato, carrots, onion, potato, etc.	...	11	4	6	1.95	...	...	0.19	...	18.90	72	11
12	Leafy Vegetables...	...	...	Spinach (palak), cabbage, "bhajee", etc.	...	11	4	6	2.40	...	...	0.19	...	7.20	42	12
13	Condiments	...	...	Chili, ginger, pepper, cloves, "amli", etc.	...	...	...	...	...	...	...	...	...	...	...	13
14	Salts	...	...	.....	...	...	...	...	...	...	...	...	...	...	...	14
				Total	...	...	57.50	25.50	55.67	25.54	48.80	37.55	558.17	9845.00		
					...	...	...	...	106.71	...	...	80.85	...	...
				Less 10 per cent. for waste	...	...	5.75	...	10.67	...	...	8.08	55.81	884.50		
					...	...	51.75	...	96.04	...	...	72.77	497.86	8010.50		

N. B.—Figures for the analysis of foods into Proteins, Carbohydrates and Fats and for their Calorie value have been taken largely from Sir Robert McCarrison's book "Food". An enlarged edition of this Diet Table can be had separately on good paper at anna one a copy from the Honorary Provincial Secretary.

TABLE D—Balanced Diet at moderate cost. (Non-Vegetarian.)

Number.	Group.	Food-Stuff.	Quantity per man per month.		Per man per day calculations.								Group No.
			Lbs.	Ozs.	Quantity in	Proteins (in grams).			Fats (in grams).		Carbo-hydrates (in grams).	Calories.	
					Ozs.	Good.	Fair.	Low.	Good.	Low.			
1	Rice	Rice polished	8	12	2	...	3-58	...	0-26	...	52-18	226	1
		Rice (unpolished)	7	8	4	...	9-20	...	...	0-34	89-20	896	
		Rice polishings	1	6	0-75	...	3-97	...	4-20	...	...	51	
2	Other Cereals	Wheat, Bajri and jowar, etc.	21	4	11	...	...	35-11	...	7-88	232-87	1144	2
3	Pulses	Lentils, tur dal, peas, beans, etc.	2	4	1-2	...	14-50	...	...	2-00	32-40	200	3
		Whole Horse grams...	1	8	0-8	...	...	...	...	...	...	...
4	Soya Beans	Soya beans	1	14	1	...	9-60	...	4-60	...	9-50	116	4
5	Vegetable Oils	.....	0	15	0-5	...	...	...	...	14-00	...	126	5
6	Animal Fats	Tallow, lard, mutton fat, etc.	1	14	1	...	...	...	28-00	...	...	252	6
		Genuine ghee or butter	0	15	0-5	...	...	...	14-00	...	...	126	
7	Milk	Milk	7	8	4	5-40	...	...	8-70	...	4-90	120	7
	Skim Milk Powder	.....	0	15	0-5	4-80	...	...	0-75	...	7-25	55	

= 5 ozs. of skim milk.

8	Oil Cake	...	...	Ground-Nut Cake	...	0	15	0.5	...	6.60	...	...	0.80	6.60	60	8
9	Flesh foods	...	...	Meat, fish, eggs, etc.	...	8	12	3.0	17.91	...	...	6.00	...	...	125	9
10	Sugar	...	...	Jaggery (goor) or sugar	...	2	19	1.5	...	...	...	...	...	38.25	150	10
11	Root and Fruit Vegetables	...	...	Tomato, carrots, onion, potato, etc.	...	11	4	6	1.95	...	...	0.19	...	18.90	2	11
12	Leafy Vegetables...	...	...	Spinach "palak" cabbage, "bhajee", etc.	...	11	4	6	2.40	...	...	0.19	...	7.20	42	12
13	Condiments	...	...	Chilli, ginger, peppor, cloves, "amali", etc.	...	...	...	...	...	...	...	...	...	...	...	13
14	Salts	...	...	.....	...	...	...	...	...	...	...	...	...	...	...	14
Total						...	...	48.75	32.46	47.45	35.11	66.89	25.02	498.75	9261	
						...	...	...	115.02	...	...	91.91	...	...
Less 10 per cent. for waste						...	...	4.87	...	11.50	...	9.19	...	49.87	826	
						...	...	43.88	...	103.52	...	82.72	...	448.88	2935	

N. B.—Figures for the analysis of foods into Proteins, Carbohydrates and Fats and for their Calorie value have been taken largely from Sir Robert McCarrison's book "Food." An enlarged edition of this Diet Table can be had separately on good paper at anna one a copy from the Honorary Provincial Secretary.

TABLE E.

Conversion of lbs. into Standard Weights and Measures and addresses of some of the Stores where soya beans, etc., can be had.

Conversion of pounds (Avoirdupois) and ounces into the Standard Weights and Measures that have come into force in this Presidency :—

		<i>Weights.</i>		
1 Bombay Tola	= 180 grains.		1 Bombay Seer	= 80 tolas.
1 Ounce	= About $2\frac{1}{2}$ tolas.		1 Bombay Maund	= 40 seers.
1 Pound (Avoirdupois)	= „ 39 tolas.			

N.B.—This Bombay Maund and the Bengal Maund are now identical in weight.

Dry Measures.

1 Bombay Seer	= The volume occupied by 80 tolas of water.	1 Bombay Adholi	= 2 seers.
1 „ Chatak	= $\frac{1}{16}$ seer.	1 „ Payali	= 4 „
1 „ Adpav	= $\frac{1}{8}$ „	1 „ Maund	= 16 payalis.
		1 „ Map	= 2 maunds.

Some grains are lighter than others. The same measure, therefore, of different grains and seeds will weigh differently. The actual weights in lbs. and ozs. of one payali of the common grains and seeds are given below :—

		Lbs.	ozs.				Lbs.	ozs.
1 Payali of Rice (unpolished)	=	6	14		1 Payali of whole Horse grams	=	6	12
1 „ „ Rice (polished)	=	7	$2\frac{1}{2}$		1 „ „ Soya beans	=	6	$2\frac{1}{4}$
1 „ „ Broken rice	=	6	$8\frac{1}{2}$		1 „ „ Jowar	=	6	11
1 „ „ Bajri	=	6	9		1 „ „ Wal	=	6	10
1 „ „ Wheat	=	6	$11\frac{1}{2}$		1 „ „ Chowli	=	6	$14\frac{1}{4}$
1 „ „ Tur dal	=	7	0		1 „ „ Mug	=	7	2
1 „ „ Masoor dal	=	6	$8\frac{1}{2}$					

Liquid Measures.

1 Bombay seer =	Volume occupied by 80 tolas of water.		1 Imperial pint =	{ 48 tolas or
1 Fluid pound =	{ About 39 tolas or $\frac{1}{2}$ a Bombay seer or 16 Fluid ounces.			{ About $\frac{3}{8}$ Bombay seer or 20 Fluid ounces.

The special foods recommended in this pamphlet can be had at the following stores. (They may be available at other stores as well especially outside Bombay but the following are some of the stores about which we have received intimation so far) :—

Soya Beans at about Rs. 6-0-0 a maund (80 lbs.) from :—(1) Mr. I. P. Parekh, Kitab Mahal, 192, Hornby Road, Fort, Bombay; (2) Popular Pharmacy, Chemists, Lamington Road, Bombay No. 7; (3) Ratansi Velji & Co., Grant Road, Bombay No. 7; (4) B. M. Palekar & Co., Girgaum Road, Bombay No. 4; (5) Popular Pharmacy, Chemists, Opposite B. B. & C. I. Railway Station, Dadar; (6) Vithaldas Sakalchand, 220, Raviwar Peth, Poona; (7) F. S. Kale, Esquire, Food Survey Department, Baroda State, Baroda; (8) Panachand Javeridas, Kalupur, Chakala, Ahmedabad; (9) M. P. Dastoor & Co., Bunder Road, Karachi; (10) Bharat Stores Ltd., Rajamandi, Agra; (11) Bharat Stores Ltd., Sadar Bazar, Delhi; (12) Patna Agency Syndicate, Exhibition Road, Patna; (13) Madan Stores, Merchants, Johnstongunj, Allahabad; (14) Gopinath Lalbehari, Ford Motor Agents, Satara; (15) Commission & General Agency, 180, Narasimharaja Road, Bangalore; (16) Soya Bean Supply Co., 15, Anna Pillai Street, George Town, Madras; (17) The Dohnavur Stores, Dohnavur, Tinnevely District (S. I.).

Stockists of Indian Soya Beans.

Soya Beans at about Rs. 2-8-0 and Rs. 3 per maund of 80 lbs., from :—(1) The Botanist in Sind, Agricultural Research Station, Sakrand; (2) The Chairman, Seed Society, Hulkoti (district Dharwar); (3)

Skim Milk Powder at about Annas 5 a lb., in tins of 56 lbs. from :—(1) Messrs. Martin & Harris Ltd., Graham's Buildings, Parsi Bazar Street, Fort, Bombay.

Fresh Groundnut Cake (by the Expeller process) at about Rs. 2-12-0 a maund (80 lbs.) from :—(1) Prabhat Oil Mills, Sadar Bazar, Sholapur; (2) Swastik Oil Mills, Wadala, Bombay; (3) Ahmed Omerbhoy, Oil Millers, Two Tanks, Bombay.

Fresh Rice Bran at about Rs. 1-13-0 a maund (80 lbs.) from :—(1) The Bharat Rice Mill, Poibavdi, Parel, Bombay; (2) The Bombay Bharat and Swadeshi Rice Mills Depôt, Argyle Road, Wadi Bunder, Bombay.

Special Foods referred to above can also be obtained from :—Purshottam Vithal & Co., Provision Merchants and Government Contractors, Kandewadi, Bombay No. 4.

TABLE F.
Weekly Menu.

At minimum cost—Suitable for manual workers.					At moderate cost—Suitable for brain workers.			
Days.	7 a.m.	12 noon.	4 p.m.	8 p.m.	7 a.m.	9 a.m.	1-30 p.m.	8 p.m.
Monday, Wednesday, Friday.	Rice, roti and nut cake chutnee.	Kitchri and ghee, vegetable curry, and curds.	Soya bean coffee.	<i>Vegetarian.</i> Rice and dal, roti, butter, salad of sprouted grams, vegetable curry, curds and papaya or banana.	Soya bean coffee.	Rice and dal, ghee, salad of sprouted grams, vegetable curry and curds.	Ladu, cocoa-nut chutnee.	Roti, butter, vegetable curry, curds and fruit.
Tuesday, Thursday, Saturday.	Do. ...	Roti, ghee, vegetable curry, raw onion and curds.	Do. ...	Rice and dal, ghee, salad, vegetable curry and curds.	Do. ...	Rice and dal, ghee, salad, vegetable curry and curds.	Roti, nut cake chutnee, banana.	Kitchri, roti, butter, vegetable curry and curds.
Holidays, or alternate Sundays.	Soya bean coffee, or tea.	Rice and dal, ghee, puri and some pudding, salad, vegetable curry, "Usal" of uprouted seeds and curds.	...	Rice, vegetable curry and curds.	Do. ...	Rice, dal and ghee, puri and some pudding, salad, vegetable curry, "Usal" of sprouted seeds and curds.	.....	Roti or rice, vegetable curry and curds.
Monday, Wednesday, Friday.	Rice, roti and nut cake chutnee.	Kitchri, egg and vegetable curry.	Soya bean coffee.	<i>Non-Vegetarian.</i> Rice and dal, roti, vegetable curry and salad.	Soya bean coffee.	Rice and dal, ghee, roti, egg and vegetable curry and salad.	Ladu, cocoa-nut chutnee.	Rice and dal, roti, vegetable curry and fruit.

Tuesdays, Thursday, Saturdays.	Do. ...	Roti, egg and vegetable curry and raw onion.	...	Kitchri, meat and vegetable curry, salad of sprouted grams, curds and fruit.	Do. ...	Do. ... with salad of sprouted grams and curds.	Roti, nut cake chutnee and banana.	Kitchri, ghee, meat or fish and vegetable curry.
Holidays or alternate Sundays.	Soya bean coffee, or tea.	Rice and dal, puri and some pudding or meat or fish preparation, salad, vegetable curry, "Usal" of sprouted seeds and curds.	...	Rice and vegetable curry.	Do. ... or tea.	Rice, dal and ghee, fish or meat preparation or puri and some pudding, salad, vegetable curry and curds.	.....	Roti, vegetable curry and fruit.

Menu for Children.

Feeding times for children should generally be those mentioned for brain workers. They should be given a cup of milk or one egg and soya bean coffee extra at 4 p.m.

on active duty all this time and require substantial food for maintaining heat and energy. Tea with "Shev" or "Chivda" at about 4 p.m. is quite insufficient in amount and is actually harmful. To allow such temporary starvation to go on month after month in the period of active life, i.e. between the ages of 15 and 35, is not only to impair body growth, but invite wasting diseases like consumption. We suggest that for a very little extra cost every person between 15 and 35 should take a hearty home-made lunch (brought by him in a tiffin carrier) of rice or bread or "laddu" with curds and curry.

FOOD REQUIREMENTS OF A FAMILY.

The above diet is for adult persons over about 18 years of age with about 140 lbs., body weight. It is presumed that they do the average amount of outdoor work. If the food is found to be excessive a reduction should be made *proportionately* in all the groups except in milk and vegetables. This will retain the balance of the diet and will ensure a better supply of food-salts and vitamins. Women, children, old people and people with sedentary habits would require proportionately less as shown below. Let us assume that an adult male requires one complete unit of food. In that case:—

Children of both sexes between the ages of 2 to 5 years require about $2/5$ th.

Children of both sexes between the ages of 5 to 8 years require about $3/5$ th.

Children of both sexes between the ages of 9 to 12 years require about $4/5$ th.

Girls between the ages of 13 to 16 years require about 1.

Boys do. 14 to 18 do. $5/4$ th.

Women above 16 years require about $4/5$ th.

Old men and women require about $1/2$.

The food requirement of a family of five (father, mother, a boy of 15 and two children of 9 and 3 years old) would thus be, roughly, $(1 + 4/5 + 5/4 + 4/5 + 2/5 = 4\frac{1}{2})$ just a little more than that required for four adults.

Pregnant women, nursing mothers, and children up to 8 years old should be given, when possible, an extra cup of milk or one egg a day to meet the extra demand for rapid growth during this period.

Hard manual workers should increase the quantity of grains only (Groups I and II) to satisfy their hunger. Children up to 8 years of age should take food four times a day, the rest should accustom themselves to three feeds per day up to the age of 40.

COMMENTS ON THE DIET TABLES.

The Diet Tables give the quantity of the different food-stuffs required per month and the analysis of the food taken per day. If the explanatory notes are carefully followed the diet will not be found deficient in food-salts and vitamins.

The vegetarian diet at *minimum* cost contains enough skim milk and butter equivalent to about *two cups of whole milk per day*. Skim milk and butter are used to keep down the costs in cities, and assure a constant *quality* of milk.

The non-vegetarian diet at *minimum* cost contains less milk but the deficiency is more than made up by the inclusion of meat, fish or eggs, and tallow.

It costs, in Bombay, about $1\frac{1}{4}$ annas to prepare a lb. (16 ozs.) of whole milk from 2 ounces of skim milk powder and 1.2 ounces of butter whereas a lb. of fresh whole milk costs about $1\frac{3}{4}$ annas in Bombay. The poor can, therefore, get at least 40 per cent. more whole milk if they secure it from skim milk powder and butter. In the smaller towns and villages, however, pure fresh milk may be had at about annas $1\frac{1}{2}$ or less a lb. In such places it is obviously unnecessary to buy this powder and butter or ghee as advised in the Diet Tables at minimum cost.

The daily menu, vegetarian and mixed, also permits *more than half a lb. of vegetables* and an ounce of jaggery or sugar.

The monthly cost is very nearly the minimum that can be attained at present in cities like Bombay to keep body and soul together in a fairly healthy condition. Those who can afford to spend more should spend it on milk, eggs and leafy vegetables.

A study of the Diet Tables will show that in the case of vegetarians nearly half the expenses on food-stuffs and in the case of non-vegetarians nearly one-third have to be incurred on dairy produce and vegetables. It is quite possible to increase their production and thus lower the cost of diets if the instructions of the Agricultural and allied Departments of the Government are followed in the right spirit. Why should, for instance, milk be dearer in Bombay than it is in London, Denmark or New Zealand when all other commodities are dearer in these places than in Bombay? The slaughter of animals cannot be advanced as a cause because this is a constant feature in all countries. We hope the businesses concerned and the leaders of public opinion will look at this problem dispassionately and find a solution.

Skim milk powder and soya beans are the only food-stuffs that are yet new to India. We have shown that they are cheap and have a great nutritive value. They can be easily produced in India if there be a demand for them.

All food-stuffs are classified into groups. *Those in each group have, approximately, the same composition and nutritive value. But they should be varied frequently because variety in diet is essential not only to relieve the monotony of a few articles but also to eliminate the possibility of any slight deficiencies in quantity and quality of nutriment.* In the group of pulses, for instance, over ten different kinds are available and in the group of vegetables or fruits, there is a great variety to choose from.

Specimen menus are given with a view to guide the housewife in the choice of foods and their preparations.

EXPLANATORY NOTES.

Rice.—It is available as (1) unpolished rice (sold as “*Patni*” or “*Chokha*”) or as (2) polished rice. Most people boil the grains. Unpolished rice is unsuitable for boiling as it takes longer to boil and turns into a watery mass. If, however, it is soaked in water overnight and boiled in the same water the grain remains free to a certain extent. The best way, however, to use it is in the form of “conjee” or “roti” of its flour.

Polished rice is good for boiling.—Water should not be added in excess to the rice and then thrown away as is usually the custom. It is a wasteful method because the natural salts in rice are thus lost to us.

Bran.—All those who use polished rice should take fine *rice polishings* (bran) that is removed from an equivalent amount of unpolished rice. Eleven parts of unpolished rice yield about 10 parts of polished rice and one part of rice polishings. The rough or the 1st grade bran should be discarded. The polishings are valuable as food as they contain nearly 20 per cent. of a fair quality protein and about an equal proportion of good oil. They are also very rich in food-salts and vitamins. The *unadulterated* bran is not coarse, has a pleasant sweetish taste and can be used in curries or in flour. It must be remembered that the polishings begin to go bad within 4 or 5 days; any polishings older than this period should, therefore, be discarded. It can be obtained fresh from a rice mill at about annas 10 a maund. We have included about 3/4th oz. of rice bran in the daily diet in the case of even those that use unpolished rice in order to increase the supply of vitamins and salts of the diet at very little extra cost.

Where fresh bran is not available twice a week the quantity required for a week should be purchased and preserved for daily use in the following way: “It should be heated cautiously over a low fire for about an hour till it turns slightly dark in colour. In this way the moisture in the bran is removed and it is heated uniformly. The heating also stops the action of ferments in the bran and destroys any moulds, insects or their eggs that may be present in it. The bran thus remains sweet for at least a week and the vitamins and salts are scarcely affected.” [From the Bureau of Science, Manila, in “*The Philippine Journal of Science*”, September 1933.]

Where possible, unpolished rice should be pounded at home twice a week so that we can be sure about the freshness of the polishings. *The best course is to give up the habit of using polished rice and to use the flour of unpolished (whole) rice as we do of wheat.* The custom of using one or two-year old rice in preference to new rice should be discarded. The older the grain the less it is in nutritive value.

Broken rice (Kani) is the portion of rice that breaks during the hulling and polishing process. It has the same composition as that of unbroken rice but as people have taken a fancy to the latter, broken rice is sold nearly 30 per cent. cheaper. Broken rice and rice polishings are useful items on account of their cheapness in the dietary of the poor. We have used a large proportion of rice in these dietaries because it is cheap and "compared with the proteins of wheat, the proteins of rice resemble more nearly the proteins of animal tissue." [*The Bureau of Science, Manila, Philippines.*]

Parboiled Rice.—It is partly boiled rice and, therefore, partly denuded of salts. But it retains much of the vitamins and salts of the original grain (paddy). It is therefore lower in the nutrition scale than the unpolished raw rice but higher in the scale than polished rice.

Wheat.—"Atta" and white flour seen in the market usually come from the big flour-mills. Wheat is first washed with water and the heavy dust, earth, lumps and sand are removed. It is then dried in a current of hot air and brushed. The moisture, heat and brushing partially removes the delicate coating which contains the vitamins and salts. It is now milled by machinery and first the coarse bran and then the fine bran is removed; the flour is still further sifted as "atta" and white flour. White bread is made of the latter and is thus devoid of any wheat bran. Mill "atta" is also not as rich in bran as the one prepared in a local small mill (*chakki*). The best way, therefore, of using wheat is to sift and grind it at home or send it to the small mill. *The coarse bran should be sieved out but should not be discarded. It should be ground again and mixed with the flour.*

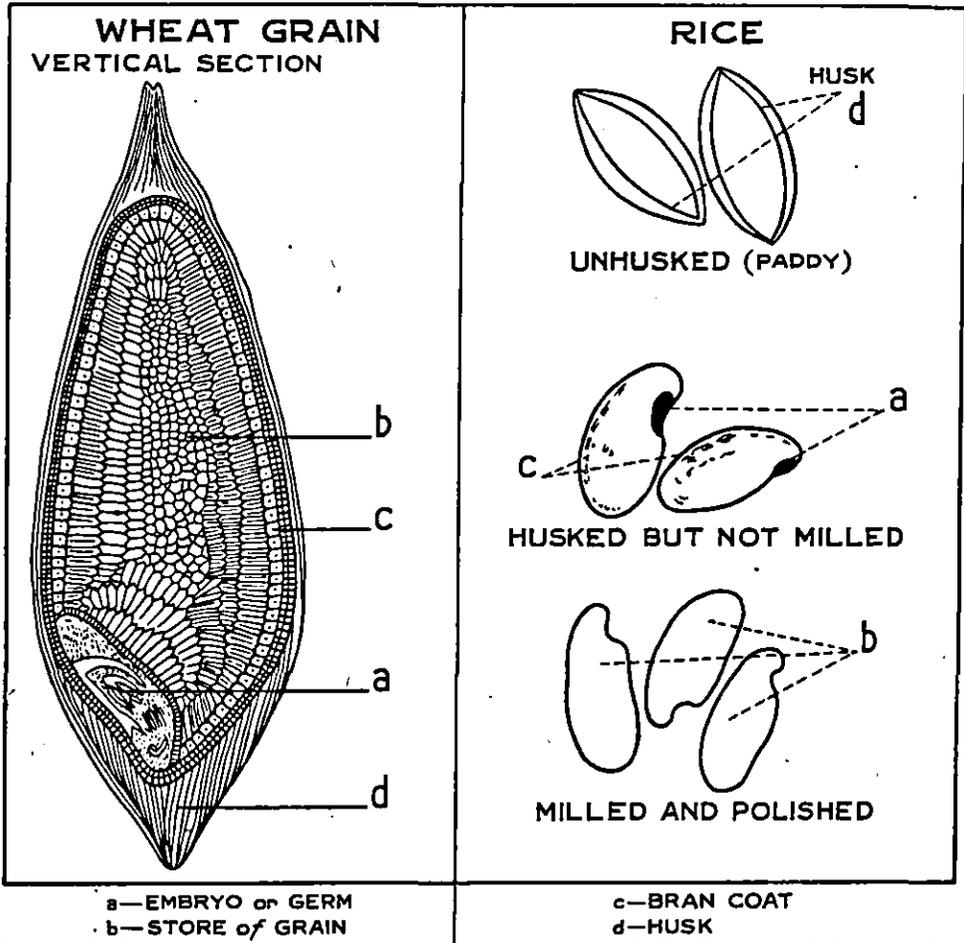
Bran of rice and wheat, and oil cake contain an indigestible matter known as *roughage* or *cellulose* which is useful in giving a gentle stimulus to the bowels and preventing constipation—a malady commonly seen in civilized people. In the case of those whose bowels are irritable, *i.e.*, easily moved to action, only half the quantity of bran and oil cake recommended in the Diet Tables should be used in the beginning. They should be increased gradually according to toleration.

Jowar (Andropogon Sorghum) [*Hindi* :—Jowari, Jondla. *Bengali* :—Juar, Kasa-Jonar. *Deccani* :—Jowari, Jondhala. *Gujarati* :—Jowari. *Tamil* :—Cholam. *Telegu* :—Talla, Jonna, Jonnalu. *Kanarese* :—Jolah, Shalu.] Like barley, it yields a large percentage of malt.

Malted Jowar is a mixture of partially digested starches and proteins and of *ferments* that are produced during the process of germination of the grain. The ferments assist the digestion of other foods that might be mixed with it. It is prepared as follows :—

"Take good quality jowar, soak it in clean water for about 24 hours changing the water at least every six hours. Drain

EMBRYO AND SKIN OF WHEAT & RICE



COMPOSITION OF THE BRAN of Wheat & of Rice.

1. Salts of calcium, iron, phosphorus, etc.,	...	...	6'0 P.C.	8'7 P.C.
2. Proteins of fair quality	...	...	16'4 "	19'0 "
3. Fats of good quality	...	...	3'5 "	20'0 "
4. Vitamins B ₁ , B ₂ , and E.	...	...	+++ "	+++ "
5. Carbo-hydrates	...	...	43'6 "	43'0 "
6. Cellulose & fibre	...	...	18'0 "	1'0 "
7. Moisture	...	...	12'5 "	8'3 "

(See pages 2, 21 and 22 for reference)

the water out, heap up the grain on a gunny bag and cover it with a wet cloth till sprouts appear. Then spread the grain thinly and evenly on a clean mat and occasionally sprinkle some water on it. When the sprouts are about $\frac{3}{4}$ th inch long dry them again in the shade for about six hours and then in the Sun till well dried. It should then be slightly moistened and pounded in order to remove the husk and sprouts. The sprouts are removed as they taste bitter. The clean grain is now slightly roasted in a frying pan over a slow fire till the grains are just browned so as to stop the malting process going too far. It now contains a large percentage of malt. It is mixed with other grains in the proportion of 1 to 6 and ground into flour for the preparation of "rotis". It may also be used as conjee in milk or water and sugar or salt may be added to taste. This conjee should be eaten along with meals." [From a pamphlet by the Department of Agriculture, Madras.] The sprouting of jowar should be done once a week.

Sprouted Seeds.—The process of sprouting generates not only Malt as stated above but "vitamins A and C also at no extra cost. Sprouted grains and seeds are therefore, an excellent source of these vitamins for the poor. Sprouting improves the flavour of pulse seeds. *Unsplit* dals, grams, peas or any other *whole* grain is soaked in water for about 24 hours and is then spread out on damp sackcloth. This is covered by another piece of sackcloth and a light plank of wood is placed on top in the cold season to maintain warmth. It is kept moist by sprinkling water from time to time. After about two days the grains will have sprouted and be ready for use." [From "Food" by Sir Robert McCarrison.] They should be eaten raw in the form of *chutnee* or as salad with curds or oil.

Pulses should as far as possible be ground into flour and then used. In this way they are cooked easily and the pulse proteins are digested better.

Baking powder is destructive to vitamins present in foods and therefore should *not* be used for softening the pulses, for making the preparations light and crisp or for brightening the colour of vegetables.

Soya Beans are as cheap as but are quite different, in composition from, ordinary peas or beans. They contain as much as 40 per cent. proteins and 20 per cent. oil and they resemble animal proteins and fats in their nutritive value. The oil contains vitamin A. The usual pulses, beans or oil seeds do not contain this vitamin. From the literature already published by us it will be seen that soya beans are fit to be included in a poor man's dietary—especially in a vegetarian dietary. They are at present imported from Manchuria but they can be, and are now being grown by, among others, the Department of Agriculture, Bombay Presidency.

Light yellow variety of soya beans look very much like white peas ("vatana") but they can be easily distinguished from peas. Majority of soya beans show five or six closely set tiny wrinkles.

on the skin. No other beans or peas have such a mark. If the soya beans are soaked in water they elongate while the peas and beans retain their original shape.

During the sprouting of soya beans an offensive smell is noticed. But it disappears if the sprouted beans are washed twice or thrice. We did not succeed in preparing soya bean milk in a palatable form. The beans are at present used daily *only as a mixed flour* as under:—

They are first shelled and the skin is discarded. The shelled bean, i.e., the pulse is mixed with other grains in the proportion of about 1 to 4 and sent to the mill once a week for grinding. The mixed flour is utilized in one week as otherwise it may begin to go bad. If the shelled soya beans are mixed with pulses in the same proportion "*bhajias*" or "*shev*" can be prepared of the mixed flour. The soya bean pulse should not be used entire because it is very hard to cook. Its flour should not be used by itself as it is slightly bitter or acrid in taste.

[*For soya bean coffee see under the table of weekly menu.*]

Vegetable Oils should be poured in a flat vessel and exposed to the sun's rays for a few hours when the sky is clear and free from dust. Vitamin D is thus developed in them. They should then be used, preferably, as salad dressing.

Mutton fat or Tallow is good for the non-vegetarians. It is available at practically the same rate as vegetable oils and is much more digestible than the oils.

Butter and Ghee are more digestible than, and are richer in vitamins than, vegetable oils. For vegetarians, this is the only source of animal fats. Great care has, however, to be taken in purchasing them as adulteration is very common. Butter is more digestible than ghee as it is in the form of an emulsion of fat. It is also richer in vitamins than ghee as it is not subjected to prolonged boiling. Butter is now available in small sizes in paper cartons at reasonable rates.

Skim Milk Powder.—Milk from which cream is extracted is sprayed under high pressure into a vast drying chamber. Warm filtered pure air absorbs the moisture and the solid portion containing proteins, sugar and salts quickly settles down as a soft powder. The milk or the powder is not touched by hand and remains scrupulously clean during this process. The proteins are not in any way damaged.

"*The powder represents nearly 55 per cent. of the original energy value of whole milk.* The conversion of surplus skim milk into the dry powder which can be stored, handled and transported with little danger of contamination makes it valuable from the standpoint of convenience and a ready source of skim milk supply for the non-milk producing areas of the country. It offers an opportunity for greater conservation of an excellent food-supply for humans, and incidentally, increases returns to the producer." [*From the Department of Agriculture, U.S.A.*]

This powder is not yet made by the Indian dairies. They turn the skim milk into curds by adding an acid. The *casein* of milk thus separated becomes unfit for human consumption. It is exported to Europe at anna one or so a lb., for industrial purposes and a very nutritious cheap food is thus lost to us! The skim milk powder at present available is imported from New Zealand in tins of 56 lbs., and costs about annas five a lb. Skim milk is prepared by simply stirring the powder with 8 to 9 times as much water and boiling the mixture for a few minutes. The powder keeps well for a month after opening the tin if it is kept in a dry place and the powder is taken out with a clean dry spoon. It is a very cheap source of skim milk and may prove cheaper still if and when Indian dairies begin to prepare it.

Ground-nut Cake.—The nuts are very rich in fair quality proteins and in salts. We eat this portion when we use whole nuts but when oil is extracted we think the cake must be unfit for human consumption. If, however, the nuts are cleaned, freed from sand, earth, etc., and then shelled and rotten seeds are removed the thin cakes produced by the Expeller process of oil extraction can be used safely in the dietary to the extent of about $\frac{1}{2}$ an oz. a day. It keeps well for about a month. It is a valuable food for increasing the proteins and fat content of a poor man's diet.

Flesh foods.—There is nothing special to describe about beef, meat, mutton, pork or fish.

Liver, Spleen and Lungs.—These are available in one bunch known in the local market as "*keni*". The bunch from goat weighs about two and a half pounds and is sold for about annas five only. This portion is very rich in almost all the vitamins and mineral salts. The poor non-vegetarians should include it in their dietary at least twice a week.

Vegetables.—All leafy vegetables, such as cabbage, spinach (palak), turnip-tops, raddish-tops, "math", "chuka", "methi" etc., and tomato and carrots are rich in mineral salts (iron, calcium phosphorus, etc.), and in vitamins. They should, therefore, form a considerable proportion of the diets of the rich and the poor alike. *Some of these vegetables should be eaten raw as salad—two or three ozs. a day—in order to secure a sufficient amount of vitamin C which is destroyed if they are cooked.* Attempts should be made to increase the production of these vegetables and of "papaya" and banana.

Condiments should be used in strict moderation. When so used they have a definite nutritive value because of their appetizing and flavouring qualities; while some of them such as ginger, black pepper, cumin and cloves are rich sources of the important mineral element, *iodine*; others such as chilies and red pepper are rich in vitamin C. If taken in excess, they tend to inflame the stomach and interfere with the digestion and assimilation of food.

Water.—Prepared food contains plenty of water. Drinking water should, therefore, be used very moderately during meals but it is necessary to drink a cup of water every two or three hours during the day and once during night if one gets up. It is at these intervals very helpful in diluting the partially digested food and in increasing the internal secretions which complete the digestion and assimilation of food. It also helps in washing out waste products. All suspicious water should be strained and boiled before use to protect ourselves from water-borne diseases such as guineaworm, typhoid dysentery, cholera, etc.

Fresh Air and Sun-shine.—It is important to realise that fresh air and sun-shine are foods and can usually be had for nothing. That is why, perhaps, their importance as essential food-factors is forgotten. People living in cities have been particularly guilty in this respect. Without fresh air and sun-shine our blood will not get purified and digestion will be faulty. Daily exposure to sun-shine—about 15 to 30 minutes—is useful in giving a general sense of vigour and in developing vitamin D in our body.

Cookers.—In ordinary open cooking vitamins A and B are slightly damaged. If foods are steam cooked in closed vessels these vitamins are unaffected. The food also does not get charred or smoked and the natural flavour of the food is retained. Simple cookers are generally better than high pressure cookers for this purpose.

SUGARCANE JUICE—A NUTRITIOUS AND CHEAP DRINK.

The juice of sugarcane is worthy of being given a pride of place among the many drinks that we enjoy to quench our thirst or to refresh ourselves. It contains about 15 per cent. of *natural sugar* and vitamins B and C. It is specially rich in *organic salts of calcium, iron, manganese* etc. which are rather sparse in other foods. No other drink except milk and fruit juices is so rich in them. It can be recommended by doctors for patients suffering from Anæmia or Jaundice owing to its medicinal properties. The flavour of this juice can be greatly improved by the addition of a small quantity of the juices of lemon and raw ginger. The taste may be further improved by crushing small pieces of the rind of limes, lemons or oranges. What a contrast this drink presents when compared with other drinks which are comparatively very costly and yet possess little nourishing properties!

Why is it then, that it is not available in restaurants and tea shops? We find it having a good sale in the sugarcane crusher shops that are seen here and there. It is not, therefore, that the people have no taste for it. Perhaps the

proprietors of restaurants do not find it practicable to keep the ordinary wooden crusher in the shop as it occupies one whole room and makes a creaking noise.

An iron sugarcane mill capable of crushing about 150 lbs. of cane in an hour does not make much noise and occupies small space. A still smaller space will be enough if the mill is worked by an electrically worked motor in places like Bombay where cheap electricity for powder is available. Such an apparatus is recently put on the market. We are informed authoritatively that *the juice does not suffer any change in colour or taste by reason of the iron crusher.*

A *note of warning* is required if we order sugarcane juice from the juice vendors. These people have very little idea of cleanliness and if the juice gets contaminated with the germs of diseases like cholera, dysentery, typhoid etc., it is likely to spread these diseases. The sugarcane mill and the space around must be capable of being washed frequently so that flies may not grow. Much more care is required in handling sugarcane juice than in handling milk because the juice is not boiled and thus sterilized, like milk, before use.

The natural salts and vitamin B of sugarcane juice are present in a concentrated form in the *treacle or molasses* (kakvi) prepared by open-pan or khandsari system, and to a slight extent in jaggery or "gul" also. Poor people will find these not only cheap sweetening agents but more useful than sugar because of the important salts and vitamins they (the poor) will be getting incidentally at no extra cost.

COMPOSITION OF COMMON FOODS.

(Compiled from various sources.)

Food.	Protein per cent.	Fat per cent.	Carbo- hydrate per cent.	Salts per cent.	Calorie (energy value) per lb.
Rice unpolished	8.1	0.8	78.7	4.0	1,584
„ polished	6.8	0.4	92.0	1.0	1,808
„ parboiled	6.4	0.8	92.1	1.0	1,824
„ broken "Kani"	6.8	0.4	92.0	1.0	1,808
„ Bran (polishing of rice)	15.4	19.7	49.6	8.5	1,980

Food.	Protein per cent.	Fat per cent.	Carbo- hydrate per cent.	Salts per cent.	Calorie (energy value) per lb.
Wheat (whole)	16.5	1.8	66.4	1.5	1,577
Bajri. Bulrush millet: Pennisetum typhoideum	9.8	1.6	82.4	2.0	1,744
Nagli, Ragi, Eleusine Coracana Goertn.	6.5	1.3	73.3	1.0	1,506
Jowar: Andropogon sorghum ...	10.8	4.1	79.5	2.5	1,616
Maká: Maize (Poona) Zea mays, Linn.	8.9	3.6	75.6	1.3	1,664
Vatáná: Pisum sativus	24.6	1.0	57.5	8.0	1,540
Ground-nut: Arachis hypogaea, Lin ...	25.6	38.0	24.3	2.0	2,480
Ground-nut cake	38.0	10.0	36.0	4.0	1,500
Sesame seeds: Sesamum indicus ...	21.9	61.7	4.3	...	3,020
Linseed	22.6	33.5	26.8	2.0	2,272
Grams, Cicer arietinum, L	20.1	4.6	54.0	2.8	1,536
Soya Beans	33.9	16.6	33.5	4.8	1,904
Masoor: Lentils, Lens esculenta, Moench.	25.0	1.0	58.0	6.0	1,550
Ghee ... ..	...	98.8	...	...	4,032
Butter	1.0	85.0	...	...	3,634
Skim milk powder	35.6	1.0	51.3	7.8	1,700
Milk, Cow	3.8	3.6	4.8	0.7	350
„ Buffalo	4.3	7.7	4.4	0.8	480
Meat (mutton)	29.0	26.8	...	1.5	528
Liver (Sheep's)	21.5	6.0	2.7	1.2	688
Egg	13.4	10.5	...	1.0	672
Sugar ... ..	...	...	100.0	...	1,808
Jaggery	0.3	...	88.2	1.5	1,600
“Khandsari” Molasses	0.7	...	70.0	4.6	1,300
Sugarcane-juice	1.4	0.6	21.8	0.3	448
Potatoes	2.5	0.1	28.7	0.9	576

PRICE LIST OF LITERATURE ON FOOD AND HEALTH.

Abbreviations :—E—stands for English ; M—for Marathi ;
G—for Gujarathi ; H—for Hindi.

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Posters—				
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3. Dairy farms.				
4. Ghee and nuts.				
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